Inter Co-op GMS 2015
The 1st International Conference on the Development of Economy, Society, Environment and Health under International Cooperation in the Greater Mekong Subregion
July 23-24, 2015

Venue: Thailand Science Park Convention Center,
National Science and Technology Development Agency (NSTDA), Thailand

Economy  Society  Environment  Health

Proceedings

Hosted by Faculty of Nursing, Thammasat University

Co-hosted by

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As per the rules to publish academic journal of the Civil Service Commission dated B.E. 2556, a committee will be appointed to prepare the proceedings of the International Conference. The members of the committee will be responsible for the collection and completion of the report of International Conference (Coop GMS). The committee is listed as follows:

1. Assoc. Prof. Dr. Manyat Ruchiwit  
   Consultant  
   Dean of Faculty of Nursing
2. Asst. Prof. Dr. Teeranut Harnirattisai  
   Editor-in-Chief  
   Associate Dean for Administration  
   and Academic Affairs
3. Dr. Sararud Vuthiarpa  
   Associate editor  
   Associate Dean for Research  
   International Affairs and Corporate Communications

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9. Prof. Chan Ngai Weng
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    Committee
    Institute of East Asian Studies, Thammasat University

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6. Asst. Prof. Chatnarin Metheekul
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   College of Nursing, University of Santo Tomas,
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   College of Nursing, University of Santo Tomas,
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9. Dr. Shinobu Sakurai
   Committee
   School of Health Care and Nursing,
   Juntendo University, Japan

10. Dr. Sunjoo Boo
    Committee
    College of Nursing, Ajou University, Japan

11. Prof. Dr. Lisa Pawloski
    Committee
    College of Health and Human Services Department of
    Nutrition and Food Studies, George Mason University,
    USA

12. Mr. Virya Koy
    Committee
    President of Cambodian Council of Nurses,
    and Vice President of Chenla University, Cambodia
Greeting Message from Dean and Conference Director

Dear Colleagues:

As Dean and Conference Director, on behalf of the Faculty of Nursing at Thammasat University, I am delighted to welcome all co-hosts to the forthcoming 2015 International Conference on the Development of the Economy, Society, the Environment, and Health under International Cooperation in the Greater Mekong Sub-region, scheduled to be held at Thammasat University in Thailand on 23-24 July, 2015.

The conference is organized around the major theme of the development of the economy, society, culture, environment, and health, including interrelated issues in the Greater Mekong Subregion countries, and will feature some of the work supported by the National Research University Project of The Thailand Office of the Higher Education Commission and its Regional Network Partners, as well as research studies from all over the world. Additionally, it aims to provide a unique opportunity for researchers, policy makers, and development practitioners to answer some of the challenges in the development of these countries and to outline new solutions for developing them.

Today, the world is changing at a fast pace, and the borders between countries are becoming more and more transparent. The problems occurring in the society are more complex than those in the past. In order to solve these problems, we need a multidisciplinary approach on a global scale. This is evident in the existence of this Conference, and it is also clearly apparent in the collaboration that is already taking place among the nations around the world, especially among the countries of the Association of Southeast Asian Nations.

The conference is organized around a competitive call for sessions and papers, in addition to our Awards Competition. The main theme of the Conference includes interrelated issues, each of them calling for a variety of disciplinary approaches.

We are excited and honored to have a chance to work with all the co-hosts, discussants, chairs, and moderators of this conference. I hope that this unique international and multidisciplinary conference will provide our participants with a truly transformative experience through a variety of knowledge and perspectives so that the complex problems in our society can be improved.

Best Regards,

Assoc. Prof. Dr. Manyat Ruchiwit
Dean & Conference Director
Faculty of Nursing, Thammasat University
Dear colleagues,

It is absolutely amazing and awe-inspiring to be co-host of The 1st International Conference on Development of Economy, Society, Environment, and Health under in the International Cooperation in the Greater Mekong Subregion. What a sight! And what a wonderful example of the solidarity of our universities!

Over many years, we have great relationship between our respect universities. On Behalf of Chenla University, we would like to express our sincere thanks and high appreciation for Thammasat University to allow us to be co-host of the first conference, which is focusing on economy, environment, society, and health.

As we know, in reality, the environment contains human society, which in turns contains the economy. A vibrant economy depends on the rule of law and depends on people earning enough money to create a robust market for goods and services. The environment is the service provider that enables human society to exist. Human society creates the conditions, rules and relationships that support economic activity. While the economic has found considerable and convincing evidence that significant economic benefits can be achieved by improving health of the people.

Nurses are the largest group of health professionals and account for a large proportion of total healthcare cost. As a result, at times of economic austerity nurses are often the first to be reduced, which is detrimental to patient safety and quality of care. To illustrate, the economic downturn had a negative impact on nurses where there have been mergers of health care facilities to decrease cost, terminations or cutbacks, and reductions in overtime and shift allowances resulting in high dissatisfaction levels. In this regards, nurses play important roles to integrate economy, society, environment, and health for promoting quality of life of people amounts Mekong Sub-region and in the whole world.

This first conference is a transforming collaboration amounts Greater Mekong Sub-region countries to bring common issues to solve together presently and in future as well. We are proud of the work we do and proud of our collaboration with those who are seated here today, those who we will have the honour to hear over the next few days, and those who cannot be with us today but who continue to work closely with us to keep our populations health and successful.

And now let us look forward to the upcoming few days. Today, we have the opportunity, once again, to hear from respect keynote speakers and presenters to cover all themes of the conference.

Finally, I would like to take this opportunity to extend my sincere appreciation to the Faculty of Nursing, Thammasat University for all their work to bring this Conference together and allow Chenla University to be part of co-host of this wonderful conference. It promises to be quite an amazing week.

Thank you.

His Excellency Sin Khandy
President, Chenla University
Dear Colleagues:

We are honored to be serving as a co-host from Japan in the International Cooperation’s 2015 International Conference on the Development of the Economy, Society, Environment, and Health in the Greater Mekong Sub-region. The world of academics is without borders, and we believe that working together with people from different backgrounds will result in the development of new ideas and discoveries.

We are excited to share with you several highlights relating to issues involving the development of the economy, society, culture, environment, and health, our main focus. For health care improvements to occur a specific emphasis must be given to the attitude of health care professionals and the outcome of research activities. The attitude of health care professionals must emphasis patient-oriented management, the ability to adjust to the changes in time, and the will and courage to challenge the unknown. Research activities should be planned and carried out with the goal that the results will contribute to the well-being of the society.

I hope that this international and multidisciplinary conference will create and strengthen partnerships among the participants leading to greater advances.

Jun Ueki MD
Conference co-host
Dean and Professor
Faculty of Health Care and Nursing
Professor
Graduate School of Health Care and Nursing
Juntendo University
Dear Colleagues:

On behalf of Ajou University, I would like to extend our warmest welcome to all participants in the 2015 International Conference on the Development of the Economy, Society, the Environment, and Health under International Cooperation in the Greater Mekong Sub-region at Thammasat University in Thailand.

I would like to take this opportunity to pay tribute to your effort in promoting international cooperation and embracing nursing metaparadigm.

In this conference with the theme “the Development of the Economy, Society, the Environment, and Health in the Greater Mekong Sub-region countries,” various international collaborations will be introduced and significant works supported by the National Research University Project of Thailand Office of the Higher Education Commission and its Regional Network Partners will be presented. I hope you have valuable information on the challenges and special opportunity about the development of the Greater Mekong Sub-region countries and time to most advantage for developing your research.

I also expect that this conference will serve as a meaningful venue for a scholastic exchange to enhance international cooperation and a great platform for developing academic partnership for international exchange.

I am very happy to see you all and I hope this conference a great success.

Moon-Sook Yoo, PhD
Professor
Dean, College of Nursing, Ajou University, Seoul, Korea
MESSAGE

It is with great honor that the UST College of Nursing accepted the invitation of Thammasat University to co-host the 2015 International Conference on the Development of the Economy, Society, the Environment and Health under International Cooperation in the Greater Mekong Sub-region, in Thailand on 23-24 July, 2015.

This conference is very timely in view of ASEAN 2015’s aim to integrate the Southeast Asian Region into one dynamic economic community where free movement of goods, services, investment, labor and capital exists. This will not only help ASEAN nations grow economically but provide citizens with the opportunity to be global learners; to come at par and compete globally with professional European and Western counterparts. To achieve this, importance must be given to avenues for the international transfer of knowledge, through research among Asean nations. To contribute to the global arena of new ideas and innovations, each Asean nation must commit to increasing the quality of research and knowledge generation through resource sharing - whether materially, in terms of funding with international partners; or by opportunity, as in the case of faculty exchanges, research expertise consultation, publication and project collaborations. It is my hope that the Asean healthcare system will benefit from the opportunities being offered by this international and multidisciplinary network among government agencies and private organizations.

My warmest congratulations to all the organizers and participants of this conference!

Assoc. Prof. Susan N. Maravilla, MAN, RN
Dean, College of Nursing
University of Santo Tomas
Manila, Philippines
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Presenter 2: Transportation and Logistics in Vietnam
Sutin Saisanguan
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Presenter 4: The Role of Religions in the Process of the Political and Economical Development in South Korean
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Presenter 7: Access Antenatal Care in Rural Areas of Lao PDR
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by Dr. Krasae Chanawongse

Keynote Address II
by Wijarn Simachaya

Welcome and Opening Remarks
by Prof. Dr. Somkit Lertpaithoon, Rector, Thammasat University

Welcoming Remarks and Report by
Assoc. Prof. Dr. Manyat Ruchiwit
Dean, Faculty of Nursing, Thammasat University

Conference Program

Keynote Address

Keynote Speakers:
1. Prof. Dr. Krasae Chanawongse
   Former Minister of Foreign Affairs, Minister of the Prime Minister’s Office
2. Dr. Wijarn Simachaya
   Deputy Permanent Secretary, Ministry of Natural Resources and Environment

**Plenary I: Economy, Society and Environment**
Presenter 1: Characterisation of the Uses of Thai Cooking Stoves:
   Performance Evaluation and Pollutant Emissions Treekitti Triboot, Satok Chaikunchuensakun, and *Prodpran Siritheerasas
Presenter 2: Sutin Saisanguan
Title: Transportation and Logistics in Vietnam
Presenter 3: *Unsuk-Song and Lim Seong Bum Lim
Title: Using a Fuzzy Extension of the DEMATEL Method to Explore the Interaction Effect of Factors Generating Organizational Learning Mechanism
Presenter 4: Lee Wonoh and *You Bunghee
Title: The Role of Religions in the Process of the Political and Economical Development in South Korean
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Title: E-Government Global Strategy in Korea: Focused on Global ICT cooperation and ODA strategy

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Title: Labour Cooperation of the Mukdahan-Savannakhet Area as a Border Community: Implications for the ASEAN Economic Community

Presenter 9: Chanin Mephokee
Title: Thailand Role on the Transport Development in the Greater Mekong Subregion

Presenter 10: Kampol Ruchiwit, Apinant Phongmethakul, and *Sararud Vuthiarpa
Title: Environmental Management of the Mekong Sub-region: A Case Study on Urban and Community Environmental Management in Vietnam

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Title: Development Process of Health Service Delivery System Management at the District Level in Rural Cambodia

Presenter 2: Manyat Ruchiwit, *Suwanna Cowawintaweewat, Anek Pootong, Chayapat Warenil, and Lisa R Pawloski
Title: An examination of Determinants Affecting the Health Service Systems and the Health Status of People in the Greater Mekong Subregion

Presenter 3: *Paveenapat Nithitantiwat and Kwanjai Pataipakaipet
Title: Nursing Student’s Perception of Unwanted Pregnancy and Abortion in Boromarajonani College of Nursing, Ratchaburi

Presenter 4: Supan Wongruksat and *Churairat Puributr and Pornphan Verapreyagura
Title: Reducing Prevalence of Medical Device Injuries among Nursing Staff at a Thai Tertiary Care Hospital

Presenter 5: Jinpitcha Mamom
Title: The Effect of Using Innovative Repositioning Bed with a Mattress to Prevent Pressure Ulcers in Patients with Stroke

Presenter 6: *Syamol Rompipat, Wipada Sangnimitchaikul, Pregamol Rutchanagul, and Patcharapor Kaewwimol
Title: Characteristics, perceived competency regarding knowledge and skills of expanded program on immunization staff in Thailand, and the factors related to the perceived competency of the staff

Presenter 7: *Phanhpakit Onphanhdala and Vanvisa Philavong
Title: Access Antenatal Care in Rural Areas of Lao PDR

Presenter 8: *Sarisa Kingminghae, Teeranut Harnirattisai, and Sunthara Liangchawengwong
Title: Factors Related to Complication Prevention Behaviors in Coronary Heart Disease patients
Presenter 9: Chatnarin Methnekul
Title: Developing Blueprints for Urbanized Area’s Health Status Improvement: A study on Health Decentralization in Laos and Thailand

Presenter 10: *Sunjoo Boo and Moonsook Yoo
Title: Is self-perceived health associated with actual cardiovascular disease risks?
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<td>09:00 – 9:15 a.m.</td>
<td>Welcoming Remarks and Report by&lt;br&gt;Assoc. Prof. Dr. Manyat Ruchiwit&lt;br&gt;Dean, Faculty of Nursing, Thammasat University&lt;br&gt;Opening Remarks by&lt;br&gt;Prof. Dr. Somkit Lertpaithoon&lt;br&gt;Rector, Thammasat University</td>
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<tr>
<td>09:15 – 10:45 a.m.</td>
<td>Keynote Address&lt;br&gt;Topic: The well being of ASEAN citizens during the next decade&lt;br&gt;Keynote Speakers:&lt;br&gt;1. Prof. Dr. Krasae Chanawongse&lt;br&gt;Former Minister of Foreign Affairs, Minister of the Prime Minister's Office&lt;br&gt;2. Dr. Wijarn Simachaya&lt;br&gt;Deputy Permanent Secretary, Ministry of Natural Resources and Environment</td>
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<td>10:45 – 11:00 a.m.</td>
<td>Coffee Break</td>
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<td>11:00 – 11:30 a.m.</td>
<td><strong>Plenary Session</strong>&lt;br&gt;Theme: “Development of Economy, Society, Environment, Cultures and Health under International Cooperation in the Greater Mekong Subregion”&lt;br&gt;<strong>Plenary I: Economy, Society and Environment</strong>&lt;br&gt;Chair: Assist. Prof. Dr. Pregamol Rutchanagul&lt;br&gt;Associate Dean, Faculty of Nursing, Thammasat University&lt;br&gt;Discussant: Dr. Chaiyod Bunyagidj&lt;br&gt;Vice President of Thailand Environment Institute&lt;br&gt;Presenter 1: Treekitti Triboot, Satok Chaikunchuensakun, and&lt;br&gt;*Prodpran Siritheerasas&lt;br&gt;Title: Characterisation of the Uses of Thai Cooking Stoves: Performance Evaluation and Pollutant Emissions</td>
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<td><strong>Plenary II: Health</strong>&lt;br&gt;Chair: Assist. Prof. Dr. Teeranut Harnirattisai&lt;br&gt;Associate Dean, Faculty of Nursing, Thammasat University&lt;br&gt;Discussant: Mr. Virya Koy&lt;br&gt;Chief Bureau of Nursing and Midwifery, President of Cambodian Council of Nurses, and Vice President of Chenla University&lt;br&gt;Presenter 1: *Miyoko Okamoto, Shinobu Sakurai&lt;br&gt;Title: Development Process of Health Service Delivery System Management at the District Level in Rural Cambodia</td>
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<td>Title: An examination of Determinants Affecting the Health Service Systems and the Health Status of People in the Greater Mekong Subregion</td>
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<td>12:00 – 01:00 p.m.</td>
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| 01:00 – 01:30 p.m. | **Discussant:** Prof. Dr. Dae Hee Lee  
The Graduate School of Counseling Welfare and Policy, Kwangwoon University | **Discussant:** Assist. Prof. Dr. Marica Estrada  
College of Nursing, University of Santo Tomas |
| 01:00 – 01:30 p.m. | Presenter 3: *Unsuk-Song and Lim Seong Bum Lim  
Title: Using a Fuzzy Extension of the DEMATEL Method to Explore the Interaction Effect of Factors Generating Organizational Learning Mechanism | Presenter 3: *Paveenapat Nithitantiwat and Kwanjai Pataipakaipet  
Title: Nursing Student’s Perception of Unwanted Pregnancy and Abortion in Boromarajonani College of Nursing, Ratchaburi |
| 01:30 – 02:00 p.m. | Presenter 4: Lee Wonoh and *You Bunghee  
Title: The Role of Religions in the Process of the Political and Economical Development in South Korean | Presenter 4: Supan Wongruksat and *Churairat Puributr and Pornphan Verapreyagura  
Title: Reducing Prevalence of Medical Device Injuries among Nursing Staff at a Thai Tertiary Care Hospital |
| 02:00 – 02:30 p.m. | | Presenter 5: Jinpitcha Mamom  
Title: The Effect of Using Innovative Repositioning Bed with a Mattress to Prevent Pressure Ulcers in Patients with Stroke |
<p>| 02:30 – 02:45 p.m. | Coffee Break | |</p>
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| 03:45 – 03:15 p.m. | Presenter 5: Choong-Sik Chung                                | Title: E-Government Global Strategy in Korea: Focused on Global ICT cooperation and ODA strategy | Prof. Dr. Song Unsuk  
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Discussant: Prof. Dr. Song Unsuk  
College of Social Science, Dankook University |
| 03:15 – 03:45 p.m. | Presenter 6: *Syamol Rompipat, Wipada Sangnimitchaikul, Pregamol Rutchanagul, and Patcharaporn kaewwimol | Title: Characteristics, perceived competency regarding knowledge and skills of expanded program on immunization staff in Thailand, and the factors related to the perceived competency of the staff | Prof. Dr. Jun Ueki  
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Dean, School of Health Care and Nursing, Juntendo University |
| 03:45 – 04:15 p.m. | Presenter 7: *Phanhpakit Onphanhdala and Vanvisa Philavong | Title: Access Antenatal Care in Rural Areas of Lao PDR                     | Prof. Dr. Phanhpakit  
Onphanhdala  
Faculty of Economics and Business Management (FEBM), The National University of Laos  
Discussant: Prof. Dr. Phanhpakit  
Onphanhdala  
Faculty of Economics and Business Management (FEBM), The National University of Laos |
| 04:15 – 04:45 p.m. | Presenter 8: Sunjoo Boo and Moonsook Yoo                     | Title: Is self-perceived health associated with actual cardiovascular disease risks? | Prof. Dr. Pranom Othaganont  
Faculty of Nursing, Thammasat University  
Discussant: Prof. Dr. Pranom Othaganont  
Faculty of Nursing, Thammasat University |

*presenter
### July 23, 2015

| 06:00 – 08:00 p.m. | **Gala Dinner** at the Institute of East Asian Studies, Thammasat University  
Welcoming Address and Opening Speech by  
Assist. Prof. Dr. Kittiprasirtsuk  
Director, Institute of East Asian Studies, Thammasat University  
Assoc. Prof. Dr. Manyat Ruchiwit  
Dean, Faculty of Nursing, Thammasat University |

### July 24, 2015

| 09:00 – 09:30 a.m. | **Plenary I: Health**  
Chair: Assist. Prof. Dr. Teeranut Harnirattisai  
Associate Dean, Faculty of Nursing, Thammasat University  
Discussant: Prof. Dr. Dae Hee Lee  
The Graduate School of Counseling Welfare and Policy, Kwangwoon University  
Presenter 9: Chanin Mephokee  
Title: Thailand Role on the Transport Development in the Greater Mekong Subregion  
**Discussant:** Assist. Prof. Dr. Phanhpakit Onphanhdala  
Faculty of Economics and Business Management (FEBM), The National University of Laos  
Presenter 10: Kampol Ruchiwit, Apinant Phongmethakul, and *Sararud Vuthiarpa*  
Title: Environmental Management of the Mekong Sub-region: A Case Study on Urban and Community Environmental Management in Vietnam |

| 09:30 – 10:00 a.m. | **Plenary II: Health**  
Chair: Dr. Wariya Muensa  
Assistant Dean, Faculty of Nursing, Thammasat University  
Discussant: Assoc. Prof. Dr. Boonjai Srisatidnarakul  
Faculty of Nursing, Thammasat University  
Title: What it takes to succeed in the Philippine nursing licensure exam (PNLE)? A Retrospective Qualitative Inquiry on the Journey of Thomasian board toppers  
Presenter 12: *Megumi Ikeda*, Judith Tanner, Michael Nevil, and Ayako Kudo  
Title: Factors determining the nurses’ knowledge, attitudes and practice towards infection control in Japan |
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<td>Keynote Address&lt;br&gt;Topic: Key Performance Indicators Benchmarking for the Economy, Society, Environment and Health under International Cooperation in the Greater Mekong Subregion&lt;br&gt;Keynote Speaker:&lt;br&gt;Assoc. Prof. Dr. Manyat Ruchiwit&lt;br&gt;Dean, Faculty of Nursing, Thammasat University</td>
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<tr>
<td>10:45 – 11:15 a.m.</td>
<td>Closing Ceremony and Awards</td>
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<tr>
<td>11:15 a.m. – 12:30 p.m.</td>
<td>Roundtable Discussion by&lt;br&gt;Assoc. Prof. Dr. Manyat Ruchiwit&lt;br&gt;Dean, Faculty of Nursing, Thammasat University&lt;br&gt;Assist.Prof.Elizabeth D. Cortez, RN, MAN&lt;br&gt;Chairperson-International Relations, College of Nursing University of Santo Tomas, Philippines</td>
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Welcome and Opening Remarks

by Prof. Dr. Somkit Lertpaithoon
Rector, Thammasat University

“The 1st International Conference on the Development of the Economy, Society, the Environment, and Health under International Cooperation in the Greater Mekong Subregion”

July 23-24, 2015

At the Thailand Science Park Convention Center, National Science and Technology Development Agency (NSTDA), Thailand

Honorary Keynote Speakers: Prof. Dr. Krasae Chanawongse and Dr. Wijarn Simachaya

Dean of Faculty of Nursing, Thammasat University and the Conference Director: Assoc. Prof. Dr. Manyat Ruchiwit

Distinguished Co-hosts

All Deans and Directors

Ladies and Gentlemen:

It is a great honor and privilege for me to be here and to preside over this conference. First of all, may I take this opportunity to welcome you all to “The 1st International Conference on the Development of the Economy, Society, the Environment, and Health under International Cooperation in the Greater Mekong Subregion.” And it is a special privilege for me to be able to recognize Prof. Dr. Krasae Chanawongse and Dr. Wijarn Simachaya, our distinguished keynote speakers of the conference.

In the past several years, I have seen dramatic changes in the Greater Mekong Subregion. As the dean has said, nowadays, the problems occurring in the society are very complicated and a multidisciplinary approach is required to address these problems. The National Research University Project of Thailand’s Office of Higher Education Commission has an urgent need to improve the potential to conduct research among Thai public universities. Thammasat University is one of nine outstanding research universities in Thailand, and this project should be seen as contributing directly to increasing the capacity of the country in manifold ways. The cooperation that has been demonstrated in establishing this international conference among the universities in Southeast Asia and East Asia will certainly move our universities forward together to meet the standards and criteria for world ranking.
I strongly believe that all of you in the audience will gain many benefits from all of the presentations at the conference, especially the keynote address by Prof. Dr. Krasae Chanawongse and Dr. Wijarn Simachaya.

With these remarks, it is now my pleasure, and honor, to officially declare the opening of this international conference. I am confident that you will all obtain many benefits from your participation. I and my colleagues at Thammasat University wish you every success in your future endeavors. Thank you very much.
Welcoming Remarks and Report

by Assoc. Prof. Dr. Manyat Ruchiwit
Dean of Faculty of Nursing

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As the Dean of Faculty of Nursing at Thammasat University and the Conference Director, it is a great pleasure and privilege for me and my colleagues to welcome all of you to “The 1st International Conference on the Development of the Economy, Society, the Environment, and Health under International Cooperation in the Greater Mekong Subregion.” We are delighted to have you here to participate and share your expertise in these areas. Thank you for coming. That many of you have travelled long distances serves to remind us all how important our work is.

Today, the world is changing rapidly, and the borders between countries are becoming more and more transparent. The problems occurring in the society are more complex than those in the past. In order to solve these problems, a multidisciplinary approach is required, on a global scale.

This international conference is focused on the major theme of the development of the economy, society, culture, the environment, and health, including interrelated issues as mentioned above.

The purposes of this conference comprise the following: 1) to provide a forum for disseminating research results to the public at the international level; and 2) to create an international network in the areas of the economy, society, the environment, and health science among government agencies and private organizations, both nationally and internationally.

My special thanks are extended to the National Research University Project of the Thailand’s Office of Higher Education Commission and its Regional Network Partners, and all of the co-hosts as follows:

- Institute of East Asian Studies, Thammasat University especially, the Director: Assist. Prof. Dr. Kitti Prasirtsuk
- The Faculty of Health Care and Nursing, Graduate School of Health Care and Nursing, Juntendo University, Japan;
- The College of Nursing, University of Santo Tomas, the Philippines; and the co-hosts from South Korea
- The College of Nursing of Ajou University;
- The College of Social Science, Faculty of Urban and Regional Planning, Department of Public Administration, Dankook University;
- The Graduate School of Counseling Welfare and Policy, Kwangwon University; then
- Chenla University, Cambodia; and
- The Faculty of Economics and Business Management (FEBM), National University of LAOS (NUOL) for their support and for making this conference possible.

We are honored to have Prof. Dr. Krasae Chanawonges, the Vice Chairman of Constitution Drafting Committee, Former Minister of Foreign Affairs and Minister of the Prime Minister’s Office, and Dr. Wijarn Simachaya, Deputy Permanent Secretary, Acting Director General of Pollution Control Department and Ministry of Natural Resources and Environment as our keynote speakers for this conference on “The Well-being of ASEAN Citizens during the Next Decade.” Prof. Dr. Krasae Chanawonges and Dr. Wijarn Simachaya have worked many years in this area and their reputation needs no introduction. The results speak for themselves.
Keynote Address 1
The Well Being of ASEAN Citizens During The Next Decade
By
Prof. Dr. Krasae Chanawongse
Former Minister of Foreign Affairs, Minister of the Prime Minister’s Office

It is a great honour for me to be invited to share some of my experiences in the name of well-being of ASEAN citizens.

As a medical doctor myself and also a public health professor I am interested in this topic. It is a topic of interest for the ASEAN nations especially in what we say the Great Mekong sub regional nations. I sometimes got involved with the ASEAN nations and also with the Greater Mekong sub regional nations. The topic today is very interesting but you cannot say something in particular to solve the problem or to promote the future of our well-being. The topic here is about economy, it's about society it is also about environment and health. These are four pillars I must say to bring us to the well-being. At the same time when we talk about the greater Mekong sub region along with our neighbouring countries, Thailand, Myanmar, Cambodia, Vietnam and Laos, but at the same time we're related to China as that is the origin of the Mekong River. When I talk about this I am also meaning that to have a good well-being in this region we need some change.

Change is inevitable, but what kind of change do we need? To make it short I must say that I am interested in the leadership development. Leadership of the members of these nations must have some kind of change. A change in terms of leadership development. While leadership can make 80% of the change, technical know-how will be only 20% to make this change possible. I believe that to bring a change in the region whether it be well-being or change in political relationship we need leadership. Leadership needs something to support change. To have some change in leadership style we need good education, and we also need some sort of an education reform. To have leadership reform for common good of the region we need good example in our ASEAN countries like Japan, South Korea. We could learn from them about education. We need to change the curriculum of teaching and methods of research in order to bring about some change in leadership. The new movement began in 2011 and this was about curriculum change that should be made for medical doctors, nurses as well as public health practitioners. What should be changed for education? They have a conclusion for three pillars of change but these three pillars have to go together at the same time.

The first one is from the WHO and the UN independent body to make a conclusion that education for the future to make a new leaders for change should be started.

The first should be information learning from books as well as research. If the emphasis is more on knowledge or information oriented, we say knowledge or information is power.

The second pillar for education for change is about formative education or formative learning which also the UNESCO talks about. Here we use different subjects to combine together to form new skills and experiences. For example if a medical doctor studies
anatomy, physiology, pharmacy and clinical examination and laboratory; he can then combine all this knowledge together. This means to form; and then it is formative learning. It can then be used to practice, to earn and to be professional. But this is not enough.

The third pillar for leadership development is transformative education or transformative learning. Learn how to change and be an agent of change, and this means to learn how to be a leader. All educators now believe that leadership is important. Many have no education in the university system but have a successful life. Bill Gates or Tiger Woods and many others that have no formal education but have a good learning from work. So how can we make working life or working style educative? This is a point. Education from working experience. We could simply say Working is education!

We have many great educators here but I try to remind you about what I understand and believe when we say leadership. We also understand that leadership is love. If there is no love there is no leadership. Two years ago, in the National teacher’s day in Indonesia they had their Motto saying that "teachers are leaders" which means that in order to be a good teacher one also needs to be a good leader. But when we say leader we also believe that leader is love, if we have no love, we have no leadership. Therefore to make people to be good leaders in future is through love. When we say this in our region, Thailand and others we mentioned about in the Greater Mekong sub region are very similar to Thailand in terms of socio economic environment society. What I learnt from the rural development is that these countries have at least four common factors. They have to move forward for change and for the well-being of the citizens. The four factors are

1. Poverty
2. Illiteracy
3. Diseases and poor health
4. Civic inertia

These four factors are very important and are closely related to Economy, Environment Society and Health. We cannot separate these four and just talk about one subject and get some good finding. My presentation is trying to say that the most important answer to this is education.

I believe what needs to be done is to help ourselves and also help our neighbouring countries and member countries in this region in terms of education reform, to understand the importance and the good of our nations.

In conclusion I would like to say that good leadership in general could be put into three points:

1. Education should be able to make people add value to the other people in other countries. Recognise their ability, their nature and their culture and appreciate the way they are.
2. Add value to the work done. To be a good leader we have to emphasise on two points. One must be hundred percent responsible for anything and also be responsible to train other people to become leaders.
3. Add value to yourself, your knowledge and education.
I would like to say from the point of view of research conducted from knowledge gurus in leadership development; if we want our students and people to be in good leadership we need to have a guideline to ensure that any successful leader, starts from Focus. There are five "F"s to be remembered in order to be good leaders.

1. Focus
2. Flexible (without losing your principle)
3. Fast (walk the talk or do what you said)
4. Friendship (loss of friendship is loss in leadership)
5. Fun (be positive, and enjoy what you do)

These are some points from my understanding. Well-being is more or less about health, but it is actually beyond health.

To keep your good health you need to

1. Eat wisely
2. Exercise regularly
3. Drink moderately
4. Do not smoke

These are good points to keep healthy but for well-being it also means about freedom, about security, about the environment, about equality, about social justice and more. We will need to keep all these points in mind for the wellbeing of ASEAN citizens
First and foremost I would like to thank Thammasat University and the faculty of nursing for inviting me as a keynote speaker at this conference.

I will talk about environmental issues especially beyond health. Talking about sustainable development we have four issues; environmental, economic, social and health. But when we talk about sustainable development most people talk about economy, social and environmental but health also needs to be included.

The ASEAN community will be opened on 31st December this year. In this community we have ASEAN Political Security and Economic Community known as AEC and we also have the ASEAN Sociocultural Community (ASCC). The health and environment comes under the ASCC.

I would like to talk more about the environmental issues and some issues related to health. When we talk about the global environmental issues we talk about climate change, about chemical management and also regarding Trans-boundary environmental pollution. Currently we are also talking about the ASEAN health pollution. I'll talk to you later about environmental education, quality living standard, harmonisation of environmental policy and database.

The issue in the ASEAN forum was regarding coastal and marine environment, conservation of nature and biodiversity, especially biodiversity being the most important issue not only for conservation but also for use of biodiversity in medicine and health; fresh water resources management are all very pressing issues in the region.

Climate change is also very important for the ASEAN region and this year as a result of it we are facing drought, in central Thailand, which has turned out to be rather severe. Climate change issue is also important in health context. Talking about malaria for example; it might come back again due to increase in temperature. I would talk about the forestry management, which also falls under the ASEAN framework.

I would like to present to you the work we have done with the ASEAN framework and also the regional cooperation. We also worked on environmental sustainable cities. The hot issues is regarding trans-boundary air pollution and trans-boundary health pollution in the region and the sub regional cooperation like GMS.

Regarding the environmental sustainable cities we work closely with the Japanese government which supports the ASEAN countries to develop sustainable cities that look forward to finding ways to manage the environment in cities. Finding techniques to handle garbage, monitor air and water quality with an aim for cities to shift towards low carbon cities.
We developed a model we call ESC model (environmental sustainable city model) for the ASEAN. As part of it we need to share our experience annually among all members. Thailand has been very actively promoting the ESC model throughout the country through various projects. To encourage proper implementation and practice they give out awards and certificates to those who have performed well based on indicators that are set for the ESC model. There is a committee that judges the performance and hands out the awards. These are primarily at the provincial municipality level.

The steps towards making a city sustainable are:

1. Public participation. This is vital towards having a clean city.
2. Implementation. This involves in setting the plan and implementing it.
3. Revise, based on lessons learned from community and city.
4. Expand good practice to other cities.

We need to develop indicators for sustainable environmental performance for ASEAN countries including the area of pollution management, water and air pollution, solid waste management, natural and cultural heritage; as these are important when dealing with low carbon societies. We need to address also the energy efficiency and sustainable consumption and production, as these are important issues in the sustainable development agenda.

Thailand has set a target of reduction of greenhouse gas by 10 to 20% as compared to the base year, 2005. By the year 2020, we expect to reduce greenhouse gas emissions by 10%; and if we get support from developed countries then we could further reduce our greenhouse gas emissions, reaching 20% by 2020.

In solid waste management our existing government pays more attention towards garbage management. Concentrating on waste to energy solutions. In the past there were more open dumping and landfills to manage garbage which had direct impact on nearby people.

As the outcome, we have cleaner air, cleaner water and cleaner land. Our plan now is to expand to other cities. And for the regional environmental sustainable city we are working closely with ASEAN cities and we put this in the GMS as well.

For the hot issues in our country and ASEAN, especially for the waste management, trans-boundary health pollution; we need to plan for the future and be ready to deal with such issues for the well-being of the people.

We have an agreement for the 10 ASEAN member countries to prevent and monitored Trans-boundary health pollution. There are however some problems that still need to be addressed.

Thailand being in the central ASEAN region, faces the air pollution, getting impacted from Sumatra in Indonesia that primarily affects the southern part of Thailand. We also get affected from other neighbouring countries. The northern part of Thailand during January to April, which is the dry season, faces health issues. We have cooperation with our member countries and rather closely with Laos and we send mobile labs and air quality monitoring system to help them. We are soon going to have bilateral agreements with Cambodia and Myanmar to help them deal with air pollution in their countries.
Singapore also gets affected by this, it being a tourist country in this region. And we now have a committee that is set to work closely and monitor the situation and share lessons learned with other countries.

Next talking about the sub regional cooperation, we have the Greater Mekong sub region (GMS), the Mekong River commission and we also have the cooperation under Irrawaddy-Chao Phraya-Mekong cooperation. It is the investment, telecommunication, tourism, trade and transport that are the major sectors for the GMS sub regional development.

For the environmental issue we have a program that was launched right after the transportation program back in 2006. Right now we're going to implement the environmental program in the GMS. Trying to connect the environment issues with the development issues and moving towards sustainable development in the region.

For the GMS we talk about natural capital which is the way in which we translate ecosystem asset into the budget and in linking it to other sectors as well.

For the Mekong River commission that has Laos, Thailand, Cambodia and Vietnam as members, while China and Myanmar are not members, it is aimed at having an economical, prosperous, socialist, and environmentally sound Mekong River Commission.

They have guidelines for hydro power management and river basin management which also includes basin development plans and strategies to develop procedures. One of these procedures is related to the environmental issues. This tries to address trans-boundary environmental impact assessment for a long time; however due to conflict among member countries it has not been put into effect.

Irrawaddy – Chao Phraya – Mekong economic cooperation strategy has the economic and environmental issues that are attached with cooperation.

Thailand has developed a social economic development plan after Rio +20 in 2012, this is known as Plan 11 and it considers low carbon society and zero waste management, green product as well as people participation. Moving towards sustainable development we are currently in the process of reviving the natural environmental regulations. Promoting public relations information on the green procurement that we implement in the government sector. We have green labelling, carbon footprint and carbon labelling. The industries are also trying to shift towards green industries and green eco-industrial park.

In conclusion talking about the well-being we need to consider social economic and the environment at the same time. Regional cooperation is also very crucial especially sharing experience. Research is needed to focus on common issues of our region. Developing methods of risk communication is necessary and standards could come from developed countries. How one translates scientific information to the general public is very important for the well-being of the people.

There are many developing projects in our countries that can't be started due to public perception, which becomes very important in order for us to progress and for our well-being, as ASEAN countries during the next decade.
Characterisation of the Uses of Thai Cooking Stoves: Pollutant Emissions and Performance Evaluation

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Abstract

The combustion of 2 types of charcoal in 3 types of Thai cooking stoves was examined for their performances and pollutant emissions. Ordinary and smokeless charcoal were burned in the cylindrical-shape, conical-shape, and high-efficiency stoves. The performances of charcoal were measured in terms of ignition time, water-boiling time, overall usage time, percentage of complete combustion, and usage efficiency. The emissions of CO and NOx emitted from the combustion were also monitored. It was found that the ignition times of ordinary and smokeless charcoal ranged from 3-5 and 5-7 minutes, respectively. The water-boiling times were 7-13 and 11-19 minutes for ordinary and smokeless charcoal, respectively. The overall usage time of ordinary charcoal was 40-77 minutes, while that of smokeless charcoal was 94-119 minutes. The average percentages of complete combustion of ordinary and smokeless charcoal were 100 and 92%, respectively. The type of charcoal had an insignificant effect on the usage efficiency. However, the usage efficiency varied differently with the type of stove. The high-efficiency stove yielded the highest usage efficiency (28.0%), followed by those of cylindrical (21.7%) and conical (19.5%) stoves, respectively. The average concentration of CO of the cylindrical stove was found to be highest (684.8 ppm), followed by the conical (617.4 ppm) and high-efficiency (550.7 ppm) stoves, respectively. The effect of charcoal type on CO emissions was negligible. On the contrary, the type of stove insignificantly affected the emissions of NOx, but the type of charcoal had an obvious effect on NOx emissions. The average NOx emissions from the combustion of ordinary charcoal (4.6 ppm) were more than twice those of smokeless charcoal (2.1 ppm). When comparing to the emission standards, it was found that NOx and CO emissions were below the corresponding NOx and CO concentrations that affect the health of the users.

Keywords: Charcoal, Thai cooking stove, Performance evaluation, Pollutant emissions.
Introduction

The recent energy statistics in Thailand reveals that approximately 20% of total energy consumption are from renewable energy\(^1\). Of this total energy consumption [approximately 76 million tonnes of oil equivalent (MTOE) in 2014 (2557 BE)], roughly 15% are used in the residential sector. The main fuels used in this sector are firewood and charcoal, which are accounted for 3.9 and 3.0 MTOE (out of 11.5 MTOE) or approximately 33.9 and 26.4%, respectively, or 60.3% totally.

There are several types of solid-fuel cooking stoves, including Thai traditional cooking stoves, which is commonly called in Thai language “Tao-Ang-Lo”. It is noteworthy that, in Thailand, these cooking stoves are generally used without chimneys, which is likely to render users to be exposed to pollutant emissions from the combustion of solid fuels in the cooking stoves, such as carbon monoxide (CO), oxides of nitrogen (NO\(_x\)), methane (CH\(_4\)), total non-methane organic compounds (TNMOC), soot, and particulate matter (PM). These pollutants can cause serious adverse effects on human health. The World Health Organisation (WHO) estimates that more than 1.5 million people prematurely die each year due to exposure to the smoke and other air pollutants from burning solid fuels. WHO also indicates that indoor air pollution is responsible for approximately 2.7% of the global burden of disease\(^8\).

Additionally, due to incomplete and inefficient combustion, solid-fuel cooking stoves consume more fuels than any other types of cooking stoves (e.g., those that used natural gas, LPG, or kerosene as fuels). Since higher amounts of fuels are burned, larger amounts of CO\(_2\), one of the most important greenhouse gases (GHGs), is emitted into the atmosphere, which, in turn, results in the global warming effect. On top of that, when large quantities of solid fuels, mainly firewood and charcoal as mentioned earlier, are to be consumed in the solid-fuel cooking stoves, it leads to a speedy rate of deforestation, which has a negative effect to the environment, both locally and globally.

In order to reduce pollutant emissions from the cooking stoves, which, in turn, leads to an improvement of health of the cooking stoves’ users; and to enhance efficiency of the cooking stoves, which, eventually, results in a lower consumption of solid fuels, thus reducing the emission of GHGs and deforestation, understanding the combustion behaviours of solid fuels in the cooking stoves is needed.

In recent years, a number of studies have been carried out to quantify or measure the performances (e.g., efficiencies) and pollutant emissions of various types of cooking stoves and solid fuels. These investigations include those of, e.g., Bhattacharya et al, Jetter and Kariher, Berrueta et al, Clark et a, and MacCartyet al. These studies, however, were undertaken with the types of cooking stoves and solid fuels that were different from those used in Thailand.

Thus, it was the principal purpose of the present study to quantify the performances and pollutant emissions of the most commonly-used Thai traditional cooking stoves (Tao-Ang-Lo) using the most widely-used charcoal as fuels. The results from this research should provide comprehensive information on the
performances and emissions from burning charcoal in Thai cooking stoves, which will lead to a proper design and a wise selection of cooking stoves and charcoal that give acceptable and desirable performances and emissions and that is healthily safe to the users of the cooking stoves.

Methodology

As mentioned in the preceding section, the main objective of this research was to investigate or measure the performances and pollutant emissions of the Thai traditional cooking stoves burning different types of charcoal.

In this study 2 types of charcoal, ordinary and smokeless ones, were burned in 3 types of the Thai cooking stoves (Tao-Ang-Lo), including the cylindrical-shape, the conical-shape, and the high-efficiency ones, as illustrated in Figure 1. Note that ordinary charcoal was made from mangrove, while smokeless charcoal was made from coconut shell. The physical appearances of these 2 types of charcoal were as depicted in Figure 2.

The amount of charcoal burned in each test run was 600, 800, or 1,000 g, which was equivalent to one-half (1/2), three-quarters (3/4), or five-sixths (5/6) of the volume of the combustion (or fuel-containing) chamber of the stove, respectively.

(a) Cylindrical-shape stove  (b) Conical-shape stove  (c) High-efficiency stove

Figure 1: Thai traditional cooking stoves used in the present study
In order to make each test run as similar to the actual household use as possible, the experiment was carried out in an open-window room with the size of approximately 5 × 5 m², which was close to the common size of a kitchen in the rural areas of Thailand. The measurements of temperatures and pollutant \[ i.e. \, \text{carbon monoxide (CO) and oxides of nitrogen (NO}_x\text{)} \] concentrations were done while boiling water contained (with the initial amount of 3,000 g) in a stainless steel pot placing on the top of the stove, to simulate the household cooking.

The experimental procedure could be described in detail as follows:

1) Before the start of each test run, a probe of a gas analyser (Testo Model 350 XL) was installed 1 cm away from the stove at the location between the top of the stove and the bottom of the stainless steel pot.

2) A K-type thermocouple (Lega Model 02L), used for measuring the temperature of the combustion (or flue) gas, was also installed at the same location of the probe of the gas analyser.

3) To start the experiment, 4 g of torch (a briquette of easily-burned biomass soaked with kerosene) was placed at the centre of the combustion chamber of the stove and then ignited.

4) After the torch is already ignited, charcoal, at a specified amount (600, 800, or 800 g), was slowly put into the combustion chamber. Subsequently, an electric fan (with a diameter of 17.5 cm), placed 40 cm from the window of the stove, was turn on to provide air (used for the combustion of charcoal) to the stove. When charcoal was ignited throughout the combustion chamber of the stove, which could be observed by a sharp increase in the flue gas temperature, the fan was turned off. The time from the point when charcoal was initially put into the combustion chamber to the point when charcoal was ignited throughout the combustion chamber was recorded. This time interval is called the ignition time.

5) The stainless steel pot (with a diameter at the top of the pot of 30 cm), containing 3,000 g of water (the pot was closed by a lid), was then placed onto the stove. The initial temperature of water was recorded. When water inside the pot started to boil (at this point, the temperature of water should be close to 100 °C), the lid of the pot was opened, and the experiment was kept carrying out until the...
The combustion of charcoal was exhausted, which was the point when the flue gas temperature was below 90 °C.

The time interval from placing the stainless steel pot onto the stove to the point when water was fully boiled was called the water-boiling time, and the time interval from the point when charcoal was fully ignited (or when the pot was placed onto the stove) to the point when charcoal was exhausted was called the overall usage time.

6) From the starting point (i.e. when charcoal was fully put into the combustion chamber) to the end of the experiment (i.e. when charcoal was exhausted), the concentrations of CO and NOx, and the flue gas temperature, were measured and recorded every minute.

7) The amount of water remained in the pot \( m_{w_f} \) and the mass of the remaining charcoal in the combustion chamber of the stove \( m_{F_f} \) at the end of the test run were measured and recorded.

The performances of the stove and charcoal of each test run were determined by the ignition, water-boiling, and overall usage times, the percentage of complete combustion (% complete combustion), and the usage efficiency (% usage efficiency). The latter two could be calculated as follows [Eqs. (1) and (2)]:

\[
\text{% complete combustion} = \frac{m_{F_i} - m_{F_{esh}}}{m_{F_i} - m_{F_{ash}}} \times 100
\]

(1)

where
\[ m_{F_i} = \text{initial mass of charcoal} \]
\[ m_{F_f} = \text{remaining mass of charcoal at the end of the test run} \]
\[ m_{F_{ash}} = \text{mass of ash of charcoal} \]

\[
(= \text{mass of charcoal} \times \text{percentage of ash of charcoal})
\]

and

\[
\text{% usage efficiency} = \frac{m_{w_i} \left( T_{w_f} - T_{w_i} \right) + \left( m_{w_f} - m_{w_i} \right) h_{w_{fg}}}{m_F \times \text{HV}_F} \times 100
\]

(2)

where
\[ m_{w_i} = \text{initial mass of water in the stainless steel pot (3,000 g)} \]
\[ m_{w_f} = \text{remaining mass of water in the stainless steel pot at the end of the test run} \]
\[ T_{w_i} = \text{initial temperature of water} \]
\[ T_{w_f} = \text{temperature of water when it started to boil} \]
\[ h_{w_{fg}} = \text{latent heat of vaporisation of water the its boiling temperature} \]
\[ m_F = \text{mass of charcoal} \]
\[ \text{HV}_F = \text{heating value of charcoal} \]

Note that the usage efficiency was computed by following the guideline described in the 2003 revised University of California-Berkeley (UCB) Water Boiling Test (WBT) Version 3.0(12).
Experimental Results and Discussion

This section was divided into 2 main parts:

1) the performances of stoves and charcoal, which included the ignition time, the water-boiling time, and the overall usage time of each type of charcoal, the percentage of complete combustion (% complete combustion) of charcoal, and the usage efficiency of each type of stove; and

2) the pollutant emissions, which were presented as the concentrations of CO and NOx of each type of stove and charcoal. The values of the CO and NOx emissions in this study were compared to the emission standards and the corresponding levels of these 2 gases that affect the human health.

Additionally, the properties of mangrove ordinary charcoal and coconut-shell smokeless charcoal, which include their proximate analyses and heating values, were also presented in this section.

Properties of Charcoal Used in the Present Study

Proximate analyses and heating values of mangrove ordinary charcoal and coconut-shell smokeless charcoal were summarised in Table 1.

<table>
<thead>
<tr>
<th>List of analysis (air-dried basis)</th>
<th>Ordinary charcoal</th>
<th>Smokeless charcoal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximate analysis (wt.%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Moisture</td>
<td>6.4</td>
<td>4.8</td>
</tr>
<tr>
<td>• Ash</td>
<td>2.5</td>
<td>27.3</td>
</tr>
<tr>
<td>• Volatile matter (VM)</td>
<td>33.5</td>
<td>29.7</td>
</tr>
<tr>
<td>• Fixed carbon (FC)</td>
<td>57.6</td>
<td>38.2</td>
</tr>
<tr>
<td>Heating value (MJ/kg)</td>
<td>25.6</td>
<td>19.0</td>
</tr>
</tbody>
</table>

The combustible parts (i.e. VM and FC) of mangrove ordinary charcoal were added up to approximately 91% (33.5 + 57.6), while those of coconut-shell smokeless charcoal were approximately 68% (29.7 + 38.2). It is noteworthy that ordinary charcoal contained a few amount of ash (2.5%), whereas smokeless charcoal contained a considerable amount of ash (27.3%, more than one-fourth of the total mass of smokeless charcoal). The heating values of ordinary and smokeless charcoal were corresponded to the amounts of their combustible parts; i.e. ordinary charcoal, whose combustible parts were higher than those of smokeless charcoal, possessed higher heating value than did smokeless charcoal.
Ignition, Water-boiling, and Overall Usage Times of Charcoal

The ignition, water-boiling, and overall usage times of each type of charcoal at different amounts were summarised in Table 2.

It was found that the amount of charcoal had negligible effects on the ignition, water-boiling, and overall usage times of both types of charcoal.

The ignition and water-boiling times of mangrove ordinary charcoal were, on average, shorter than those of coconut-shell smokeless charcoal.

Table 2: The ignition, water-boiling, and overall usage times of ordinary and smokeless charcoal

<table>
<thead>
<tr>
<th>Amount of charcoal (g)</th>
<th>Ignition time(min)</th>
<th>Water-boiling time(min)</th>
<th>Overall time(min)</th>
<th>usage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ordinary</td>
<td>Smokeless</td>
<td>Ordinary</td>
<td>Smokeless</td>
</tr>
<tr>
<td>600</td>
<td>3-4</td>
<td>5-6</td>
<td>7-11</td>
<td>13-19</td>
</tr>
<tr>
<td>800</td>
<td>3-5</td>
<td>4-6</td>
<td>7-13</td>
<td>11-17</td>
</tr>
<tr>
<td>1,000</td>
<td>3-5</td>
<td>5-7</td>
<td>7-12</td>
<td>11-14</td>
</tr>
</tbody>
</table>

As indicated in Section 3.1, the amount of volatile matter (VM) of ordinary charcoal was higher than that of smokeless charcoal. With a higher amount of VM, ordinary charcoal could be ignited easier than did smokeless charcoal, as VM helped the ignition; the higher amount of VM, the easier the fuel can be ignited\(^{(13)}\).

It was also found, from Section 3.1, that the total amount of combustible parts (\(i.e.\) VM + FC) of ordinary charcoal was higher than that of smokeless charcoal (\(\sim 91\% \ vs. \sim 68\%\)) and that the heating value of ordinary charcoal was also higher than that of smokeless charcoal (25.6 \(\text{vs.} 19.0 \ \text{MJ/kg}\)), which meant that, for the same amount of fuel, ordinary charcoal released more energy than did smokeless charcoal. This should be the reason why the boiling time of ordinary charcoal was shorter than that of smokeless charcoal. This argument could be justified by the observation of the flue gas temperatures of these 2 types of charcoal, in which the average flue gas temperature during the peak period of the combustion of ordinary charcoal was higher than that of smokeless charcoal.

The overall usage time of coconut-shell smokeless charcoal was significantly longer than that of mangrove ordinary charcoal, by approximately 1.5-2 folds.

Since coconut-shell smokeless charcoal had a higher amount of ash than that of mangrove ordinary charcoal, this higher amount of ash made the shape of the remaining smokeless charcoal relatively fixed (\(i.e.\) almost the same as its original
shape before being burned), which, in turn, made the heat being retained inside the lumps or briquettes of charcoal. This kept the flue gas temperature continuously high (higher than the exhaustible temperature of charcoal; \( i.e. \) 90 \(^{\circ}\)C), thus resulting in a longer overall usage time.

**The Percentage of Complete Combustion of Charcoal**

The percentages of complete combustion (% complete combustion) of both types of charcoal were shown in Figure 3. Note that the type of stove had an insignificant effect on % complete combustion.

The complete combustion percentage (% complete combustion), as described by Eq. (1), was the ratio between the amount of charcoal actually burned \( (m_{c} - m_{r}) \) and the amount of charcoal that can completely be burned \( (m_{p} - m_{p_{a}}) \); note that if charcoal was completely burned, only ash should be remained in the resulting charcoal.

The average % complete combustion of mangrove ordinary charcoal was found to be 100%, whereas that of coconut-shell smokeless charcoal was 92%.

As mentioned earlier, the amount of combustible parts of ordinary charcoal was higher than that of smokeless charcoal (~91% \( v.s. \)~68%), whereas the amount of ash of smokeless charcoal was higher than that of ordinary charcoal (27.3% \( v.s. \) 2.5%). This made the combustion temperature of ordinary charcoal higher than that of smokeless charcoal, as discussed in Section 3.2. With higher combustion temperature and lower amount of ash, which is an incombustible part of charcoal, mangrove ordinary charcoal was likely to be more completely burned when compared to smokeless charcoal.
Additionally, smokeless charcoal was found to be denser than ordinary charcoal, and the shape of the remaining smokeless charcoal was relatively fixed during the combustion, as discussed earlier. This made it difficult for air to flow through the ash (or already burned) layer to react with the unburned part inside the briquettes of smokeless charcoal, thus increasing the chance of incomplete combustion of smokeless charcoal.

**The Percentage of Usage Efficiency of the Cooking Stoves**

The usage efficiency (% usage efficiency) of each type of cooking stove used in this research, *i.e.* cylindrical-shape, conical-shape, and high-efficiency ones, was depicted in Figure 4.

The usage efficiency (% usage efficiency) is the ratio between the amount of heat utilised by the stove (in this case, the heat was used for boiling water) and that provided by charcoal.

In each experiment, heat obtained from the combustion of charcoal was used to increase the temperature of water inside the stainless steel pot (*i.e.* sensible heat) and to boil water (change the state of water from liquid phase to gas phase: *i.e.* latent heat).
It was found, from Figure 4, that the type of charcoal negligibly affected % usage efficiency. However, % usage efficiency varied with the type of cooking stove. The cylindrical-shape, the conical-shape, and the high efficiency stoves had the average % usage efficiencies of 21.7, 19.5, and 28.0%, respectively.

The high-efficiency cooking stove is designed to be compact, which reduces the heat loss, and to enhance the flow of air passing through the grate to the combustion chamber (which is done by reducing the size of the holes of the grate but increasing the number of the holes), which increase the combustion of charcoal in the stoves. This resulted in the fact that the high-efficiency cooking stove yielded the highest usage efficiency.

![Figure 4: The usage efficiencies (% usage efficiencies) of cylindrical-shape, conical-shape, and high-efficiency cooking stoves for different type of charcoal](image)

**The Emissions of CO and NO\textsubscript{x}**

The average concentrations of CO and NO\textsubscript{x} during the peak period of the combustion of charcoal for different types of cooking stoves and charcoal were illustrated in Figures 5 and 6, respectively.

The average concentrations of CO emitted from cylindrical-shape, conical-shape, and high-efficiency stoves were found to be 684.8 (highest, # 1), 617.4 (# 2), and 550.7 (lowest, # 3) ppm, respectively, as depicted in Figure 5.
The type of stove, however, had an insignificant effect on the NO\textsubscript{x} emissions; the average concentrations of NO\textsubscript{x} were 3.8, 3.4, and 3.1 ppm for cylindrical-shape, conical-shape, and high-efficiency stoves, respectively, as also shown in Figure 5.

The effect of the type of charcoal on the CO emissions was found to be negligible. The CO concentrations for ordinary and smokeless charcoal was 613.7 and 602.3 ppm, respectively, as illustrated in Figure 6.

The concentration of NO\textsubscript{x} emitted from burning mangrove ordinary charcoal were found to be 4.6 ppm, which was more than twice that from burning coconut-shell smokeless charcoal (2.1 ppm), as shown in Figure 6.

When compared these CO and NO\textsubscript{x} emission data obtained in this study to the emission standards, set by Ministry of Natural Resources and Environment\textsuperscript{(14)}, and the corresponding concentrations of CO and NO\textsubscript{x} that affect the health of users\textsuperscript{(15)}, it was found that the average concentrations of CO and NO\textsubscript{x} emitted from burning ordinary and smokeless charcoal in cylindrical-shape, conical-shape, and high-efficiency stoves were below the emission standards and the corresponding CO and NO\textsubscript{x} levels that affect the human health, as shown in Tables 3 and 4.

![Figure 5: The average concentrations of CO and NO\textsubscript{x} during the peak period of the combustion of charcoal for different types of cooking stoves](image-url)
Figure 6: The average concentrations of CO and NO\textsubscript{x} during the peak period from combustion of mangrove ordinary charcoal and coconut-shell smokeless charcoal
Table 3: The concentration of CO and NO\textsubscript{x} emitted from cylindrical-shape, conical-shape, and high-efficiency stoves, compared these CO and NO\textsubscript{x} emission data to the emission standards, set by Ministry of Natural Resources and Environment, and the corresponding concentrations of CO and NO\textsubscript{x} that affect the health of users.

<table>
<thead>
<tr>
<th>Type of Pollutant</th>
<th>Concentration that emitted from the combustion in the present study (ppm)</th>
<th>Maximum allowable concentration (ppm\textsuperscript{(14)})</th>
<th>Symptoms at the maximum allowable concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>• Cylindrical-shape stove 684.8</td>
<td>690</td>
<td>Serious headache, intensify, dizziness, nausea, and convulsions.</td>
</tr>
<tr>
<td></td>
<td>• Conical-shape stove 617.4</td>
<td></td>
<td>Life threatening after 1-2 h, and unconsciousness within 2 h, and death after 2-3 h.</td>
</tr>
<tr>
<td></td>
<td>• High-efficiency stove 550.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NO\textsubscript{x}</td>
<td>• Cylindrical-shape stove 3.8</td>
<td>200</td>
<td>Irritating to the respiratory system, damage to the lungs, and constricted bronchial pneumonia.</td>
</tr>
<tr>
<td></td>
<td>• Conical-shape stove 3.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High-efficiency stove 3.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4: The concentration of CO and NO\textsubscript{x} emitted from burning mangrove ordinary charcoal and coconut-shell smokeless charcoal, compared these CO and NO\textsubscript{x} emission data to the emission standards, set by Ministry of Natural Resources and Environment, and the corresponding concentrations of CO and NO\textsubscript{x} that affect the health of users.

<table>
<thead>
<tr>
<th>Type of Pollutant</th>
<th>Concentration that emitted from the combustion in the present study (ppm)</th>
<th>Maximum allowable concentration (ppm)\textsuperscript{(14)}</th>
<th>Symptoms at the maximum allowable concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ordinary charcoal 613.7 • Smokeless charcoal 602.3</td>
<td>690</td>
<td>Serious headache, intensify, dizziness, nausea, and convulsions.</td>
</tr>
<tr>
<td>CO</td>
<td></td>
<td></td>
<td>Life threatening after 1-2 h, and unconsciousness within 2 h, and death after 2-3 h.</td>
</tr>
<tr>
<td></td>
<td>Ordinary charcoal 4.6 • Smokeless charcoal 2.1</td>
<td>200</td>
<td>Irritating to the respiratory system, damage to the lungs, and constricted bronchial pneumonia.</td>
</tr>
</tbody>
</table>

It should be noted, however, that, although the average concentration of CO during the peak period was lower than the emission standard, it was still relatively high; \textit{i.e.} it was within the range of 550-685 ppm, comparing to the maximum allowable concentration of 690 ppm. With this concentration (\textit{i.e.}~550-685 ppm), it can cause serious headache and nausea after approximately 1 h of exposure, convulsions and life threatening after 1-2 h of exposure, and unconsciousness within 2 h of exposure. Eventually, after 2-3 h of exposure, it can lead to the death. Accordingly, prolonged exposure to CO, by being in the cooking area for a long period of time (more than 1-h), must be avoided. Additionally, it is strongly recommended that users be in the upwind position and that the ventilation of the cooking area should be good.
The concentration of NO$_x$ was well below the maximum allowable concentration, as shown in Tables 3 and 4. Thus, it can be considered healthily safe to the users. Nevertheless, prolonged exposure to this pollutant must also be avoided.

Conclusions

In overall, the results obtained from this study can be summarised as follows

- The ignition times of ordinary and smokeless charcoal were in the ranges of 3-5 and 5-7 minutes, respectively. The water-boiling times were found to be 7-13 and 11-19 minutes for ordinary and smokeless charcoal, respectively. The overall usage time of ordinary charcoal was 40-77 minutes, while that of smokeless charcoal was 94-119 minutes.
- The average percentages of complete combustion (% complete combustion) of ordinary and smokeless charcoal were 100 and 92%, respectively.
- The usage efficiency of the high-efficiency stove was the highest one (28.0%), followed by cylindrical (21.7%) and conical (19.5%) stoves, respectively. The type of charcoal had an insignificant effect on the usage efficiency.
- The average concentration of CO of the cylindrical-shape stove was found to be highest (684.8 ppm), followed by the conical-shape (617.4 ppm) and the high-efficiency (550.7 ppm) stoves, respectively. The effect of charcoal type on CO emissions was negligible.
- The type of stove insignificantly affected the emissions of NO$_x$. However, the type of charcoal had an apparent effect on NO$_x$ emissions. The average NO$_x$ emissions from the combustion of ordinary charcoal (4.6 ppm) were more than twice those of smokeless charcoal (2.1 ppm).
- When comparing the emission data of CO and NO$_x$ from the present study to the emission standards, it was found that NO$_x$ and CO emissions were below emission standard and the corresponding NO$_x$ and CO concentrations that affect the human health. However, prolonged exposure to these gases must be prohibited.

References


Transportation and Logistics in Vietnam

SutinSaisanguan

Abstract

The purposes of this paper were 1) to investigate how to strengthening the linkage of Vietnam’s logistics among the Greater Mekong Sub-region (GMS) countries; 2) to explore how to facilitate cross border transportation and inspection procedure more efficiently; and 3) to examine how to support and encourage change in knowledge, attitudes, and skills for Vietnamese logistics and transportation manpower. This article argues that Vietnam’s transportation and logistics development is the combination of hardware, soft-ware, and peopleware that integrates Vietnam with the GMS countries. This study is an applied research which mixed qualitative and quantitative methods, such as reviewing literature, observation, and in depth interview. In 2011, road transport and logistics activities were observed in Dong Ha, Hue, Da Nang and Hoi An. Descriptive analysis was used to describe the basic features of the data that relevant to research questions. The findings reveal that 1) road transport remains the core of transport in Vietnam that improved in strengthening the linkage of logistics with other GMS countries; 2) the government sectors take the key role to facilitate more efficiently cross border transportation and inspection procedure; and also 3) the government have to emphasizes to empower transport and logistics manpower to cope with the lack of qualified logistics specialists.

Keywords: Road transportation; Logistics; Vietnam.
Background and Rationale

Vietnam’s economic growth rate has been expanding at an average about 6.15 percent per year during the period 2000 – 2015. Due to the rapid growth of Vietnam’s export-oriented, the manufacturing sector has boosted demand for logistics services. (Thompson, 2013; Trading Economics, 2015; Yuen, 2015) Thanks to its under-developed transport infrastructure and inadequate logistics facilities, logistics costs in Vietnam are estimated to run at about 25% of GDP, far higher than the 18% in China and the 13% in Malaysia. However, the decline in tariffs, trade transactions costs are even more important in determining the competitive advantage of trading nations. These consist of transport and logistics costs associated with the processing of trade documentation involved in cross-border trade. (Moïse and Bris, 2013; Yuen, 2015) Road transport carries about two-thirds of total domestic freight in Vietnam so that the condition of the road network is a major factor that constrained transport services of the country. Especially, transportation costs represent 30-40 percent of the total logistics expenditure. (MILLAR, 2013) Vietnam has to improve transport and logistics services to cope with the costs that make inefficiency in the domestic market. Asian Development Bank (ADB) reported that since resuming operations in Viet Nam in 1993, ADB assistance has amounted to $13.91 billion (as of 31 December 2014). Around one-third of cumulative lending had been sharing by transport and communications sector. (ADB, 2015)

During 2004- 2012, Vietnam’s road transport was drastic change in term of road infrastructure, road transport equipment, and road transport measurement. For example, table 1, concerning about road infrastructure, Vietnam’s total road length increased from 238,000 km in 2004 to 326,000 km in 2012. During the same period, length of paved road increase from 137,969 km to 216,000 km, and also, ratio of paved road to total road length increase from 58.0% to 66.3%. (AJTP Information Center. 2015)

<table>
<thead>
<tr>
<th>Road infrastructure</th>
<th>2004</th>
<th>2012</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total road length (km)</td>
<td>238,000</td>
<td>326,000</td>
<td>+88,000</td>
</tr>
<tr>
<td>Length of paved road (km)</td>
<td>137,969</td>
<td>216,000</td>
<td>+79,000</td>
</tr>
<tr>
<td>Ratio of paved road to total road length (%)</td>
<td>58.0%</td>
<td>66.3%</td>
<td>+8.3%</td>
</tr>
<tr>
<td>Total length of expressways (km)</td>
<td>0</td>
<td>120</td>
<td>120</td>
</tr>
</tbody>
</table>

Source: AJTP Information Center. 2015
Transportation and logistics play a critical role in GMS countries as the driving force to achieve the GMS program’s three Cs - enhanced connectivity, increased competitiveness, and improved sense of community. (ADB, 2008) Cross-border logistics is an emerging industry combining several composite services such as transport, warehousing, and information. Connecting production with consumption and linking countries to the outside world, the industry is composed of tangible and intangible factors and covers the entire process from product manufacturing to commodity flow. Vietnamese government’s logistics policies and regulations are unclear to provide conditions for growth of the country’s young logistics industry, however. Especially, legal and regulatory standards significant affect over the logistics sector depending on the political environment which formulates under laws and regulations. Moreover, due to the Viet Nam Logistics Institute (VNLI), thousands of logistics entrepreneurs are struggling with a serious shortage of employees since a rapid increase of services demands. (Vietnam News. 2015)

The paper focuses on the linkage of Vietnam’s logistics among the GMS countries, cross border transportation and inspection procedure, and man power in logistics and transport of Vietnam. The paper comprises of 5 sections: background and rationale, objective, methodology, results & discussion, and conclusion, respectively.

Objective

The purposes of this paper were as follows:- 1) to investigate how to strengthening the linkage of logistics among the six GMS countries; 2) to explore how to facilitate cross border transportation and inspection procedure more efficiently; and 3) to examine how to support and encourage change in Vietnamese logistics and transportation man power.

Methodology

Transportation is defined as the movement of people, animals and goods from one location to another. Modes of transport include air, rail, road, water, cable, pipeline and space. The field can be divided into infrastructure, vehicles and operations. Logistics is the management of the flow of things between the point of origin and the point of consumption in order to meet requirements of customers or corporations. The logistics of physical items usually involve the integration of information flow, which is material handling, production, packaging, inventory, transportation, warehousing, and often security. By definition, transportation is just simply a part of logistics. This study emphasized on road transportation, however. Transport infrastructure concerns about roads, terminals (bus stations, trucking terminals, and refueling depots (including fueling docks and fuel stations) and vehicle traveling on these networks in the scope of the study just only include automobiles, bicycles, buses, and trucks.
The study is an applied research which mixed both qualitative and quantitative approach, such as, reviewing literature, observation, and in depth interview. Due to digital government which employment of the Internet and the world-wide-web for delivering government information and services to the citizens, the researcher could collect the data and information that relevant to the research question from several official website, for example, the World Bank (http://www.worldbank.org/), Asian Development Bank (ADB, http://www.adb.org/), and AJTP Information Center (http://www.ajtpweb.org/). These websites provide publicly available regular update databoth reliability and validity.

The field observation was conducted about two weeks by mid-2011 incentral of Vietnam comprising Dong Ha, Hue, Da Nang, and Hoi An. Along the National Route 9, the segment called National Route 9A begins at Lao Bão on the Vietnam-Laos border and ends at Đông Hà. After that following National Route 1A, from Đông Hà runs across Hue, Hoa Vang and Vinh Dinn. And then, by National Route 14B, Hoa Vang - Da Nang and Hoi An. Because of time and budget constraint, the observation just focuses on infrastructure and vehicles. Although the survey had been conducted for a long times, the available corresponding data were updated status to present.

Descriptive statistics were used to describe the basic features of the Vietnam’s transportation and logistics.

Results and Discussion

The purposes of this study were achieved which can divided into 3 sections according to each purpose.

A strengthening the linkage of Vietnam’s transport and logistics among the GMS countries

Vietnam is located in Southeast Asia, Figure 1a, bordered by the Gulf of Tonkin and the South China Sea to the east, China to the north, Laos and Cambodia to the west, and the Gulf of Thailand to the south. It’s shape is long and thin. In Vietnam, roadways are being the primary means of movement for people and cargo (ADB, 2012). The country has actively participated in the GMS program. According to ADB’s funding that provided in the areas of transport connectivity, development of corridor towns, promotion of tourism, and other, Vietnam’s major highways, urban roads, and metro systems are being constructed (ADB, 2015).
Vietnam's road system, fig. 1a, includes national roads administered by the central government; provincial roads managed by provinces; district roads managed by districts; urban roads managed by cities and towns; and commune roads managed by communes. The current percentage of paved national roads is reasonable by regional standards.

As table 1 and Figure 1a above, in the year 2012, the road network in Vietnam is 326,100 km with 66.3% paved mainly national roads and provincial roads. It increases from 238,000 km (in 2004) to 326,000 km (in 2014). With respect to road transport, Vietnam has an extensive national network but a relatively low percentage of roads are paved (AJTP Information Center. 2011). The key roadway consists of National Route 1A (or QL1A), red line in fig. 1b, National Route 8, National Route 9, and National Route 12. In the Red River Delta, a road network has been developed covering the capital city and major cities and international ports as well as the small and medium-sized cities and towns in the provinces of the area. The major national highways in the area are: NH1, NH5, NH10, and NH18. As shown in the list of Japanese ODA projects in the road sub-sector under the Program, these are all targets of Japanese ODA under the Program. (Ministry of Transport, Vietnam, 2006; ADB, 2015)

National Route 1A (or QL1A), Figure 1b, red line, is the trans-Vietnam highway that runs through half of the provinces and cities in the country, linking Ha Noi, Da Nang, Ho Chi Minh City and Can Tho. It is the most important highway in Vietnam. The route begins at km 0 at Huu Nghi Quan Border Gate near the China-
Vietnam border. The route ends at Năm Căntownship in Cà Mau Province. It has been upgraded recently by Japanese ODA as well as loans from World Bank. Total length 2,300 km, road width: 10–12 m, road surface paved with asphalt, 874 bridges, bridge load varies from 25 to 30 metric tons.

Figure 2: Road Map of Vietnam _ National Route 8; National Route 9
(Figure 2a: Asiaweek. 1996; Figure 2b: ADB, 2015)

National Route 8, Figure 2, is a highway in HàTĩnh Province in North Central of Vietnam, which is managed and maintained by the central government. The route includes two segments. The 85.3 km-long segment from HồngLĩnh Township across ĐứcThọ and Hrqong Son districts is called National Route 8A. National Route 8A crosses Annamite Range and connects to National Route 1A, Ho Chi Minh Highway and Lao National Route 8. The 25 km-long segment from HồngLĩnh Town eastward and reach XuânHải Port is called National Route 8B.
**Table 2**: Vietnam’s road transport equipment, 2004 and 2012, (unit: 1,000)

<table>
<thead>
<tr>
<th>Road transport equipment</th>
<th>2004</th>
<th>2012</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of registered road motor vehicles</td>
<td>532</td>
<td>1,590</td>
<td>+ 3 times</td>
</tr>
<tr>
<td>Number of registered passenger cars</td>
<td>182</td>
<td>727</td>
<td>+ 4 times</td>
</tr>
<tr>
<td>Number of taxis or taxicabs</td>
<td>N/Col</td>
<td>56</td>
<td>-</td>
</tr>
<tr>
<td>Number of registered trucks</td>
<td>195</td>
<td>651</td>
<td>+ 3 times</td>
</tr>
<tr>
<td>Total number of registered buses</td>
<td>73</td>
<td>118</td>
<td>+ 1.6 times</td>
</tr>
<tr>
<td>Number of public buses</td>
<td>N/Col</td>
<td>79</td>
<td>-</td>
</tr>
<tr>
<td>Total number of registered motorcycles</td>
<td>13,375</td>
<td>36,894</td>
<td>+ 3 times</td>
</tr>
</tbody>
</table>

Source: AJTP Information Center, 2015

National Route 9, Figure 2, runs across Vietnam roughly in line with the 17th Parallel. Total length 82 km, road width 10m, road surface paved with asphalt. The route includes two segments. The segment called National Route 9A begins at Đồng Hà and ends at Lao Bào on the Vietnam-Laos border and is entirely within Quảng Trị Province. The 8 km-long segment called National Route 9B begins at Đông Hà and runs eastward to Cửa Việt Port. With the completion of the Ho Chi Minh Highway, Route 9 has become an important link between the Ho Chi Minh Highway and Route 1.

Transport and logistics are crucial in facilitating the rising flow of goods so that a large amount of resources have been invested in the development of infrastructure and physically connecting the countries in the region. National infrastructure and transportation network significantly lie under international standards and hence account for a low share of the overall logistics market. The improvement of these will greatly enhance the country’s potential to develop its domestic and international logistic co-operations. Vietnam has great capacities to become a major shipping hub.
Vehicle

Vietnam will have to deal with 3.5 million automobiles by 2020, according to a plan for road traffic development up from the current 1.5 million cars on the road. Of the automobiles, cars will make up 57 per cent, passenger coaches 14 per cent and trucks 29 per cent (Maierbrugger, 2013). From table 2, concerning about road transport equipment, there were 1,590,000 of registered road motor vehicles in Vietnam in 2014. And also, 727,000 of registered passenger cars; 56,000 of taxis or taxicabs; 651,000 of registered trucks; 118,000 of registered buses; 76,000 of public buses; and 36,894,200 of registered motorcycles (AJTP Information Center, 2015). Comparing changing these items between 2004 and 2012, it indicates that Vietnam’s road transport equipment increases dramatically during the period: total number of registered road motor vehicles increases 3 times; number of registered passenger, 4 times; number of registered trucks, 3 times; total number of registered buses, 1.6 times; and, total number of registered motorcycles, 3 times. Motorcycles are the primary mode of transport in the major cities which account for 60 - 65 % of vehicular trips while bicycles and automobiles are accounting for 25 % and less than 5 % of trips, respectively.

Motorcycles

Vietnam Low per capita income combined with automobile speed limit has made motorcycle a more popular choice. Motorcycles are presently the primary mode of transport in the major Vietnamese cities. For example, Ha Noi and Ho Chi Minh City (HCMC), have to accommodate between 4 and 5 million motorcycles each. In both cities, motorcycles account for 60 - 65 percent of vehicular trips, with bicycles accounting for another 25 percent. The motorcycle has been a staple of Vietnam as well as that of other Asian developing countries, such as Thailand or Indonesia. The most common and well-documented street view of urban Vietnam is that of a crowded crossroad with tons of motorcycles. As the motorcycle is so important in everyday life, almost every family owned a motorcycle back then. (LUAN NGUYEN, 2011) Vietnam’s total number of registered motorcycles increase 3 times from 13.4 million in 2004 to 36.9 million in 2012, table 3. It means that another 23.5 million motorcycles added to the streets during 2004-2014.

Trucks

In 2012, table 2, the number of registered trucks were 651,000 units. It increased more than 3 times from 195,000 units in 2004. Trucking services are almost completely privately operated. While trucking costs are competitive, the condition and coverage of the national road network are limited. In terms of cost and usefulness, the trucks are generally preferable for flexible and frequent transport needs, while the railways are more cost effective for high volume and/or longer distance transport needs. Moreover, because of the single North-south corridor that has recently been improved and tolled and that domestic road network is made up of
single and two lane roads of varying standards with fair to poor maintenance, as a result, travel speeds are slow and there delay due both to traffic and official roadside checks.

**Table 3**: Road transport measurement, 2004 and 2012,(unit: 1,000)

<table>
<thead>
<tr>
<th>Road transport measurement</th>
<th>2004</th>
<th>2012</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of road passengers</td>
<td>1,042</td>
<td>2,647</td>
<td>+ 2.6 times</td>
</tr>
<tr>
<td>Road passenger-kilometer</td>
<td>34.3</td>
<td>91.7</td>
<td>+ 3 times</td>
</tr>
<tr>
<td>(Million passenger-kilometer)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freight</td>
<td>265</td>
<td>735</td>
<td>+ threefold</td>
</tr>
<tr>
<td>Freight-kilometer (Thousand ton-kilometer)</td>
<td>14.9</td>
<td>38.6</td>
<td>+ threefold</td>
</tr>
</tbody>
</table>

Source: AJTP Information Center, 2015

As table 3, concerning about road transport measurement, the road transport equipment impacts on the huge of movement of people and goods. It shows that total number of road passengers increase 1.6 million or about 2.6 times, from 1.0 million to 2.6 million, and 2012, respectively. Furthermore, Vietnam’s road passenger-kilometer increases nearly 3 times from 34.3 million (in 2004) to 97.1 million (in 2012). In the same way, the freight and freight-kilometer increased about threefold from 265 thousand ton to 735 thousand ton, or from 14.9 thousand ton-kilometer to 38.6 thousand ton-kilometer.

**B facilitating cross border transportation and inspection procedure**

While the Vietnamese logistics sector is only at an early stage in its development, demand for such services is growing fast. In Vietnam, the administration of the road sector is complex with different agencies responsible for the financing and implementation and others for investment and maintenance. The transportation sector in Vietnam is to a large extent subject to the government’s influence. Government owned companies in each of the modalities dominate the market (Martine van Es, 2010). The government sectors take the key role to facilitate more efficiently cross border transportation and inspection procedure such as, freight insurance, vehicle insurance, and customs duties for transit goods.
Increased traffic was already benefiting small businesses in areas served by new and improved roads and the GMS countries realized that providing sub-regional physical infrastructure is a necessary but not sufficient condition for increased connectivity and efficient flow of goods and people. Thus, in order to further increase and facilitate traffic and promote transport and trade facilitation, the Lao PDR, Thailand, and Vietnam signed the Cross-Border Transport Facilitation Agreement (CBTA) in 1999.

Cross-Border Transport Facilitation Agreement (CBTA)

CBTA was initiated by six GMS countries in response to the emerging necessity to strengthen the related software to complement large-scale investments in physical infrastructure in the GMS in order to achieve the benefits of greater economic connectivity. Cross-border logistics is an emerging industry combining several composite services such as transport, warehousing, and information. By giving full play to the function and role of transport and upgrading the efficiency of cross-border logistic transport will have significant impact on all aspects of the economic and social lives of the countries in the GMS. To date, all the GMS countries have fully ratified the CBTA main agreement and four countries have fully ratified the CBTA’s 20 annexes and protocols and two countries are at various stages of ratification. Institutional mechanisms for monitoring and ensuring the accelerated implementation of the CBTA were put in place. National Transport Facilitation Committees have been established in each country and the ministerial Joint Committee of the GMS CBTA was established at the regional level.

The countries have concurred on the use of a sub-regional road transport permit, and the pilot operations of the Customs Transit and Temporary Admission System and the GMS road permit system, including CBTA “Fast Tracks” at border checkpoints, have commenced along the GMS East–West Economic Corridor. However, in spite of the significant progress achieved in the CBTA program, new challenges have emerged and a lot remains to be done. During the course of the CBTA implementation, more issues and more problems that require better and more efficient solutions have materialized. However, lack of sharing of information, decentralization on roles and responsibilities also create potential challenges and can further become barriers to the growth of the Vietnam’s logistics industry. The complex legal and regulatory environment is a major involvement for both private and foreign investors. It is an important reason for the lower participation of private investors in critical sectors such as heavy industry and infrastructure development.

In Vietnam, the regulations and legislations are highly complicated and not usually consistency such as customs clearance, ground handling, and terminal operations. The multiple layers of administration levels also result to some corruption issues and increase in both the cost and times of processing freight. The government sectors and private ones, especially service providers, collaborate to facilitate cross border transportation and inspection procedure more efficiently, however. In conclusion, first of all, the government have to improvement of legal framework, and, after that build and improve transport facilities, such as, improve appropriate related
law regulations, goods distribution center related law regulations, parking rest areas, IT systems to be utilized parking, rest areas, ICD at the border checking for customs declaration. Effective implementation points, effective implementation improve management and of CIQ, SSI & SWI, and, improve management and services currently provided at the existing transit warehouses.

The Logistics Performance Index (LPI)

The Logistics Performance Index (LPI) is based on a worldwide survey of operators on the ground (global freight forwarders and express carriers), providing feedback on the logistics “friendliness” of the countries in which they operate and those with which they trade. They combine in-depth knowledge of the countries in which they operate with informed qualitative assessments of other countries with which they trade, and experience of global logistics environment. Vietnam is one such country which has outperformed its peers, ranking among the Top5 countries in the same per capita GDP bracket. Vietnam was rated as one of its top five countries in terms of its development. Meanwhile the World Bank's 2012 Logistics Performance Index (LPI) rated the country one of its top four countries for logistics “over-performance” relative to its per capita GDP. In the year 2014, Vietnam ranking no.45, with LPI score 3.15. (World Bank, 2015)

Vietnam’s transport and logistics man power development.

There are about 300,000 business entrepreneurs involved in logistics services, providing jobs for nearly 1.5 million labors across the country. However, due to a rapid increase of services demands, the Viet Nam Logistics Institute (VNLI) indicated that thousands of logistics entrepreneurs are struggling with a serious shortage of employees and these employees could only meet 40 per cent of the sector's demand in Vietnam. The next three years, the country will be facing a serious shortage of workers. (Viet Nam News, 2015) The GMS Strategic Framework focuses on development thrusts to achieve its goal that depend on developing human resources and skill competencies. Therefore, Vietnam transport and logistics human resources development are needed.

A manpower shortage at both the management and operational levels in the logistics sector has the potential to dent the industry's rapid growth. Build human resource capacity in areas related to intelligent transportation and sustainable cities through professional training, research programs, short courses and outreach activities. One of the major issues in the GMS countries is the governments’ ability—or lack thereof—to retain qualified staff. High turnover of government staff that have received technical training is a major issue that needs to be addressed. Apart from training, ADB assistance implemented as part of the GMS program has had limited effects on other aspects such as institutional structuring, development of cross-border institutions, and coordination among institutions within the government as well as between the government and the private sector.
One of the key issues facing freight forwarders and truck operators in the GMS countries is cross-border legal transactions such as freight insurance, vehicle insurance, and customs duties for transit goods. The inadequate HR for logistics services as lack of qualified logistics specialists. It means that Vietnam have to improvement of training/learning systems of transport /forwarding/logistics, integrated with vocational training center or university to deal with the lack of qualified logistics specialists. It is expected that enterprises, also, need to look for funding and cooperation in human resource training from foreign countries and organizations. For example, Japan supports the efforts to establish the Sub-Regional Logistic Training Center in Vietnam funded by Japan-ASEAN Integration Fund (JAIF) in cooperation with ASEAN Member States under the framework of Mekong-Japan Partnership (2010-2011). MLIT-Japan will technically assist for Human Resource Development (HRD) Project and establishment of Sub-Regional Logistic Training Center in Vietnam funded by JAIF. HRD Project includes developing curriculums and text books as well as conducting lectures for logistics service providers in CLMV countries to enhance their skill and knowledge (AJTP Information Center. 2011b).

Conclusion

In conclusion, the Vietnamese Government has invested heavily in improving its transport infrastructure and attempted to improve of logistics-related law and regulation. Training and human resources are needed and started because the progress of getting aware of logistics, building logistics management skills. The findings were as follow: firstly, the roadways in Vietnam are being the primary means of movement for people and cargo. The percentage of paved national roads is reasonable by regional standards. In major cities, motorcycles, bicycles, and automobiles are the primary mode of transport. Operations and ownership of infrastructure can be either public or private, depending on mode in Vietnam’s transport industry. Secondly, to facilitate cross border transportation and inspection procedure more efficiently, the GMS program has included investments in physical infrastructure as well as in the development of cross-border agreements across the sub-region and related trade facilitation. Perhaps redesigning of regulations and laws as well as co-operation of small enterprises could facilitate trade operations faster, cheaper and more effective. But historically service providers have faced various challenges including inconsistent regulations across levels of administration and a lack of manpower skill. And, finally, transport and logistics industry is highly fragmented with a count of several hundred thousand entrepreneurs competing for business. Most of a small scale have service range, limited coverage, and information technology potentials. Vietnam government should have policies to support enterprises and schools in order to step up the task of training under various flexible forms, providing human resources for the industry. However, these things take time.
Acknowledgements

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References


Using a Fuzzy Extension of the DEMATEL Method to Explore the Interaction Effect of Factors Generating Organizational Learning Mechanism

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Abstract

Knowledge creation and management are critical success factors for an organization's survival. How an organization creates and manages this knowledge is crucial to the expansion of the organization as a whole.

As a process of knowledge acquisition and sharing, the organizational learning mechanism (OLM) delves into the heart of the problem. We examine a variety of learning processes that constitute these organizational learning mechanisms. This paper aims to capture the process and framework of OLM and knowledge sharing and acquisition. In doing so, five facets of OLM are discussed: structural, cultural, psychological, policy, and contextual.

The notion of OLM has been receiving some attention in the literature on organizational learning capability. However, the relationship between the factors generating OLM has not been empirically tested so far. We also need to understand its systemic approach.

OLM can be represented by factors that are inextricably interwoven within an organization’s system. Thus, before we empirically test the factors generating OLM, we need to take into account integration to explain how to effectively treat each factor. This paper significantly serves to develop a framework to manage knowledge and find a method to numerically evaluate these factors.

An empirical study applies the proposed fuzzy extension of the decision-making trial and evaluation laboratory(DEMATEL) method to explore the interaction effect of factors generating OLMs. This type of method integrates the fuzzy set theory to evaluate linguistic variables with the DEMATEL method to determine the interaction effect of systems in organizations.

In particular, we adopt the extension of DEMATEL. By applying a fuzzy extension method to this study, we can expect the augmented matrix to serve as a stochastic matrix of an absorbing Markov chain.

Keywords: Organizational learning, Learning organization, Fuzzy set theory, DEMATE
Introduction

Couple this phenomenon with customer demand for innovation in public service, and changes in technology and the socio-economic and political environment, and members of a public organization would feel a pressing need for innovation. “Value for money” and other political changes accelerate this change. However, pressures and political demands would likely facilitate a crucial conflict between an organization and its members.

Without an understanding of organizational innovation and the nature of an organization, this would prove to be a failure. In particular, the stress of organizational learning and turning to learning are likely regarded as critical success factors for improving organizational performance. However, each organization has its unique nature and dynamic mechanism to operate and survive as an entity.

In recent years, the importance of organizational learning tools as intangible assets has increased rapidly. Public and private organizations and their members should consider improving their dynamic performance to cope with these problems. A smart organization is likely to effectively treat a wide range of issues in public management in a complex environment. Therefore, combining the importance of assets with a systemized and scientific study of organizational learning is required to effectively manage its members. Willingness to learn is an intangible asset and a complex concept involving various aspects such as cognitive science and group dynamics.

Relatively fewer studies have devoted themselves to an analytical, detailed examination of organizational learning in the public sector, e.g., health care and social service. Although numerous researchers have studied organizational learning for a long time, a clear definition of OLM seems to be elusive.

Adopting a systemic approach to construct a theoretical background is a powerful advantage. Organizational learning is not a single process performed by the entire organization in a uniform fashion. Therefore, to study its nature and mechanism, we first take into account its theoretical approach. OLM’s operational mechanisms in the organizational process draw heavily on the psychology of individuals. According to Stewart (2001), organizational learning is a type of collective cognition where individuals constantly make sense of the environment and negotiate with one another’s learning experiences. Further, learning should not be treated as a separate endeavor that occurs only in classrooms or training settings. That is, learning does not apply to only one stratum of an organization’s members, such as the lower ranks or the managerial functions, alone.

So, OLM need to have considered. Finding OLM make it possible to transform individual level learning (micro level) into organizational level learning (macro level), and use the frame of organizational learning as base of individual learning (Popper and Lipshitz, 1998). All of these things are derived from finding and understanding of OLM. Most of organization have their essential nature
such as culture, history, atmosphere. Learning also lead to these nature. So, finding learning mechanism and suggesting strategies are very important because these things are densely related with organization's survive.

For these things, this paper will effort firstly to find interact effect between factors generating learning mechanism within organization system, and need to transform it into influence relation based on numerical mechanism. Researcher and manager on organization can find the factors effecting on any other factors, and the factors caused from others with numerical influence relation. From this process, they also find the dynamic behavior of factors, i.e., having relation effect on each other.

This paper is two central ideas: first, supporting factors consisting organizational learning mechanism with systemic perspective, and second, exploring the interaction effect of factors generating organizational learning mechanism with a fuzzy extension of the DEMATEL(The Decision Making Trial and Evaluation Laboratory) method. This paper also copes with the relation of these facets are straightened out by DEMATEL. Applying a fuzzy extension method in this paper, we can expect augmented matrix serving as a stochastic matrix of absorbing Markove chain. Especially, to overcome linguistic vagueness with evaluation, fuzzy set theory is taken into account to integrate with DEMATEL method.

The remainder of the study is organized as follows: section 2 provides literature review of the study focusing on factors consisting organizational learning mechanism and fuzzy DEMATEL, section 3 develops research design and methods, section 4 presents and discusses the result of data analysis, section 5 concludes.

**Literature Review**

**Organizational Learning Mechanism**

Before we embark upon organizational learning mechanism reflecting organizational learning, we will briefly examine preliminary literature of conceptual difference between organizational learning and learning organization. Argyris and Schon(1978) defined "organizational learning" is a process of the detection and correction error. Error here is for purpose any feature of knowledge or knowing that inhibit learning. Fiol and Lyles(1981) later define learning as "the process of improving action through better knowledge and understanding". Dodgson(1993) describe organizational learning as the way firms build, supplement and organize knowledge and routines around their activities and within their cultures and adapt and develop organizational efficiency by improving the use of the broad skills of their workforce. Huber(1991) also states that learning occurs in an organization if through its processing of information, the range of its potential behaviors is changed.

A learning organization is a firm that purposefully constructs structures and strategies so as to enhance and maximize(Dodgson, 1993). The concept of a learning organization has become popular since organizations want to be more adaptable to change. Learning is a dynamic concept and it emphasize the continually changing nature of organization. The focus is gradually shifting from individual to
organizational learning. Just as learning is essential for the growth of individual, it is equally important for organization. Since individuals form the bulk of the organization, they must establish the necessary forms and processes to enable organizational learning in order to facilitate change.

However, according to Popper and Lipshitz (1998:167), collective level hypothetical construct does bridge the gap between learning in and learning by organization. They also assert that two forms of OL must be distinguished. Learning in organization means that how individual learning becomes organizational. By contrast, Learning by organization is focused on anthropomorphism. This approach is the attribution of human form or qualities to nonhuman entities (Popper and Lipshitz, 1998: 162).

It is difficult to understand the relation finding the organization's pattern of activities (Cook and Yanow, 1993). So, Popper and Lipshitz (1998) also suggest the notion labeled organizational learning mechanism. As a operational mechanism of learning in organization, OLM (Organizational Learning Mechanism) is heavily relied on individuals' psychological aspect as well as structural and other facets (i.e., cultural and contextual facet). Studying organizational learning, we have to consider understanding of the context of OLM and analyzing, and its integration. This is because integrated and dual-purpose OLM can create synergy. They reduce the gap between learners and doers. So, lesson-learned will be implemented and that implementation will be closer to original intentions (Lipshitz et al., 2002).

How to occur organizational learning is related with whether or not discoveries, inventions, and evaluation of individual members are embedded in the organization's theory-in-use or shared mental model (Argyris and Schon, 1978). To introduce this notion, Argyris and Schon (1978) borrow mental model concept.

Organizational learning with concrete structural and procedural arrangement of actions by organizational members are understood that learning are followed by observable change in the pattern of members' activity. So, we need to find the interaction effect between the factors to generate and facilitate OLM.

Extension of Fuzzy DEMATEL

DEMATEL

The Decision Making Trial and Evaluation Laboratory (DEMATEL) can reflect the relations between cause and effect of criteria into a model, and be used as a way to cope with the inner dependences within a set of criteria derived from system model (Tseng and Lin, 2009:158). Also, this method has been widely used in many areas such as system control, service quality, group decision making (Hori and Shimizu, 1999; Sankor and Prabhu, 2001; Liou and Tzeng, 2007; Lin and Wu, 2008).

The matrix reflecting comparative strength between criteria is $A^*$. $A = \lambda \cdot A^*$ where $\lambda = 1/(\text{the largest row sum of } A^*)$. The normalized matrix $A$ is
calculated. From \( \lim_{\theta \to \frac{\pi}{2}} A^\theta = [0] \) then \( T = A + A^2 + A^3 + \cdots + A^k = A(I - A)^{-1} \). Direct/indirect matrix \( T \) is also called total-relation matrix summed up separately. Where column sum(D) and row sum(R) respectively refer to \( T = [t_{ij}], i, j \equiv 1, 2, \ldots, n \).

\[
R = \left[ \sum_{i=1}^{n} t_{ij} \right]_{1 \times n}, \quad D = \left[ \sum_{i=1}^{n} t_{ij} \right]_{n \times 1}
\]

A causal diagram can be acquired by mapping the ordered pairs of \( (D_i + R_i, D_i - R_i) \), where the horizontal axis(D+R), named "prominence", is made by adding \( R_i \) to \( D_i \) and vertical axis (D-R), named "Relation", is named by subtracting \( R_i \) from \( D_i \)(Lin and Wu, 2004). Where, \( D \) value denote the total effect of a factor on any other factors, while \( R \) denotes the total effect of any other factors on a factor(Hsu et al., 2008). Where the \( D_i - R_i \) is positive, the criterion belong to the cause group. And, if the \( D_i - R_i \) is negative, the criterion belongs to the effect group. Causal diagram represented shows the complicatedly interwoven relations between criterion into a visual structural model(Tseng and Lin, 2009).

**Fuzzy Set and Integration**

According to Bellman and Zadeh(1970), problems involving imprecision, constraints and possible action in social science area are not precisely in description. Human being's subjective that are vague and imprecise affect research result(Tseng and Lin, 2009:122).

To overcome this difficulty, this paper takes into account fuzzy set theory because fuzzy logic, each number between 0 and 1 indicates a partial truth, can represent and tackle vague or imprecise judgment mathematically(Al-Najjar and Alsyouf, 2003; Wu and Lee, 2007). Especially, linguistic process can convert linguistic terms into fuzzy numbers(Tseng and Lin, 2009). In this section, we review briefly some essential definition of fuzzy logic(Gupta, 1991)

**Definition TFN(Triangular Fuzzy Number)** \( \tilde{N} \) defined as a triplet \((l, m, u)\), and the membership function \( \mu_{\tilde{N}}(x) \) representation are defined below

\[
\mu_{\tilde{N}}(x) = \begin{cases} 
\frac{(x - l)}{(m - l)}, & l < x \leq m \\
\frac{(u - x)}{(u - m)}, & m < x \leq u \\
0, & x < l \text{ or } x > u
\end{cases}
\]

where \( l, m, u \) are real numbers and \( l < m < u \).

Theorem Let \( \tilde{N} = (l, m, u) \) be a triangular fuzzy numbers \( k > 0 \) a crisp number, then

\( k \times \tilde{N} = (kl, km, ku) \)

Theorem Let \( \tilde{N}_1 = (l_1, m_1, u_1) \) and \( \tilde{N}_2 = (l_2, m_2, u_2) \) be two triangular fuzzy numbers. The addition and subtraction operations of \( \tilde{N}_1 \) and \( \tilde{N}_2 \), denoted by \( \tilde{N}_1 \oplus \tilde{N}_2 = (l_1 + l_2, m_1 + m_2, u_1 + u_2) \) and \( \tilde{N}_1 \ominus \tilde{N}_2 = (l_1 - l_2, m_1 - m_2, u_1 - u_2) \) respectively, yield another triangular fuzzy number.
Theorem Let \( \vec{N}_1 = (l_1, m_1, u_1) \) and \( \vec{N}_2 = (l_2, m_2, u_2) \) be two triangular fuzzy numbers. The multiplication of \( \vec{N}_1 \) and \( \vec{N}_2 \), denoted by \( (l_1 \times l_2, m_1 \times m_2, u_1 \times u_2) \), is not a triangular fuzzy number (Li, 1999).

However, the following property provides an approximation formula to regard \( \vec{N}_1 \otimes \vec{N}_2 \) as a triangular fuzzy number.

Theorem Let \( \vec{N}_1 = (l_1, m_1, u_1) \) and \( \vec{N}_2 = (l_2, m_2, u_2) \) be two positive triangular fuzzy numbers, \( \vec{N}_1 \otimes \vec{N}_2 \) approximates a triangular fuzzy number \( (l_1 \times l_2, m_1 \times m_2, u_1 \times u_2) \) (Laarhoven, 1983), i.e., \( \vec{N}_1 \otimes \vec{N}_2 = (l_1 \times l_2, m_1 \times m_2, u_1 \times u_2) \).

Definition Linguistic variables are used as variables whose values are not numbers but linguistic terms (Zadeh, 1975). As can be seen, linguistic value can be represented with triangular fuzzy numbers commonly used. Especially, the method can be used decision-making area to express assessment and to deal with ill-defined situations in traditional quantitative expression (Lin and Wu, 2004).

Emerging Organizational Learning Mechanism with Systemic Approach

The concept of OLM firstly introduced by Popper and Lipshitz (1998, 2000) as the conceptual framework of rational information processing (OLM). Organization need to and has to develop information processing mechanism with knowledge stockpiling (Daft and Weick, 1984). OLM can not serve as a producing outcome for organization. Many researches suggest OLM need to be supported by cultural, psychological, policy, and contextual facet of organization (Lipshitz et al., 2002; Schechter, 2005, 2008).

Organizational learning is not a simple sum of individual members’ knowledge (Lipshitz and Popper, 2000), or an organizational process performed by the entire organization in a uniform fashion. Rather, it is an assemblage of loosely linked sub-processes performed by a wide variety of OLMs, in which different organizational units participate in different ways and at different intensities. In addition, no organization can truly be classified as a learning organization.

According to Argyris and Schon (1996), the definition of OL as the detection and correction of error, including the discovering and exploring of its opportunity. This means that the organizational learning process is same as a cyclical process, involving the evaluation of past behavior, the discover of error or opportunity, the invention of new behavior and their implementation (Lipshitz and Popper, 2000:6).

The cyclic process generates productive learning and it serves catalyst as a OLM. They also suggest that productive learning is a process: conscious and systemic, yielding valid information, resulting in actions intended to produce new perception, goals, and behavioral strategies.

The systems concept takes into account organizations as interactive with their environment. The success of organizational learning also continuously have to meet
the condition the factors or facet generating organizational learning process interact each other. In doing so, systems are usually considered to be evolving or self-organizing into something new. This approach based on complexity paradigm beyond system theory (Ferlie, 2007:155; Beyon, 2005).

In this aspect, we have to take into account systemized mechanism to evolve capacity for organizational learning. According to Amagoh (2008), a system comprises of subsystems whose inter-relationships and interdependence move toward equilibrium within the large system (Martinell, 2001; Steele, 2003).

However, the systems model does not specify when and how collaboration with the organization need to take place. That is, differentiating boundaries and transformations are not always easy when organization have multiple nodes of interactions and communication line, i.e., systems complicatedly interwoven generate unpredictable behavior. In complex situation, it is difficult systems theory to provide answer to how organization need to address (Castells, 1996).

We expect to generate a synergy effect and an interaction effect to produce creative learning capacity. The functions of an organizational learning system serve as critical linchpins to each other to develop and arrange the different facets of OLM. It also depends on developing facets of the learning mechanism and transforming the model into a numerically related map.

In this aspect, we need to take into account systemized mechanism to evolve capacity for organizational learning. By integrating complexity and systems theory, the disruptive and fluid process of synergy effect of organizational learning. Popper and Lipshitz (1998, 2000) and Lipshitz et al. (2002) suggested five facets of OLM. We have briefly exam the notion and component of factors, serving as critical factors to analysis of dematel.

**Structural Facet**

If structures represent the relatively tangible “hardware” of organizational learning, culture represents its “software.” According to Popper and Lipshitz (1998), organizational learning has two facets: the relatively tangible “hardware” and the intangible “software” facet. The former consists of learning mechanisms, and the latter, shared values and beliefs.

**Cultural Facet**

The cultural facet is classified into five norms that provide valid information for corrective action: transparency, integrity, issue-orientation, inquiry, and accountability. These norms are the observed manifestations of a set of shared values that contribute toward an organizational culture that is conducive to productive learning.

**Psychological Facet**

Psychological safety is a very important factor for the success of organizational learning, because it serves to maintain the willingness to learn. In the
organizational learning process, learning is accompanied by various risks and failures. To overcome these, an individual’s psychological safety need has to be seriously considered.

**Policy Facet**

For facilitating organizational learning, Popper *et al.* (2000) suggest the following: commitment to learning, tolerance for errors, and commitment to the workforce. We will briefly discuss the component consisting of the policy facet of organizational learning.

**Contextual Facet**

The contextual facet is considered an exogenous factor in learning mechanisms (Popper *et al.*, 2000). The authors also suggest five components of the contextual facet. Their approach shows that they applied the systemic approach by determining evolving organizational learning.

![Figure 1: Components of OLM](image)
References


Appendix

Questionnaire for Organizational Learning Mechanism

Dear respondents!

This is an academic research about "Using fuzzy extension of DEMATEL method to explore the interaction effect of factors generating organizational learning mechanism". The purpose of this questionnaire is to explore the factors generating OLM, related to performance evaluation. This questionnaire also consists of two subject. One is related with fuzzy numerical evaluation. The other is related with DEMATEL method.

We are greatly impressed by your career, outstanding achievement in this field, if we could have the honor of your precious opinion, the result and credibility of this research will be tremendously benefited. All the information provided will be used for academic statistical analysis only, and will not be separately announced to the outside or transferred to other applications.

Therefore, please feel at ease in filling out the answer. Your support will be very crucial to the successful completion of this research. We sincere hope that you would spend some time to express your opinions to be taken as reference for this research. Please accept out most sincere appreciation. Thank you and wish you all the best.

Step 1: Introductions for filling out the questionnaire

This questionnaire is divided into five steps: (1) introductions for filling out the questionnaire; (2) facets and components description; (3) fuzzy numerical evaluation; (4) comparison of the impact of the five facets of OLM for DEMATEL method, the component of each facet and overall components; (5) evaluating the composit importance of each facet and component; (6) personal data.

Step 2: Description of facets and criteria

Organizational learning mechanism questionnaire contains several facets: structural, cultural, psychological, policy, and contextual facet. Each facet has the components consisting of the facets. They also interact each other between facets as well as components. Especially, the model as below is based on system theory. So, the facets and components are complicatedly interwoven within organization system. In doing so, organizational learning mechanism will emerge and organize.
The figure represents overall facets and components generating OLM and each area of it.

- **Facets of OLM**: Structural, Cultural, Psychological, Policy, Contextual

- **Components within facets**:
  - Structural: Transparency, Integrity, Issue orientation, Inquiry, Accountability
  - Cultural: Psychological safety, Organizational commitment
  - Psychological: Tolerance for error
  - Policy: Commitment to learning, Commitment to the workforce
  - Contextual: Error criticality, Environmental Uncertainty, Task structure, Proximity to core mission, Committed leadership

These things are applied to this questionnaire. Please consider the interaction and mechanism based on system theory during your evaluation.

**Fuzzy Numerical Evaluation**

The questionnaire suggested is about your evaluation toward organizational learning mechanism. Please answer this questionnaire according to your subjective perception of organizational learning mechanism.

This questionnaire adopts a likert-type-five point scale. It has five different linguistic terms, based on "influence", as {very high, high, low, very low, no}. It is on a fuzzy five level scale through which its range is defined (range lies between 0 to 100). Give a score between 0 and 100 to indicate three different scale (i.e., low, medium, high)- TFN(Triangular Fuzzy Numbers). For example, you might think evaluation level a linguistic score of "very high influence", that score would or correspond to a TFN of (75, 90, 100) respectively. please answer this questionnaire according to your perception. The example of TFN is represented as below.
**Example**

<table>
<thead>
<tr>
<th>TFN influence</th>
<th>Linguistic value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>4. very high</td>
<td>75</td>
</tr>
<tr>
<td>3. high</td>
<td>50</td>
</tr>
<tr>
<td>2. low</td>
<td>25</td>
</tr>
<tr>
<td>1. very low</td>
<td>0</td>
</tr>
<tr>
<td>0. no</td>
<td>0</td>
</tr>
</tbody>
</table>

Please filling the blank as below !

**STEP 4 :** Comparison of the impact of five facets of OLM

Method for filling out : Filling factors influence level

0. No influence (No)
1. Very low influence (VL)
2. Low influence (L)
3. High influence (H)
4. Very high influence (VH)
However, if you fill out blank, please consider Triangular Fuzzy Numbers instead crisp value. This is because this research applies fuzzy extension of DEMATEL (The Decision Making Trial and Evaluation Laboratory). So, in DEMATEL method, TFN also maintain, and then the triangular fuzzy numbers will be converted to crisp value with CFCS (Converting Fuzzy into Crisp Score: Opricovic & Tzeng, 2003).

Example

If you consider the influence degree of A to B is high influence, you will fill 3 under B column, shown the figure. However, if you filled out TFN (Triangular Fuzzy Numbers) as (50, 75, 100) in step 3, it is considered in actual calculation instead crisp value 3. So, please consider this type of Fuzzy numerical evaluation and its mechanism during your evaluation.

Now, please filling the blank of influence degree between facets, components within each facets, and all of the components each other.
Comparison of Impact of Facets

<table>
<thead>
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<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>F1. Structural facet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F2. Cultural facet</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>F3. Psychological facet</td>
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<td>F4. Policy facet</td>
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<tr>
<td>F5. Contextual facet</td>
<td></td>
<td></td>
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</tbody>
</table>

0. no influence
1. very low influence
2. low influence
3. high influence
4. very high influence
The Role of Religions in the Process of the Political and Economical Development in South Korean

You, Bung-Hee (Dankook University in Korea)
Lee Won-Oh (Dankook University in Korea)

Abstract

During the last 60 years, South Korea has been achieved remarkable progress in terms of the political system and economy. However, it is questionable in relation to the area of mental health and quality of life. Now a day, the rate of suicide, mental illness and divorce have been increased rapidly. And so many crime and social problems related to mental health occur. It is the time to ask the role of regions in the South Korean society. Especially, we have to understand the impact of the religions on the process of Korean economic development.

The role of religion in Korea has changed according to the political situation. Under the powerful authoritarian government, religion is subordinate to state, but as the state becomes democratic and secular, the religion tends to influence on the state. Whether religion effects on the economic and political development of the state is in question. It seems that its influence was not as strong as we expected. Rather with the absence of the state religion which sticks to a certain value system and way of life, the Korean politics and economy could be developed freely. In other words, in the multi-religious society, it was easy for the authoritarian government to pursue its own secular goals such as accumulation of wealth, pursuit of individual benefits, and development ideology without any intervention of religion. However, in the process of economic development the fundamental virtues of religion such as the respect for life, love, harmony, faith, self-sacrifice, and humility were neglected. Those virtues are crucial to the sophisticated society of today.

Keywords: Religions, Process of the political, Economical development.
Introduction

Under theocracy in ancient times, state often degenerated into a tool to realize religion's creed or ideology. Religion and politics were inseparably intertwined. The separation of politics from religion in history began with the philosophy of Enlightenment in 16th century. With the philosophy of Enlightenment, human beings' concern was changed from spirituality of supernatural beings to human beings. As a result, the relationship between religion and politics was re-established. When the Royal authority was absolute in 17th and 18th century Europe, Kings and Queens took advantage of religion under the theory of Divine Right of King. Today though there are still many countries where religious creed is one of the very important actors to determine human being's way of life (for example, in Arab world), in most countries democracy gradually has supplanted theocracy. Therefore, now it's time to define the relationship between religion and politics again.

In Korea, religions (Buddhism in Goryeo dynasty and Confucianism in Choseon dynasty) had provided the state's ruling ideology to rulers and the way of life to people. After the Independence from Japan, Korea has undergone a rapid change not only in politics and religion but also in society as a whole. Politically, there were South-North divisions, the rule of US military government, the Korean Civil-War, and the military Coup d'etat, etc. In religion, the age of religious freedom and multi-religious society had come. In this situation, the interaction of religion and politics became very complex and had important influence on the life of people. The purpose of this paper is to examine the relationship between the two and how religion has influenced on society in the process of Korea's political and economic development from the Independence (1945) to today. For convenience, the time from the Independence to today into three periods: National Building Period (NB), Economic Building Period (ED), Political Development Period (PD), and Culture and Welfare Period (CW).

While Korea became a multi-religious country after the Independence, under the authoritarian government, only the three principal religions survived successfully: Protestant, Catholic, and Buddhism. Still there are many religions, but their influence on society is weakened under the past regimes or their inner conflicts. Confucianism, the state religion in Chosun dynasty declined rapidly due to its inner conflicts, the intervention of the authority, the absence of its religious pundit, and above all its opposition to the separate independence in US military government and Lee Seung Man regime. Cheondogyo, another leading religion in late Chosun dynasty, most actively took part in the opposition movement of separate independence, and some of its leader even went to North Korea to accomplish their goals. US Military Government and Lee Seung Man Regime counted them as the leftist and it was subject to decrease.
<table>
<thead>
<tr>
<th>Religion</th>
<th>Year</th>
<th>1995</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Religion</td>
<td></td>
<td>21,953</td>
<td>22,070</td>
</tr>
<tr>
<td>Buddhism</td>
<td></td>
<td>10,321</td>
<td>10,726</td>
</tr>
<tr>
<td>Christianity</td>
<td></td>
<td>8,760</td>
<td>8,616</td>
</tr>
<tr>
<td>Catholic</td>
<td></td>
<td>2,951</td>
<td>5,146</td>
</tr>
<tr>
<td>Confucianism</td>
<td></td>
<td>211</td>
<td>105</td>
</tr>
<tr>
<td>Won-Buddhism</td>
<td></td>
<td>87</td>
<td>130</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td>268</td>
<td>247</td>
</tr>
<tr>
<td>Population</td>
<td></td>
<td>44,551</td>
<td>47,040</td>
</tr>
</tbody>
</table>

**Table 1: The Ratio of Religious Population**

**Nation Building Period:**

In Chosun dynasty, Confucianism was the state religion. The Confucian way of life was dominating in every part of society. But, with the collapse of Chosun dynasty and the Japanese occupation, the influence of Confucianism decreased rapidly. Under the chaotic state after the Independence, there were no leading religions and keeping the traditional way of life was also threatened. There were Confucianism, Buddhism, Cheondogyo, Dae religion, Protestant and Catholic at the same time. Korea had never had such diverse religions and religious freedom before. During US military government period, one of the most important goals of the government was to establish Pro-American and anti-Communist government in South Korea. No religion being dominant at the time, the government's policy was to support religions which agreed the separate independence and to oppress the ones which objected to it.

As traditional religions, Buddhism, Confucianism, and Cheondogyo considered that the unification of Korea was more important than being communist state or anti-communist one. Unlike Christianity, they didn't have much knowledge about Communism. They severely opposed to separate independence. During this period, to traditional religions, one of the most urgent issues was to expel pro-Japan members from their orders. There were many conflicts between two, sometimes three sects within same order and many reform movements arose in each order.
US military government could not allow their opposition. It took side with each minority group rather than majority group because it was easy to control the minority group. As the minority group in each religion got power to fight against the majority group with the help of the government, it could not but depend on the government. In the case of Buddhism, Dae Cheo, the married Buddhist priest was the majority and the Bhikku (Buddhist Monk) was the minority group at the time. With the help of the government, Bhikku could fight against Dae Cheo. The government regarded the reformer group in which most of Dae Cheo members included as the leftist and broke up the organization. The Buddhist order as a whole, slowly began to depend on the authority.

Meanwhile Protestant and Catholic which experienced Communism's persecution in Russia and Europe had strong aversion to Communism. Their anti-Communism ideology agreed with the government. Furthermore, Protestant had come to Korea by American missionaries, and people in the government were also Protestants. Between the government and Christianity as a whole, it had formed strong bond of sympathy. The government strongly supported Protestant and Catholic but ignored or oppressed the traditional religion as superstition or the leftist. With designating Christmas a national holiday, Christians' privilege in confiscating Japanese property, and above all the policy of authorized church register, Protestant became a quasi-state religion under the US Military government.

Lee Seung Man, who was educated in America and himself a Methodist, joined the independence movement in China. When he came to Korea to become a president, he didn't have any strong support groups in Korea. Therefore he tried to overcome the lack of support groups within the country with Pro-American, anti-Communism and authoritarian sovereign power. Anti-Communism became a tool for authoritarian ruling ideology. Lee succeeded US Military government's policy on religion. His ruling system was strengthened after Korean War in 1950. He began his inaugural ceremony with Christian prayer allowed the military ordinariate only to Protestant and Catholic. The more his regime was corrupted and his support base was weakened, the more he intensified his biased policy for Protestant. In turn, Protestant strongly stood by him.

Early in his term, Lee had very close relationship with No Ki Nam, Seoul Catholic parish priest. With this relationship, he aimed at getting support from European countries. However, during the Korean War, some of Catholic priests questioned about the meaning of war and suffering. They became skeptical about the war and also criticized the regime's corruption in morality. "The Association Broadcasting Incident" (1950), "the Massacre of Civilians in Geochang" (1952) and "the Incident of National Guard" (1951) were the incidents which made a wide gap between the order and the regime. Finally his government committed a terror to the Kyung Hang Daily News owned by Catholic and he sent the Minister of Justice to Vatican to ask for No Ki Nam's dismissal.
Lee firmly applied "divide and control" strategy to Buddhism. As US Military

government did, he strongly supported Bhikku over Dae Choe and openly intervened

in their conflicts. Chong Moo Won, the Bhikku organization depended on the regime

and voluntarily participated in the 3.15 fraudulent election.

By and large, this period was characterized as multi-religious one. The
collapse of traditional religions provided opportunity for the ordinary people to be
free from traditional patriarchal system. The presence of Christianity led the country
to more westernized and modernized way of life. In some way, this chaotic period
formed a foothold of Korea's political and economic development without any
pressure of one dominant religious creed.

Economic Development Period

Park Jung Hee(1963-1979) and Chun Doo Whan(1979-1988) regime

The economic development period which formed the basis of present Korean
economy, began with the 5.16 Military Coup d'état. Early in this military Regime, the
government tried to overcome their lack of legitimacy through strong authoritarian
power with pro-America, anti-Communism and development ideology. Though the
government was inclined to have close relation with America and its state polity was
officially anti-Communism, Park had affinity with traditional religion rather than
Christianity. He even attended one of the ceremonies of Cheondogyo and pronounced
that some of his ancestors were advocates of Cheondogyo (however, when its leaders
go to North Korea, he oppressed Cheondogyo as the leftist.)

By making "the Religion registration law", in which all religion must be
validated by the government, the regime tried to get information about the resources
and members of all the religions and control them. Protestant, at large, kept friendly
relationship with the government in spite of its authoritarian ruling system. The
fundamentalism in Korean Protestant is not interested in participating in political and
social problems, so they were discreet in criticizing the authority. Rather, Protestant
was the one group that stood to benefit from the regime most. From the colonial
period, Protestant had been associated with Westernization and modernization. With
industrialization and urbanization, those features stand for wealthy nation which
development ideology pursues. So the development ideology was naturally linked
with Protestant. Moreover, Protestant emphasizes on wealth as God's Bliss and related
the material abundance to faith. In a sense, Korean Protestant at the time was prone to
be Bliss-seeking religion. It suited to contemporary trend and Protestant extremely
expanded congregation and the rate of increase of believers was 412.4% during this
period. With this power, Protestant could prevent the government from enacting any
law against their religion and avoid paying any corporate tax and income tax( except a
few cases, they are still exempt from paying taxes). Of course, there were small
groups such as the National Council of Churches that resisted against the dictatorship
but their influence was infinitesimal.
Vatican approved the military regime just after the Coup t'etat regarding it as a defender of anti-Communism. The relationship between the regime and Catholic was very friendly at first. However, the regime's dictatorship, corruption, ignorance of human rights and long-term hold of the power gradually made Catholic go against the authority. After the second Vatican Council which pronounced the positive participation in labor movement, social absurdity and civic movement, Catholic actively resisted against the authority. A series of incidents, "Simdo fabric affair"(1967), bishop Ji Hak Soon's arrest(1974), and organizing "the Catholic Priests Association for Justice" made the relationship worse and worse.

The Park regime was slanted in favor of the Buddhist Jogye order( the former Bhikku) as the past regimes did. The conflict between Bhikku and Dae Cheo still went on but as the government made the Jogye order the only validated sect in Buddhism, the Jogye order became the biggest order in Buddhism and the only Buddhist sect which go a permission to join the military chaplain. In 1962, the government passed "the Property management law for Buddhism . According to this law, all of the Buddhist property lay under the government. The Buddhist priest could be an owner of the temple but the management of it belonged to the designated person outside of the temple. Usually this person was appointed by the government and the right to buy and sell temples was also under the government. Due to this law, Buddhism faced turmoil. There were continual law suits on the ownership of temple. After 1970s, the government stopped favoring the Jogye order and approved the Dae Choe (the Tae Go order) and other minority sects. In 1975, the government made Buddha's birthday as a holiday. Through this process, all the Buddhist sects, as a whole, came to be attached to the regime. Whenever the regime was threatened by resistant groups or in danger, they held a Buddhist ceremony for the regime as religion of defending state.

Under Chun Doo Hwan regime, the relationship between religion and politics slowly changed from subordinate to conflict relation. His presidency was unexpected to people and his controlling power was not as strong as Park's. Under the another authoritative military government, not only Protestant and Catholic but also Buddhist joined the resistant movement.

Park Jung Hee and Chun Doo Whan regimes were the most authoritarian and powerful regimes in modern Korea. According to Park's strong will to make Korea a wealthy developed country, the state often had intervened every level of society. He pronounced "the family rite standards" and was willing to play a role of ethical teacher. Wearing too short mini skirt for woman and long hair of boys were all illegal. Government became a quasi-religion. As a great religion, Protestant permeated all levels of society and gave comfort to middle and lower classes that were inflicted with sense of lost and alienation in the process of country's industrialization.

As mentioned above, from this period, the progressive group in each religion began their resistance to authoritarian system. Later they contributed to state's democratization. But it also resulted in the inner conflict with the conservative group.
The Political Development Period


Korea has undergone a rapid democratization process since the late 1980s. After the successful transition from an authoritarian-military regime to a democratic one, Korea entered the next stage of democratization, that is, democratic consolidation. During this period of democratic consolidation, the relationship between religion and politics also changed. The more the nation got democratic, the more it became desacralized or secularized. The government not only lost its influence on religion but also had no intention to intervene matters of religion. But passing through various stages of government's support and oppression, three principal religions became to have big congregation and tremendous influence on society. Under this circumstance, the government's main concern was how to deal with religion without making any problems. One of the most important tasks of the government was not to make any one of these religious group anti-government or anti-establishment. They tried to strike a balance among three religions by giving preference of tax or subsidy.

To balance the nation's privilege on three religions, most of the restriction on Buddhism were lifted. In 1987, the authority abolished Buddhist property management law and enacted "the preservation law for the traditional Buddhist temples" and it returned much of the Buddhist property to Buddhist order.

In this period, the main issue in the area of religion can be summarized into two matters: the competition among religions to get benefit from the government (especially between Protestant and Buddhism) and the conflict between the conservative group and the progressive one within each religion.

As the influence of the government on religion was weakened, the only way for the government to control religion was through tax exemption and subsidy as mentioned above.

From the late 1970s, Catholic and Protestant progressive group began to take part in the democratic movement. Their participation in social and political problems was quite successful in this period. However, in protestant, this progressive group was a minority group. The majority of Protestant was conservative and authoritative privileged group that had a long history of government's preference. From 1970 to 1980, the progressive group took lead in social movement while the conservative group led a secure life, but since 1990, the conservative one has led the social movement with the appearance of Kim Dae Jung and No Moo Hyun regime.

In this period of political development, religion itself played double roles by the division of each order. While the conservative groups supported government, the progressive groups were constantly involved in the movement. The conflict of two groups emerged to the surface. The state tried to be a fence sitter on the subject of
religion and was reluctant to have relationship with religion. In the process of political development the relationship between religion and politics became ambiguous by religion's support and resistance and government's involvement, neutral attitude.

Culture andelfare Period
No Moo Hyun regime(2002-2007) and Lee Myung Park regime(2007-2012)

In early 2000s, Korea was stabilized politically and economically. The era of culture has begun. With the state's policy of non-involvement, the conflict of conservative group and the progressive group becomes more intensified and materialized. The conservative group tried to influence on government to keep their power and economic benefit. One of their efforts was realized as Lee Myung Park, a devout Christian, became a President. As religion participates in the campaign to influence on election, many political parties are eager to make policy favoring religion. The relationship between religion and politics seems to be inverted.

In the democratic open society, the civic movement and the media would play a government role against religion. The laity had double membership as believers and citizens. As a believer, he or she is subordinated to the order, but as a citizen, he or she can surveil, refrain or regulate the order. At any time the laity in any religion can be the check power against their order as reformers. As the three principal religions in Korea became great religions and their leaders got tremendous influence on the order, their misbehavior and corruption were the big issue in the orders. The laity became restraint of influence. They had been passive believers but they came to actively participate in the management of the order.

Since late 1980s, Protestant missionary works in the country as well as abroad have been controversial issue in the media. The murder of Kim Sun Il by Iraqu terrorists(2004), the abduction and murder of two Sam-mul church missionaries by Afghani Talebans(2007) were big issues. The Protestant admired them as religious martyrdom, but those incidents reflected badly on the media and the ordinary people.

When Lee Myung Park, a devout Christian himself, became a President, there seemed to be a partial throwback to authoritarian, pro-Protestant political structure.

He favored Protestant, especially the conservative group. In 2010, there were temple-stay budget cuts and the omission of the name of temple in the national map. Also in 2011, he knelt down in front of a minister. A series of these events were severely criticized by the Buddhist order as well as the civilians. His party lost a 2010 election due to anti-campaign against the Han-Nara Party candidates by Catholic, Buddhist, and the Protestant progressive groups. In the end of the regime, he had no choice but keep those religions in balance.
Table 2: The Relationship between Politics and Religion in Korea

<table>
<thead>
<tr>
<th></th>
<th>Nation Building Era</th>
<th>Economic Development Era</th>
<th>Political Development Era</th>
<th>Cultural &amp; Welfare Era</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Politics</strong></td>
<td>Strong state authoritarianism oppression of traditional religion</td>
<td>Strong state authoritarianism State: Quasi-Religion. Ethical teacher</td>
<td>Middle state authoritarianism avoiding intervention in religious matters</td>
<td>Weak state authoritarianism trying to get supports from religious groups in election</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td>Religious pluralism: seeking for government support</td>
<td>Religious Groups: expansion depending on government policy. Progressive groups appeared</td>
<td>Conservative and Progressive Groups divided. Conservative was for and progressive was against the government</td>
<td>Religious groups tried to influence government through voting</td>
</tr>
<tr>
<td><strong>Relationship between Politics and Religion</strong></td>
<td>Subordinate relationship</td>
<td>Subordinate relationship</td>
<td>Conflict and ambiguous relationship</td>
<td>Symbiotic relationship</td>
</tr>
<tr>
<td><strong>Impacts on the society</strong></td>
<td>Without concerning about the religious ethical and traditional way of life, the state could lead the society</td>
<td>The state became an alternative religion, play the role of the ethical teacher. The secularization of society was possible.</td>
<td>Joining in the antigovernment movement the progressive religious groups contributed in the political development.</td>
<td>With secularization, weaken the ethical creeds in the society. A desirable relationship between two has to be redeveloped.</td>
</tr>
</tbody>
</table>

**Conclusions**

The relationship between religion and politics in Korea has changed according to the political situation. Under the powerful authoritarian government, religion is subordinate to state, but as the state becomes democratic and secular, the religion tends to influence on the state. Whether religion effects on the economic and politic development of the state is in question. It seems that its influence was not as strong as we expected. Rather with the absence of the state religion which sticks to a certain value system and way of life, the Korean politics and economy could develop freely. In other words, in the multi-religious society, it was easy for the authoritarian government to pursue its own secular goals such as accumulation of wealth, pursuit of individual benefits, and development ideology without any intervention of religion. However, in the process of economic development the fundamental virtues of religion such as the respect for life, love, harmony, faith, self-sacrifice, and humility were neglected. Those virtues are crucial to the sophisticated society of today. The task of religion in the future will be practice those virtues in life and the task of government.
should be to help religion realize that goal. It's time to readjust the relationship between religion and politics.

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E-Government Global Strategy in Korea

- Focused on Global ICT Cooperation and ODA Strategy-

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Abstract

The Korean e-Government began with the e-Government portal site (www.egov.go.kr) on November 1, 2002. After going through continuous efforts in e-Government and national informatization, Korea has become one of the global e-Government leaders - obtaining the highest scores in ‘E-government Development Index’ and ‘E-participation Index’. In addition, many of Korea’s e-Government practices until now have been introduced to the world as the best cases and received worldwide acknowledgement.

The success factors of Korean e-Government are summarized as a strong political leadership, clear vision and policy objective, project’s strategic priority and human & financial resource distribution. Korean government’s experience and know-how will be shared in e-Government with the Asian countries by promoting joint projects with international organizations and exporting e-Government systems to foreign countries. Furthermore, Korea will work to contribute to the narrowing of the digital divide between countries by helping developing countries through ICT official development assistance (ODA).

e-Government development remains a distant hope for many of the least developed countries due to the cost of technology, lack of infrastructure, limited human capital and a weak private sector. In December 2009, Korea joined the OECD Development Assistance Committee (DAC) and officially became an advanced donor. Therefore, Korea’s overseas aid projects are expected to increase and be carried out in a more systematic manner. Also in the area of e-Government, the importance of not

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only the overseas aid ‘in ICT’ itself but also the overseas aid ‘through ICT’ is increasing along with the expanding scale for more efficient and influential support. The ICT and policy assistance program for developing countries is a knowledge-transfer initiative that provides Korea’s experiences in informatization or technical assistance. The Korean e-Government is now progressing; however, it still has a long way to go to reach full interactive service delivery and government integration.

Keywords: Governance, e-Government, ICT Cooperation, Collaboration, ODA

Introduction

Korea began to channel efforts into laying the foundation for an e-Government since the late 1970s. Through the Five National Computer Network project of the early 1980s, the Comprehensive Plan for Korea Information Infrastructure Establishment project, and the National Basic Information System project of the late 1980s, the Korean government established a high-speed communications network and stored vital government records—resident registration, real estate, and vehicle records—in a digital format to create the foundation for an e-Government.

Through projects such as the Master Plan for Informatization Promotion and the Cyber Korea 21 project in the 1990s, information technology has been applied to enhance key government functions such as levying custom duties and approving patents while also fostering interagency collaboration. In January, 2001, President Kim Dae-jung announced a national vision for building a knowledge-based information society and gave a presidential order to the presidential secretary of the Cheong Wa Dae Policy Planning Bureau to organize the Special Committee for e-Government. The Committee selected 11 major e-Government initiatives and reported the successful completion of the project (October 2002) to President Kim Dae-jung.

The creation of an e-Government platform is necessary to keep ahead with the emergence of a new paradigm that will change government practices and services in the 21st century (NPR, 1997; Accenture, 2001; Deloitte Consulting, 2001). E-Government will play a key role in expanding national competitiveness (OECD, 2003). An e-Government initiative is the most effective citizen-centered system
available to meet the needs of citizens and private businesses and will provide quality and faster government services. The government will become more transparent, effective, and accountable through an e-Government service and will expand the use of information technology among citizens and private businesses (Gartner Research, 2002).

The Republic of Korea has made major strides in Information and Communication Technology (ICT) over the last five decades. In 1960, Korea had a telephone penetration of 0.36 per 100 inhabitants, barely one tenth of the then world average. By 1981, Korea caught up with the world average. Now, Korea leads the world in broadband Internet access penetration. Korea is the leading example of a country rising from a low level of ICT access to one of the highest in the world.

Korea’s economic growth is often described as a miracle. Starting with a per capita income of less than US$100 in 1960, Korea averaged an annual economic growth rate of eight percent a year for the next five decades. By 2010, per capita income was US$20,000 and Korea’s economy ranked 13th in the world. The focus of growth has been manufacturing and exports. As Korea’s economy has matured, its manufacturing base has shifted from textiles, to chemicals, then machinery and later electronics. Today knowledge and information products and services play an important and increasing role in the Korean economy.

Korea’s emergence as the world leader in ICT – in field such as broadband Internet, semiconductors and third generation mobile and so on- it is not an accident. The government has specifically targeted this objective. It is no coincidence that the period of most intensive investment in broadband infrastructure corresponded with recovery from the worst effects of the Asian Financial Crisis in the late 1990s. Because the Korean government specifically planned this, despite the general level of austerity imposed by IMF’s conditions for their assistance.

After going through continuous efforts in e-Government and national informatization, Korea has become one of the global E-government leaders - obtaining the highest scores in ‘E-government Development Index’ and ‘E-participation Index’. Korea’s E-government Development Index ranking assessed by the United Nations improved from 15th in 2001 to the top in 2010 out of 192 countries worldwide, and its E-participation Index ranking was also ranked 1st in
2010, 2012 & 2014 (UN, 2010, 2012, 2014). In addition, many of Korea’s E-government practices until now have been introduced to the world as the best cases and received worldwide acknowledgement.

In addition, the level of Korea’s informatization is highly recognized by the world, as can be seen from the fact that Korea has ranked 1st for three consecutive years in ITU’s Digital Opportunity Index. The results of Korea’s e-Government services are selected as the best practices and their excellence is being acknowledged by the rest of the world. For example, with the e-Customs system called UNI-PASS that was established to complete an online export and import system for the first time in the world, Korea Customs Service won the WCO (World Customs Organization) Trophy in 2006 for intellectual property right protection with the fastest customs system among 169 member countries.

After joining the World Bank Development Gateway Foundation as a founding member in December 2001, Korea has provided technological and policy consulting service to developing countries based on its experience and success in informatization. The importance of official development aid/assistance (ODA) through informatization is especially gaining attention as Korea has joined the OECD Development Assistance Committee (DAC) and its status has significantly improved within international organizations.

Specifically, the fact that Korea was ranked at the top in the UN E-government Development Index assessment back in April 2001 and that its experience is being introduced as the best practice and benchmark implies that its informatization has reached the world-class level and Korea’s contribution to the international community needs to be increased to reflect its level of standing.

The Korean government has selected countries that have high potential in trade, economic, and E-government cooperation or those that are selected as ODA priority countries by the international community and has carried out various activities including ICT consultation, ICT Cooperation Center operation, and ICT learning programs.

Therefore, the main object of this paper is to verify that the implications of Korea’s e-Government experience for other developing countries will be discussed along with specific initiatives and programs. This paper examines the ICT cooperation
and ODA strategy in Korea focus on the global ICT initiatives from January 2001 to December 2014.

**e-Government Initiatives in Korea**

Korea’s informatization began in the late 1970s, when major administrative business processes were computerized in the areas including resident registration, real-estate and vehicles. In the 1990s, the focus of informatization shifted to unit-based or function-based processes such as those for passport patent and procurement administration.

Between 1992~1994 when the government structure was in a transition period from totalitarian government to congressional government, the interest in IT development by President Kim Young-Sam has somewhat diminished but in with the launch of Information Superhighway Project in USA in 1993, the government solidified its will once more by newly establishing the Ministry of Communication (MIC) and through High Speed Broadband Network Project. During 1998~2000, right after the Asian financial crisis, President Kim Dae-Jung’s interests were focused in restructuring of 4 major sectors to recover from the economic crisis and therefore, the president’s interest in e-government project has lowered but from 2001, the president’s will and interest solidified the e-Government Project as the strategic enabler with highest importance for government innovation (NCA, 2002). The history of e-government promotion in Korea is outlined in table 1.
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<thead>
<tr>
<th>Stage</th>
<th>Main implementation contents</th>
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</table>
| ICT Initial stage                         | • Introduction of computers to the statistics business of Economic Planning Board (1967)  
| (1960s ~ 1970s)                           | • Administration ICT 5 year basic plan establishment (1978)          |
| e-Government incubation period (1980s ~ 1990s) | • Administration ICT business (NBIS)  
|                                           | • National period of computing network business (1987)               |
| e-Government base preparation period       | • Establishment of ultra high speed information communication base  
| (mid 1990s ~ 2000)                        | • Framework enactment on ICT Implementation law                     |
| e-Government starting period (2001 ~ 2002) | • Implement e-Government 11 tasks  
|                                           | • Enact laws on e-Government (2001)                                 |
|                                           | • Prepared the base for linking and integrating government institutions and departments |
|                                           | • Implement e-Government 12 tasks based on opening, sharing and cooperation of businesses. |
| GOV3.0 with e-Government period            | • National ICT master plan establishment (2008)  
|                                           | • Data disclosure act (2013)                                       |
(2013 ~ Present)


The Korean government established the Special Committee of e-Government on January 30, 2001 in order to promote interagency collaboration in negotiating issues concerning the e-Government initiatives. The Special Committee for e-Government was established as a special committee under the Presidential Commission on Government Innovation, which is an executive branch committee. Therefore, the Special Committee for e-Government reports to the president as an independent body. 

The 11 e-Government areas are the basic framework for an advanced e-Government and core businesses for various ministries. Therefore, if these initiatives were fully implemented, it was expected not only will the people and companies benefit from the system, but also the transparency and accountability of the Korean government will be significantly enhanced.

President Kim Dae-Jung held a meeting for the ‘Report on the Completion of e-Government Infrastructure’ on November 13, 2002 with all ministers from each participating ministries in attendance. President Kim announced that 11 major e-Government initiatives were successfully executed and declared the opening of full-scale e-Government services (SCEG, 2003). Therefore, the Special Committee for e-Government was dissolved as of January 31, 2003.

The successful completion of the 11 e-Government initiatives were bring many changes to how the government operates and have a positive impact on citizens and private business. The inefficient use of the budget and human resources that were allocated to outdated procedures and functions have been reduced substantially. Efficient government services were boost productivity of private businesses and lessen the burden on civil servants who will no longer have to process redundant

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2 The main structure of the Special Committee for e-Government is based upon the committee’s working-level group which consists of civilians and directors of agencies. To support the working-level group, two working-level co-heads were appointed. One civilian and one high-level government officer(the presidential secretary of the Cheong Wa Dae Policy Planning Bureau) were appointed as co-heads.
procedures. The level of national competitiveness was increased in the long-term due to these e-Government initiatives (MOGAHA, 2003).


The Korean Roh, Moo-Hyun was elected in the 16th presidential election on December 19, 2002 and sworn in as President on February 25, 2003. The Roh administration established the Presidential Committee on Government Innovation and Decentralization (PCGID); its mission is to make the government of Korea more open, transparent, and closer to the people. With full support of the President, the PCGID has changed the way government works and transformed the government into an open, transparent, accountable and participatory government for the people.

The PCGID consists of the main committee, and five executive committees: Administrative Reform Committee, HR Management Reform Committee, Decentralization Committee, Fiscal/Tax Reform Committee, and e-Government Committee. The PCGID proposed the vision and strategy of e-Government of Roh, Moo-hyun administration in May 2003, as follows (PCGID, 2003a);

Upon his inauguration in 2003 President Roh prepared policy measures to further develop national informatization and e-government projects promoted by previous administrations. To promote government innovation in a more comprehensive and systematic way, the Presidential Committee on Government Innovation and Decentralization (PCGID) was established to deal with such issues as e-government, administrative reform, local decentralization and tax reform.

In 2003, the ‘Roh Administration e-Government Vision and Principles’ was announced, followed by the ‘e-Government Roadmap’. The e-Government Roadmap is composed of four areas of innovation, 10 agendas and 31 projects as shown below in table 5.

The e-Government Roadmap projects present grand ambitions for achieving the national vision and goals of Korea, which include (1) the realizing of a participatory democracy, (2) establishing balanced social development, (3) promoting the era of Northeast Asia, and (4) achieving a per capita income of USD 20,000. In so doing, the goals of e-government have been set; innovating service delivery, enhancing efficiency and transparency and promoting democracy in administration,
coinciding with the vision of achieving the “World’s Best Open e-Government” (PCGID, 2003b).


The Lee, Myung-Bak government in the second advanced stage formulated the <National Informatization Basic Plan> (2008~2012) in December 2008 and the <Smart E-Gov Plan> (2011~2015) in March 2011. The Lee, Myung-Bak government organized a work group, Informatization Promotion Working-Level Committee, for the National Informatization Basic Plan in the early 2008. The work group first analyzed the megatrends, the informatization plans of each ministry, and the government agendas to select the activities of the national informatization (MOPAS, 2010b). The vision, goal, and direction of the national informatization were determined based on the result of analysis. Also, the work group conducted the demand survey of whole central administration agencies, citizen, and system integrators. As a result, the five areas, twenty one agendas, and seventy two informatization activities were chosen. Among them, the e-Government project is the fourth area, “knowledge government which works well” which consists of four agendas and nineteen activities (MOPAS, 2010a).

The Smart E-Gov Plan was formulated in 2011 to convert the PC-based e-Government into the mobile e-Government with the use of mobile devices such as smart phones and tablet PC (MOPAS, 2011). In this plan the smart government was defined as “The advanced government where the citizen freely use public services regardless of the type of medium by combining the advanced information technology with government services and which is being improved through the participation of and the communication with citizens.”

4. Park, Geun-Hye Administration (Feb. 2013 - Present)

The Park, Geun-Hye Administration embraces Government 3.0 as a new paradigm. The notion Government 3.0 goes beyond what the technological potentials of Web 3.0 promise, as shown in Figure 2. The Park administration envisioned Government 3.0 for the purpose of building a new age of hopes and happiness for all Koreans. The Korean Government 3.0 drive seeks for two high level goals: providing services customized for and tailored to various needs and demands, and creating new
jobs and reboosting development engines. For these two goals, the Korean Government presents three strategic directions: service-oriented government, transparent government, and better (and smarter) administration (in other words, competent government). All these efforts are supported by four core values such as openness, sharing, communication, and collaboration.

Figure 1 describes the details of three categorized strategies for the Government 3.0 drive. First, Government 3.0 is a strategy for service-oriented government. NIA considers Government 3.0 as a pack of low-cost but high-quality services for customized citizen happiness. The Government 3.0 drive personalizes public services adjusting for individual needs, supports entrepreneurialism and businesses, enhances more efficient and effective access to public information and services, and customizes citizen services through using new technologies.

![Figure 1: Strategies and Tasks in Park, Geun-Hye Administration](image)

For that, the Korean Government establishes consolidated systems to provide information and services integrating across public agencies, policy domains, and geographical jurisdictions. These systems enable services based on lifecycle, services adjusted for specified beneficiaries’ needs, and one-stop welfare services. The needs that Government 3.0 considers also include those of businesses and entrepreneurs. Especially, small and mid-sized businesses gain help from integrated services for
economies. Service-oriented government seeks for multi-channel and any-channel services. This means more access points for those with otherwise limited access to information and services. Adopting mobile services for public services and information is gaining a promising vehicle for a new generation.

Second, Government 3.0 pursues transparency of government. Open government in terms of data and information means the transition from supply-driven transparency (reactive, responsive disclosure of public information) to demand-driven transparency (proactive sharing). According to President Park (see the news section of http://www.gov30.kr), Government 3.0 is intended to “make information sharing more equitable and transparent between the central government, local governments, government agencies and the public.” As well, information sharing can boost job creation and spur economic growth. Government-held data in such fields as weather, transportation and health care has considerable commercial value.

Last, better and smarter government specifies three directions: integrated (e.g., cross-boundary, cross-organizational, cross-agency, and cross-departmental) administration, cross-boundary information sharing and collaboration driven by digitization and informatization, and scientific (data-driven) administration. These strategic orientations require substantial improvements and also paradigmatic changes in public management and administration. Identified are the following three key words: collaborative administration, knowledge-based management, and data-based policy-making. While the previous two strategic anchors (service-oriented and transparent) are involved in the relationships with citizens, this means a fundamental shift inside government. For collaborative administration, the Government 3.0 drive transforms existing administration from typical bureaucracy-based to task-centered, program-centered mechanisms. The latter necessarily requires cross-boundary collaboration.

**Analytical framework**

The Korea e-Government Global initiatives are originally evaluated by the evaluation criteria of OECD/DAC. However, the content of the ODA project is about e-Government, so it is necessary to set up a separate evaluation model. Generally, post evaluation for e-Government ODA projects can be charted as follows (See Figure 2)
Figure 2: A Conceptual Framework for Evaluating ODA Projects in the Field of e-Government


ODA project evaluations are carrying out for the increase of mutual cooperation and aid effectiveness between donors and recipient countries. In addition, e-Government performance evaluations are conducted in order for the recipient countries’ e-Government to contribute to public sector reforms and service improvements. Since the year 2000, countries all around the world have been putting a lot of effort into e-Government, which makes it possible to have administrative services available anytime and anywhere with the development of ICT and the Internet regardless of time and place. Therefore, there is no standardized model for evaluating the performance of e-Government. However, PRM (Performance Reference Model) is being used widely among the developed reference model in the United States, the currently most e-Government advanced country.

In the Performance Reference Model, there is a framework to measure since the e-Government ODA projects ex-post evaluations have been centered on the final outcomes of the project. In other words, both the results and the impact of ODA projects can be considered as outcomes of e-Government. In the Performance Reference Model, there is a framework to measure the performance of major ICT
investments and their contribution to program performance. It helps government and public agencies in evaluating ICT investment’s direct and indirect outcomes and their effects. By doing so, governments and agencies can provide strategically better control and support to their service. PRM performance of the classification systems has goals, areas, items, and hierarchy of performance indicators if they are conceptualized as figure 3 shows below.

Figure 3: PRM Performance Classification System and Structure


Main performance areas of e-Government PRM have following stages and components. First of all, performance goals consisted of e-Government vision and strategy. And performance area consisted of six fields (Missions and projects, customers, processes and activities, human resources, information technologies, and associated resources). And finally performance items consisted of 16 fields (Administrative services, service levels, customer satisfactions, range of services, finance, productivities, work qualities, securities, user support, system qualities, standards, information and data, utilization, ICT policies, e-Government legislations).

Global ICT Initiatives

1. Global ICT Projects
After joining the World Bank Development Gateway Foundation as a founding member in December 2001, Korea has provided technological and policy consulting service to developing countries based on its experience and success in informatization. The importance of official development aid/assistance (ODA) through informatization is especially gaining attention as Korea has joined the OECD Development Assistance Committee (DAC) and its status has significantly improved within international organizations.

Specifically, the fact that Korea was ranked at the top in the UN E-government Development Index assessment back in April 2001 and that its experience is being introduced as the best practice and benchmark implies that its informatization has reached the world-class level and Korea’s contribution to the international community needs to be increased to reflect its level of standing (UN, 2002).

The Korean government has selected countries that have high potential in trade, economic, and e-Government cooperation or those that are selected as ODA priority countries by the international community and has carried out various activities including ICT consultation, ICT Cooperation Center operation, and ICT learning programs. Recently, it is interested in leading the efforts in global ICT cooperation to overseas expansion of Korean businesses and job creation, adding further values through international cooperation.

The ICT and policy assistance program for developing countries is a knowledge-transfer initiative that provides Korea’s experiences in informatization or technical assistance. It mainly consists of establishing national information (or E-government) master plans, constructing high-speed information and communication networks, E-government services such as e-procurement, e-customs, and patent informatization, government-wide computing facilities or information systems interoperability. Sometime, feasibility studies on applications of specific information and communication technologies such as mobile smart office are also included.

Projects have been carried out by EDCF, KOICA, and NIA. Major items of the projects were e-Government, communication and information networks, and building of ICT training centers. Most of the projects performed well throughout the whole process, and recipients' satisfaction level was high. However, obsoleteness of
some facilities, lack of cooperation between Korean agencies turned out to be areas of concern.

2. Cooperation with International Organizations

The government is endeavoring to join in the efforts for international development through a cooperative framework with international organizations and to establish a favorable environment for Korean ICT companies to expand overseas. It is considered that cooperation with international organizations that have such significant global influence helps enhance the national status and build a favorable environment for overseas market development. In this regard, the government has joined hands with international development banks for dispatching experts and providing joint consultations. In 2009, it worked on many cooperative projects with Asian Development Bank (ADB), Africa Development Bank (ADB), World Bank (WB), and Inter-American Development Bank (IDB). In early 2010 when Korea earned the top ranking in the UN E-Government Development Index, OECD requested Korea to support E-Government projects in the Middle East and the Northern Africa. With the Korean economy improving and getting stronger as well as highly recognized performances in the area of informatization, such requests from international organizations are expected to increase in the future.

3. ICT Cooperation Centers

The Korean government establishes and operates ICT Cooperation Centers (ICTCC) with newly industrializing countries and promotes informatization and mutual cooperation through joint projects and technological exchange. ICTCCs serve as a foundation for transferring Korea’s experiences, know-how and technology for informatization, increasing Korea’s global influence and supporting overseas expansion of Korean businesses.

Starting from the establishment of two ICTCCs in Mexico and Chile in 2002 and 2003, the project operation gained momentum and led to the establishment of two more Centers in Turkey in 2007 and in South Africa in 2008. The Centers in Mexico,
Chile and Turkey have already completed operation and the Center in South Africa is currently under operation.

4. Improving the Environment for Information Use

Since 2002, the Ministry of Public Administration and Security and the National Information Society Agency have implemented projects for improving information usage environment such as construction of Information Access Centers and distribution of used PCs to overseas developing countries around the world in order to spread information technology and the culture of Korea in order to enhance Korea’s role as the strategic base for future ICT expansion.

The Information Access Center construction project is a program that establishes and supports Information Access Centers (IAC) that consist of ICT training labs, Internet lounges, seminar rooms, and administrative offices that aims to close the digital divide within a country and between countries.

In addition, the project for distributing used PCs to developing countries is part of the efforts to improve the information usage environment in those countries and has been carried out by National Information Society Agency since 1998. Personal computers that have been used in government and public agencies in Korea have been collected and repaired in order to be provided to the government or educational organizations of the beneficiary countries with the aim of improving the environment for their information use. Again, this project is contributing to the closing of digital divide between countries.

The government of Korea plans to continue to support the establishment of Information Access Centers in selected strategic countries that have high potential for market entry by Korean ICT businesses. Also by upgrading the Centers to digital knowledge-based centers through a connection to TEIN3 network, it seeks to explore and develop a variety of areas for cooperation with the respective partner countries.

As for the used PC distribution project, a more thorough analysis will be made on the status of the digital infrastructure in beneficiary countries or organizations as
well as on the impact of PC penetration so as to make sure program turns out to be worthwhile and efficient.

5. Korea Internet Volunteers

Since 2001, Korea has organized groups of volunteers called Korea Internet Volunteers (KIV) including college students studying ICT and has supported and sent them out to developing countries where they provide ICT training and education to local government officials, students and teachers.

The Korea Internet Volunteers program is also classified as an ODA project and along with the measures to increase Korea’s aid, the number of volunteers and target countries have been steadily increasing each and every year. The economic development and the improved status of Korea as a donor country have led to the expansion of overseas aid demand increasing from both home and abroad. By joining OECD DAC in 2009, Korea has clearly shown its firm commitment to increase overseas aid in the future.

In 2010, more volunteers - as many as 550 - are planned to be dispatched and the number of volunteers will continue to increase every year - up to average 600 per year. Fostering ICT manpower in Developing Countries Korea’s project for fostering ICT manpower in developing countries goes back as early as 1998 when it launched the ‘Korea ICT Learning Program’. At that time, advanced countries including the United States and Japan were aggressively promoting invitational training programs for ICT manpower in other developing countries so that they could establish a foundation for their domestic ICT industry to expand. In this regard, Korea also came to take part in fostering overseas ICT manpower based on the need to expand into developing countries in the Asia-Pacific region and requested from the international community such as the Asia Pacific Tele-community.

The project in 2010 will be designed and operated so as to continue effective contributions for Korean businesses to expand with such an aim considered right from the stage of planning. Moreover, Korea will focus on improving the effectiveness of the training courses by designing tailored programs for each region or country.
6. Summary

Since 2001 Policy Consulting has been carried out by NIPA, KISDI, and KOICA. The main areas of consulting were institution building in ICT sector, and the setting-up of master plans. The evaluation team found that these activities also contributed greatly to the policy-making of recipient countries. However, independent activities by the agencies led to the lack of synergies, resulting from the destitute sharing of information (KIET, 2011).

Invitation Training has been carried out by KOICA, NIA, and KISA. These agencies have independently invited 200~400 persons annually, and have provided training on e-Government, IT policies, communications, etc. Most invitees evaluated the training programs as highly satisfactory, and the programs brought positive effects to the capacity build-up of the recipient countries. However, also the lack of information sharing between the agencies, and the spread effects of training turned out to be areas of concern.

Dispatch of Volunteers, which has been carried out by a number of agencies, was integrated as the "World Friends Korea" in 2011. This program has also brought positive effects to the development ICT in the recipient countries by providing on-field consultation and technical assistance. However, the short period of dispatches, and the rising costs turned out to be areas of concern.

In conclusion, the ODA activities in ICT sector are evaluated as the distinct areas of Korea's ODA, which reflect the position of the nation as a strong global producer in the industry. They have met the needs of recipient countries, and have contributed to the reduction of Digital Divide between advanced and developing countries. However, this paper shows several areas of concern to be improved in the future.

Conclusions

The future e-Government in Korea is being developed towards seamless and consolidated services, based on the e-Government projects that have been promoted so far. In addition, a new master plan for e-democracy where citizens can actively participate in policy-making and execution would also be necessary. The new e-
Government strategies will be taken into account from various perspectives, especially in terms of strategy, e-Government services, citizens’ e-participation and strengthened infrastructure for e-Government.

Korea’s e-government received first place in the 2010, 2012 and 2014 UN e-Government Survey consecutively. Therefore, experiences and best practices in Korea e-government are shared with our global friends through the establishment of Information Access Centers, Korea IT Learning Programs, and dispatching internet volunteers overseas. Korean government’s experience and know-how will be shared in e-Government with the international community by promoting joint projects with international organizations and exporting e-Government systems to foreign countries. Furthermore, Korea will work to contribute to the narrowing of the digital divide between countries by helping developing countries through ICT official development assistance (ODA).

E-government development remains a distant hope for many of the least developed countries due to the cost of technology, lack of infrastructure, limited human capital and a weak private sector (UN, 2010). In December 2009, Korea joined the OECD Development Assistance Committee (DAC) and officially became an advanced donor. Therefore, Korea’s overseas aid projects are expected to increase and be carried out in a more systematic manner (Park and Suh, 2011). Also in the area of e-Government, the importance of not only the overseas aid ‘in ICT’ itself but also the overseas aid ‘through ICT’ is increasing along with the expanding scale for more efficient and influential support.

The ICT and policy assistance program for developing countries is a knowledge-transfer initiative that provides Korea’s experiences in informatization or technical assistance. It mainly consists of establishing national information (or e-Government) master plans, constructing high-speed information and communication networks, e-Government services such as e-procurement, e-customs, and e-patent informatization, government-wide computing facilities or information systems interoperability. Sometime, feasibility studies on applications of specific information and communication technologies such as mobile smart office are also included.

The Korea government is endeavoring to join in the efforts for international development through a cooperative framework with international organizations and to
establish a favorable environment for Korean ICT organization and companies to expand overseas. It is considered that cooperation with international organizations that have such significant global influence helps enhance the national status and build a favorable environment for overseas international relationship. In this regard, the Korea government has joined hands with international development banks for dispatching experts and providing joint consultations.

Up to now, e-Government ODA program has been evaluated that ODA principle is not consistent and systemic. Also, e-Government ODA program has been evaluated that the doner countries has a difficulty in maintaining the program after ending the program. Therefore, it is needed to be systemized ODA program. Consequently, this study can inform the e-Government ODA program to many developing countries.

It is very meaningful to perform the e-Government ODA projects in developing countries to give some opportunities for realizing aids’ values such as partnership and world friendship and entering to the global market to Korea ICT industry. Thus, it is need to urgently be realized in the enforcement of the systematic e-Government ODA projects. The Korean e-Government is now progressing; however, it still has a long way to go to reach full interactive service delivery, government integration and foreign aid.

References


A Case Study for Characteristics of Passion Leadership during Development Period of the Republic of Korea

Daehee Lee & Cheon Lee

Abstract

In this paper the author analyzed the passion leadership through the cases of leaders during development period of the Republic of Korea. These leaders were people who stood out clearly during modern Korea’s economic development. They had similar characteristics of passionate leadership and had succeeded in their field. As a leader, they showed their inner energy of passion actively outward with positive thinking. In spite of hard conditions and uncertain future, they were not discouraged and pioneered the future. There were too many difficulties, but they tried to challenge the difficulties and eventually overcame them. Their passion led positive thoughts and aggressive driving force.

Joo-young Jeong and Tae-joon Park were the passionate leaders who had to accomplish goals being set and objectives they wanted. A government enterprise and companies, The Hyundai and the POSCO, they established were good role models of how passion leadership can make fruitful outcomes. They showed wonderful creative thinking and enthusiastic driving force in their works. They took the lead of the work all the time and were absorbed in it. They regarded their organizations they established as their alter ego, and made them as passionate ones. Passion leadership led and made their members passionate ones too.

This article also tries to compare their leaderships with those of other leaders in Asian countries who achieved economic development. By identifying key features of the leaders, this paper suggests an exemplary leadership for leaders who seek economic and social development in the Greater Mekong Sub-region.

Keywords: Passion, Passion readership, Republic of Korea, Development
Introduction

Who is a great leader? It is difficult to define a great leader, but a person who achieves high performances, who can easily overcome difficulties and who is loved and respected by members can generally be regarded as a ‘good leader.’ However, because the meaning of ‘good’ can be changed based on time, place and circumstances, it would not be easy to uniformly define which leader is a good one.

Research on leader and leadership have been very active. The starting point of leadership research would be a research to study characteristics required for a leader. Stogdill (1974:81) presented traits such as initiative, passion, perseverance, adventurous spirit, creativity as leader’s traits. Northouse (2001: 19-20) mentioned intelligence, self-trust, determination, sincerity and sociality, and Howell & Costley (2011: 9-11) proposed physical background trait (?), personal capacity trait (?), work social trait (?). Roberts (1989) also mentioned loyalty, courage, passion, emotional power as traits. There are other scholars who address various traits required for leaders by classifying types of leaders. House & Mitchell (1974:83) classified types of leadership into directive, supportive, participative and achievement-oriented leadership and addressed various types of leadership traits. Fiedler (1967) explained leaders’ traits can change based on circumstances in contingency theory.

Research on leadership previously focused on leader himself had changed its focus to relationship with subordinates. Ho-jung Kim (2003:103-123) focused on relationships of leadership and categorized as considerate leadership, transformational leadership, systematic leadership, and transactional leadership. She emphasized consideration for subordinates and said that it is possible to make rational transactions with subordinates. Also, she suggests transformational leadership as a leadership considering both flexible organizational culture and external directionality. Transformational leadership emphasizes charisma, intellectual stimulus and consideration (Gyun-soo Yoon, 2006:125-145). On top of that, a leader can become a more thorough by adding leader’s passion. Ki-bock Baek and Jung-hoon Kim (2013:1929-1946) organized the research progress of leadership and explained developing of relationship-oriented leadership, spotlighting longitudinal approach rather than cross-sectional approach and the trend of focusing development of leadership identity. They accentuated the development of individual-team-organization level leadership based on holistic approach. Dong-chul Kim and Dae-gun Kim presented authentic leadership, a perspective that emphasized positive self-awareness and organizational behavior (2012: 27-51). Leader’s positive self-awareness, internalized moral perspective and behavior with sincerity, relational transparency that describes leaders ideas and emotions, balanced information processing are elements of authentic leadership. (Lee, Jung-hwan & Park, Han-kyu.
Se-geun Oh (2013:81-136) asserted that the ‘mobilization leadership’ of Machiavelli and Weber should be transformed into a new leadership in accordance with the chances in new democratic area. Then he presented ‘resonance leadership’ as a new political leadership frame. This leadership emphasizes mutual communication by leader’s ensuring sympathy and solidarity.

Recently, there have been numerous discussions on ‘emotion’ itself among leader’s traits. Research on emotions sparked from mid-1990s in the US by J.D Mayer, P. Salovey, D.R Caruso and D. Goldman. Mayer, Salovey & Caruso (2008: 513-517) highlighted the importance of emotional intelligence and saw emotional awareness of oneself and others, utilization of emotions on rational thoughts, expression of emotions and understanding of emotions and languages in delivery process, and managing emotions to pursue specific goals as required traits for leaders. Goldman (1999: 26-27) divided emotional capability of a leader into personal emotional (capability, self-awareness, self-regulation and motivation) and social emotional capability (empathy and social skill.) The writers of this article also would like to emphasize the importance of emotion as a trait that a leader should have. A leader should possess not only rational wisdom but also warm emotions. A leadership harmonizing emotion and intelligence can be called as emotional intelligence.

In this article, the writers try to address passion, or enthusiasm among emotional capabilities leaders should have. Passion is one of leader’s many traits and it contributes to demonstration of leadership by combining with other intellectual and emotional traits. This article will theoretically discuss what passion is, review what characteristics passion leadership has, and, based on these, analyze cases of Joo Young Jung, Tae-jun Park and Jung-hee Park who are regarded as examples of a passion leader.

**Theoretical Background of Passion and Passion Leadership**

Passion is an adequately exited state of a motivated person when he or she is focusing on a certain object. Enthusiasm is quite similar to passion. Passion refers to compelling emotion, outburst of emotion and strong amorous feeling, whereas enthusiasm refers to absorbing interest and eager involvement (Shaunice Hawkins, 2010: 3). However, it is proper to say that passion includes a strong or extravagant fondness, enthusiasm, or desire for something (S. Hawkins, 2010:6).

Passion makes people have purpose, learn and sustain life. Without passion life would be meaningless, dull and people could achieve nothing. (Hawkins, 2012:33). Passion is motivation (Hawkins, 2012:34-35). Passion provides strong motivation to people who want to do something. Also, passion arousing strong motivation toward a goal enables people to solve problems creatively (Hawkins, 2012: 34-35). Passion is a source of endless creation (Hawkins, 2012:36). When a person has passion toward something, the person becomes excited and generous, and endless creativity surges from inside. People with passion can overcome challenges...
and solve various problems. Passionate leaders mostly have characteristics of accomplishing tasks creatively. J. Hermes (2015) talks about the relationship between labor and passion and says that passion energy is important in working creatively. P. Long & S. Barber (2015) says that there is a relationship between a music composer’s creative activities and his/her passion toward works. If passion becomes a basis, whatever a person does will be full of energy.

Passion can also make difficult tasks done (Hawkins, 2012: 35-36). A person with passion enjoys doing difficult tasks. Working delightfully itself is happiness. Happiness is the closest companion of passion.

Passion is inner source of energy which makes people strong, love themselves and friendly (De Angelis, 1998: xi). Passion is concentrating on a certain subject with affection. Passion is focusing on a certain object with affection. If we consider that heat is energy which physically arises temperature of an object by entering it whereas affection is a feeling toward an object, passion is a feeling that makes people’s mind feel the warmth. Specifically, first, passion works toward a ‘certain object.’ Whether it is an existing or imaginary object, passion is related to it. Second, passion is affection related to senses. Affection is a sensory action which we feel through the five senses and passion arises from this process. Third, passion has a characteristic of ‘attention.’ If a person is distracted and cannot focus on something, it is difficult for the person to show passion. Fourth, passion accompanies ‘hot and excited state’ to some degree. It possesses both attributes of getting easily thrilled and easily focused. Passion often enters enthusiastic state. On the contrary, imperturbability sits on the opposite side of the passion and means becoming calm by allaying thrilled emotions. Imperturbability can also occur when a person focuses on an object (e.g. when we apply logic to solve math problems), but it is slightly different from passion because it holds down sensory affection. Fifth, focusing on an object means that people with passion show ‘positive motivation’ to the object (Alofs, 2012). The more one becomes motivated, the stronger the passion will be. Sixth, passion is a strong power and energy that surge from the inner side (Hawkins, 2010: 3). Passion is an innate property of people and is something like inherent skills, interests and potentials (Hawkins, 2010: 8).

What effect does passion influence on our mind? Does our rationality get certain effect when passion increases? When passion increases, it accompanies an increase in concentration. The more we concentrate on, the clearer our rational activities become and the better our judgement becomes. However, to what extent will passion and concentration increase? Passion can lead us to excited state and therefore increase concentration, but there’s a limit to it. When passion focuses on one point, it is likely that our rationality also sinks into the point. When rationality sinks into one point, the range of options becomes narrow and consideration of surroundings reduces. Vallerand et al. (2003: 756-767) classified passion as harmonious passion and obsessive passion by focusing on how passion is internalized in people’s minds. The former is when a person internalizes passion him/herself and the latter is when a person inevitably internalizes passion because of control from external circumstances.
or immersion in passion itself. Likewise, a state where passion and rationality harmoniously work can be called as harmonious passion and a state which is a reduced rationality by passion can be called as obsessive passion. In the state of obsessive passion, because concentration on an object is excessive, people tend to indulge in passion itself.

Passion is what people possess from their birth (Angelis, 1998). However, a capability to identify, nurture, reveal and utilize the passion varies from person to person. While some people easily identify and utilize passion, other people cannot even detect its existence. It is better for people to reveal passion outward (Hawkins, 2012: 7). Because passion is innate, to be passionate is natural just as breathing is natural (Angelis, 1998: 5). When people satisfy their needs or desires, they feel good. However, once the needs or desires fulfilled, though people feel satisfied, the needs or desires are not strong any longer and wane. Nevertheless, compared to waning desires, passion is naturally sustained and can never easily disappear.

Enemies of passion are doubt, disbelief and ambivalence (Hawkins, 2012: 41-42). Doubt results in mistrust and suspicion. Distrust makes us refuse to believe what is truth. Also, suspicion makes us hesitate and decide or trust nothing. Indifference is also an enemy of passion (Angelis, 1998: 19). There are some elements which defeat enemies of passion and bring back passion: faith, trust and acceptance (Hawkins, 2012: 42-43). Faith gives us hope and makes something certain. Faith toward hops is our accepting of hope. Acceptance makes us happy and makes us feel good by accepting something as good.

Passionate leaders have a trait of actively challenging what they plan and want to do. These leaders do not care much about how people look at them and challenge their tasks without orders from others, just because they want to do it. They are full of creativity. Being active is that leaders are creative in setting and achieving goals. They take the initiative and set examples. They want to play a leading role and are full of energy. When leaders take the initiative, members also become active. Focusing on and being absorbed in their objectives is a common phenomenon among passion leaders (De Angelis, 1998: 15). Immersion in tasks is a basic property of passion. If a leader concentrates on a goal and is absorbed in the goal, the leader will achieve outstanding performances. That is a passion leader. Passion leaders have tireless energy. Of course, there should be physical stamina and health to support the energy, but they possess amazing willpower (Hawkins, 2012: 4).

Passionate leaders articulate the vision. Passionate leadership is about a deep-rooted belief in better opportunities and alternative outcomes. The ability to conceptualize those new futures and communicate them in a clear and concise way is vital. Also, they share the values. They move beyond the vision and mission statements and not only articulate values in written statements and programs but also in their everyday speech and interactions. They set examples and standards that are possible. They convince people, by their personal standards, of what can be achieved and they behave ethically (Davies and Brighouse, 2010).

When we say that a leader is charismatic, it means the person has considerable amount of passion (De Angelis, 1998: 12). Chang-jun Lee and Jung-goo Yoon (2007)
conducted a comparative analysis on charismatic leader and emotional leader with two criteria of ‘hedonic’ and ‘arousal’ based on circumplex model of affect. As a result, despite slight differences, both type showed strong correlation with interest/passion and happiness/satisfaction. Emotional leadership showed a relatively strong correlation with happiness/satisfaction.

Passion leadership is a leadership which leaders appropriately utilize passion in managing organization and pursuing tasks. These leaders show a tendency to actively foster, to transform the passion into energy, and to concentrate on tasks or their organizations. Leaders also show a talent to develop and to utilize passion of organizational members for organizational performances. Among other required traits such as intelligence, judgement, trust, endurance, responsibility, passion could be one of them. However, (harmonious) passion performs a function of invigorating and promoting other traits. Leaders’ passion vitalizes physical energy of both leaders and members, improve creative problem solving ability and momentum. Comprehensive emotional, intellectual concentration and immersion increase creative problem solving capability achieve outstanding performances.

A leader’s passion may be one factor that could play a key role in pursuing strategic actions and making strategic decisions when economic decline calls for diffidence. Passion could be important for organizational leaders during times of economic adversity. The nature of passion, however, whether harmonious or obsessive, affects the nature of task engagement. In turn, the nature of task engagement through harmonious and obsessive modes of passion could affect performance and environmental adaptation. (Patel et al. 2015).

Passion leadership, compared to other leadership theories such as trait theories, instructional leadership and supportive leadership, situational leadership, transformational leadership and participative leadership, focuses on ‘emotions’, especially on ‘passion’. Although other factors are equivalent, entirely new leadership can be created by incorporating ‘passion’ (Vallerand et al., 2003). Passion leadership is a leadership that leader’s passion stands out and this creates outstanding achievements.

Maslow addressed needs that promote people’s needs, levels of instincts. From the lowest needs, he mentioned psychological needs, safety needs, social needs and esteem needs. These needs are deficiency needs that arise when people feel insufficiency (Hawkins, 2012: 12-27). On top of these, there are cognitive needs, aesthetic needs, self-actualization needs and transcendence needs. These needs are growth needs which appear when people want to grow as complete human beings. As people seek for more upper needs, they become more passionate. Suk-il Kim and Sung-je Park found that endurance and passion of athletes have a positive effect on the goal-seeking needs (2010: 1546-1557). Gui-ok Lee’s (2011) study of elderly people participating leisure program showed that passion had an effect on emotions but not on subjective happiness. Gyung-sang Gwon et. al (2014) analyzed effect of passion of leisure sports participants on physical self-efficiency and mental satisfaction.
Research Method

For case study, three analyzing criteria were selected with respect to traits of passion leadership: passion for oneself, passion for organization, passion for work. As we theoretically discussed passion and passion leadership on Chapter II, these traits can be divided into parts that internally affect leaders themselves and parts that externally affect objects outside. The latter can be divided into parts related to leaders’ tasks and parts related to their organizations.

1) Passion for oneself is an attitude of a leader who acknowledges his/her potential passion, sublimates it, and actively transforms it into energy. Passion leader respects and loves oneself and has positive thinking about oneself. Self-positivity makes leaders think positively about their ideas or works, provides power and weakens negative thinking. By affirming their ideas or activities, leaders can increase energy and vitality. This article would analyze selected leaders’ passion on themselves from their words, habits, attitudes and values. The article would focus on two aspects, (1) traits related to emotional and physical capabilities and (2) traits related to intellectual capabilities.

2) Passion for work means that leaders creatively set goals, do their best to achieve the goals, energetically push the work forward and achieve desired outcomes. This article would analyze how selected leaders aggressively challenge, set goals creatively, take the initiative and immerse themselves in works. The article would look at (1) passion during planning and decision making process and (2) passion during policy implantation and performance creation.

3) Passion for organization means that leaders value their organizations as they love themselves and manage their organizations with ownership spirit. This also includes making their employees passionate and making entire organization as a passion capital. Passion capital represents passion which became an asset to be utilized as intense, continuous energy source (Paul Alofs, 2013: 10). Passion is an emotion but passion capital is an asset. Creating passion capital is arousing intense passion and transforming it into valuable asset. The article examines how leaders loved their organization and how they transformed their organization into passion capital. The analysis would look at (1) passion related to members of organization and (2) passion related to entire organization.

The two selected leaders, Joo-young Jung and Tae-jun Park, are successful leaders who achieved the most significant achievements in the economic development period of the Republic of Korea. Both started from the scratch with no favorable environment to companies but set creative business goals, overcame difficulties and made their companies range with top global companies. Park was the CEO of the POSCO, a government company at time, and Jung was the CEO of the Hyundai.

Case Analysis: Jung, Joo-young and Park, Tae-jun

1. Passion for oneself
1) Traits related to emotional and physical capabilities

In the Chapter II, the article reviewed the characteristics of passion. Based on the review, the article analyzed if the two leaders showed these characteristics.

There is a research that comprehensively studied characteristics of Jung and other Korean CEOs. Tae-hyung Kim (2010) well defined characteristics of Jung. He saw that Jung had extroverted, emotional, intuitive propensities. Jung is an extroverted-emotional type and he was lively and active, and loved to meet other people by nature. Because of his straightforward expression of emotions and proper response to others’ emotions, he was good at managing relationships. He used to go along with emotions or atmosphere and brighten up the atmosphere. However, he lacked contemplation, had severe mood swings, and tend to become overly emotional, making a fuss or lacking clear thinking. Also, he is an extroverted-intuitive type and was good at ‘possibilities’ of external world. Therefore, if he was intellectual, he could show outstanding predictive ability or analyze the situation accurately. He was less speculative than introverted-intuitive type, so he ran short of thinking ability. However, because he was active, he showed excellent executive ability (Kim, 2010: 259)

By looking at how he had lived, it is estimated that he might had rural and rough emotions. He tried to escape four times to escape from gloomy countryside during the Japanese empire. When he was sixteen, he worked at a railroad construction, was caught by his father and tried to escape right after his father had brought him home. At the age of seventeen, he stole money that his father received by selling a cow to attend bookkeeping courses. His father brought him back home but when he was eighteen he escaped again, went to Seoul and worked at a company (Lee, Byung-Do, 2003). It is an anecdote that shows passion of Jung in his youth to find a new life. He exactly saw the truth of rural areas where most of people were tenant farmers. His intense desire to escape from suffocating countryside and the lives of farmers was already formed during his youth.

Jung was more diligent than anyone. He told people that his diligence was the best and lifetime capital which he inherited from his parents (Goo, Pyung-Hui, 1997: 35-36). He had inborn hatred toward laziness (No, Shin-young, 1997: 148). His character was that he just couldn’t sit and do nothing and became impatient of being idle. From his strong tone, saying that with an idea of ‘if you can’t do it today, you can do it tomorrow’, there is no development, and if you avoid difficult challenges, there will be nothing easy left, we can comprehend his strong will, acting power, and his positiveness and courage to challenge difficulties without fear (No, 1997: 148).

He only graduated elementary school. However, his academic background was nothing unusual for people at that time. Nevertheless, He was a man with intellect, sense of humor, sheer courage, strong will, endless endeavor, diligence, and initiative (Kim, Ok-Ryul, 1997: 90). On the other hand, he is also described as a person without pretense, who was neither too humble nor to domineering. He was a person whom others can feel comfortable and close (Kim, Soon-yong, 1997: 78). In personal relationships, he said that credibility is more important than life and one can rise again after failure but lost credibility never comes back.
Compared to Jung, Park, Tae Joon was a former-military officer, worked in a military government, established the POSCO which shows characteristics of quasi-government and managed the company. Park wasn’t big and had calm personality. He was originally a timid person, but was good at understanding others’ feelings (K.K. Seo, 1997:447). He was a disciplined man who was loyal to a person whom he respected.

Lennard described Park as follows (Lennard, 1995:265-266): “Because he was from the military, he showed thinking and behaviors in military fashion, but people could understand that he was not simply a cold-hearted commander once they visited the POSCO. You can presume how he valued his subordinates when you visit residential areas or schools. His appearance might be cold but he had a warm heart. He had keen judgement when it comes to work, and pursued goals with endurance and extraordinary momentum.” He understood what the phrase ‘look before you leap.’ He was not a sprinter but a distance runner who gradually pursued goals (Yoo, Chan-woo, 1995: 77).

Park cold-heartedly turned down requests of political money, intervention of personnel management, corruption from political circles and high government officials. He was an incorruptible man with no chance of corruption (Seo, 1997: 276-273). He did not compromise his principles (Cho, 1995: 18). His austerity and perfection are well shown from his work processes. When he was a CEO of Korea Tungsten Company, he found that his company was operated by a rule of thumb and therefore attempted to systematize and standardize the management with long term plans and realistic analysis (Seo, 1997: 96-98). Good examples would be that he ordered to recheck all of 240,000 bolts of a steel frame structure which was not properly constructed and to detonate all of the structure (Seo, 1992: 167-168). While he was still a military officer as a 71st Regiment Commander, he found a corruption and resolved the case in spite of requests or threats from outside (Seo, 1997: 234-38).

There were many Japanese politicians and entrepreneurs who saw different aspects of Park. Shin, Gyuck-ho, the CEO of Lotte Corporation, saw Park as a forthright and honest man who didn’t cling to his opinion but also didn’t lose himself (Shin, 1995: 35). For many people who saw Park as a strict military officer and a great leader with discipline, it was astonishing for them to witness Park showing his mildness when socializing with high-level people. People said, ‘Park is a gentle and strong person’ (Fukuda, 1995: 148) and ‘it is easy to possess strong spirit, but what’s more great about Park is that he possesses good-natured attachment’ (Akazawa, 1995: 214). Yahiro told Park that a man should have cheerful character and good-nature, and be flexible and relaxed. However, on top of that, he should have persistent determination not to step backward when facing challenges (Yahiro, 1995: 183).

To describe Park comprehensively, Sugiura said, “President Park I know is a person with numerous virtues such as extraordinary fervor, energy, foresight, sincerity, affinity and morality (Sugiura, 1995: 219).”, “His natural, easygoing figure is well-remembered in our hearts.” His leadership style was not simply suppressive. He didn’t make people frightened and made people naturally follow him (Sekira,
1995: 294). Park was quite humane and a devoted man to work (Brian, 1995: 348). He was strong, had clear vision, and most of all was a patriot who loved his country.

2) Traits related to intellectual capabilities

From his youth, Jung had a quick and keep judgement. When he faced complex problems, he was good at understanding and responding to them. Once he had a clear answer, he showed his momentum to pertinaciously, passionately pursue it. Furthermore, he had innate stamina and desire to accomplish that were stronger than that of anyone, traits required for an entrepreneur (Kim, Sang-hong, 1997:72). He was proficient in lateral thinking, and his quick judgement and bold challenge spirit are highly appreciated. When he decided to construct the Federation of Korean Industries building at the Namsan mountain, most of people reported that it was impossible because there were strong oppositions from government, military bases and relevant organizations. Then Jung helped relocate military anti-aircraft guns to higher locations and received approval to build the building at last (Jeon, Do-geun, 2010: 28-30). Also, he built steel structures (ten-floor building, 89 of them) in Korea that were required for harbor construction in Jubail, Saudi Arabia, shipped them on barges that sailed almost 12,000 km and finished the construction (Jeon, 2010: 44-45). Park also commented about Jung, saying that Jung is positive and active in everything and it was impressive to witness Jung handling every matter with confidence (Park, 1997: 200). Jung was excellent in judgement, an ability to see through complexity and to pinpoint the point (Goo, 1997: 35). Instead of relying on logically analyzed brief or thick documents, he made blitz decisions on business directions based on his own judgment. He had unrivaled foresight, timely and accurate decision, seamless plans, and decisive executive powers (Kang, 1997: 16-17).

Jung was also a very creative man. Seosan reclamation project was a construction which tried to create reclaimed lands by constructing 7.6 kilometers of seawalls. The reclamation project had to block water. Hyundai faced two problems, the velocity of current that was 8.2 meters per second and a difference of eight meters between high tide and low tide, at the final stage of the construction. Only a few hundreds of meters to finish, the current between the gap was too fast and all the rocks and earth swept away with the current as the dump trucks pour them into the water. Then, Jung thought of a brilliant yet eccentric idea. He purchased and brought a 230,000 ton obsolete oil tanker which was about 300 meters long and blocked the gap and slowed the current. With his brilliant idea, Hyundai was able to successfully complete the construction. He was the one who invented this construction technique which is known as ‘the Jung Joo-young method.’

Park was good at analytical and mathematical skills when he was a military cadet (Seo, 1997: 24). The President Park, Jung-hee thought highly of his skills, making him contribute to the steel industry which was of core industries for economic development. He was a perfectionist with strong self-control and extraordinary intellect and was goal-oriented and straightforward (Seo, 1997: 25). These traits are related to ‘dispassionateness to prevent mistakes’ which is one of additional requirements for passion leaders. Given that people with passion tend to focus on one thing, moderate level of dispassionateness and self-control are essential to leaders. He
thoroughly understood what the problem was and firmly pushed forward once a direction was set. Achieving outstanding performance based on perfection, determination and momentum was his characteristic (Seo, 1997: 56). Entering the integrated steel industry was a very complex, difficult, domestic and international challenge, but he overcame the challenge and succeeded in establishing the POSCO. He made the company out of nothing (Yoo, Chan-woo, 1995: 77).

Nakasone said, “Park is a true patriot and has a noble character, energy and international view. The reason Japanese economic circles cooperated with Park to build a steel mill was because they saw passion, faith in him and were impressed by him.”

2. Passion for work

Jung and Park are leaders who actually carried out ‘the miracle’ of nation building and economic development of the Republic of Korea. They created ‘something from scratch’ and made ‘the impossible possible.’ Jung’s Hyundai Construction, Hyundai Shipbuilding and Hyundai Motor Company of Jung and Park’s POSCO have been major industries which took the lead of economic development of the Korea and are key industries of the Korea in the 21st century.

Jung’s passion for work had accompanied Jung throughout his life. From his 20s, when he managed a car maintenance shop as his first business, his passion for work and startup spirit went through endless challenges, failures, hardships and successes. Whenever he saw people who were reluctant to do something that seemed impossible to achieve, he asked them, “Have you even tried it before?” (Kim, Tae-hyung, 2010: 76). This positive attitude is one of the best traits passion leaders have. It is important to get rid of negative mind and to highlight hope and success.

1) Passion during planning and decision making process

Passion for work starts from creative business plan and goal setting. Jung’s management style was reckless and sometimes tyrannical, but more than 80% of ideas from his head resulted in successes (Kim, Gyung-sun, 1991: 94). During the construction of the 120-meter Soyang Dam, he suggested to use sands from river bed instead of imported cement to build a rockfill dam. Many people opposed his idea but by completing construction of the dam with his method he was able to reduce cost and time and to accumulate a new skill. He had creativity and applying capability that let him invent other things and had momentum that made him possess accomplish his goals without yielding to other views (Gwon, Ki-tae, 1997: 48).

3 A conversation between Jung and the President Park, Jung-hee about entering the Middle East construction market in summer 1975 shows Jung’s creative and active work style. (Park) Countries in the Middle East are trying to establish social infrastructure by using money from oil industry. They requested to us for the construction, saying it is difficult because of scorching heat and lack of water. (Jung) Because there is almost no rain, we can do construction all the year around. And there is plenty of sand and gravels on the site. (Park) What about the heat that goes beyond 50 degrees? (Jung) We can set up tents, sleep during daytime and work during night.
day and night, was a method to complete the tasks in a short time, to reduce costs, and to double the company’s performances (Kwak, Jong-won, 1997: 23-24).

This trait can also be found from Park. We can presume his creativity from his episodes where he named a construction office ‘the Rommell house’ and where he set up a company sign and aerial views of each construction process and used them to raise funds (Innace & Dress, 1992: 69-70, 72). Park insisted that people should always be diligent in order to motivate themselves and be proud of what they are doing (Seo, 1997: 91). He wanted employees to become creative workers who are not bound by conventions or regulations but always search for new things. He also said that people feel satisfied when they set far-reaching goals and work hard to achieve the goals, and that people should be proud of what they do and feel sense of unity with other members (Seo, 1997: 91).

As superior decision-makers, Jung and Park showed capabilities of creative agenda-setting, goal setting and seeking alternatives. They had to pursue quests which had never existed on the Korea at that time creatively from a blank sheet of paper. They did not end up looking at previous practices or precedents as alternatives. They challenged future uncertainties without fear. People around them were shocked and they tried to do things that were almost impossible.

2) Passion during policy implementation and performance creation

Passion leaders have a tendency to focus on a task to achieve what they aim for. It is natural for a creative business plan and goal-setting to involve much uncertainty. Therefore it is difficult to figure out options and decide by considering all possible options from the first decision making process. The creative decision making can be also found in other processes. Many people who are familiar with existing practices cannot help but questioning the outcome. To pursue business under high uncertainty, leaders have to ingeniously respond to unexpected circumstances.

Construction of the Patani-narathiwat highway made Jung suffer predicaments and many trials and errors. Contrary to expectations, construction was delayed due to soft ground and rainstorms, and costs continued to rise without a limit. At that time, facing unexpected situations, Jung himself drove a jeep from dawn to visit construction sites to encouraged workers (Kim, 1991: 42). One construction site manager even said, “It was impossible to stay conscious because Jung visited our site and hustled around. I let him do whatever he wanted. By doing so, he was able to complete the highway. Although he had to accept tremendous amount of loss, passion leader Jung showed his capability to actively and creatively overcome difficulties and moments of failures.

Construction of the Hyundai dockyard and shipbuilding orders also showed his momentum and performance creating capability. Obtaining construction budget and construction skills and getting orders, none of them was easy but he was able to

(Park) What about water? (Jung) We can get water from elsewhere. (Park) I will provide whatever support Hyundai Construction needs to go to the Middle East (Jeon, 2010: 168-169).
achieve his goal based on his capabilities. Starting Kumgang mountain tour business by persuading the North Korea and becoming the main contributor in hosting the Seoul Olympics in 1988 also explain his passion leadership to us.

Park was a dreamer and also a doer who surely put his dream into practice (David, 1995: 281). His passion and endeavor for work are expressed in financing process for construction of steel mill. Establishment of KISA, request for loan, denial from KISA, conversion of Korea’s detailed property claims against Japan was a dramatic process of hope, frustration and success. It showed his tireless effort to achieve his goal. With his belief, ‘where there’s a will, there’s a way,’ he got 100 million dollars of commercial loan from Japan. It was the result of his earnest effort and passion (Shin, 1995: 38). In fact, this money had its original purpose for developing agricultural industry. He got support from the President Park, Japanese acquaintances and persuaded Japanese politicians and businessmen. Sometimes logical, sometimes appealing to grave situations of Korea and sometimes stubbornly demanding that you must help us, he utilized his bargaining power. He tried to show numerous statistics, logical validity and clear proof to support his claim (Innace & Dress, 1992: 108-109).

He demonstrated his ‘superhuman’ leadership to shorten the construction period, so that the steel mill was able to start production when the price of steel almost reached its peak (Innace & Dress, 1992: 124). Setting production capability by 100 million ton from the start and continuously increasing production by expanding the mill resulted from his aggressive momentum and guts and also from his excellent prediction. No one knew and agreed about the future of Korean steel industry, but only he perceived and was certain about the future (Innace & Dress, 1992: 133).

Park was loyal to his country. He said, “We are not simply working for money. Because we are public servants working for the country, we should be confident in ourselves and try out best (Seo, 1997:90).” Also, he was always ready to sacrifice himself for ‘the country’ and ‘the goal.’ When he became the president of the Korea Tungsten Company, he put a slogan, ‘My short life to my everlasting country’, and started practicing the slogan (Seo, 1997: 85). Only one year after becoming the president, he completely transformed the company with tremendous debts into a company with a profit of 1.2 billion won. Regarding the construction of

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4 He decided to get construction budget from international loan. The Korea International Steel Associates (KISA), consisted of eight steel companies and international banks from five countries, was established to determine whether to provide funds for the construction. However, KISA, IBRD and USAID turned down the request. KISA refused to provide funds and a report from IBRD also evaluated that Korea’s steel mill project was impractical and impossible. In despair, he thought of converting the fund from Japan, supposed to be used for agricultural industry. As soon as he received approval from the President Park, he headed right toward Japan and began to persuade Japanese politicians and businessmen. The former Japanese Prime Minister Nakasone Yasuhiro wrote about Park in his autobiography, saying that Park ran about so frantically to raise money that people even felt sorry for him and Japan was deeply touched by his sincere efforts.
the POSCO steel mill, he made a firm resolution to successfully construct the steel mill, thinking that he could even risk his own life. From the moment when he and the former President Park, Jung-hee talked about constructing a steel mill, he thought that his life was the only thing he had and he decided to risk his life for his country.

Park’s job performance was outstanding. To build the steel mill, he persistently persuaded 800 households, churches, a nunnery and cemeteries to tear down existing buildings and to move residents to other areas. He was able to solve the issue despite opposition from residents (Seo, 1997: 115). After three months from the groundbreaking, construction speed had slowed down and he realized that the delay could interrupt his overall plan. He encouraged construction workers to quadruple the workload. Everyone said it was impossible but he urged the workers, mobilized all the construction vehicles and even handcarts in the vicinity, decided to work for 24 hours a day, and eventually was able to meet the construction date. He awoken sleeping drivers and installed vinyl tents to work on rainy days. Park himself worked along with other workers on the site. He scolded and gave disadvantages in promotion to managers who didn’t meet daily targets. He kept a tight rein on the progress and emphasized self-sacrifice again and again (Innace & Dress, 1992: 68).

3. Passion for organizations

Jung was not just an owner of a company but was a founder, owner of an entire conglomerate, the Hyundai. He was a leader of a private organization which pursued profits in a free market system. On the contrary, Park was a leader of a public organization that was similar to a quasi-government under the control of its government, especially under a military regime. Park had to consider both profits and public values. What can common features be found from the two people?

1) Passion related to members of organization

Compared to Lee, Byung-chul, the founder of Samsung, Jung was said to have an image of somewhat unsophisticated and broad-minded big brother while Lee was said to have that of delicate, meticulous businessman. It is said that Jung faced employees in easy-going and broad-minded way just like his life and image. The Hyundai, the company he owned, have company motto of diligence, frugality and affection (Lee, Chae-yoon, 2011: 145). The motto was his management philosophy and the main power to integrate Hyundai employees. It is one of his management philosophies which includes creative foresight, active will and strong momentum and which have been passed down (Lee, 2011: 145).

In terms of attitude toward organization members, whenever he visited sites, there was no formality or ceremony and he didn’t ask for charts or reports. Because he suddenly showed up, made inspections of sites and pointed out mistakes, there was extreme tension from few days before his visit to the end of his visit. Like this, his management style was not limited by formalities and he made decisions by confirming sites. Therefore, his companies and organizations maintained a moderate level of tensions (Gwon, 1997: 45). This trait can also be found from Park. He tried to directly hear opinions from workers on site. He gained respect and trust from people.
by correcting errors, gathering new ideas and applying them on management (Seo, 1997: 100).

Park can be regarded as a charismatic leader. He always carried his ‘baton’ like a military commander. Just like a baton of an orchestra conductor, he carried it as a symbol to lead the entire organization (Innace & Dress, 1992: 29-30). He emphasized unity and cooperation of employees (Seo, 1997: 91).

On the other hand, he also managed the POSCO based on humanism (Cho, 1995: 19). He believed that the success and failure of business depend upon physical, mental health of members and personal dedication (Seo, 1997: 92). Jung, Soo-chang (1995: 134) thought that Park was a leader only good at planning and pushing forward, but when he saw facilities and environments of the POSCO’s educational institutes, he realized Park’s consideration for welfare of employees. Batista said, “Park gave considerable thought to employees’ health, education of their children, cooperative spirit, welfare facilities, etc. His leadership was not just making orders and having others follow the orders. His leadership was a democratic leadership that he first treated employees warmly and made employees follow him from their hearts (Batista, 1997: 324).”

2) Passion related to entire organization

Jung saw his organization with the same view as his saw his employees. The Hyundai has the image of a bold company achieving goals by overcoming challenges. It is an organization which is not bound by existing practices, difficult situations or frames.

Jung was an advocate of free trade. Under the conditions where companies can exhibit their creativity, he thought that only a privately led economy where people could run businesses on their own responsibility could sustain the Korean economy and acted based on the thought (Goo, Ja-kyung, 1997: 29). His ideas were applied to his thinking and philosophy and he managed the organization very freely and creatively. In a human resource management guide of which the draft was written by Jung, there were contents such as ‘inspire equality among employees, treat people respectfully and use refined languages,’ or ‘aware that every person has the need of self-development and self-actualization and therefore motivate employees to let them work autonomously instead of ordering them to work forcibly’ (lee, 2011: 260).

Jung’s active and positive passion leadership can be regarded as a representative idea or the Hyundai spirit. His self-confidence was spread to entire organization and employees are said to shout a slogan, ‘If you do it you can achieve it. If you can’t, then try a new method’ (Jeon, 2010: 159). This strong impetus is a corporate culture that started from Jung.

He respected capable employees and give them more responsibilities and tasks by promoting them quickly to do more work. As he was a self-made man, he was good at finding competent people and making them exercise their abilities. When the former President Lee, Myung-bak was young and was an employee of the Hyundai, he was highly appreciated by resolving protests occurred by construction workers and
got rapid promotions after that. Jung said that his management style is to recruit competent people, give numerous tasks and promote them. He also tried to introduce a personnel management system that boosts morale of employees.

When Park became the president of Korea Tungsten Company, he put emphasis on money and people, and with meticulous, calculated fund management and impartial personnel management refreshed the company (Seo, 1997: 86). He abolished previous customs to exclude external pressures and irregularities and exercised leadership that employees could trust and follow. When he was the president of the POSCO, he let all the start-up personnel to participate in business and operated the company in a democratic way. He stressed that everyone should embrace self-respect, success and failure with modesty and patience (Innace & Dress, 1992: 68). He disclaimed his merits in favor of others and showed leadership selflessly. He combined military discipline and creativity of a businessman in every way. Also, he took the initiative, set examples and did his best to encourage people to do their best (Seo, 1997: 102).

Conclusions

We saw passion leadership through cases of Jung and Park. The two people distinguished themselves during the economic development process of the Korea. They shared similar traits of passion leaders and made huge successes in their own fields.

As individuals they actively demonstrated their inner energy with positive thinking. Even though the circumstances were unfavorable and future was uncertain, they were not disappointed and shaped their future. There were numerous difficulties but they overcame them and achieved their goals. They never lost their hope and did their best. They had passion in their hearts and acted as positive thinking and momentum.

Jung and Park were leaders who surely achieved their objectives. Hyundai and POSCO are models of what passion leaders can create. Above all things they had outstanding creativity and impetus. They overcame difficulties that could not be resolved by previous practices by inventing creative alternatives and implementing them. They set themselves as examples and immersed in achieving their goals.

They regarded their organizations as their alter ego and made them passionate. They tried to make all the employees as passionate as themselves. To do it, passion was regarded as a motto of their companies. The organizations they lead also became passionate organizations.

This article focused positive aspects of passion and analyzed cases of Park and Jung. Therefore, it did not pay much attention to the negative side of passion. Jung did not have fruitful outcome from sending a herd of cattle to the North Korea or Gumgang Mountain tour business. There were numerous blemishes such as nepotistic family-run management, corruption, imperial management (Lee Byung-do, 2003). In
his later years, Jung made a political mistake that became another blemish. Park might have walked path of success because there was a strong support from the military government.

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Labour Cooperation of the Mukdahan-Savannakhet Area as a Border Community: Implications for the ASEAN Economic Community

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Abstract

The economic development in Mukdahan and Savannakhet areas have been changing when Savannakhet province which has set up “Savan-SENO Special Economic Zone” since 2003. In the near future, Mukdahan province will be developed as Thailand’s special economic zone in response to the realization of ASEAN Economic Community in 2015. For this reason, the researcher would like to study the situation and the cooperation of labour by using Mukdahan and Savannakhet as a border community. There are 3 purposes of this research study; 1) to study the area of labour cooperation between the government and private sector in Mukdahan and Savannakhet; 2) to study the influence of the culture and traditions that affect labour situation at the Mukdahan-Savannakhet area; 3) to study the possibilities of labour cooperation between Mukdahan and Savannakhet for human resource development, including the implications on the ASEAN Economic Community. In this study, qualitative methodology based on documentary research and field research was utilized. The latter was carried out by using in-depth interviews. Furthermore, the approach to international cooperation was used for research analysis.

The results were found that Mukdahan and Savannakhet cooperated in the improvement of Lao labourers’ skills in order to increase their capability to support the establishment of the Mukdahan and Savan-SENO Special Economic Zone, and to facilitate the relocation of the manufacturing base from Thailand to Laos. This kind of project met the needs of both the private sector and Lao people. Moreover, a Thai company, as a private sector, starts working with Savannakhet University for transferring knowledge of agriculture to Lao university students. This helps incubate those students for working after graduation. In cultural aspect, the people in Mukdahan and Savannakhet areas still adhere to their culture and traditions,
especially “Heat Sibsong” which remains crucial to the livelihood of Lao labourers. As a result, business owners have to learn about the local culture and adapt to it because it clearly shows that the cultural influence on labourers from Savannakhet area plays a more important role to their spirits than filling up their stomachs. In the future, since Thailand is forecasted to face a labour shortage once Mukdahan special economic zone is completely set up so it needs to accelerate the skill development trainings to support the special economic zone which will attract more investments in Mukdahan. The possibility of labour cooperation is to assist Lao labourers for training higher technical skills and to provide more training grants for vocational schools. Therefore, education is another important cooperation as it is a way of developing human resource to meet the needs of labour market at the Mukdahan and Savannakhet area in response to the impact of the ASEAN Economic Community on labour.

Keywords: Labour cooperation, Border community, ASEAN Economic community

Labour Cooperation of the Mukdahan-Savannakhet Area as a Border Community: Implications for the ASEAN Economic Community

Introduction

Today’s world is changing at an accelerated pace as people around the globe have increasingly become interconnected beyond frontiers; especially through communication, transportation and technology. This phenomenon is called “Globalisation” which is a driving force in a modern world. Generally speaking, globalisation paves the way for capitalism to flourish without a limit and also enables international capital flows, labour mobility and technology to grow more rapidly than ever. However, there are a number of negative effects that come hand in hand with this fast development. The ever-growing expansion of globalization causes many problems that affect international relationships. Examples are economic problems, human trafficking, illegal immigrant workers, environment, and inequality. Undoubtedly, these problems are massive challenges for governments to tackle.

Thai border areas have close links with neighbouring countries as we can see from the dynamic movement of trade and labours between these countries. In the case of Mukdahan, the province which borders Laos, it is regarded as a gateway to Indochina. Mukdahan has links to Laos (Savannakhet), Vietnam (525 km. from the province to Da Nang and 945 km. to Hanoi) and China (1,100 km. to Chong Zuo and 1,340 km. to Nanning). The Second Thai – Lao Friendship Bridge is a vital connection between Mukdahan and Savannakhet. It was built to link economic development projects along the East - West Economic Corridor (EWEC) line. The bridge enables Mukdahan to become a distribution hub and also facilitates the labour flows in the area. In spite of that, many Lao workers still try to enter Thailand illegally by crossing the Mekong River as the two cities share a 72-km. long natural border.
It is important to note that most Lao labourers, whether or not legal ones, are considered unskilled. They normally work as cleaners or other physically tough jobs or so-called “3 D” (Difficulty, Danger, and Dirty) which many Thais are not willing to do. In the past, most Thai employers preferred Lao people because they can be hired at a lower pay rate. Since 2013, however, Lao workers have been paid at a rate equivalent to their Thai counterparts thanks to the new Thai’s minimum wage which is 300 baht per day. Nevertheless, the employers still hire Lao people because of the labour shortage and their obedient nature.

The economic development in Mukdahan and Savannakhet areas affects workers on both sides, especially in Savannakhet province which has set up “Savan-SENO Special Economic Zone: SASEZ” in 2003. It can be considered as the first major investment zone in Laos. The SASEZ is a modern industrial area which promotes the manufacturing and processing, servicing, and logistics businesses. The main investors in this special zone are from Japan, the Netherlands and Thailand. As a result, Lao workers flocked into the industry in Savannakhet instead of travelling to Thailand to find jobs as in the past. However, Mukdahan has approved the establishment of a special economic zone as well and the province will join the Asean Economic Community (AEC) in 2015. It is interesting to analyse the labours situation in Mukdahan and Savannakhet areas by taking social and cultural aspects into account. The cooperation between the government and private sectors from both sides is also worth studying.

Thus, the researcher would like to analyse how governments cooperate in order to fix the problems of labourers in the age of globalization by using Mukdahan and Savannakhet areas as case studies. There are 3 purposes of this research study: 1) to study the area of labour cooperation between the government and private sector in Mukdahan and Savannakhet; 2) to study the influence of the culture and traditions that affect labour situation at the Mukdahan-Savannakhet area; 3) to study the possibilities of labour cooperation between Mukdahan and Savannakhet for human resource development, including the implications on the ASEAN Economic Community.

Theories of International Cooperation

According to Joseph Grieco, International Cooperation happens when states voluntarily compromise their policies in order to overcome difficulties and achieve mutual benefits (Amstutz, 1999, p.78). Normally, international cooperation has three main characteristics; 1.) There are voluntary actions of the state. (Or other non-state actors) 2.) The participated states have been identified and shared goals. 3.) Each participant will benefit from the results of the collaboration. (Amstutz, 1999, p. 78).

The fundamental objective that attracts other non-state actors to cooperate is to share common interest. There are six major reasons which make the international cooperation happen: 1) to maintain national security and political interdependence of states; 2) to reduce the possibility of a war through arms control; 3) to create peace through the development of rules and setting up institutions to resolve conflicts; 4) to
develop and enforce common rules; 5) to develop practices and institutions that can facilitate the national economic growth; 6) to manage and protect natural resources effectively (Amstutz, 1999, p. 78).

Sirote Paksuwan stated that international cooperation in solving economic, social and political problems might act between two countries (Bilateral Cooperation) or several countries together (Multilateral Cooperation) (Sirote, 1979, p.152). The major reasons that trigger international cooperation are; Participated countries agree that solution may not be reached if there is no cooperation between them. As a result, many countries come together to solve problems that they face (Sirote, 1979, p. 153).

The lack of resources crucial to developing countries is a key to keeping the country together. Not having enough resources such as experts, capital investment or raw materials pose several problems which cannot be solved if there is no cooperation. Therefore, international organization has become an important tool for helping countries that lag behind in development. (Sirote, 1979, p. 153)

Research Methods and Data Collection

This study used qualitative research in the form of descriptive analysis (analytical description) by gathering information from the documents and interviews.

Documents: which are divided into primary source (e.g. official announcements and official declarations/statements from the international conferences) and secondary source (e.g. newspapers, journals and articles from various websites).

In-depth interviews: the researcher interviewed several key informants, namely Consul-General of Thailand in Savannakhet, Nakhon Phanom University Rector, Secretary of the Mukdahan Chamber of Commerce, Labour Specialist, Skill Development Technical Officer at Mukdahan, Managing Director of Mitr Lao Sugar Ltd., Thai business owners, Director of Children's cultural centre of Savannakhet, Lao lecturers of Savannakhet University. The entire documentation data and empirical data will be analysed with descriptive and analytical processes as mentioned above.

Results

Labour cooperation in Mukdahan and Savannakhet area

From various sectors’ perspectives, the labour situation in Mukdahan and Savannakhet areas are not in a problematic condition or threatening the stability of the international community which normally stems from drugs, crimes, and human trafficking problems. In addition, it does not need to accelerate the implementation of cooperation on tourism to boost the economy in the area. In regard to the relationship, Thai employers still rely on unskilled labourers from Laos and it is also forecasted to hire more Vietnameses because of the better transportation. Undoubtedly, The Second
Thai – Lao Friendship Bridge makes the labour mobility and movement of goods much easier and more convenient because, currently, there are international buses that run several times a day. In the border areas, more than 80 percent of the labourers come from Laos and Vietnam and most of them work in factories, commercial trades and service sectors. However, there is a noticeable difference as most Laos are domestic workers while Vietnamese people work in agricultural sector. It has been observed that some Vietnameses have a hidden agenda in that they want to learn valuable skills in Thailand before starting a career back in their own country (Prasert Wongmalasit, Interview, 19 May 2014; Suwit Laohasiriwong, Interview, 19 May 2014; and Nattakritta Dahan, Interview, 23 May 2014).

There are three levels of cooperation in Mukdahan and Savannakhet areas: 1) cooperation between private sectors; 2) between governments; and 3) between government and private sectors. The examples of the cooperation include the partnership between the Governors of the Lao and Thai provinces, and Thai business owners send workers to the private sector of Laos. The concrete cooperation project that has already been carried out was "Skills development for workers in Lao PDR" which was a joint initiative from the Ministry of Foreign Affairs and the Ministry of Labour of Thailand.

The project was stemmed from the Fiscal Year 2014 by Department of East Asia and it aimed to develop professional skills for workers in Lao PDR, Cambodia and Myanmar. The Department of Skill Development was assigned to be responsible for building workforce skills and professional development to increase the capability in public and private sectors, government officials and workers in Thailand and the neighbouring countries. This project is expected to build good relationships with each other, prevent and resolve the problems that may occur along the border, such as drug problems and human trafficking. The Department of Skill Development has requested cooperation from regional and provincial Skill Development centres, especially the border provinces, to cooperate with relevant organisations to provide plans / project support budget. (Documentation Project Department of Skill Development, 2014)

Mukdahan Skill Development Centre in cooperation with the Department of Labor of Lao PDR in Savannakhet set up a project called "Skill Development for Lao PDR labourers" to help increase their capability. This project accommodates the possibility of the relocation of Thai production and services enterprises to the special economic zone Savan - Seno in Savannakhet. It also helps prepare skilled workers in Mukdahan, which will become a special economic zone as well, and prevent the movement of unskilled labours from working in the province when it opens for AEC in 2558. In the first year of this project, there are 60-hour training courses for 60 technicians in total (20 people per session) as requested by Department of Labour and Welfare, Savannakhet and in accordance with the market demand in the area (Chaipan Kranlek, Interview, 23 May 2014). The courses provided by the Thai department are as follows;

1) Building Electrical Wiring
2) Electric Arc Welding Level 1
3) Air-Conditioner Repair

After the course, the students will be evaluated and followed up after completing a course within three months. The results showed that the participants were satisfied and thought the training was beneficial. The students who completed the course are expected to apply their knowledge and skills to use in their work more effectively.

Not only does this project meet the needs of the private sector to support the establishment of the Mukdahan and Savannakhet special economic zone, but it also facilitate the relocation of the manufacturing base from Thailand to Laos. In addition, it helps promote the careers and generate income for Lao people in Savannakhet which may result in decreasing the cross-border problems such as crimes, drugs and human trafficking. The project also strengthens the cooperation between authorities responsible for labourers of Thailand and Savannakhet. Ideally, this would lead to the ongoing development and concrete cooperation in other areas.

Education is another important cooperation as it is a way of developing human resources to meet the needs of skilled workers in the future. The concrete example gathered from the field study and interviews is the cooperation of the Thai private sector and the government of Lao PDR in Savannakhet. Thailand’s Mitr Lao Sugar Company Ltd signed a Memorandum of Understanding (MOU) with Savannakhet University to open a curriculum taught in the Faculty of Agriculture. It theoretically and practically focuses on the sugar industry where students will study about the importance of sugar cane as industrial drop, harvesting, processing into sugar, management and marketing. The company will provide lecturers or instructors throughout the semester and will give the students 2-3 months internship with remuneration and assessment. If a student wishes to apply for work after graduation, the company will also give them the opportunity as they normally take care of about 20-30 students per year (Wichit Niwaterangsan, Interview, 22 May 2014).

Other educational cooperation are generally involved with the government as Thailand offer scholarships to Lao students to study in Thai institutions, for example, Nakorn Phanom University. However, the feedback from Lao PDR government in Savannakhet or even by the students themselves is not so positive. The main reason for concern is that students will familiarise with the concept of capitalism from Thailand which could threaten the Lao’s socialist approach. In addition, it is believed that graduating from a Thai institution will have less opportunity in term of career paths compared to graduating from Vietnam. Therefore, Lao people prefer to study a bachelor’s degree in Vietnam. In contrast, there are more and more Vietnamese students who choose to study in Nakorn Phanom University. Most of them are interested in learning Thai language along with working part-time. The negative side of this cooperation is the imbalance of interest as there are only a few Thai students in Lao PDR or Vietnam compared to their students study in Thailand. Moreover, Lao people are more enthusiastic about learning and developing themselves (Suwit Laohasiriwong, Interview, 19 May 2014, and Satheuane Thyekeo, Interview, 22 May 2014).
From the field study, however, it has been found that Thailand has provided assistance to Children's cultural centre of Savannakhet Province Lao PDR, which is the centre of activities for children and young people aged between 8-15 years. The centre focuses on training and developing skills in arts, culture and performances. It operates outside school hours so that the youth can use their free time to do something productive and also gain skills training to create extra money and may lead to a future career. In the past, Thailand helped supplying trainers for radio broadcasting and the youth who participated in the program can make some money to help their family. Thailand also hosted the ASEAN Cultural Youth Camp which 10 people from Savannakhet and 2 from Kummuan province had been chosen to represent Lao PDR. Another cooperation is the Savannakhet and North-Eastern Thailand Cultural Exchange program (Souliphone Ounchanh, Interview, 21 May 2014). That is the new phase of the cultural cooperation between Thailand and Savannakhet.

It is forecasted that the cooperation in Mukdahan and Savannakhet areas will be expanded to Vietnam in order to forge multilateral relations between the border areas. The example of this project is the partnership initiative at the local level in 9 well-connected provinces in 3 countries; that are Nakorn Phanom, Nong Khai, Sakon Nakhon province of Thailand, Savannakhet, Bolikumsai, Pakxan of Lao PDR, and Ha Ting, Nghe An, Quang Binh of Vietnam. There is a group meeting annually but with little progress as Thai local officials cannot make a decision without the government’s approval. Moreover, the frequent leadership changes in Thailand also proved to be a disruption for the project where a similar problem occurred with the trilateral cooperation between Thailand, Laos and Vietnam (Mukdahan - Savannakhet - Quang Tri), which has operated since 2006.

The influence of the culture and traditions that affect labourers in Mukdahan and Savannakhet Areas

The Mekong River crossing in order to join cultural and traditional celebrations between people from Mukdahan and Savannakhet dated back to ancient times. They have formed close relationships as families, whether or not a blood-related one. Even though they are not blood relative, they still have, as anthropologist called, “artificial kinship” through “Phuk Siew” (Friendship making) ritual. “Siew” is like a tie that binds children to respected adults that would later become their “Siew Father” or “Siew Mother”. The interaction between the two communities along the Mekong River is still going strong due to the inherited traditional practice, for example, a rice giving ritual during the funeral. No matter where the relatives of the dead person are, they have to return home to join this practice (Adisorn Semyam, Interview, 6 July 2011).

The joint tradition of Mukdahan and Savannakhet that shows the close relationship between the two communities is “Heat Sibsong” (12-month customs). Each month of the lunar calendar is related to the agricultural livelihoods, Buddhism and traditional beliefs of both sides of the Mekong River. During rice harvest seasons, Lao and Thai people still cross the border to help each other work in paddy fields which is called the “Long Khag” tradition. After the harvest is finished, the
communities normally have a party to celebrate the cooperation. The regular socialisings and joint rituals between the two communities intensify their bond and help eliminate the divide between ethnic groups (Piyachat Sinthusa-ard, 1997: 77). Meanwhile, other traditional faiths of people along the Mekong River are continuously preserved, such as worshiping angels, ancestral spirits and city pillar shrine in the 7th lunar month (Piyachat Sinthusa-ard, 1997: 77).

In this day and age, “Heat Sibsong” still plays an important part in Mukdahan and Savannakhet communities and it has been described as followed; Sutin Sanongphun (2000: 9) said that even though there are written laws governing people, “Heat Sibsong Kong Sibsi”** is still vital as a mechanism of social order in Mukdahan and Savannakhet area. Nevertheless, this local custom has to adapt to the changing social context as well. Piyachat Sinthusa-ard (1997: 39-42) stated that “Heat Kong” is a rule which controls the behaviours of people in the community so that they can live peacefully together.

It can be assumed that people in Mukdahan and Savannakhet areas still adhere to their culture and traditions, especially “Heat Sibsong” which remains crucial to the livelihood of local people, including labourers. Adisorn Semyam (Interview, 6 July 2011) stated that “Heat Sibsong Kong Sibsi” or “Heat - Kong” is an important practice of people along the Mekong River, especially the beginning and the end of Buddhist Lent when anyone from Mukdahan and Savannakhet has to return home to celebrate with their family and friends. Many of them are willing to accept a pay cut just to be able to join the ceremony or even resign if they are not granted leave. This ongoing situation has become a problem in Northeastern Thailand provinces that border Laos in particular.

The information gathered from various sources above is similar to what the researcher collected from the field study in Mukdahan and Savannakhet areas. The researcher interviewed Prasit Viriyaboonma (Interview, 30 August 2012), a Thai “ODOP” shop owner in Savannakhet about the influence of “Heat Sibsong” on the workers.

“Whether it is a religious ceremony or funeral, they (workers) usually go back to their village to give a hand, this is their culture. You have to grant them leave, especially the 3 main festivals that are Songkran, the beginning and the end of Buddhist Lent. I tried to persuade them to work by offering an increasing wage but it did not work as they were prepared to quit if they could not return home. Undoubtedly, Songkran is the most important festival because they have a chance to celebrate together in a family reunion.” Prasit said.

Somsak Siboonruang (Interview, 23 May 2014), Secretary of the Mukdahan Chamber of Commerce has a similar view to Prasit in regard to the importance of the local traditions.

“Isaan (Northeastern Thailand) and Lao people naturally focus on their livelihood and community and that caused problems for Mitr Phol and Mitr Lao sugar factories because no one wants to work during the festivals. They do not accept a special pay rise and are ready to resign if they cannot have days off. We would be in
trouble if most workers quit so we have to find a compromised way. The business owners have to learn about the culture thoroughly. Songkran festival is really important to Lao people as it marks the New Year and they normally celebrate for a whole week. The end of Buddhist Lent festival is also popular as there is boat racing which is a tradition that they preserve.” Somsak said.

Even though people in Mukdahan and Savannakhet still adhere to the inherited culture and traditions, it can be said that Lao people in Savannakhet are stricter than their Thai counterparts because Thailand has been more familiar with western culture for a long period of time. Meanwhile, Lao people are so proud of their own culture that they have a saying “Culture brings the economy” (Prasert Wongmalasit, Interview, 19 May 2014).

The cultural influence on labourers in Mukdahan and Savannakhet areas is still plain to see and it plays a more important role to their lives than earning money in some contexts. Originally, Heat Sibsong was created to deal with the community’s economic problems through religious rituals such as Boon Duan Yi (2nd lunar month ritual) or alternatively called “Boon Koon Lan”. People have believed that this ritual would bring success to their rice farming. Boon Duan Hok (6th lunar month ritual) or “Boon Bung Fai” (Rocket festival) is another example of Heat Sibsong that people believe will bring plenty of rainfall for their produce and lead to prosperity.

Other main roles of the rituals are involved with spiritual aspect and social obligations that they have toward their communities. “Boon Duan Khao” (9th lunar month ritual) or called “Boon Khao Pradab Din” is a merit making ritual that people dedicate their good deeds to their loved ones who have passed away. “Boon Duan Paad” (8th lunar month ritual) or the beginning of Buddhist Lent and “Boon Duan Sib-ed” (11th lunar month ritual) or the end of the Buddhist Lent are also important. These religious ceremonies reflect the function of Heat Sibsong that link faith and spirit of people to Buddhist beliefs about life after death. Traditional rituals are used as a key to bring people together to help prepare and do the tasks during the ceremony or festival which can strengthen communities at the same time.

Capitalist employment relationship is heavily based on reciprocity as labourers will be paid when they work for their employers. However, this relationship cannot respond to the workers’ spiritual need because most labourers along the border have a strong sense of commitment to their families and culture. Therefore, a large number of labourers from Mukdahan and Savannakhet are ready to take leave without pay or even quit the job to return home during an important festival such as Songkran or Buddhist Lent. As a result, business owners have to adapt to the local culture because it clearly shows that offering a pay rise or threatening to fire the workers are not effective measures to keep them working during the festivals. In other words, the power of traditional culture can meet both spiritual and relational needs for villagers. In certain times, it is even more important to them than wages because the employment under capitalism can only respond to their economic need.
Thailand Role on the Transport Development in the Greater Mekong Sub-region

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Abstract

The Greater Mekong Sub-region (GMS) is a natural economic area bound together by the Mekong River, covering 2.6 million square kilometers and a combined population more than 300 million. This paper mainly analyzes the growing presence of China in this sub-region, especially, Cambodia, Laos, and Myanmar. China has adopted the pro-active approach to boost the development program through and investment in physical infrastructure. The strong physical connectivity between China and GMS has created opportunities for China to have more influence economically and politically. Then the paper explains the passive approach of Thailand in transport development in this sub-region. It describes the contents of transport development assistance that affect trade and investment of China and Thailand in these three GMS countries. This paper argues that there are both political and economic meanings in China transport assistance which is an important measure for Chinese strategies of increasing economic and political power in this sub-region. China has been successful in setting the new balance of power to the West. Meanwhile, Thailand that is the high economic power in this sub-region, plays the “small country” role by being passive more than active. As a result, China has been able to gain more economic and political power in this region, while Thailand role in this sub-region is becoming smaller relatively.

Keywords: China; Greater Mekong Sub-region; regional economic integration; International Political Economy; Thailand.
Introduction

The Greater Mekong Sub-region (GMS) represents the natural economic area bound together by the Mekong River. With the 2.6 million square kilometers and a combined population of 333.8 million, the area is becoming one of the most vibrant region in terms of politics and economics. The GMS countries comprises Cambodia, the People’s Republic of China (PRC, specifically Yunnan Province and Guangxi Zhuang Autonomous Region), the Lao People’s Democratic Republic (Lao PDR), Myanmar, Thailand, and Vietnam. In 1992, the six countries of the GMS, with assistance from the Asian Development Bank (ADB), entered into a program of sub-regional economic cooperation, designed to enhance economic relations among the countries. The GMS Program, with support of ADB and other development partners, the Program helps the implementation of high priority sub-regional projects in transport, energy, telecommunications, environment, human resource development, tourism, trade, private sector investment, and agriculture. To realize its vision of a prosperous, integrated, and harmonious sub-region, the GMS Program has adopted a three-pronged strategy (the Cs):

- Increasing connectivity through sustainable development of physical infrastructure and the transformation of transport corridors into transnational economic corridors;
- Improving competitiveness through efficient facilitation of cross-border movement of people and goods and the integration of markets, production processes, and value chains; and
- Building a greater sense of community through projects and programs that address shared social and environmental concerns.

The GMS leaders adopted a 10-year Strategic Framework at the Fourth GMS Summit in 2011 to guide the GMS from 2012 to 2022. The Strategic Framework builds on the member countries’ commitment and national development plans to promote regional cooperation and integration within and beyond the GMS. In the GMS Ministers in December 2013, the GMS Regional Investment Framework (RIF) was set. The RIF identified a pipeline a priority investment and technical assistance projects from 2013-2022. The RIF contains more than 200 projects across 10 sectors with an estimated investment of more than $ 50 billion.

The GMS transport initiatives seek to develop the priority transport corridors that connect the sub-region together and to provide transport links to population
centers, tourist destinations, markets, and other centers of economic activities. This will promote trade, tourism, investment, and access to social and other services. The principal transport corridors from the base of the three major GMS economic corridors, namely: (1) the North-South Economic Corridor, (2) the East-West Economic Corridor, and (3) the Southern Economic Corridors.

Substantial progress has been achieved in terms of implementing GMS projects since 1992. Priority infrastructure projects worth around $11 billion have either been completed or are being implemented (www.adb.org/countries/gms/overview). Among these are the upgrading of the Phnom Penh (Cambodia)-Ho Chi Minh City (Vietnam) highway and the East-West Economic Corridor that will eventually extend from the Andaman Sea to Da Nang.

The infrastructure foundation of the GMS corridors was bolstered by the completion of the 4th International Mekong Bridge between Hoayxay in Laos and Chiang Khong in Thailand. It is the last missing link along the North-South Economic Corridor. The 240-kilometer Noi Bai-Lao Cai Expressway in Vietnam was open in September 2014. The Southern Cambodia Railway line from Phnom Penh to Sihanoukville was completed and opened for commercial traffic in December 2012. With these several completion in Physical transport, the costs of cross-border trade in
the GMS remain high and vary widely across countries partly because of the remaining infrastructure gaps. According the 5th Summit declaration in 2014, the GMS countries are committed to continue the efforts to transform the GMS transport corridors into economic corridors.

**China Role in the GMS Economic Cooperation Program**

In this sub-region, China has been trying to integrate since 1990. Although the GMS economic development program started in 1992, the implementation and consolidation stage did not take place until after the first GMS Summit held in Phnom Penh, Cambodia in November 2002. The initial focus of the projects was to develop or improve the transportation infrastructure in the area to reduce physical barriers to trade and investment. As the southwest provinces of Yunnan and Guangxi made up the region, most of China’s participation in the GMS development program is concentrated in the North-South Corridor. This corridor stretches from the southern city of Kunming in Yunnan to Bangkok. It covers Luang Namtha province in north Laos, the Shan state in western Myanmar, and three main Northern provinces of Thailand (Chiang Rai, Chiang Mai, and Phitsanulok). It, as well, covers the area southeast from Kunming to Hanoi of Vietnam. China’s participation in the GMS development program is very much in line with its economic benefit. After hosting the Second GMS Summit in 2006, China spent around US$4 billion building highways connecting Kunming with several cities in the GMS sub-region. Since January 2006, China has also unilaterally removed tariffs for more than 200 items from Cambodia, Laos, and Myanmar in an effort to boost bilateral trade with the GMS countries. China has promoted private and state-owned Chinese enterprises to invest in this region, particularly in Cambodia and Laos. To strengthen economic ties, China has offered “no-string attached” loans similar to those offered to African countries to the governments of these two countries mostly for the construction of transportation infrastructure.

One of the examples of these was the completion of the Route 3 highway in March 2008. The 220-kilometer highway, which passes through nearly 100 villages in Laos, replaces the previous horse trail that has been closed for four months each year during the rainy season. The completion of Route 3 is the final link of the network of road that link Beijing to Singapore via mainland Southeast Asia. The total cost of Route 3 is about US$97 million. China, Thailand, and the ADB each contributed US$30 million while the remaining was financed by the Lao government.

Besides Route 3, China also involved in the construction and refurbishing of several roads and bridges in the North-South corridors in Myanmar, Laos, and Vietnam. Those projects are the Route 4 (Kunming-Lashio), the Route 5 (Kunming-Hanoi-Haiphong), the Route 7 (Lashio-Loilem-Kengtung), and the Route 8 (Luang Namtha – Hanoi).

During the Third GMS Summit in March 2008, Premier Wen announced that China would put more efforts to expand development projects into other areas, particularly in human resource development, trade and investment facilitation, and telecommunications development. Many of these are reflected in the Vientiane Plan
of Action for GMS Development for 2008-2012 which was adopted during the third GMS Summit.

Constructing these transport networks has increased the economic influence of China in the region. Total trade volume between them has increased nearly 300 percent from US$610 million in 1990 to over US$12 billion in 2006. In addition, there has been more inflow of investment from China to the GMS region. China has invested US$60 million in 2004 and US$115 million in 2006.

| Table 1: Value of Imports and Exports to the GMS Countries (US$ million) |
|--------------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Total | Exports | Imports | Total | Exports | Imports |
| Cambodia | 2923.43 | 2708.11 | 215.32 | 3773.14 | 3409.51 | 363.64 |
| Laos | 1720.78 | 934.14 | 786.63 | 2732.66 | 1722.58 | 1010.08 |
| Myanmar | 6971.94 | 5673.71 | 1298.23 | 10195.56 | 7338.69 | 285.68 |
| Vietnam | 50439.41 | 34208.11 | 16231.29 | 65478.19 | 48586.30 | 16891.89 |

Source: China Statistics Yearbook, 2014

Trade between China and the GMS countries mostly consists of mineral commodities, forestry products, resource-based products such as oil, gas, and hydro-energy. China investments in the GMS countries are mostly in the energy and transport sectors as well as agro-business and tourism industries. In Laos, Ruifeng Rubber Company had invested around US$20 million to set up rubber plantations in Luang Namtha province. The Suzhou Industrial Park Overseas Investment Company was granted to build a sport stadium for SEA Game 2009 in Laos with the loan given by the China Development Bank. Currently, China is a key trading partner for the GMS countries. In 2013, trade between China and other five members reached US$153.4 billion, and the direct investment from China to the rest were up to US$2.3 billion.

In Cambodia, Chinese companies invested in the energy industries. China funded the construction of four hydropower plants, including the US$280 million investment in 193 MW Kamchay hydropower station by Sino-Hydropower Corp. China National Overseas Oil Corp. is in joint venture with Cambodia National Petroleum Authority to explore the gas reserve along the coast of Cambodia. The China Cooperative State Farm Group and Cambodia’s pulp and paper Pheapimex invested more than US$70 million in pulp plantation in Kompong Chanang and Pursat provinces. The Chinese firm, Green Rich, invested in acacia plantation in Koh Kong province.

In Myanmar, China National Petrochemical Corp., Petro China, and China National Offshore Oil Corp. set up joint ventures with local oil companies to utilize
oil and gas in the Andaman Sea. China constructed pipelines from those offshores platforms to Yunnan province, such as, the US$2 billion gas pipeline from Sittwe.

The private and state-owned companies are increasing their investment in Vietnam, mainly in energy and transportation sectors. Some of these projects included the US$710 million Cao Ngan thermal-power plant, and the US$340 million Hanoi-Ha Dong railway project. Chinese oil companies such as the China National Offshore Oil Corp. set up joint venture with Vietnamese oil companies to explore for oil and gas in the Tonkin-Beibu Gulf.

China and Thailand also signed a MOU on railway cooperation which allows China to invest in Thailand’s first dual-track standard-gauge railways with a total length of more than 800 kilometers.

Chinese Premier Li Keqiang delivered a speech at the opening ceremony of the Fifth Summit of the Greater Mekong Sub-region Economic Cooperation in Bangkok, Thailand in December, 2014 that China will contribute US$1 billion to the GMS connectivity projects. China would provide US$ 490 million in grant for poverty alleviation and US$ 1.6 billion in special loan for China production capacity export. Moreover the US$10 billion special loan has been set up by the China Development Bank for the ASEAN infrastructure development. Li said the loan also supports Chinese companies opening factories and developing industrial chains within GMS.

According to Lim (2008), the growing Chinese investment in the GMS countries has drawn criticism from some western and local observers. Rather than viewing it as a catalyst for development, they called the increasing presence of Chinese investors a Chinese invasion that is threatening the sovereignty of the countries. For example, the Chinese project in Laos on “New City Development Project” is called “Chinese City” by local people when they saw a large number of Chinese people relocated to reside in this project. Some Chinese investment projects are received negative reviews on environment impacts and local economic system. For example, the Chinese hydropower projects in Cambodia received complaints from the local residents who need land for agriculture that they stole their ancestor land for the projects and its impact on Cambodia river system.

**Thailand Role in the GMS economic cooperation program**

The key driving forces that bring about the need for connectivity development and improvement come from internal changes in the economic structure of Thailand and the external factors that are the change in regional policies. The important changes in economic structure that drive the need for connectivity come from two factors (Chirathivat and Cheewatrakoolpong, 2015). First, Thailand is becoming a home country of FDI instead of a sole recipient of flows. Second, Thailand experiences high logistics costs that are the major obstacles to facilitating trade. Recently, Thailand has been an important production and assembly base for industries such as automobiles and electronic appliances. With the economic growth, Thailand has faced an increasing of shortage in operational workers and skilled labor. Also,
Thailand is becoming an aging society that causes a decline in the labor force. Additionally, Thailand faces a sharp increase in the wage rate. An increase in the national minimum wage affects labor-intensive industries such as textiles, garments, electronics and leatherwear. As a result, Thailand needs to increase in outward FDI in labor-intensive and resource-intensive sectors. Thailand outward FDI in Cambodia, Laos, Myanmar, and Vietnam are around 68 percent of total Thailand outward FDI in ASEAN.

Another economic structure that drives the need for connectivity improvement is the high cost of logistics. According to the world Trade Indicators Index, Thailand logistics performance index is at the level of 3.43 of 5, ranked 35 among 183 countries.

Table 2: Logistic Performance Index (LPI), 2014.

<table>
<thead>
<tr>
<th>Country</th>
<th>LPI Rank</th>
<th>LPI Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>1</td>
<td>4.12</td>
</tr>
<tr>
<td>Singapore</td>
<td>5</td>
<td>4.00</td>
</tr>
<tr>
<td>Malaysia</td>
<td>25</td>
<td>3.59</td>
</tr>
<tr>
<td>China</td>
<td>28</td>
<td>3.53</td>
</tr>
<tr>
<td>Thailand</td>
<td>35</td>
<td>3.43</td>
</tr>
<tr>
<td>Vietnam</td>
<td>48</td>
<td>3.15</td>
</tr>
<tr>
<td>Myanmar</td>
<td>145</td>
<td>2.25</td>
</tr>
</tbody>
</table>


As high logistic costs hinder Thailand competitiveness, the NESDB is reforming the logistic and trade facilitation system via Thailand logistic development plan. Thailand 2013-2017 logistic development plan aims to enhance trade facilitation and logistics system through policies to improve connectivity to neighboring countries and gateways and to improve transport services and logistic networks.

The external factor is the change in economic policies in this sub-region. Cambodia, Laos, and Vietnam have introduced the economic reforms to be more open and export-oriented.; the Socio-Economic Development Plan for Cambodia, the Doi Moi for Vietnam and the Five Year Plan for the Laos. These three countries have joined the WTO; Cambodia in 2004, Vietnam in 2006, and Laos in 2013. As a result, there is a large increase in trade between Thailand and these three countries. Apart from trade, these three countries also aim to attract FDI by issuing investment promotion schemes, resulting in a sharp rise in FDI. Myanmar, as well, introduced its
economic reforms in 2011, open more opportunities to economic cooperation and connectivity. Myanmar has policies reforms on taxation, FDI laws, anti-corruption laws, and the exchange rate system. Myanmar economic and political reforms attract FDI from several countries, including from neighboring countries.

In Cambodia, Thailand by the CP Group invested in animal feed plant in Pailin province with the investment value of US$8 million and is investing more than US$ 50 m in rice mill project with Soma Group in Kampong sapue province. In Laos, the SCG, with Saeng Manee Co., are investing more than US$400 m in cement production plant and Thai restaurant business group invested US$10 million to construct Community Life Style Mall that would be completed in 2015. In Vietnam, the Central Retails Cooperation is investing more than US$ 160 million to build the department store in Hanoi and in Ho Chi Min. The Sri Thai Superwares is building new plant to produce food and drink containers with the cost of US$ 7 million. The PTT group with the Saudi Arumgo of Sadui Arabia, are investing to construct the petrochemical refinery plant with the investment cost of US$ 650 million.

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Vietnam</td>
<td>10451</td>
<td>3913</td>
<td>11826</td>
<td>3951</td>
</tr>
<tr>
<td>17</td>
<td>Myanmar</td>
<td>7821</td>
<td>-244</td>
<td>8156</td>
<td>322</td>
</tr>
<tr>
<td>21</td>
<td>Laos</td>
<td>5118</td>
<td>2398</td>
<td>5443</td>
<td>2622</td>
</tr>
<tr>
<td>22</td>
<td>Cambodia</td>
<td>4612</td>
<td>3901</td>
<td>5115</td>
<td>3936</td>
</tr>
</tbody>
</table>

Source: Ministry of Commerce, Thailand

<table>
<thead>
<tr>
<th>Country</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>794.1</td>
<td>1180.4</td>
<td>1384.7</td>
<td>2445.4</td>
</tr>
<tr>
<td>Laos</td>
<td>632.5</td>
<td>1,075.8</td>
<td>1069.7</td>
<td>1647.3</td>
</tr>
<tr>
<td>Myanmar</td>
<td>895.4</td>
<td>959.6</td>
<td>1179.9</td>
<td>1583.5</td>
</tr>
<tr>
<td>Vietnam</td>
<td>1797.3</td>
<td>1632.2</td>
<td>1824.4</td>
<td>2501.2</td>
</tr>
</tbody>
</table>

Source: Bank of Thailand
The Thai government’s Eleventh National Economic and Social Development Plan, 2012-2016, recognizes that regional cooperation to develop stronger economic links with its increasingly prosperous neighboring countries is pivotal to Thailand’s effort to move to highvalue added production. The Plan views regional cooperation as important in providing new economic opportunities to less-developed border areas. It identifies the core objectives of regional cooperation as (i) strengthen the capability of utilize the advantageous strategic location of Thailand as a key connection point in ASEAN and Asia and the Pacific; (ii) enhance the interest of Thailand in international trade, investment, finance, and market opportunities through ASEAN membership, and trade and investment; (iii) promote Thailand as a key participant in cooperation under sub-regional frameworks. The plan provides specific directions, including to enhance transport and logistics connectivity under sub-regional cooperation programs; develop border areas, border economic zones, and economic corridors; create regional economic partnership for human capital development and labor mobility; encourage Thai firms to invest in the region via private-public linkages; and help prevent trafficking and communicable diseases. The government plans to increase investment to strengthen connectivity, which is expected to generate new market opportunities and stimulate growth and development of regional production chains utilizing the comparative advantages of regional economies.

For the GMS Economic Cooperation Program, Thailand has been an active partner, particularly in transport. It is involved with three original GMS economic corridors. The Thai government finances most of the GMS-related investment projects in Thailand from its own resources. The ADB, however, financed the 2009 GMS Highway Expansion Project for US$ 77.1m. The Thai government also financed a road section of the North-South Economic corridor in Laos, in cooperation with ADB and the People’s Republic of China; and financed a road section of the EWEC in Myanmar in cooperation with ADB.

The GSM sub-region can be a growth market for Thailand. The GMS posted 3 percent economic growth during 2001-2012. During this period, income per capita quadrupled to US$ 2,950. Thailand stands out in terms of its per capita level but not in terms of growth. If we exclude Thailand (US$5,686 per capita income)from the GMS, per capita would show nearly a five-fold expansion.
**Table 5: Thailand and the GMS**

<table>
<thead>
<tr>
<th></th>
<th>GMS 6 countries</th>
<th>Thailand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area</td>
<td>2.6m square km</td>
<td>20%</td>
</tr>
<tr>
<td>Population</td>
<td>328.814m people</td>
<td>20%</td>
</tr>
<tr>
<td>Population growth (annual)</td>
<td>Cambodia 1.8%</td>
<td>Laos 1.8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Myanmar 0.9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vietnam 1.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>China 0.5%</td>
</tr>
<tr>
<td>GDP per capita</td>
<td>US$2,949.76</td>
<td>US$5,686.28</td>
</tr>
<tr>
<td>Foreign direct investment</td>
<td>US$276.35b</td>
<td>58%</td>
</tr>
<tr>
<td>Total exports</td>
<td>US$363.08b</td>
<td>73%</td>
</tr>
<tr>
<td>International tourist arrivals</td>
<td>45,256,100</td>
<td>55%</td>
</tr>
<tr>
<td>Registered motor vehicles</td>
<td>21,280,700 units</td>
<td>75%</td>
</tr>
<tr>
<td>Electricity consumption</td>
<td>423,518 gigawatt-hours</td>
<td>45%</td>
</tr>
</tbody>
</table>


In order to utilize the GMS to be a market for Thailand, a lot needs to be done to facilitate movement of goods and services. At the 5th GMS Summit in Bangkok in December 2014, leaders of the six GMS countries endorsed an addition US$ 30b, around 3 percent of the GMS GDP, five-year budget to further develop the region under the regional investment framework implementation plan (RIF-IP) for 2014-2018. The 90 percent of the budget will be transport-related.
Table 6: Some Transport priority projects that cover Thailand and the GMS countries.

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Country coverage</th>
<th>Cost estimation (US$ m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mekong bridge at Bungkan-Paksan</td>
<td>Laos</td>
<td></td>
</tr>
<tr>
<td>Construction of Poipet-Klong Loeuk</td>
<td>Cambodia</td>
<td>0.5</td>
</tr>
<tr>
<td>Mae Sot-Myawaddy Border Crossing Project and infrastructure improvements</td>
<td>Myanmar</td>
<td>30.0</td>
</tr>
<tr>
<td>Feasibility Study for the Rail Link between Laem Chabang Port and Dawei deep sea port project</td>
<td>Myanmar</td>
<td>3.0</td>
</tr>
<tr>
<td>Bang Yai Kanchanaburi Intercity Motorway project (part of the Leam Chabang-Bangkok-Dawei corridor)</td>
<td>Myanmar</td>
<td>2,000</td>
</tr>
</tbody>
</table>

Source: RIF-IP, ADB

Conclusions

Back in the last decades of the 20th century, the divers and role models for development in Asia were the “four tigers” which were Hong Kong, Singapore, South Korea, and Taiwan. The onset of the 21st century began to position China toward the epicenter of the Asian economy, with its influence spreading across the continent through more trade, outward FDI, and other outgoing initiatives such as cross border infrastructure development. China’s trade with each of the GNS countries has grown since 1990 and most rapid since 2000. In addition to increasing trade, China exerts strong influence on the GSM through various development projects.

China, growing participation in the GMS sub-region has shown the change in Chinese foreign policy with its immediate neighbors as well as developing countries. This policy consists of both economic and politic aiming to increase its influence in this region. In term of economics, China can guarantee the supply that China needs badly especially mineral commodities and energy. The fast-expanding GMS market can be the market for Chinese industrial products that are going to be oversupply in
the near future. The GMS region is as well the best destination for Chinese investors. With the relatively cheap production costs, the GMS region is the investment hub for China who has high surplus of international reserves, to produce factors of production particularly energy to feed Chinese economy in the South. In addition, the GMS region can be the future production hub for Chinese products in the future when labor costs are not the comparative advantages for Chinese products anymore.

In term of politics, China needs to set new balance in this region, usually under the influence of the West. To guarantee the national security and national resources, China needs to have good relation with the GMS countries.

Bringing development to the GMS could benefit China Western development program, both Yunnan and Guangxi have been included in the program since it was introduced in the early 1990s. However, due to their location and lack of market opportunities, they were unable to achieve any real progress in inducing substantial growth. The GMS development program and the growing role of China in the sub-region should improve this situation. By improving the transport system and GMS economies, China has more opportunities to bring growth to the southern part of China.

Due to internal and external factors contributing to uncertainties for the Thai economy, the country is still looking forward to moving ahead with a large industrial base and strong supply chains and a new path of greater connectivity to the regional economies. With changes in economic structure, improving connectivity inside Thailand and within the region could become the key for Thailand future development.

**Policy Recommendations**

1. According Chirathivat and Cheewatrakoolpong (2015), there are many agreements containing connectivity initiatives such as ASEAN, ACMECS, and several FTA frameworks. The GMS Economic Cooperation Program is one of them. These agreements have overlapping memberships with different coordinating and governance structures. As a result, the initiatives in several agreements might cause conflicts in the medium and long term. In case of physical infrastructure such as road links, it might be easier to start with the sub-regional agreements as the member countries usually share a border. The GMS framework for transport sector should be put to the first priority over these many agreements containing connectivity initiatives.

2. The major obstacle of Thailand physical infrastructure projects come from the political reasons. The projects that were politically driven by the previous government became the victims of political game. As a result, the projects became victims of political circumstance and the implementation process is subject to delay. The Thai government needs to make sure the projects and their funding mechanism are transparent and credible with a proper governance structure. One possible way to reduce the delay is to increase the involvement of the private sector through the creation of public-private partnerships and to award concession contracts to procure projects to the private sector.
3. With the China’s growing participation in the GMS countries, especially in these three countries of Cambodia, Laos, and Vietnam, China has gained more power economically and politically in this sub-region. In order to regain more economic benefit through transport and trade facilities, Thailand should play more active role as a donor in physical infrastructure investment.

4. Since most of the GMS countries are low-income countries, the investment projects on physical transport infrastructure have been delayed or unable to be implemented. The Chinese participation in the Economic Corridors projects are needed but the recipients should accept this assistant under the consideration on sovereignty economically and politically.

5. The private sector should be the primary driver of economic corridor development, with the public sector establishing a conductive policy and regulatory environment, providing basic infrastructure, utilities and services, as well as facilitating cooperation and collaboration at the local, national and sub-regional levels.

6. The physical connectivity is a necessary condition for trade and investment cooperation. However, transport and trade facilitation are important as a sufficient condition. Removing all “software constraints” to cross-border connectivity that affect the cross-border flow of vehicles, goods and people must be implemented in a highly coordinated and effective manner.

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Nursing Student’s Perception of Unwanted Pregnancy and Abortion in Boromarajonani College of Nursing, Ratchaburi

Paveenapat Nithitantiwat, R.N, Ph. D. and Kwanjai Pataipakaipet, R.N, MSN.Boromarajonani College of Nursing, Ratchaburi

Background and Significance

Unwanted pregnancy and abortion in worldwide have become critical concern because many adolescents and young people are interested in sexuality at a younger age with unprotected sex. It was the global health risk for women and their families. Researcher reported that there were over thirty million pregnancies and forty million pregnancies had an abortion in 2012 [1]. In Thailand, abortion with a medical indication is legal; for example; rape cases and when pregnancy threatens the woman’s health such as mother with HIV, mother with psychological problem and so on [1, 4, 6]. However, abortion is prevalent in Thailand; an estimated 150,000 to 300,000 abortions occur per year [2, 4, 5]. Nowadays, in Thailand, unwanted pregnancy and abortion are the high risk problem because many adolescents and young adults engaged in the first sexual at their young age [27]. Therefore, risky sexual behavior such as having multiple sex partners without using condom and unprotected sex are important problem in Thailand [6, 26, 27, 28]. In Thailand, unwanted pregnancy results from having sexual intercourse without contraception use, early sexual debut, and limited knowledge about reproduction [3, 8, 11, 12, 13].

Unsafe sex, illegal abortions can lead to increased maternal mortality and morbidity [9]. Adolescents and young adults perceived that induced abortions among Thai women aged 20–24 years old and adolescents were due to social norms and abortion is morally wrong and sinful [1, 2, 6, 7, 10, 13, 14]. In Thai society, women are expected to remain virgins until marriage [15]. Young Thai women have abortions because their partners and families want to protect their reputation [8]. In addition, studies revealed that the Thai women have abortions because the pregnancy is an obstacle to work and education [10, 16]. A study reported that 56.7% of Thai
adolescents believed that it was acceptable to have an induced abortion to avoid quitting school and an economic crisis [12]. When Thai women have unwanted pregnancy, their mothers should be responsible grandchildren [6, 8].

The theory of planned behavior (TPB) has been predicted health behaviors, including abortion [17]. As an extension of the theory of reasoned action [18], TPB similarly proposes that attitude and subjective norm indirectly affect behavior via intention and that intention directly influences behavior. TPB adds perceived behavioral control that can directly influences behavior as well as indirectly influences behavior via intention [17]. Attitude is beliefs about a particular behavior, subjective norm is the perceptions of family’s and friends’ thoughts about a behavior, and perceived behavioral control (PBC) is the perceived ease or difficulty in performing the behavior [17]. A favorable attitude, favorable subjective norm, and favorable PBC will positively influence one’s intention to perform the behavior. Intention is ones’ plans to perform the behavior and determine how much of an effort one will exert to perform the behavior [17]. Janepanish, Dancy, and Park [19] used TPB to explore the behavioral determinants of consistent condom use for 400 Thai young heterosexual adult males. Subjective norm and PBC were significant determinants of intention to use condom consistently.

Aim of this study was to explore perception about unwanted pregnancy and abortion of nursing students using the concept from the theory of planned. Nursing students are a risk group to involve with this situation in future; therefore, this study is conducted to advice nursing student to avoid unwanted pregnancy and abortion.

Method

Design

A qualitative descriptive research design using in-depth semi-structured interviews until data was saturated, including digital audio recorded individual face-to-face interviews. Data were collected from nursing student at Boromarajonani College of Nursing, Ratchaburi where this study was approved.

Participants

A purposive sampling of 15 Thai male and 15 Thai female nursing students was used. All participants were obtained from the first year to the fourth year. Four males and two females were from the first year; three males and five females were from the second year, three males and three females were from the third year and five males and five females were from the fourth year. The selection criteria were: nursing students 18–24 year old at Boromarajonani College of Nursing, Ratchaburi, who speak Thai and willing to participate. The exclusion criteria were: not 18–24 year old nursing students at Boromarajonani College of Nursing, Ratchaburi who have no ability to speak Thai and unwillingness to participate.
The instruments developed by the researcher were used: a demographic data sheet elicited informative on age, birth date, education level, and religion, a semi-structured interview guide based on the theory of planned behavior consisted of 8 open-ended questions with probes. The interviews started with opening questions: tell me about how you define unwanted pregnancy and abortion. Then, talk about attitude, subjective norms, perceived behavior control, and intention questions. Examples of these questions were: have you had an abortion or know anyone who has had an abortion and have your girlfriend had an abortion? What were your attitudes about unwanted pregnancy and abortion? Whom you want to talk to when you are involved with unwanted pregnancy and abortion? Did you know how to use condom and the pill? How did you avoid an unwanted pregnancy and an abortion or to have their female partner avoid an abortion related to unwanted pregnancies? Field note were used to note during interview.

Data Collection

The PI recruited and conducted the interviews. Participants were recruited face-to-face. Moreover, thirty face-to-face recruitments were conducted and all met selection criteria. After potential participants expressed a willingness to participate in this study, the PI scheduled a convenient time and date for a private interview. The PI met with the participants to sign consent form to participate in-depth semi-structured interview and collect data in a private room. The PI informed the goals, benefits, and potential risks of this study to the participants. The confidentiality and anonymity of the participants were guaranteed. Participants could withdraw at any time. Interviews lasted two hours per each. The PI and participant were the only people in the room. The PI began to ask the participant questions from the demographic data sheet and entered the participant’s answers. After the demographic questionnaire was completed, the interview started. The PI used two digital tape-recorders. The PI gave some souvenirs to participants after interview.

Data Analysis

To analyze the demographic data, descriptive statistics were used. Direct content analysis as described by Hsieh and Shannon [20] was used to analyze the qualitative data. To analyze qualitative data, the PI used the process of coding, categorizing and conceptualizing [29], also the technique of credibility, transferability, dependability, and conformability were used in this study [30]. After listening to the tapes and reading to the transcriptions and field note several times to attain an understanding of the content, the PI developed a codebook by first identifying the preliminary categories that were consistent with the theory of planned behavior. These categories were attitudes related to unwanted pregnancy and abortion, subjective norms related to unwanted pregnancy and abortion, perceived behavioral control related to unwanted pregnancy and abortion, and intention related to unwanted pregnancy and abortion. Each category was defined consistent with the theory of planned behavior. Using two transcripts, the researchers highlighted text that
exemplified each category and derived codes for each category, resulting in a preliminary codebook. Additional categories and codes were developed for text that didn’t fit the categories above and were agreed upon by the researchers. The resulting codebook was used to code the remaining transcripts and a second coder independently checked all coding for inter-rater reliability. Any disagreements among coders were discussed until an agreement was reached. Matrices were used to display the data and identify themes. Because all transcriptions and all codes were in Thai, the researcher translated them from Thai into English. Translations were confirmed using back-translation performed by a bilingual scholar with a doctoral degree or a bilingual faculty member [21, 22]. To establish rigor in qualitative study, the PI used the technique of member checking and peer debriefing.

Results

Demographic Characteristics

A total of 30 nursing students were individually interviewed. Their age range was 18 to 23 years (M = 20.53, S.D. = 1.63), 33.3 % were seniors and 96.7 % were Buddhist. All males reported their girlfriends never had an abortion, and all females reported never having an abortion.

Attitudes

Unwanted Pregnancy. Thirty nursing students believed that unwanted pregnancy was wrong made by individuals who have sexual intercourse without using a condom. One female explained:

Probably, we have sexual intercourse because it is our love. It may love at first sight. It happens to those who are only interested in having fun. It is a mistake. They probably had unprotected sex. ..............

By comparison, a male said: most men now can have sex easily and it is just for fun. But it may be wrong, often time, I think they do not want to use condom......

Abortion. All participants reported that abortion was the termination of the pregnancy. They reported that abortion in Thailand was illegal and believed that abortion was immoral, a sinful, and murder as both male and female said: “Abortion is very wrong. It is murder, a sin, and illegal.” It is not good, you are killing people. A person who did it, he or she was selfish, bad people. However, abortion is legal in case of rape or abnormal pregnancies. Nowadays, as we have heard, many adolescents had abortion easily; they just went to the clinic or did by themselves that was very
terrible. If we did not know how to abort, just go to the internet, we can find everything from there.

**Subjective Norms**

*Unwanted Pregnancy.* Twenty-two of the 30 nursing students thought that they would consult their “parents” or “mother” if they needed suggest about having a baby because they believed that their parents were the most important people in their lives, that their parents would give them good advice, and that they could talk to their parents about everything. A female believed that: “My parents are a good consultant”, and “I can talk to my mother about everything, she is close to me. She does not scold me and I can trust her. She will tell me to keep the baby.”

A male said:

My parents would tell me that I would take care of a baby because this is my child. They would blame me for getting a girl pregnant while still in school and having to raise a baby at that age. They could be disappointed in me. However, they would still tell me to keep the baby and get married. They wouldn’t let us get an abortion and worried about our future.

Another female said:

My parents will help me to raise the baby. They might scold me about the pregnancy, but they will support me and teach me how to survive with this bad situation. They will be concerned about how to finish school and get a good job and teach me how to take care of the baby. They will not allow me to have an abortion.

*Abortion.* Twenty-five of the 30 nursing students said that they would consult their “parents” or “mother” about having an abortion because they could talk to their parents/mothers about everything and that their parents would be the best consultant. A male indicated that: my parents will not agree if I need my partner have an abortion, they will tell me to keep the baby and help my partner take care of the baby. They might worry about how I support my wife and baby. They would worry about my future as well. A female said: my parents will not allow me to have an abortion because they worried that I may die during having an abortion. Finally, they will help me to raise the baby. Also, 15 of 30 nursing students told that they would consult their close friend because they trust close friend. One male said: I think my close friend is close to me more than parents and I can talk to them everything. One female said: my close friend did not scold me; she might help me to solve any problem.

**Perceived Behavioral Control**
**Unwanted pregnancy.** Twenty-seven of the 30 nursing students reported that they would use both condoms and the pill to prevent unwanted pregnancy.

A male said, “I think it is easy to talk to my girlfriend about using condom if we did not want to have a problem further.” A female said, “It is easy to tell him to use a condom to avoid pregnancy. I will tell him, if he refuses, I will not have sex with him.”

Moreover, they believed that condoms are easily accessible and affordable. They reported that condoms are accessible “at the Seven Eleven store and drug stores”

They also believed that they had easy access to birth control pills as stated in these quotes: Birth control pills are sold at any drug stores, clinics, hospital, and health center” and “It is easy to buy them even though I am embarrassed to buy them, because people may look down on me for having sex.” All nursing students reported that birth control pills are “very cheap and easy to buy”.

However, when we asked about how you abstained from having sex, 23 of the 30 nursing students, both male and female told that: it is easy for them to abstain from having sexual intercourse because they still need to know each other first before having sex. Moreover, having sex before marriage in Thailand is common, mass media and internet affects their sexual behavior.

**Abortion.** Twenty-seven of the 30 nursing students thought that it would be difficult for them to have an abortion or support their girlfriend in having an abortion because it is a sin and illegal. Both male and female told that they did not want to abort because they believed that it is sinful and illegal. One female said: she did not want to die during having an abortion as same as one male told that he did not want her partner dead.

**Intention**

**Unwanted pregnancy.** Twenty-seven of the 30 nursing students reported planning to use both condoms and the pill to prevent an unwanted pregnancy.

**Abortion.** All of nursing students believed that the strategies to prevent having an abortion were to avoid from sex or to have protected sex and believed in Buddha’s teaching. Also, they reported that they planned to keep the baby if a pregnancy occurred.

**Discussions**

The finding of this study reported that all participants never have had an abortion because they believed that killing people was sinful and 96.7 % of them were Buddhist, they followed Buddha’s teaching. Nursing students in this study had similar attitudes about unwanted pregnancy. The majority of these students believed that
unwanted pregnancies happened to those who made a mistake and failed to use condoms. Failure using condoms or use condom at some time resulted in unwanted pregnancy for Thai youth aged 13-23 years [11, 21, 22]. Not knowing how to protect oneself from getting pregnant was the primary reason for not using condoms for Thai women aged 17-23 years [23] and for Thai college female students [14]. A study suggested that in order to avoid having sex before marriages, male and female would have concern about dating. They would not have sex or if they cannot avoid that situation, they would have knowledge about contraception [23]. Similarity, several studies found that Thai young adults have not known about contraception before they have sex [13, 14, 23].

Consistent with Thai laws, all of participants reported that abortion in Thailand was illegal and legal in rape cases and abnormal pregnancies. Moreover, the majority of the participant believed that abortion was a sinful, killing people is murder and cruel. Because of Buddhism, the major religion in Thailand, most people believed that who had an abortion will get bad karma in the future; they were banned from society [4, 10]. Buddhism champions’ life beginning at conception and thus abortion is murder [24].

The majority of all participants reported that having an abortion nowadays was easily because mass media and internet influenced their sexuality. Parents would be concerned about this situation; they would teach their children how to protect sex [23]. In addition, most of participants reported that parents and close friend was important people in their life. Participants in this study also reported that a primary reason for Thai males wanting their girlfriend to have an abortion was the males’ concern that the males’ parents would find out and not accept the pregnancy. While a studies reported on Thai young women’s being stressed because they worried that their parents might be angry and not accept the pregnancy, our study is the first known study to explore Thai males’ perceptions of their parents’ reactions to an unwanted pregnancy [4, 21]. In addition to the above subjective norms related to unwanted pregnancy, Thai male and female nursing students in this study reported that their parents would be the people who would advise them about whether to have an abortion [4, 8, 16, 21]. However more females than males in our study reported friends as influential people in their decision making related to abortion. [4, 21, 25] also reported that Thai women talked to friends.

In this study showed that most participants planned to use condom and the pill when they may have sex to protect unwanted pregnancy. In present, condom use and the pills is easy to buy. It is available at any store. The participants in this study reported that if they experienced an unwanted pregnancy, they didn’t intend to abort. The strategies to prevent having sex and abortion is protected sex, believe in Buddha’s teaching and parents’ teaching, and avoid bad mass media and internet that involve with sexuality [23].

**Limitation and Recommendations for Future Research**
The limitation of this study is sample size; it may be a small group that cannot be representative of population. Participants come from only one place: Bormarajonani College of Nursing, Ratchaburi. This study is only guided by the concepts of the theory of planned behaviour. The research studied male’s perception about unwanted pregnancy and abortion, but we found a few studies that focused on unwanted pregnancy and abortion. Participants have not experience directly about unwanted pregnancy and abortion. Future research would study other theories, recruit participants who have experience about unwanted pregnancy and abortion and conduct longitudinal study in order to gain deep information to solve the solution for them.

Conclusions

The majority of nursing students in this study reported being Buddhist and that abortion in Thailand is illegal and sinful except in abnormal cases. However, they would have an abortion; they are not ready or are in school. Young people would not have sex before marriage. Parents, teacher, and health care provider educate them about sexuality, provide information about family planning and teach how to protect sex. Government has campaign how to prevent unwanted pregnancies and abortions and has strong policy to prohibit bad mass media and internet about sexuality.

Acknowledgements

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Many thanks to my beloved family, my mom and my older sister, who always beside and encourage me. Thanks a lot to Director and colleagues, Bormarajonani College of Nursing, Ratchaburi as well.
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The Prevalence of Medical Device Injuries among Nursing Staff
at a Thai Tertiary Care Hospital

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Abstract

This descriptive research aims to study and analyze incidents with medical devices, particularly needle stick and sharp objects, among the nursing staff for a Thai tertiary care hospital. The utilized findings will lead to the reduction of the prevalence of such accidents, in terms of reducing the risk of infection among nursing staff and increasing the safety of patients. The researcher collected data from a sample of 390 members of the nursing staff for the Thai tertiary care hospital over a period of two months employing questionnaires and interviews. Data was analyzed by descriptive statistics such as frequency, percentage, a chi-square test, and a contextual analysis.

The findings concluded that there were two main factors associated with needle stick or sharp injuries: - a human factor and an environmental factor, statistically significant at the 0.05 level, had occurred under three conditions: carelessness, hastiness and fatigue.

The research proposition pointed out that the guidelines to reduce the prevalence of accidents for the Thai tertiary care hospital can be found under the policy mechanisms and safety culture in the structure of the physical working environment. Besides, there should be a mechanism to create awareness of the activities within the guidelines set for the nursing staff.

Keywords: Prevalence reduce, Medical device injuries, Nursing staff, Tertiary care hospital
Introduction

The main activities of nursing staff are nursing care patients visited at the Out Patient Department or admitted in the In-patient Department, and the majority of their procedures involve the use of sharp devices during blood drawing, injection, intravenous fluid care, cleaning the used sharp devices and so on. If they do those activities while in hurried, excited, careless, or inexperienced with the procedures, they will be put at the risk of needle stick or sharp injuries. Those injuries could cause abrasion or wounds and the torn skin would be the route to expose to blood-borne pathogens or infectious diseases. Especially, if the needle or sharp device is contaminated with blood, secretion or discharge of patients who are infected with HIV or Hepatitis, those nursing staff will be at a high risk of serious infections which are public health issues, including HIV, Hepatitis B and C. Thus, the impact of needle stick or sharp injuries is not only blood infection, but subsequently also the physical and psychological problems.

The studies on needle sticks (NS) and sharp injuries (SI) in many countries found that the number of nursing staff that had accidents from needle sticks and sharps had increased continually and sometimes were at a very high quantity. For instance, a study in California, United States, found that during 1998 – 2000, registered nurses were the highest prevalence group of needle sticks and sharp injuries at 49% through nursing interventions: injection (26%), blood drawing (21%), intravenous fluid care (16%) and suture (13%) [Gillen, et. al., 2003 cited in Nuanjun Supun, 2005]. Related with the studies on percutaneous injuries among healthcare workers in 9 similar sized hospitals in United States by Babcock & Fraser, this revealed that registered nurses were the staff that got needle sticks and sharp accidents at high prevalence (44.3%). The majority of nursing procedures that caused accidents were: blood drawing at 13.6%, needle or sharp disposal at 13.3%, post-operation at 11.4% and suturing at 13.6%. The survey research on needle sticks or sharp injuries among nursing staff in a university hospital in Turkey in 2004 by Ilhan et. al. found that in the previous year, nursing staff got the injuries at 68.4%. And the study of injuries in a hospital in South Korea also found the prevalence of the injuries among registered nurses at 79.7%. Equipment involved in the injuries was injecting needles at 67.3%, and most of the nursing activities that caused injuries was medicine preparation and medicine ampoule breaking at 35.2%. Those injuries among nursing staff were not different from Thai studies on needle stick or sharp injuries among Thai healthcare workers which found that nursing staff among 11 community hospitals in Patanee Province got the injuries at 34% in 2003. Furthermore, a study on sharps injuries among nurses in a Thai regional hospital in 2011 by Honda et. al. found that the prevalence of sharp injuries among nurses was at 55.5% (250 nurses).

According to Thammasat University Hospital (TUH) as a tertiary care hospital in Pathumthani Province, Thailand, it was reported that in the years of 2009 to 2011, the tendency of needle stick or sharp injuries were increased continually at 2.8%, 3.3% and 4.1% respectively, even though the Nursing Department provided orientation, training courses and workshops about personal protection equipments, infectious control principle, and universal precautions, including the policy and proactive measures set for staff and patient safety. Therefore, this study was
conducted to study the prevalence of needle stick and sharp injuries and to determine factors associated with that prevalence among nursing staff. Besides, the findings of this study could be utilized for developing a policy and measures to prevent infections effectively, to reduce the accidental risk for nursing staffs and to increase patient safety.

**Purposes**

1. To study the prevalence of needle stick and sharp injuries among nursing staff of the Nursing Department, Thammasat University Hospital, Thailand

2. To determine factors (human, equipment and environment) associated with the prevalence of needle stick and sharp injuries among nursing staff of the Nursing Department, Thammasat University Hospital

**Materials and Methods**

**Design**

The study was a descriptive research, and conducted among nursing staff working at Thammasat University Hospital, Pathumthani Province, Thailand.

**Study Population and Sample**

The population of this study was 846 nursing staff in 2012; including 481 registered nurses and 365 practical nurses. The sample size was estimated using a calculation formula, as can be seen below:

\[
    n = \frac{Z^2 \cdot \pi (1 - \pi)}{d^2} \quad (3)
\]

Where:  
\[
    Z = 1.96
\]

\[
    \pi = \text{The prevalence of NSI/ SI among 250 Nursing Staff in the previous year was at 55\%} \quad [12]
\]

\[
    d = 0.05 \text{ (was the percentage of } \pi)\]

Then, instead the number:

\[
    n = \frac{1.96^2 \cdot (0.555 \times 0.445)}{(0.05)^2} = 380
\]
Thus, the sample size was 380 nursing staff, but this study increased the size to be 430 nursing staff for protecting the sample size in case of participants dropping out. Stratified random sampling was used to select the participants, with wards as the strata and the number of nursing staff was selected proportionally to the size of the ward nursing staff population.

**Instrument**

The questionnaire, the main research instrument for this study, was developed from literature review and was divided into two main parts:

Part 1: the quantitative questionnaire composed of socio-demographic data, the occurred needle stick or sharp injuries and the factors associated with the injuries.

Part 2: the qualitative questionnaire consisted of open questions for the staff that had incidents leading to injuries. Furthermore, they would be interviewed concerning the issue of factors associated with the injuries under the condition which the questionnaire of part 1 might not provide enough information to determine and understand the factors associated with the occurred injuries.

**Validity and Reliability of the Instrument**

Content validity of the questionnaire was examined with the participation of three experts, and the agreement of the experts (Content Validity Index: CVI) was 0.92. The questionnaires were revised according to their comments and suggestions before implementation. In order to ensure the objectivity of questionnaire, the questionnaire was revised after being approved by the experts, and was trialed with 30 nursing staff in a similar study area. Then, the questionnaire was revised and amended to be clearer and more easily understandable.

**Ethical Considerations**

The study was permitted by the Thammasat University Ethics Committee and the director of the Thammasat University Hospital. The Committee reviewed the required human subject review form and sent written notifications giving permission to the researcher to proceed with the research. Before the data collection, the participants were informed of the purposes of the study, and their rights in participating in the research project which included a guarantee that privacy and confidentiality would be protected and maintained and no penalty for withdrawal or termination from the study would be imposed. The participants were asked to sign the consent forms before the data collection and the interview.
Data Collection

When the Thammasat University Ethics Committee and the director of the Thammasat University Hospital had consented, the researcher informed the administrative committee of the Nursing Department to collect data. Four hundred and thirty self-administrative questionnaires were distributed to nursing staff who worked at TUH and took care patients directly more than one year. Additionally, some nursing staff-experienced with NSI/ SI was interviewed. The data was collected in the period of two months: May to June 2013.

Data Analyses

The quantitative data: socio-demographic data of participants, including gender, age, marital status, educational level, work position and work experience, was analyzed by descriptive statistics: frequency, percentage, mean, standard deviation, minimum and maximum. The data of NS/ SIs for determining prevalence of those injuries was analyzed by percentage, and Fisher’s Exact Test was used to analyze factors associated with the injuries. The qualitative data from interviewing technique was analyzed by classifying similar data characteristics into categories and by comparing each item to find out the difference and the similarity.

Results

Socio-demographic Data Analysis

Of the 430 questionnaires distributed, 390 questionnaires were completed and returned by nursing staff, translating into a response rate of 90.7%. The majority of participants were female at 92.1%, with an average age of 28.5 years. Most of them were single at 74.4% and got a Bachelor’s degree at 61.5%. The participants were registered nurses and practical nurses at 53.6% and 46.4% respectively. The majority had more than five-year experiences at 41.8% (Table 1).
### Table 1: Socio-demographic characteristics of the participants (n = 390)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>31</td>
<td>7.9</td>
</tr>
<tr>
<td>Female</td>
<td>359</td>
<td>92.1</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 – 30 years</td>
<td>270</td>
<td>69.2</td>
</tr>
<tr>
<td>31 – 40 years</td>
<td>107</td>
<td>27.4</td>
</tr>
<tr>
<td>41 years and up</td>
<td>13</td>
<td>3.3</td>
</tr>
<tr>
<td>(Average = 28.5 years, SD = 5.98)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>290</td>
<td>74.4</td>
</tr>
<tr>
<td>Married</td>
<td>93</td>
<td>23.8</td>
</tr>
<tr>
<td>Separated</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Divorced/ Widowed</td>
<td>6</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Levels of Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocational College/ Diploma</td>
<td>138</td>
<td>35.4</td>
</tr>
<tr>
<td>Bachelor’s Degree</td>
<td>240</td>
<td>61.5</td>
</tr>
<tr>
<td>Higher than Bachelor’s Degree</td>
<td>12</td>
<td>3.1</td>
</tr>
<tr>
<td><strong>Work Position</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Registered Nurse</td>
<td>209</td>
<td>53.6</td>
</tr>
<tr>
<td>Practical Nurse</td>
<td>181</td>
<td>46.4</td>
</tr>
<tr>
<td><strong>Work Duration/ Experience</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 – 2.9 years (Advanced Beginner &amp; Competent)</td>
<td>146</td>
<td>37.4</td>
</tr>
<tr>
<td>3 – 5 years (Proficient)</td>
<td>81</td>
<td>20.8</td>
</tr>
<tr>
<td>5 years and up (Expert)</td>
<td>163</td>
<td>41.8</td>
</tr>
</tbody>
</table>
The Prevalence of Needle Stick or Sharp Injuries among Nursing Staff

Table 2 presents the prevalence of the needle stick or sharp injuries for one year prior to this study among nursing staff of Nursing Department, with TUH being at 22.4%. The nursing procedures that caused the injuries were breaking a drug ampoule, blood drawing and injection at 37.8%, 14.6% and 13.4% respectively. The types of needle stick or sharp associated with the injuries were ampoule, needle stick and blade at 43.3%, 33.7% and 9.6% respectively. Nursing staff had injuries with needle sticks or sharps that had not been used on patients yet, had been contaminated with blood of patients and were being used with the patients at 49.4%, 22.4% and 16.5% respectively.

Table 2: Frequency and percentage distribution of nursing staffs regarding NS/ SIs

<table>
<thead>
<tr>
<th>Injuries</th>
<th>Nursing Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nursing Staff had Needle Stick or Sharp Injury (n = 390)</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>87</td>
</tr>
<tr>
<td>No</td>
<td>303</td>
</tr>
<tr>
<td><strong>Nursing Activities Caused NS/ SIs (n = 82)</strong></td>
<td></td>
</tr>
<tr>
<td>Breaking Drug Ampoule (Preparing Drug)</td>
<td>31</td>
</tr>
<tr>
<td>Blood Drawing</td>
<td>12</td>
</tr>
<tr>
<td>Administrating Injection</td>
<td>11</td>
</tr>
<tr>
<td>Cleaning after Procedure</td>
<td>7</td>
</tr>
<tr>
<td>Use of Lancet for Glucose Test at Finger</td>
<td>6</td>
</tr>
<tr>
<td>Skin Preparation before Operation</td>
<td>4</td>
</tr>
<tr>
<td>Assisting Physician during Procedures</td>
<td>3</td>
</tr>
<tr>
<td>Disposing Needle Stick or Sharp to Sharp Container</td>
<td>3</td>
</tr>
<tr>
<td>Accident by Colleague</td>
<td>2</td>
</tr>
<tr>
<td>Patients’ Movement</td>
<td>2</td>
</tr>
<tr>
<td>Intravenous Fluid Access by Inserting Devices</td>
<td>1</td>
</tr>
</tbody>
</table>


**Type of Needle sticks or Sharps Associated with Injuries (n=83)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampoule</td>
<td>36</td>
<td>43.4</td>
</tr>
<tr>
<td>Needle Stick</td>
<td>28</td>
<td>33.7</td>
</tr>
<tr>
<td>Blade</td>
<td>8</td>
<td>9.6</td>
</tr>
<tr>
<td>Medicate for Access of Intravenous Fluid</td>
<td>6</td>
<td>7.2</td>
</tr>
<tr>
<td>Suture Needle</td>
<td>3</td>
<td>3.6</td>
</tr>
<tr>
<td>Lancet</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Hematocrit Tube</td>
<td>1</td>
<td>1.2</td>
</tr>
</tbody>
</table>

**Needle sticks or Sharps that Nursing Staff had Injuries by (n=85)**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-using with Patients</td>
<td>42</td>
<td>49.4</td>
</tr>
<tr>
<td>During Use with Patients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contaminated with Blood of Patients</td>
<td>14</td>
<td>16.5</td>
</tr>
<tr>
<td>Not Contaminated with Blood of Patients</td>
<td>3</td>
<td>3.5</td>
</tr>
<tr>
<td>Post-using with Patients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Needle Stick or Sharp Contaminated with Blood of Patients</td>
<td>19</td>
<td>22.4</td>
</tr>
<tr>
<td>The Needle Stick or Sharp not Contaminated with Blood of Patients</td>
<td>4</td>
<td>4.7</td>
</tr>
<tr>
<td>The Needle Stick or Sharp had been Disinfected with Antiseptic for 30 minutes already</td>
<td>3</td>
<td>3.5</td>
</tr>
</tbody>
</table>

**Factors Associated with Needle Stick or Sharp Injuries**

Table 3 presents factors associated with needle stick or sharp injuries (NS/SIs) among nursing staff at TUH which were analyzed by Fisher’s Exact Test. The finding points out that there were two main factors associated with NS/SI: human factors about disposal of needle sticks to sharp containers and environmental factors on the area between patients’ beds during nursing activities or procedures statistically significant at 0.05 levels.
Table 3: Association between Needle Stick or Sharp Injuries and Factors (n = 390)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Needle Stick or Sharp Injuries</th>
<th>n (%)</th>
<th>Total</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>81 (21.4)</td>
<td>297 (78.6)</td>
<td>378</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>6 (50.0)</td>
<td>6 (50.0)</td>
<td>12</td>
</tr>
</tbody>
</table>

**Human Factor: Nursing Procedures Unsafty due to Unawareness**

- **Disposal Needle Sticks to Sharp Container**
  - Yes | 23 (35.9) | 41 (64.1) | 64 | 0.004* |
  - No | 64 (19.6) | 262 (80.4) | 326 |       |

**Environmental Factor: the Appropriate Space between Patients’ Beds for**

- **Nursing Procedures**
  - Yes | 64 (19.6) | 262 (80.4) | 326 |       |

*p<.05

Qualitative Data from Interviews with Open Question

Regarding the interviews from participants who experienced needle stick or sharp injuries, the factors associated with the injuries could be concluded into three main issues, as follows;

1) Carelessness

Interviews of nursing staff that experienced sharp injuries, indicated that nine out of thirteen accepted human factors such as carelessness, neglect and colleagues’ unconcern associated with NS/ SIs as a cause for the accident, as the following:

- “Because of me, carelessness”
- “But the most important thing, I think, is careless”
- “It’s human error, carelessness”
- “One of my jobs is to clean the medical devices after procedures and the doctors did not dispose the needle-
sticks and sharps to the sharp containers after finishing suture. They were careless and messy. So I couldn’t see the disposal needle, it hurt me.”

“Medical students did not separate the used suture needles after procedures were done.”

2) Hastiness

Interview results showed that eight out of them (30.8%) accepted the hastiness and/or rush as a cause of their loss of concentration and described the human factor associated with NS/SIs, as the following:

“Hastiness makes me unbeware of the nursing procedures and leads to the injury”

“This accident occurred due to humans’ hastiness in the rushed situation”

“The factor that caused me to get this injury was my hastiness”

“There are many patients; my work needs to be clear in few minutes, so my work is characteristically like that in a hurry. This can cause injuries consequently”

“Everything is in a rush, and everybody has to work in a hurry, so it caused the accident”

3) Fatigue

The next interviewing result marked that three out of them (11.5%) accepted fatigue from workload and insufficient rest as a human factor associated with needle stick or sharp injuries, as the following:

“So tired because of long working hours and a heavy workload”

“Fatigue due to tiredness and exhaustion”

“Time to rest is not enough”
Discussion

The prevalence of needle sticks or sharp injuries (NS/SIs) during the previous year among 390 nursing staff in TUH was 22.4% compared to a similar study, which was done by Sujittra Aeimsa-ar, that found that the prevalence of NS/SIs among nursing staff in Sawan Pracharak Hospital was lower (10.7%) than in TUH, whereas the study of Honda, M., Chompikul, J., et al. revealed that the prevalence of NS/SIs among nursing staff in a Thai regional hospital was higher (55.5%) than in TUH. The study of Wicker, et. al., found that the prevalence of healthcare workers in a German University Hospital to get NS/SI was 22.0%; the study of Kebede et. al. found that the prevalence of NS/SIs among nursing staff in the last 12 months in a hospital in Ethiopia was high at 30.8%. Analysis results led to the conclusion that the NS/SIs still occur commonly to nursing staff in other hospitals in various countries and these injuries happened among nursing staff more than in other occupations because of the various nursing procedures and interventions related to needle sticks or sharps; therefore nursing professionals are continually at high risk of NS/SIs. It revealed that various activities of nursing staff are still connected to needle sticks or sharps mostly, so NS/SIs could not be avoided even though the training program of universal precaution was provided for the staff annually and the sharp preventing policies as well as measures or guidelines were set up to protect them from the NS/SIs. This result related to the study by Nuanjun Supun which found that 70.3% of nurses attending were trained about NS/SIs, but 9.6% of them still got NS/SIs during the last three months after the training. Next the study of Jintana Tapin showed that nurses who experienced with NS/SIs at 24.1% had got training at least one time (20.4%) but most of them had knowledge of protecting NS/SIs at 90.7%. The nursing procedure which caused most NS/SIs was administering injection at 25%. The study of Wanida Konsue revealed that nurses experienced NS/SIs at 28.1% and most of them (62.5%) got training to prevent NS/SIs. Besides, it remarked that the nursing procedures that caused most NS/SIs were blood drawing and preparing a drug for injection at the same 30%. In conclusion, this research’s result is that the prevalence occurred due to certain conditions: carelessness, hastiness, and fatigue. Therefore, the prevalence of NS/SIs among nursing staff is still quite high and constitutes a public health issue in Thailand and other countries.

In this study, the three factors, human, equipment and environment, which are associated with the prevalence of NS/SIs among nursing staff in TUH, could be explained, as follows;

1) Human Factor

From the analyzed human factors: - work experience, unsafe nursing procedures due to unawareness, physical status of nursing staff, limited knowledge of needle stick and sharp protection, and shortage of nursing staff, associated with prevalence of NS/SIs among nursing staff of TUH, revealed that the human factor of unsafe nursing procedure: - needle stick disposal to a sharp container, due to unawareness associated with prevalence of NS/SIs statistically significant at 0.05 (as shown in Table 3). It could be defined that any nursing staff who did not dispose needle sticks or sharps into a sharp container had a higher risk of NS/SIs than other
staff did, by following the guidelines for protecting the NS/ SIs. Regarding staff as humans who had a chance to make errors repeatedly, it is necessary to set guidelines for nursing interventions to protect the staff from error and raise their self-awareness to realize how important the guidelines are. These guidelines related to the survey study of Bureau of Nursing, Office of Permanent Secretary, Ministry of Public Health mentioned that the main reasons that caused NS/ SIs among nursing staff were that the staff had incorrect nursing interventions, unsafe methods, and was unaware of the protection guidelines that they must follow carefully. The study of Nuanchan Supan supported that lack of awareness was one factor caused NS/ SIs. Similarly, the study of Chonthicha Rodpetchphai had reflected that the risk factors to NS/ SIs among nursing staff working at Emergency Rooms at TUH were human factors:- carelessness and negligence during working hours, including unawareness of impact after the injuries and incorrect practices of universal precautions. All factors above also related to factors in the study of Martin, et. al which stressed that failure of needle stick disposal to sharp containers was one of the risk factors associated with NS/ SIs among healthcare workers in a Portuguese hospital statically significant at 0.01.

2) Equipment Factor

The analyzed equipment factors: - inappropriate medical devices, such as needle sticks and so on, inadequate medical devices, associated with prevalence of NS/SIs among nursing staff of TUH showed that the association between these factors and the prevalence was not statistically significant. As discussed above, it was obvious that to follow the guideline of NS/ SI protection with care and self-awareness could significantly contribute to the reduction of injuries even though the equipment was inappropriate and inadequate.

3) Environmental Factor

The analyzed environmental factors: - inadequate lighting during nursing interventions, the appropriate space between patients’ beds during nursing procedures, the building area; such as a slippery or messy floor, raised the risk of NS/ SI, and rushing situation associated with prevalence of NS/ SI among nursing staff of TUH revealed the environmental factors: - the appropriate space between patients’ beds during nursing procedures associated with NS/ SI among the nursing staff statistically significant at 0.05 (as shown in Table 3). The space between patients’ beds at TUH is designed appropriately under the standards of hospital regulations, and most of nursing interventions need availability during operations; sometimes patients’ conditions must be treated with various medical devices; such as respirator, infusion pumps and so on, and consequently the space is reduced automatically. This affects the nursing staff that has to do nursing procedures with inconvenience which can be a risk for NS/ SIs. It was in line with the study of Kebede, et. al which found that the working environmental factor was one of the risk factors associated with NS/ SI among healthcare workers in a hospital in Ethiopia, statistically significant at 0.01.

Additionally, for the qualitative interview data, it could get more detailed information and enhance the sharp proactive guidelines for practical response. The interviewees who experienced NS/ SIs agree that “the human factor has been the
main factor that caused nursing staff to have experiences with the injuries”. Three main factors were, as following: 1) carelessness (34.6%), 2) hastiness (30.8%) and 3) fatigue and inadequate rest (11.5%). This was consistent with the study of Kebede, et. al. which supported that nursing staff who had long working hours: - more than 48 hours per week, were affected in their physical well-being by causing fatigue and inadequate rest which are a risk associated with NS/ SIs at 0.01 statistically significant.

Implications

The research proposition showed that the guidelines to reduce the prevalence of the accident for the Thai tertiary care hospital can be under the policy mechanisms and safety culture in the structure of the physical working environment. Besides, there should be a mechanism to create awareness of the activities within the guidelines set for the nursing staff.

Acknowledgments

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The Effect of Using Innovative Repositioning Bed with a Mattress to Prevent Pressure Ulcers in Patients with Stroke

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Abstract

Pressure ulcers are a complication that can occur to in-patients, particularly those with stroke. Care to prevent such ulcers is important to reduce the suffering as well as the burden of patients’ families. The present study was a semi-experimental research to study effects of innovative repositioning beds with mattresses on pressure ulcer rates and on satisfaction of caregivers. Samples were 26 staying-at-home stroke patients; 13 of which were allocated into experimental group and the other 13 control group. The study was conducted during January 2015 – June 2015, using the following research instruments: 1) pressure ulcer evaluation form, 2) caregivers’ satisfaction assessment form and 3) repositioning beds, which allowed the repositioning of patients via rotating handles, with mattresses that could be adjusted to 0-60 degrees at head level, 0-45 degrees at knee level and turned right and left by 0-30 degrees. These beds were developed by the investigator. Data were analyzed using descriptive and Chi-square statistics.

The results showed that the repositioning beds with mattresses correlated prevent pressure ulcers with statistical significance, and the caregivers were extremely satisfied with the use of such beds.

It can be seen that the repositioning beds with mattresses developed based on patient-positioning and -repositioning principles, which correspond to nursing standards, are nursing innovation that will help solve one of people’s health problems by promoting and enhancing the potential of patients and their families in prophylaxis of pressure ulcers, which are considered a problem affecting the state of health of patients, especially many elderly ones nowadays

Keywords: Stroke patient, Repositioning bed, Pressure ulcer

Introduction

Pressure ulcers are a complication that can occur to in-patients, particularly those with stroke and mobility limitations (Baumgarten M, 2012; Baumgarten M, 2006). These ulcers are caused by pressure. Pressure more than 32 millimetre mercury that is applied to body continuously for a long time leads to insufficient blood
perfusion around affected areas, resulting in oxygen deprivation of skin and tissues and, in turn, skin and tissue necrosis (Guy H, 2012). On the other hand, arrangement of activities to help reduce related factors, such as pressure itself, increases the blood perfusion, supplies nutrients and oxygen to tissues and prevents such ulcers (Guy H, 2012). Reducing shearing force is also important as this force, which occurs when patients slide while sitting or lying, causes tissue tears and wounds that consequently decrease blood flow followed by the tissue necrosis. Friction is another factor that usually results from patients being moved. The friction causes tears and exfoliation of superficial skin, rupture of subcutaneous capillaries and eventually wounds. Stroke patients, who cannot take care of themselves, encounter the friction and shearing force while being moved/transported, rendering them 11.2 times more prone to pressure ulcers than those without the friction and shearing force do (Suttipong C & Sindhu S, 2011). This group of patients, therefore, needs to be assisted in positioning in order to minimize the potential pressure and the friction and, in turn, to help reduce the pressure ulcer occurrence.

Sleep posture positioning and repositioning of patients are vital activities in the pressure ulcer prophylaxis, particularly in those with stroke who spend much time in bed (Moore ZH & Cowman S, 2010). A number of research studies have found that the sleep posture positioning that helps distribute and minimize the surface pressure and best protects against pressure ulcers is one that does not raise each patient’s head to more than 60 degrees in order to minimize the pressure around the patient’s inion, scapulae and coccyx. This together with knee flexion not more than 45 degrees, raised feet and 30-degree side-lying position helps reduce the pressure around coccyx, shoulders and scapulae, and helps facilitate the oxygen supply to greater trochanters (NPUAP, 2012). The proper positioning or repositioning of patients is, however, difficult and complicated, causing troubles to patients’ caretaking relatives. Consequently, the relatives may not value the proper and on-schedule positioning or repositioning, resulting in increasingly higher incidence of pressure ulcers (Mamom J, et al, 2014). Also, the limited number of beds in hospital limits the number of in-patients; other patients have to be cared for at home by their relatives and families. The investigator, therefore, as a teaching and advanced nurse practitioner, developed an innovation to help solve one of people’s health problems based on the nursing principle of the efficient care of patients with pressure ulcers and integrated it in the research, which will construct new, evidence-based body of knowledge to be accepted academically.

**Project Objectives:**

1. To conduct a comparative study on pressure ulcer rates between a group of samples using the repositioning beds with mattresses and another group of normally-cared samples
2. To study caregivers’ satisfaction towards the repositioning beds with Mattresses

**Scope of Research**
The present research employed experimental design for innovative development. Samples were stroke patients who met the following inclusion criteria: stroke patients who were unable to turn to sleep on their sides by themselves, pressure ulcer risk scores of six or higher, ability to communicate in and understand Thai accurately, and willingness to participate in the research. The study was conducted during January 2015 – August 2015.

In the present study, the sample size was calculated using power analysis with G*Power software (Erdfelder E, Faul F and Buchner A, 1996), alpha = 0.05, power = 0.8, a large effect size (w = 0.3) and one-tailed test, yielding the sample size of 13 per group, totalling 26.

Research Instruments

1. The research instruments were as follows.
   1.1 Repositioning beds designed by the investigator. Each bed comprised an iron frame of 90-centimetre width, 200-centimetre length and 60-centimetre height, weight bearing of up to 100 kilograms, able to turn from the side by 0–30 degrees from horizontal via handle rotation; a head portion able to tilt by 0–60 degrees from horizontal via handle rotation; a knee portion able to raise by 0–45 degrees via handle rotation as well; lockable wheels; a headboard; and a footboard.(Patent in progression)
   1.2 Mattresses designed by the investigator to be used with the invented beds. The mattresses were made from specially compressed rubber with approximately 90-centimetre width, 200-centimetre length and 12-centimetre thickness, not easily depressed, light-weighted and readily movable.

2. Data-gathering instruments, comprising:
   2.1 Pressure ulcer evaluation form, which evaluates the skin to diagnose pressure ulcers, using the method by AHCPR & NPUAP (2001) with Cronbach’s alpha coefficient of 0.91.
   2.2 Relatives’ satisfaction assessment form towards the manual repositioning beds, comprising 10 assessing items that covered five aspects, namely design, material selection, functionality, strength and convenience. Satisfaction levels to choose form were: very low, low, moderate, very satisfied and extremely satisfied.

Data Collection

1) Following approval of human research by the research ethics committee, Thammasat University, the investigator met with the head nurse of the out-patient department to communicate the objectives and to request for research cooperation.
2) The investigator introduced herself as well as explained research objectives, data-gathering procedure and right protection of the subjects in the present research participation.

3) The investigator met the subjects (patients and caregivers) at the outpatient department of Thammasat Chalermprakiet Hospital, introduced herself as well as explained research objectives, data-gathering procedure and right protection of the subjects in the present research participation.

4) The investigator explained how to complete the record form and to respond to the questionnaire so that the subjects understood prior to the form completion. The following steps were taken.

- The experimental group: The investigator educated the subjects on pressure ulcers, skin evaluation, patient positioning, repositioning and how to use the invented beds and mattresses as well as gave demonstration and return demonstration until she was certain that the relatives were able to manage the beds appropriately. Then the investigator evaluated pressure ulcer occurrence based on the skin appearance around condyles, took the beds to the patients’ houses to advise the patients individually and exchanged telephone numbers for symptom inquiries and counselling.

- The control group: The investigator educated the subjects on pressure ulcers, skin evaluation, patient positioning and repositioning, and provided each subject with the created patient care manual for the ulcer prophylaxis as well as gave demonstration and return demonstration until she was certain that the relatives were able of the proper repositioning. Then the investigator evaluated pressure ulcer occurrence based on the skin appearance around condyles and exchanged telephone numbers for symptom inquiries and counselling.

5) The investigator paid house visits everyday for two weeks to monitor pressure ulcers and other potential problems.

6) At the end of the two weeks, the investigator paid another house visit to determine the pressure ulcer rate and to ask the relatives to respond to the satisfaction assessment form towards the invented beds.

Statistics Analysis

Data were analyzed by using descriptive statistics and Chi-squares ($\chi^2$).

Results

The present study included 26 subjects with the mean age of 65.25 years (SD = 5.70), and most of them were female (19 subjects, 73.1%). Their marital status was widows/divorced/separated (11 subjects, 42.3%), married (10 subjects, 38.5%) and single (5 subjects, 19.2%). Most had sufficient family incomes with savings (18
subjects, 69.2%), and the most right to medical care was that of government officials (14 subjects, 53.8%) as shown in Table 1.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Experimental</th>
<th>Control</th>
<th>Total</th>
<th>chi square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td>.57 NS</td>
</tr>
<tr>
<td>Mean</td>
<td>56.50</td>
<td>58.22</td>
<td>57.36</td>
<td></td>
</tr>
<tr>
<td>S.D.</td>
<td>5.30</td>
<td>6.98</td>
<td>6.17</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>48-66</td>
<td>45-68</td>
<td>45-68</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td>.49 NS</td>
</tr>
<tr>
<td>Male</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>14</td>
<td>12</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td>.90 NS</td>
</tr>
<tr>
<td>Married</td>
<td>7</td>
<td>6</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>3</td>
<td>4</td>
<td>7</td>
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</tr>
<tr>
<td>widows/divorced/separated</td>
<td>8</td>
<td>8</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>The right to medical care</td>
<td></td>
<td></td>
<td></td>
<td>.95 NS</td>
</tr>
<tr>
<td>Government officials</td>
<td>8</td>
<td>9</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>30 bath health insurance</td>
<td>9</td>
<td>8</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>State enterprise</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Remark: NS = not significance

Comparing pressure ulcer rates between the group using the repositioning beds and the group using ordinary beds, the rate in the former group was correlated with statistical significance at 0.05, as demonstrated in Table 2.
**Table 2**: Comparison of pressure ulcer rates between the group using the repositioning beds and the group using ordinary beds. Statistics: Chi-square test.

<table>
<thead>
<tr>
<th>Sample group</th>
<th>With occurrence of ulcers</th>
<th>Without occurrence of ulcers</th>
<th>$\chi^2$</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>0</td>
<td>13</td>
<td>4.727</td>
<td>1</td>
<td>0.035*</td>
</tr>
<tr>
<td>Control</td>
<td>4</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remark: * p < 0.05

The study on the satisfaction of family caregivers who used the repositioning beds found that the sample group was extremely satisfied with the mean score of 4.52.

**Conclusion and Discussion**

The present study included 26 subjects with the mean age of 65.25 years and most of them were female. The results showed that the repositioning beds with mattresses correlated prevent pressure ulcers with statistical significance, and the caregivers were extremely satisfied with the use of such beds.

The developed repositioning beds with mattresses have been based on the nursing fundamental in the pressure ulcer prophylaxis by managing the pressure. Pressure more than 32 millimetre mercury that is applied to body continuously for a long time causes pressure ulcers. In addition, the friction and shearing force usually occurring when patients slide or were pulled lead to pressure ulcers on condyles, such as inions, scapulae, coccyges, knees and heels. Proper positioning and repositioning as per standards and empirical evidence, therefore, reduce or distribute the pressure, enabling the blood flow to pressed skin areas, increasing nutrients and oxygen tissues receive and eventually protecting against pressure ulcers.

The proper positioning and repositioning as per standards and empirical evidence require the head to not be raised by more than 60 degrees and pillows to be inserted between both knees and both ankles with knee flexion not more than 45 degrees and raised feet to prevent the pressure on heels. Patients should be in oblique position, 30-degree from horizontal, to facilitate the oxygen supply to tissues around greater trochanters. In particular, stroke patients who are unable to turn to lie on their sides by themselves and who always are in bed must be repositioned every two hours. The positioning and repositioning, however, require accessories, such as a few pillows and at least a few caretakers for proper postures. In the context of patients staying at...
home in rural areas, it is found that most patients have only one caretaker while other patients may have no caretakers at all but rely on neighbours coming to take care of them periodically, such as to feed them breakfast/lunch, because current economic condition forces all family members to earn the living, and this situation compromises part of the patient care. Additionally, studies have found that the repositioning has not been done properly; for example, one with a hip angled by 60 or 90 degrees increases the pressure around a greater trochanter and becomes another cause of ulcers. The developed repositioning beds with mattresses, therefore, facilitate the proper positioning and repositioning, help protect against pressure ulcer incidence as well as shorten time needed in the care and nursing activities of patients. All these explain why patients’ relatives are extremely satisfied with the invented beds.

The invented mattresses were based on principle of selecting pressure-distributing materials, which should be able to support weight and distribute the pressure on patients regardless of postures, to prevent the friction and shearing force well, to extract humidity well and to make patients feel comfortable. The materials used were fibre combined with rubber and tailored in eight parts so that they could be used with the invented beds to enable the proper and convenient positioning and repositioning.

Additional weekly house visits will provide opportunity for patients and their families/caregivers to ask questions that may arise at home as well as to ask about how to reach health team for assistance. These enable patients and their families to learn how to cope with problems appropriately, and give caretaking relatives or patients a chance to express problems as well as encourage and support them to live happy lives with the diseases they encounter.

Based on the present nursing innovative development and research study, it can be seen that nurses not only play a role in caring for patients from the time of hospitalization to discharge and preventing potential complications both at the hospital and at home but also are important health team staff in assisting and solving health problems in all dimensions and contexts. Take the pressure ulcer problem as an example. With the problem occurring to elderly patients, patients who are unable to take care of themselves and those with chronic diseases, adapting concrete knowledge to practical innovation will be able to truly solve the patients’ problem efficiently and effectively.

Research Limitations and Suggestions

The present study was a pilot one to compare efficacy of the repositioning beds accompanied with mattresses to that of typical beds available nowadays, hence the small sample size. As the data-gathering period was also short, further study should expand the number of samples and the study period.
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Characteristics, Perceived Competency Regarding Knowledge and Skills of Expanded Program on EPI Staff in Thailand, and the Factors Related to the Perceived Competency of the Staff

Syamol Rompipat, Wipada Sangnimitchaikul, Pregamol Rutchanagul, Patcharaporn Ratanasongkram

Abstract

Although the rate of vaccination coverage is rather high, epidemics of previously existing diseases and emerging infectious diseases are constantly occurring. Operational flaws were discovered. This descriptive research aimed to illustrate the characteristics of an expanded program on immunization (EPI) staff in Thailand and to identify the level of competency regarding knowledge and skills. Level of competency was compared with age, duration of work in EPI service, experience with EPI training and job position. Furthermore, the factors related to the perceived competency of the staff were identified. One hundred and eighty-one subjects were recruited using simple random sampling. The instruments were a demographic data questionnaire and a questionnaire of perceived competency regarding knowledge and skills validated by three experts. The reliability was 0.97. Descriptive statistics, independent t-test, ANOVA, Spearman’s rank correlation, and Pearson’s product moment correlation were used to analyze the data.

The result found that the mean age of the EPI staff members was 39.94 years. Duration of work in EPI service averaged 7.7 years. Approximately 72 percent were nurses and 55 percent had experienced training. The overall mean score for perceived competency was at a high level (X = 3.89, SD .63). Performing the right methods and processes for vaccination shots as well as maintaining a cold chain system were perceived at a high level, whereas knowledge about herd immunity was perceived at a moderate level and showed the lowest score for perceived competency. The staff members that took part in a training program exhibited a significant difference in the perceived competency mean score when compared to the group not trained at .05. In addition, none of the factors, except experience with training, was positively related to the perceived competency of EPI staff (r =.408, p .05). It is suggested that the training of EPI staff, which focuses on essential knowledge and skills, might be able to improve the level of competency and enhance the quality of EPI service provision in Thailand.
Keywords: Characteristics, Perceived competency regarding knowledge and skills, Expanded program on immunization (EPI), Factors

Introduction

Immunization has been proven one of the most cost-effective parts of health promotion since the achievement of high immunization coverage in many countries with downward trends in the morbidity and mortality rates of vaccine-preventable diseases. In Thailand, the Expanded Program on Immunization (EPI) had been taking place since 1977. Under the academic supervision and support of the World Health Organization (WHO), the Thai Ministry of Public Health (MOPH) has offered vaccination services based on the EPI through combination or integration with the public health service system of the domestic public and private sectors from the start. The primary objective of EPI is offering maximum protection on vaccine-preventable diseases for Thai people. According to the latest survey by the Department of Disease Control, Ministry of Public Health, in 2008, Thailand’s mean rate of coverage for all types of vaccinations in EPI (except for Diphtheria-Pertussus-Tetanus (DTP) and oral polio vaccine (OPV) No.5) was at a high rate of over 90 percent with Bacillus Calmette-Guérin (BCG) vaccine having the highest mean coverage rate (99.9%), followed by complete vaccinations for DTP and OPV (three shots) and Hepatitis B (HBV) (three shots) with mean coverage rates of 98.7 percent and 98.3 percent, respectively (Bureau of General Communicable Diseases, 2014). Although the rate of vaccination coverage is rather high, epidemics of previously existing diseases and emerging infectious diseases are constantly occurring. According to a survey conducted by the Bureau of Epidemiology, Department of Disease Control, in 2011-2012, the rate of sickness caused by vaccine-preventable diseases only decreased slightly or even rose for some diseases such as hepatitis B, which only decreased from 9.93 to 9.07 cases per 100,000 people, or measles, which saw an increase in prevalence from 5.02 to 8.10 cases per 100,000 people (Bureau of Policy and Strategy, 2013). Consequently, immunization work requires constant improvement.

In order to improve EPI against diseases in Thailand and to achieve the primary objective, four components must be relied upon: 1) Vaccination – standardized vaccines must be produced; 2) Budget – budgets for promoting production and research for new vaccines to stay up-to-date on emerging epidemics, along with capacity building budgets for EPI staff; 3) Administration – EPI requires multi-level and -faceted administration involving the production, storage, transportation and management of service units and 4) EPI Staff (vital) – although EPI staff is composed of multidisciplinary medical professionals in fields involving EPI service such as pediatricians, pharmacists, nurses, epidemiologists, public health academics, etc. with varying EPI responsibilities, people make up the key factors, mechanisms and core of work that achieves objectives regardless of the type of work. The present research, therefore, focused on EPI staff, because staff is the most dynamic component. Hence, the researcher is interested in surveying the characteristics of EPI staff at every level of service in Thailand.
In Thailand, EPI remains mired in obstacles. According to a situational assessment on the development of immunization in Thailand in 2007, operational flaws were discovered. For example EPI staff neglected to maintain vaccination quality according to the cold chain system, knowledge about the specifications for each type of vaccination was deficient, education about vaccines and proper service provision were absent and the dissemination of practical knowledge and skills from previous EPI staff to newer staff was inadequate. Moreover, EPI staff learned independently and worked without training. In addition, vaccination knowledge is dynamic, which hinders EPI staff from making improvements and keeping up with changes. The consequences are service provision errors. Furthermore, data from the EPI observation of the Department of Disease Control in 2012 and sub-standard services such as vaccination administration and cold chain system that failed to meet standards, inadequate planning and insufficient preparation in providing assistance to persons with unusual symptoms and anaphylaxis following immunization, etc. were encountered. The aforementioned findings concur with a previous study conducted abroad by Cohen and colleagues (Cohen, Lauderdail, Shete, Seal & Daum, 2003) in 550 doctors. The doctors were instructed to answer questionnaires to evaluate knowledge on vaccinating children late for vaccinations along with vaccination restrictions. According to the findings, 32 % of respondents answered none of the vignettes correctly. Almost 50 % of the physicians would not give MMR to a child living with a family member receiving chemotherapy, and one third would not give MMR to a child living with an HIV-infected person. The aforementioned findings revealed that doctors on EPI staff with erroneous understanding about scheduling children late for vaccination and vaccination restrictions may prevent children from being properly vaccinated at the right times. The aforementioned data highlighted the presence of inefficiency and operational problems. Therefore, how perceived competency regarding knowledge and skills in immunization of the EPI staff in Thailand are, as well as factors related to perceived competency, are of interest.

According to a review of research conducted in Thailand over the past five years, a study was conducted to evaluate EPI service provision knowledge and skills according to the EPI plan and cold chain system in a province of Thailand (Widsanugorn, Suwattana, Harun-or-rashid, & Sakamoto, 2011). However, the aforementioned study was an epidemiological study, not focused on studying in EPI staff. Furthermore, studies conducted abroad were conducted with the aim of surveying the personal factors and perceived self-competency only in one group of health service personnel or another (Al-Rukban et al., 2005). In the present study, therefore, the researcher is interested in studying the personal factors of EPI staff from an aggregate perspective with data collection performed in each region of Thailand along with studying perceived competency regarding knowledge and skills, including certain factors potentially correlated with perceived competency.

The findings of the present research will aid persons involved with EPI service in gaining knowledge about the characteristics of EPI and awareness of the degrees of perceived competency regarding knowledge and skills in the EPI service provision of EPI staff, including factors potentially correlated with perceived competency as preliminary data for setting policies, work plans or guidelines for properly developing
staff consistently with the performance of EPI staff in order to lead to systematic work improvements and help EPI achieve greater success in the future.

**Objectives**

1. To study the personal factors, namely, age, duration of work in EPI service, occupation type, level of education, and workshop training experience of EPI staff.

2. To study the degrees of perceived competency regarding knowledge and skills of EPI staff.

3. To compare the personal factors affecting perceived competency regarding knowledge and skills of EPI staff.

**Hypothesis**

Different personal factors, namely, age, duration of work in EPI service, occupation type, level of education and workshop training experience produce different perceived competency regarding knowledge and skills in EPI staff.

**Scope of the Study**

The present research is a study conducted on the personal factors and degrees of perceived competency regarding knowledge and skills, as well as comparing the personal factors affecting perceived competency regarding knowledge and skills of EPI staff in Thailand. Data collection was conducted in the EPI staff of every region of Thailand from February-May 2015.

**Methodology**

**Design**

The present research was based on a descriptive research design aimed at studying personal factors, such as age, duration of work in EPI service, occupation type, level of education and experience in workshop training for EPI staff; degrees of perceived competency regarding knowledge and skills, along with comparing the personal factors affecting perceived competency regarding the knowledge and skills of EPI staff.

**Population and Sample Group**

The population consisted of EPI staff in Thailand.
The sample group consisted of EPI staff from six regions with operational staff providing direct immunization services to people. Vaccine manufacturers and laboratory staff were excluded.

The size of the sample group was calculated using the G*power program. F test-ANOVA was used for data analysis. The effect size was equal to .25, while the discrepancy (alpha) score equaled .05. The power score equaled .80. In all, 159 subjects were randomly sampled by the researcher nationwide by stratified random sampling in six regions of the country. The ratio of the entire sample group was calculated at 181 subjects.

**Instrumentation and Instrument Quality**

The instrumentation employed in data collection was questionnaires divided into the following two parts:

**Part 1** – Demographic Data Evaluation Form on gender, age, level of education, current occupation/position, length of immunization work, type of agency, workshop training experience for EPI staff.

**Part 2** – The Perceived Self-Competency for EPI service provision Evaluation Form contained at total of 80 questions covering self-competency confidence on knowledge and skills in EPI service provision and administration. The evaluation form was divided into a five-level scale as follows: 1 = No Confidence, 2 = Least Confidence, 3 = Little Confidence, 4 = High Confidence, 5 = Highest Confidence. Mean perceived competency scores were divided into three levels: low perceived competency ( \( \bar{X} = 1-2.33 \)), moderate perceived competency ( \( \bar{X} = 2.34 - 3.67 \)), high perceived competency ( \( \bar{X} = 3.68 - 5 \)). The instruments validated by three experts in immunization content, Index of item objective congruence were 0.98. Then the researcher tested the reliability in EPI staff associated with the inclusion criteria for the samplings, namely, 30 cases of EPI staff with operational staff providing direct immunization services to people then using a standardized alpha coefficient. The Cronbach’s alpha obtained was 0.97.

**Ethical Concerns**

The present research was approved by the Institutional Review Board on Research Involving Human Subjects, Thammasat University, Unit 2 No.026/2558. The researcher explained the details of the project, the research objectives and data collection with information sheets handed out with research questionnaires in order to give information to the sample group and for the sample group to willingly decide to join the research by signing in consent forms. If a subject refused to participate in the research, the subject was permitted to not respond to the questionnaires as assured that refusal to participate in the research would have no impact on the treatment received. Furthermore, the findings of the research are reported from an aggregate perspective only.
Data Collection

1. The researcher coordinated with related agencies, drafted letters to request permission for data collection, prepared information sheets and consent forms for research participants.

2. Data was collected from the EPI staff in the randomly sampled group. The questionnaires, information sheets and consent forms for participation in the research were sent in sealed and stamped envelopes by registered mail to the workplaces of the sample group. The sample group was instructed to return the questionnaires to the researcher within a set period of time.

3. Once all questionnaires had been returned, the researcher examined them for data completion then performed data analysis.

Data Analysis

The researcher performed analysis using a computer program.

The researcher analyzed demographic data and degrees of perceived competency regarding knowledge and skills on EPI service provision by using descriptive statistics with frequency distribution, percentage, mean and standard deviation.

Correlation analysis between personal factors and perceived competency regarding knowledge and skills on EPI service provision was carried out with Chi-square test, Pearson’s Product Moment Correlation Coefficient and Spearman’s rank correlation.

The variances in the characteristics affecting perceived competency regarding knowledge and skills on EPI service provision were analyzed with independent t-test for two-tailed groups and ANOVA.

Findings

EPI staff’s characteristics

On the personal factors of the sample group, the majority of subjects were females (84.0%) with a mean age of 39.94 years (SD = 8.76 years). Nearly one in four of the sample group was aged between 36-40 years, and 81.2 percent of subjects had completed bachelor’s degree or equivalent educations. The majority of subjects worked in nursing (71.3%), followed by public health scholars (16.0%) with mean
duration of work in EPI service in immunization amounting to 7.67 years (SD = 6.86 years). The majority of the subjects had worked less than five years (45.9%). The sample group was mostly composed of operators under the jurisdiction of community hospitals (50.3%), followed by health promoting hospitals (19.9%). The majority of the subjects had experience with workshop training for EPI staff (55.2%) by the National Vaccination Institute.

**Degrees of Perceived Competency Regarding Knowledge and Skills**

The EPI staff had perceived competency regarding knowledge and skills to a high degree, with a mean score of 3.89 (SD = 0.631) and the majority of subjects (70.2%) perceiving competency to a high degree (Table 1).

**Table 1:** shows the degrees of perceived competency regarding knowledge and skills on EPI service provision by the sample group.

<table>
<thead>
<tr>
<th>Degrees of Perceived Competency Regarding Knowledge and Skills in EPI Service</th>
<th>No. of People</th>
<th>Percentage</th>
<th>X</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>3.89</td>
<td>0.631</td>
</tr>
<tr>
<td>Low Perceived Competency</td>
<td>5</td>
<td>2.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate Perceived Competency</td>
<td>49</td>
<td>27.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Perceived Competency</td>
<td>127</td>
<td>70.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When the data was considered individually, the top three perceived competency aspects in EPI staff were selecting vaccination equipment (X = 4.21, SD = 0.753), followed by correctly following procedures for each type of vaccination (X = 4.21, SD = 0.789) and correctly storing vaccines at the right temperatures (X = 4.20, SD = 0.801), while the three lowest ranking perceived competency scores were Herd immunity threshold of diseases (X = 3.33, SD = 0.837), Herd immunity or community immunity (X = 3.45, SD = 0.853) and performing shake tests (X = 3.54, SD = 0.916).

The correlations between the degrees of perceived competency regarding knowledge and skills on EPI service provision were considered and divided into the following three levels: low perceived competency, moderate perceived competency and high perceived competency, and workshop training experience for EPI staff.
Perceived competency and training experience were found to share correlations, meaning the trained and untrained groups differed with statistical significance ($p = 0.000$) (Table 2).

**Table 2:** shows the numbers and analysis if the correlations with Chi-square testing between the non-trained group and the trained group in workshops for EPI staff on levels of perceived competency regarding knowledge and skills in EPI service provision.

<table>
<thead>
<tr>
<th>Level of perceived competency regarding knowledge and skills on EPI service provision</th>
<th>Training Experience in Workshops for Immunization Staff</th>
<th>Chi-square</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-trained</td>
<td>Trained</td>
</tr>
<tr>
<td>Low perceived competency</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Moderate perceived competency</td>
<td>36</td>
<td>13</td>
</tr>
<tr>
<td>High perceived competency</td>
<td>41</td>
<td>86</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>81</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

**Comparison of the personal factors affecting perceived competency regarding knowledge and skills in service provision for promoting disease prevention**

When the correlations between the personal factors and perceived competency regarding knowledge and skills and service provision in promoting disease prevention were compared, age number of years working in immunization and occupation were not found to be correlated with perceived self-competency in EPI service provision with statistical significance at 0.05. However, the factor of workshop training experience for EPI staff was found to be positively correlated with perceived competency regarding knowledge and skills in service provision for promoting disease prevention with statistical significance at 0.01 ($r = 0.408$) (Table 3).
Table 3: Pearson Product Moment Correlation and Spearman Rank Correlation among the variables of age, duration of work in EPI service, occupation and workshop training experience for EPI staff on perceived competency regarding knowledge and skills in EPI service provision.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Perceived competency regarding knowledge and skills in EPI service provision</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pearson Product moment correlation</td>
</tr>
<tr>
<td>1.Age</td>
<td>.020</td>
</tr>
<tr>
<td>2.Duration of work in EPI service in immunization</td>
<td>.128</td>
</tr>
<tr>
<td>3.Occupation</td>
<td></td>
</tr>
<tr>
<td>4.Workshop training experience for EPI staff</td>
<td></td>
</tr>
</tbody>
</table>

*p < .05, **p < 0.01, two-tailed

When the personal factors were compared for the groups arranged for perceived competency regarding knowledge and skills in EPI service provision, the following research findings were obtained:

When duration of work in EPI service in immunization was categorized, the following three groups were obtained: 1) Under five years’ duration of work in EPI service; 2) 5-10 years’ duration of work in EPI service and 3) Over 10 years’ duration of work in EPI service. Next, the scores for perceived competency regarding knowledge and skills in EPI service provision were analyzed between the aforementioned groups, no variances were found in terms of perceived self-competency in EPI service provision in groups with different levels of duration of work in EPI service (Table 4).
Table 4: shows the analysis of fluctuations in perceived competency regarding knowledge and skills in EPI service provision among the groups categorized by level of duration of work in EPI service in immunization.

<table>
<thead>
<tr>
<th>Source of fluctuation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-group</td>
<td>11641.812</td>
<td>2</td>
<td>5820.906</td>
<td>2.279</td>
<td>.105</td>
</tr>
<tr>
<td>Intra-group</td>
<td>454574.000</td>
<td>178</td>
<td>2553.787</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>466215.812</td>
<td>180</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Occupation was categorized into the following three groups: 1) nurses; 2) public health scholars/employees and 3) Other medical professionals (doctors/pharmacists). Next, the scores for perceived competency regarding knowledge and skills in EPI service provision were analyzed between the aforementioned groups and no variances were found in terms of perceived competency regarding knowledge and skills in EPI service provision among the occupation groups responsible for different jobs (Table 5).

Table 5: shows the analysis of fluctuations in perceived competency regarding knowledge and skills in EPI service provision among occupation groups.

<table>
<thead>
<tr>
<th>Source of fluctuation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-group</td>
<td>2641.169</td>
<td>2</td>
<td>1320.584</td>
<td>.504</td>
<td>.605</td>
</tr>
<tr>
<td>Intra-group</td>
<td>463556.492</td>
<td>177</td>
<td>2618.963</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>466197.661</td>
<td>179</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Levels of education were categorized into the following three groups: 1) bachelor’s degree; 2) master’s degree and 3) other levels. Next, the scores for perceived competency regarding knowledge and skills in EPI service provision were analyzed among the groups no variances were found in terms of perceived competency regarding knowledge and skills in EPI service provision among the groups with different levels of education (Table 6).
Table 6: shows the analysis of fluctuations in perceived competency regarding knowledge and skills in EPI service provision among level of education groups.

<table>
<thead>
<tr>
<th>Source of fluctuation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-group</td>
<td>374.140</td>
<td>2</td>
<td>187.070</td>
<td>.071</td>
<td>.931</td>
</tr>
<tr>
<td>Intra-group</td>
<td>465841.672</td>
<td>178</td>
<td>2617.088</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>466215.812</td>
<td>180</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The sample group was then categorized by trained and non-trained groups in workshops for EPI staff. Next, the comparison of the scores on perceived competency regarding knowledge and skills in EPI service provision was analyzed among the groups. According to the findings, the trained group had different perceived competency regarding knowledge and skills from the non-trained group. In other words, perceived competency regarding knowledge and skills in immunization services were higher in the trained group than the non-trained group with statistical significance at 0.05 (t= -5.38, p< .000) (Table 7).

Table 7: The mean, standard deviation and comparison results for perceived competency regarding knowledge and skills in EPI service provision between the trained group and non-trained group.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Group</th>
<th>Total possible score</th>
<th>Score achieved</th>
<th>Mean</th>
<th>Standard deviation (SD)</th>
<th>t</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived competency regarding knowledge and skills in EPI service provision</td>
<td>Trained group (N= 100)</td>
<td>80-400</td>
<td>80-388</td>
<td>327.89</td>
<td>37.78</td>
<td>-5.38</td>
<td>.000*</td>
</tr>
<tr>
<td></td>
<td>Non-Trained group (N= 81)</td>
<td>80-400</td>
<td>80-388</td>
<td>288.47</td>
<td>56.50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Discussion of the findings

The present study was focused on the personal factors and perceived competency in the service provision of EPI staff in immunization work and on comparing the characteristics affecting perceived competency regarding knowledge and skills in EPI service provision. The sample group of 181 subjects was selected from 6 regions nationwide and the study was conducted from February to May of 2015.

1. According to the discussion on the personal factors, the findings on level of perceived competency regarding knowledge and skills in EPI service provision, EPI staff were found to have a high level of perceived competency in EPI service provision (X = 3.89, SD = 0.631). The aforementioned finding concurred with national vaccination policy for immunization strategy set forth for personnel development, promotion and drive for the use of workshops for EPI staff. These workshops have been held from 2011 to the present with a variety of strategies (Office of the Secretary-General, National Vaccination Commission, Department of Disease Control, Ministry of Public Health, 2005) For example, there is an agency for regulating immunization standards by random observations to monitor practice, distribution of immunization handbooks and textbooks for workshops in practice to accompany the provision of vaccination services for government, private and medical school agencies nationwide, including hospitals under the jurisdiction of the Ministry of the Defense, the Ministry of Justice and independent government agencies (Bureau of Policy and Strategy, 2013). Campaigns have been waged for many sectors with ongoing practice such as training workshop programs for immunization from 2011 to the present. As a result, EPI staff gained awareness and kept monitoring changes. Accordingly, the EPI staff had perceived self-competency to a high degree. The aforementioned finding concurred with the data found in the literature which discovered work involving immunization to be dynamic in line with epidemiology such as epidemiologic rate over the past five years (2009 - 2013) in which reports show the number of patients with measles to be on the rise and measles epidemics to be periodic. Hence, a resolution was passed to adjust the MMR vaccination schedule by moving the second booster vaccination from seven years to 2.5 years (Bureau of Vaccine-Preventable Communicable Diseases, 2014) or to change the vaccine for Japanese encephalitis (JE) to an attenuated vaccine in order to reduce discomfort associated with the vaccine (Vaccine-Preventable Communicable Diseases, Bureau of General Communicable Diseases, 2014). Therefore, EPI staff needs to constantly review knowledge about vaccines.

When considered in terms of knowledge and skills in practice, the selection of equipment and materials for immunization services (X = 4.21, SD = 0.753) and correct procedures for each type of vaccine were found to be the aspects in which EPI staff were found to have the highest perceptions (X = 4.21, SD = 0.789), followed by proper storage of each vaccine type at the right temperatures (X = 4.20, SD = 0.801),
knowing the instructions or recommendations necessary for service recipients in receiving each type of vaccine (\( \bar{X} = 4.19, \ SD = 0.801 \)) and ability to vaccinate correctly with each type of vaccine (\( \bar{X} = 4.19, \ SD = 0.766 \)). The aforementioned findings might have been due to the fact that 71.30 percent of the EPI staff in the present study was composed of professional nurses who were the main EPI staff in preparing and injecting vaccines. In the context of vaccinating, once the injection is complete, children are required to stay at the clinic for another 30 minutes for observation of symptoms occurring subsequent to the vaccination. Nurses are the people who offer information or advice for the care of children following vaccinations. In addition, nurses were obviously confident about the questions involving the characteristics of direct practice. Therefore, they were confident about the aforementioned matters.

Other aspects in which the EPI staff had the lowest three levels of perceived competency regarding knowledge and skills in EPI service provision were as follows: 1) Herd immunity threshold for various diseases (\( \bar{X} = 3.33, \ SD = 0.837 \)); 2) Herd immunity or community immunity (\( \bar{X} = 3.45, \ SD = 0.853 \)) and 3) performing the shake test (\( \bar{X} = 3.54, \ SD = 0.916 \)). The aforementioned finding might have been due to the fact that the competencies mentioned in the present study involved specific epidemiological knowledge about immunization. From the viewpoint of practice in the field of immunization in various service units, the emphasis is on practical skills. As for data on Herd immunity and Herd immunity threshold, various policies are used such as campaigns for having people get vaccinated to meet set goals, etc. The shake test is a test of vaccine quality and directly involves the Pharmacy Department. The present study covered every role of the types of work or occupation of the EPI staff, which might have affected the low individual perceived competency scores in line with the aforementioned findings.

2. The study of the correlation between the personal factors and perceived competency regarding knowledge and skills in EPI service provision found only the variable of training to be positively correlated with perceived competency in EPI service provision. The aforementioned finding might explain that receiving training provides necessary knowledge and skills. When considered in terms of the details of the training courses, the courses were found to cover basic knowledge about immunization, vaccine-preventable communicable diseases, preparing registration reports, vaccine disbursement, the cold chain system, vaccine preparations and service provision, and post-vaccination observation. Furthermore, the training model or format promotes knowledge, adjusts attitudes and offers opportunities to practice skills, which can result in perceived competency. Bandura’s Self-Efficacy Theory (Bandura) states that self-efficacy is the confidence of a person in practicing a particular behavior to be linked with goals until the person is successful in achieving the desired outcome. However, self-efficacy can increase, which might depend on hands-on actions until success is achieved when a person witnesses a practice model, verbally motivated and both physically and emotionally ready to practice the desired behavior (Boeree, 2006). The aforementioned finding concurs with training workshops held for EPI staff; diseases for which content was prepared in each section were varied with explanations of the objectives for each training session. As a result, the trainees set goals together and learned by resolving simulated problematic situations. Thus, the trainees practiced problem-solving skills and had hands-on
training. The trainees learned the cold chain system by using real equipment which allowed the trainees the opportunity to view models, thereby building greater confidence in providing vaccination services. Therefore, perceived competency regarding knowledge and skills in EPI service provision was high. At each training session, pre- and post-training tests were performed in order to evaluate knowledge about immunization in line with standards. Hence, the EPI staff was confident in the ability to provide standardized immunization services. This finding concurs with the study of Widsanugorn, Suwattana, Harun-or-rashid and Sakamoto (2011) who conducted research in 117 EPI staff from 90 service agencies in the province of Kalasin to evaluate knowledge and skills in EPI service provision. According to the research findings, the EPI staff that had previously practiced their skills in proper training had higher scores than the EPI staff who had never received training with statistical significance at $p < .001$. Therefore, the fact that the EPI staff was able to provide immunization services supported the research hypothesis. Hence, it is essential that EPI staff possess perceived competency regarding knowledge and skills in EPI service provision. The findings of the present study revealed that a high mean score for perceived competency regarding knowledge and skills is correlated with training experience with statistical significance. And when the mean score for perceived competency regarding knowledge and skills was considered among the groups, the group with course training experience had higher mean scores than the non-trained group with statistical significance.

Other factors, namely, age, duration of work in EPI service, and occupation type were not found to be correlated with perceived competency regarding knowledge and skills in EPI service provision. Hence, age was not correlated with perceived competency, possibly due to the fact that work involving immunization frequently undergoes changes in the person or persons responsible for the job. The aforementioned finding concurs with the findings of a study revealing that 45.90 percent of workers were involved in vaccination work for less than 5 years. And in each group of staff members whose work involved immunization, the duration of work in EPI service differed in the group less than 5 years, 5-10 years and over 10 years. The ages of the workers when they began to work with vaccines were not equal, because the Ministry of Public Health system involves a large group of people. Furthermore, the nature of the workers’ jobs involving vaccines means work transfers for the sake of advancement in work positions. Therefore, workers are constantly coming and going which might result in differing levels of perceived competency for EPI staff.

Types of job or occupation, such as nurses, public health scholars/employees, medical professionals, was not found to be correlated with perceived competency regarding knowledge and skills in EPI service provision because the research findings revealed the majority of the workers to be nurses at a rate of 71.30 percent. Furthermore, the content of the courses on EPI service provision was not officially included in any courses about public health or medicine. The content of the aforementioned courses was concerned with vaccines in concurrence with data obtained from reports on capacity building programs for EPI staff in 2015 (Faculty of Nursing Science, Thammasat University, 2015). Previous findings have discovered 96 percent of trainees fail to pass the immunization courses, even though the trainees have a variety of work or occupation types.
Recommendations

1. Policy should be set for staff working with vaccines to receive training as a means of getting staff ready to work, because once perceived competency regarding knowledge and skills can be achieved, staff will engage in behavior confidently and be able to perform immunization work correctly.

2. Studies should be conducted in larger sample groups with similar numbers of EPI staff in each profession.

3. Studies should be conducted in groups of service recipients with opinions about the knowledge and skills of EPI staff.

4. Ongoing studies should be conducted on the topic of evaluating service provision behavior apart from measuring perceived competency regarding knowledge and skills.

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Access to Antenatal Care in Rural Areas of Lao PDR

Phanhpakit ONPHANHDALA\(^5\) and Vanvisa Philavong

Abstract

Lao PDR has the highest maternal mortality phenomenon among Southeast Asia nations even though access to antenatal care has significantly decreased those rates. This research, therefore, attempts to answer how literacy and poverty reduction clear the path to antenatal care utilization in rural area. Data from LSIS (2011-2012) is used to analyze the distribution of antenatal care utilization in a rural area of Lao PDR. The findings show that 46% of women did not receive antenatal care and 63% of deliveries occur at home or with traditional birth attendants. The results also reveal that poverty and illiteracy are important barriers to access. Using logistic regression, there are significant differences in the antenatal care utilization among regions, maternal educational level, wealth and ethnicity. Therefore, suggesting that much greater efforts on the part of the government is required in national policy if antenatal care is to reach women in different areas nationwide.

Keywords: Access to health, Maternal mortality, Rural road, Lao PDR

JEL codes: I18, O18, P36

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Introduction

There are many campaigns attempting to reduce the maternal mortality rate in the globe. The biggest policy is Millennium Development Goals especially MDG5. It aims to improve maternal health by achieving universal access to reproductive health. In 2013, Northern Africa, Eastern-Western Asia and countries in Caribbean have low mortality rate, as mothers receive at least 4 antenatal visits during pregnancy recommended by WHO. But still, Southeastern is on progress insufficient to this reach target and Lao PDR has the most maternal mortality phenomenon among South East Asia nations in 2013. WHO et al. (2012) estimated that, at 470 per 100,000 live births, Lao PDR’s maternal mortality ratio is very high, equal almost to double that of neighboring Cambodia and to eight times that of Vietnam.

Many existing studies have examined the determinants of access to healthcare. For instance, in Pakistan, rich people have more opportunity to receive better healthcare rather than the poor (Mumtaz et al., 2013). A study in Brazil and India has showed the similar result (Andrade et al., 2012). Wealthier families are more likely to take advantage of recommendation from modern treatment for their own health. Beside, education may change a perspective of modern health care for mother who value their own and child health (Elo, 1992; Govindasamy & Ramesh, 1997; and Chakraborty et al., 2003).

Moreover, many studies show that there is high travel cost in rural areas. For this reason, pregnant women who live far away from health center or at least mobile care, probably, will deliver at home instead of going to hospital (Hodgkin, 1996; and Aremu et al., 2011). Furthermore, in the Washington D.C, 1986, mothers who had a complicated labor with higher-income more likely to deliver at facility hospital (Nesbitt et al., 1990). Among poor people, it is more difficult for modern care intervention when they are influenced by cultural believes. Pregnant women will not be able to receive an antenatal care due to cultural norms (Ye et al., 2010). Nevertheless, education may acknowledge and change their perception on how they see modern treatment to take more care of health.

As mentioned above, many studies on accessing to antenatal care have shown that poverty reduction and literacy can persuade pregnant women to have access to antenatal care visits or delivery with skilled birth attendants. Though, several questions are remained such as what extent of income level and which educational level government should focus on when they want mothers to have more awareness on health issue? In examining Laos situation, this attempts to provide a clear-cut study by decomposing several characteristics of mothers to find out the impacts of each factor on accessing to antenatal care. Understanding mother characteristics will help policy maker evaluate and promote mother better health.
Health Status in Lao PDR

Lao PDR is ranked as a lower middle-income country in 2011. Roughly two-third of population, however, is living in rural areas where there are absences of basic infrastructures. Many of them, so far, lack of an opportunity to study due to poor living condition especially women. Data from Lao Social Indicators Survey or LSIS (2011-12) shows that 54% of reproductive women cannot read at all. Furthermore, Lao Expenditure and Consumption Survey or LECS4 also points out that 60% of rural people have to travel more than 10 kilometers to the nearest hospital. This is a big challenge for government to handle with problems related to health development. Moreover, individuals in the richest quintile of the population spent five times more on out-of-pocket healthcare payment as a share of total household consumption than those in the poorest quintile in 2007-2008.

It is worth noting that poverty and illiteracy are main problems, which arose in rural areas of Laos. Survey data has reported that 73% of reproductive women are living in rural areas (Ministry of Health, 2012). Many health campaigns have been concentrating in rural areas. One fifth of pregnant women are living in rural without road connection, which primary school was the highest educational level they finished. Table 1 shows that 48% of mothers who lives in rural without road never attend school, which is the highest compare to rural with (generally unpaved) road (33%) and urban with paved road (12.4%). This indicator reveals important evidence that there is a gap between rural and urban areas in terms of basic infrastructures. For this reason, education is a key indicator of people’s perception on modern health care.

<table>
<thead>
<tr>
<th>Table 1: Maternal education level in different residence area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Rural without road</strong></td>
</tr>
<tr>
<td>No.</td>
</tr>
<tr>
<td>None education</td>
</tr>
<tr>
<td>Primary</td>
</tr>
<tr>
<td>Lower secondary</td>
</tr>
<tr>
<td>Upper secondary</td>
</tr>
<tr>
<td>Non-tertiary</td>
</tr>
<tr>
<td>Tertiary</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

Source: LSIS (2011-12)
Among Southeast Asia nations, Lao PDR still has the highest maternal mortality rate. Therefore, accessing to universal maternal reproductive health is still low. Data from LSIS (2011-12) confirms that only 54% of pregnant women ever received antenatal care. Nevertheless, this is even worst when women live in isolated area; the percentage of antenatal care utilization is lower than 20%. It is the same when mothers decided a place to give birth, 88% of them deliver at home without skill birth attendances. This may because a high travel cost those poor mothers have to take into account before going for health check-up.

They are more likely to receive Antenatal Care or ANC during pregnancy when they have a higher educational level. Table 2 also shows that 76% of non-educated mothers never receive antenatal care. It, likewise, happened when mothers chose place to deliver. More than 70% of mothers who finished school lower than secondary level gave birth at home instead of going to hospital. This could be explained by the effect of education factor. Educated mothers are more likely to be aware of how importance mother and child health is. Phonvixay (2010) also suggest the same pattern of the impact of educated mother on child survival having effectiveness in the case of Lao PDR.

In term of economics perspective, demand has been a function of income. Higher-income people should have an ability to pay cost of medical care. For example, percentages of mothers who have been helped by skill birth or obstetric doctors gradually increase from 12% to 89% from the poorest to the richest. But in Laos, in 2008, more than 25% still live below the national poverty line (World Bank, 2014). Therefore, poverty still drawback a growth of economy especially people with better living conditions. In fact, poor women are more likely to live in rural area and have low educational level compare to the richest. We could say that education, infrastructure and income do affect on accessing to maternal health care. However, it claims that ethnic norm is one of an obstacle that blocks pregnant women to use modern treatment. A study about child nutrition revealed that Lao children have sufficient nutrition compare to other ethnicities (Kamiya, 2010). Some ethnic cultures restricted to their own traditional treatment when they get sick. For this reason, during labor, pregnant women are more likely to give birth at home without modern cares.
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
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<tr>
<td></td>
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<td>Yes</td>
</tr>
<tr>
<td></td>
<td>45.87</td>
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</tr>
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<td>85.4</td>
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<tr>
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<td>24.1</td>
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<td>56.5</td>
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<td>Lower secondary</td>
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<td>Upper secondary</td>
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<td>92.2</td>
</tr>
<tr>
<td>Non tertiary</td>
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<td>95.7</td>
</tr>
<tr>
<td>Tertiary</td>
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<td>98.2</td>
</tr>
<tr>
<td>Poorest</td>
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<td>23.7</td>
</tr>
<tr>
<td>Second</td>
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<td>45.4</td>
</tr>
<tr>
<td>Middle</td>
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<td>33.5</td>
</tr>
<tr>
<td>Fourth</td>
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<td>79.8</td>
</tr>
<tr>
<td>Richest</td>
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<td>95.4</td>
</tr>
<tr>
<td>Lao</td>
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<td>77.5</td>
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<tr>
<td>Khmu</td>
<td>54.3</td>
<td>45.7</td>
</tr>
<tr>
<td>Hmong</td>
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<td>23.8</td>
</tr>
<tr>
<td>Observation</td>
<td>4384</td>
<td>4319</td>
</tr>
</tbody>
</table>

Sources: LSIS (2011-12)
Review on Health Policy in Lao PDR

Since Lao PDR gained independence in 1975, health services were fully funded by the government and provided free of charge supporting by former Soviet Union and Eastern European countries up to 1989, however there were serious fiscal constraints resulting shortages of essential drugs and medical supplies, and infrastructure had deteriorated. User fees were introduced at government health care facilities in 1996. Hospitals were to keep 80% of the revenue and send 20% to the provincial or district finance department as general revenue. Policy on user fees had an impact on the utilization of health services that people, especially the poor, delayed seeking services or resorted to self-medication. The government has begun to create social safety net through a range of social protection schemes. There are four prepayment schemes that were gradually launched in the 2000s: (1) Social Security Organization (SSO) for private employees as part of a comprehensive social security scheme that is mandatory by law; (2) State Authority for Social Security (SASS) for civil servants; (3) Community-Based Health Insurance (CBHI) for non-poor workers in the informal sector; and (4) a Health Equity Fund (HEF) for the poor (Rassavong, 2015). However, currently, only small proportion of the population is covered by one of these schemes. Besides, private sector does not yet pay enough roles on health development in the country.

For several years, the Ministry of Health (MOH) had no mechanism for monitoring provincial activities and formulating national health plans properly. MOH’s division of statistics was established in 2001. Implementation of a facility-based national health management information system (HMIS) was adopted in 2004; the national Health Information Systems Strategy Plan (HISSP) (2009-2015) was launched in 2009. The data collected includes key indicators related to maternal and child health (MCH), morbidity and mortality, and inpatient and outpatient service utilization (Rassavong, 2015). The law on health care was lately adopted in 2005 (National Assembly, 2005) and other relating laws and regulations were gradually launched. The Skilled Birth Attendance Strategic Plan (2008-2012) has been important for improved reproductive health care. In recently, the National Assembly (2012) endorsed the Health Sector Reform (HSR) strategy 2013-2025. The overall goals of the reform are: the achievement of the health related MDGs by 2015 and Universal Health Coverage by 2025.

Despite several reforms, a number of challenges remain: (1) inadequate staffing, in terms of quantity, uneven distribution with too few in remote areas, poor standard professional, practical and clinical skills and as well as insufficient staff motivation due to poor incentives; (2) limited public expenditure on health sector with a heavy rely on international assistance on capital spending; (3) weak governance on health sector to support good planning, monitoring, and supervision; and (4) a lack of confidence and trust in public health services.
Data and Methodology

This study utilizes data from Lao Social Indicator Survey (2011-12) for analyzing the impact on antenatal care utilization. LSIS is a nationally representative sample survey that was conducted from 2011 to 2012 covering 17 provinces in the Lao PDR. Among the 18,843 has been successfully interviewed nationally in the survey. Of these, 47,820 were male and 49,601 were female. The survey result in rural areas covers almost 70% of sampling. It provides up-to-date information on the social situation of children, women and men covering health, nutrition, education, water and sanitation, marriage and sexual activity, fertility and mortality, contraception, HIV/AIDS, child protection, and use of mass media and information technology. However, this study restricted to only women during reproductive age (15-49) that got pregnant in the last two years. Therefore, after clearing missing data, we concluded that there are 4,384 samples that used in this study.

Logistic regression was performed to estimate the impact of maternal characteristics on accessing to antenatal care. The framework of this study is based on Health Seeking behavior that explained how people choose health services to maximize their utility (Kroeger, 1983). Thus, numbers of doctors, midwives and hospitals are held constant. Moreover, we also adapted assumptions from Elo (1992) and Andrade et al. (2012) to create the impact of access to antenatal care econometric model.

\[
\text{logit}(\text{ANC}) = \delta + \gamma_1 \text{HH} + \gamma_2 \text{welevel} + \gamma_3 \text{income} + \gamma_4 \text{eth} + \\
\gamma_5 \text{age} + \gamma_6 \text{news} + \gamma_7 \text{radio} + \gamma_8 \text{TV}
\]

Access to health care among pregnant women (ANC) included if mothers ever received care or not (ANC), how many times they go for health check-up (N.ANC) and which places they decided to give birth (BP). To evaluate the impact of maternal characteristics on access to antenatal care, extended model has been used for first step analysis. An extended model is including all possible determinants. It claims that maternal residence (HH), education (welevel), income, ethnicity (eth), age and access mass media (news, radio and TV) all can influence how mothers decided to receive a care during pregnancy. What it means is that mothers who live in corner area will probably come to see doctors less than in urbanization due to deficiency of basic infrastructures. This could lead to more travel costs. So do maternal education, many studies suggested that education could help women more aware of issue related to health problems. It is much more easier for them to open-wide a perspective on modern treatment. But what if there is more reproductive health advice available on media, it may acknowledge mothers how importance mother and child health is.

In economics point of view, service utilization based on income constraint. As known, income is a short-term asset; it was calculated base on basic salary, rent, interest etc. which difficult to collect because during a short time interview sometimes it could not be able to get an exactly value. So this might lead to bias estimations. Even though,
short-term asset tells us much better on access to health services that if 1% of income increase, and what percentages of possibility pregnant women ever received antenatal care. However, this study has used wealth index as a proxy of income instead. It is the best proxy suits with living conditions in rural areas of Laos where many people do not have earned monthly salary. Wealth index is a long-term asset households have in their houses. Those items included a vehicle, a private maid, a radio, a television, and types of floor, landowners, electricity and water supply (Rutstein & Johnson, 2004). They were calculated by a Principle Components Analysis (PCA) to classify wealth from the poorest to the richest.

What we expected is that all independent variables mentioned above significantly affect on accessing to antenatal care utilization. However, development policies relate to maternal health need more specific details if educational level or wealth really share the same impact in different areas as urban, rural with and without road. Therefore, simple models have been used to estimate this impact.

Simple models will focus more specific variables to estimate. In this case, we have had 4 main determinants including maternal education, wealth index, ethnicity and age. Then we separated into 4 main groups, divided between residences, educational level, wealth and ethnicity. It will show more specific results and make it clearer for policy evaluation.

Variables in simple model are similar to an extended model, but we had restricted each group to see specific results. This is why marginal effect has been performed for simple model results, which will be showed in the next section.

\[
\text{logit}(\text{ANC}) = \alpha_1 + \beta_1 \text{welevel} + \beta_2 \text{windex5} + \beta_3 \text{eth} + \beta_4 \text{age} \quad (2)
\]

\[
\text{logit}(\text{ANC}) = \alpha_2 + \beta_5 \text{windex5} + \beta_6 \text{eth} + \beta_7 \text{age} \quad (3)
\]

\[
\text{logit}(\text{ANC}) = \alpha_3 + \beta_8 \text{welevel} + \beta_9 \text{eth} + \beta_{10} \text{age} \quad (4)
\]

\[
\text{logit}(\text{ANC}) = \alpha_4 + \beta_{11} \text{welevel} + \beta_{12} \text{windex5} + \beta_{13} \text{age} \quad (5)
\]

\[
\text{logit}(\text{ANC}) = \alpha_1 + \beta_1 \text{welevel} + \beta_2 \text{windex5} + \beta_3 \text{eth} + \beta_4 \text{age} \quad (2)
\]

Results and Discussion

Table 3 shows results from an extended model to isolate the impact of maternal characteristics on maternal health behaviors. The model performs both coefficient and marginal effects. These results separate into three equations, which try to compare between ANC received, times mothers go for checkup and place they deliver. When we held other variables constant, wealth index is statistically significant at 5% and 1% levels in all groups. It suggested that mothers who came from wealth family would probably seek for health care more than the poor. Promoting jobs for women should be taken into accounts. As you have known, wealth index is long-term asset, it may not a perfect fit for income; however, it is the best proxy to reflect rural living conditions. It is worth to say that infrastructure has played a role on maternal behaviors. According to a limitation of health care data of health
cares’ number, maternal residences have been used for estimation. There are statistically significant at 5% and 1% levels, except times mothers received ANC only at 10% level for infrastructure variables.

Looking up at the coefficients in all three equations, the biggest impact on ANC is infrastructure variable at 2.084, which also statistically significant at 1% level. Contrary, wealth is the biggest in BP at 2.623 and 1% significantly level. What happen here may be explained by travel cost. Traveling for long distances may cause a trouble to pregnant women especially in isolated area. Because from recommendation by WHO is that pregnant women should have at least 4 times visited for ANC. Therefore, rural areas without road access are the most difficult place for them to go to local health center for check-up every quarter during pregnancy. It is pretty reversely in birth’s place group. As you may know, higher income allows people to pay for goods that improve better health. However, if poverty has overcome mothers’ living, they will find it difficult when deal with charges relates to medical care, for example hospital stay, medicines, etc. (Hodgkin, 1996).

In this extended model, we also test for mass media access. We assume that pregnant women who received information relates to reproductive health may be aware more about health issue. They will probably receive antenatal care visit more than who do not have such information. When we held other variables constant, part of mass media variables are statistically different significantly at 10%, 5% and 1% levels. Moreover, the result reveals that if mothers who read newspapers at least once a week have created 12% a chance to receive more care than who do not read at all. It is also happen to other two groups. Because, reading newspaper means that mothers are literacy. Nevertheless, the coefficient of mass media from other sources such as radio and television are quite small and less of them are significant. It may suggest that we are not sure if they really get reproductive health information from these sources.
Table 3: Logistic regression analysis: Extended model of effect of maternal characteristics on accessing to antenatal care visits and birth place.

<table>
<thead>
<tr>
<th>Nationality</th>
<th>ANC Coef</th>
<th>ANC Margins</th>
<th>N.ANC Coef</th>
<th>N.ANC Margins</th>
<th>BP Coef</th>
<th>BP Margins</th>
</tr>
</thead>
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<tr>
<td>Rural without road (reference)</td>
<td>1.397***</td>
<td>0.306***</td>
<td>0.077</td>
<td>0.351</td>
<td>0.704**</td>
<td>0.167***</td>
</tr>
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<td>Rural with road</td>
<td>(7.329)</td>
<td>(6.592)</td>
<td>(1.107)</td>
<td>(1.147)</td>
<td>(3.136)</td>
<td>(3.400)</td>
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<td>Urban</td>
<td>2.084***</td>
<td>0.397***</td>
<td>0.158*</td>
<td>0.752*</td>
<td>1.395***</td>
<td>0.335***</td>
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<tr>
<td></td>
<td>(8.611)</td>
<td>(7.979)</td>
<td>(2.209)</td>
<td>(2.360)</td>
<td>(5.672)</td>
<td>(6.227)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>(0.811)</td>
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<tr>
<td></td>
<td>(1.390)</td>
<td>(1.099)</td>
<td>(1.028)</td>
<td>(1.109)</td>
<td>(1.247)</td>
<td>(1.229)</td>
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<td>1.501</td>
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<tr>
<td></td>
<td>(1.817)</td>
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<td>(1.065)</td>
<td>(1.148)</td>
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<td>(1.374)</td>
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<td></td>
<td></td>
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<td></td>
</tr>
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<td>Second</td>
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<td>0.02</td>
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</tr>
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<td>Lao (reference)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Khmu</td>
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<td>(-6.948)</td>
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<td>(1.720)</td>
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<td>-0.001</td>
<td>0.005*</td>
<td>0.027*</td>
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<td>(2.570)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Almost every day</td>
<td>1.571*</td>
<td>0.161***</td>
<td>0.128*</td>
<td>0.653*</td>
<td>0.582</td>
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<td>(0.538)</td>
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<td>0.473**</td>
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<td></td>
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<td>(1.736)</td>
<td>(2.730)</td>
<td>(2.639)</td>
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<td>(0.363)</td>
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</table>
Do not listen to a radio at all

<table>
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<th>At least once a week</th>
<th>Less than once a week</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>0.080</td>
<td>0.232</td>
<td>-0.169</td>
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<td></td>
<td>(0.522)</td>
<td>(1.493)</td>
<td>(-0.807)</td>
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<tr>
<td></td>
<td>0.060*</td>
<td>-0.028</td>
<td>0.102*</td>
</tr>
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<td></td>
<td>(2.164)</td>
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<tr>
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<td></td>
<td>0.037</td>
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<td>-0.025</td>
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Do not watch television at all

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<th>At least once a week</th>
<th>Less than once a week</th>
</tr>
</thead>
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<td></td>
<td>0.457**</td>
<td>0.342</td>
<td>0.085</td>
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<td></td>
<td>(2.959)</td>
<td>(1.841)</td>
<td>(0.341)</td>
</tr>
<tr>
<td></td>
<td>0.076**</td>
<td>0.059</td>
<td>0.016</td>
</tr>
<tr>
<td></td>
<td>(2.732)</td>
<td>(1.849)</td>
<td>(0.345)</td>
</tr>
<tr>
<td></td>
<td>0.119*</td>
<td>0.092</td>
<td>0.008</td>
</tr>
<tr>
<td></td>
<td>(2.415)</td>
<td>(1.577)</td>
<td>(0.099)</td>
</tr>
<tr>
<td></td>
<td>0.556*</td>
<td>0.424</td>
<td>0.036</td>
</tr>
<tr>
<td></td>
<td>(2.527)</td>
<td>(1.582)</td>
<td>(0.099)</td>
</tr>
<tr>
<td></td>
<td>0.266</td>
<td>0.214</td>
<td>-0.317</td>
</tr>
<tr>
<td></td>
<td>(1.580)</td>
<td>(1.046)</td>
<td>(-1.084)</td>
</tr>
<tr>
<td></td>
<td>0.066</td>
<td>0.053</td>
<td>-0.078</td>
</tr>
<tr>
<td></td>
<td>(1.583)</td>
<td>(1.048)</td>
<td>(-1.100)</td>
</tr>
</tbody>
</table>

Constant -1.548* (-2.045) 0.997*** (-5.309) -2.058* (-2.549)
Observations 2482 2482 1793 1793 2480 2480
Pseudo R-squared 0.227 0.063 0.248

There is no statistically significant for maternal educational level in all three groups. This may acknowledge us that maternal residences are more influential on mothers’ health behavior decision. What we want to point out is, poor mothers will consider on all costs relate to health care regarding to they have no health insurance. Therefore, in the next model we did restrict residences to show more specific details on what really persuade them access to antenatal care during pregnancy.

**Maternal Residences Distribution**

Table 4 shows an empirical result from simple model. We also classified maternal residences into three groups. When we held other variables constant, all levels of education are statistically significant at 10% and 1% levels only in rural areas with road. It means that educated mothers are more likely to seek for antenatal care than uneducated mothers. The marginal effect for this variable is relatively high, which held in between 4.9% to 231%. On the other hand, to encourage mothers in urban choose hospital for childbirth place instead of home, promoting high school level for women has been necessary. A probability of choosing hospital as a place for childbirth is 13.9% for upper secondary level with 10% statistically significant level. In rural without road areas, however, there is rarely statistically significant for education variable. As there are high travels costs involve with medical costs (Govindasamy & Ramesh, 1997). Except if women have a chance to finish high
school, a chance for them to deliver at hospital is 36.4% compared to none-educated women.

In rural areas with road access, there is a similar effect. Poor women are less likely to seek antenatal care and deliver at hospital with skilled birth attendants compared to the rich. Therefore, job creation can ease this problem, while it helps them to earn enough money. Results also reveal that a probability of pregnant women to go for health check-up is increasing from 15% to 40%. Moreover, the richest women’s probability to deliver at hospital is 57% compared to the poorest and statistically significant at 1% level. In urban areas where basic infrastructure exists, still, poor people struggle from high expenditure on medical charges. Hence, job promoting will increase a probability of ANC receiving to 22% and delivery at hospital to 36% compared to the poorest. Nevertheless, it does not always mean that wealth can enhance a chance of accessing ANC of pregnant women especially in rural without road areas. The reason behind it may be because of travel time and distances are an important barrier to access (Hodgkin, 1996). What is more, some ethnic norm still forbids modern treatment intervention.
Table 4: Logistic regression analysis: Simple model distribute effects of maternal residence

<table>
<thead>
<tr>
<th></th>
<th>Urban</th>
<th>Rural with road</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ANC</td>
<td>N.ANC</td>
</tr>
<tr>
<td>None (reference)</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Primary</td>
<td>0.111*</td>
<td>0.413</td>
</tr>
<tr>
<td></td>
<td>(2.570)</td>
<td>(1.246)</td>
</tr>
<tr>
<td>Lower secondary</td>
<td>0.138**</td>
<td>1.051**</td>
</tr>
<tr>
<td></td>
<td>(2.992)</td>
<td>(3.019)</td>
</tr>
<tr>
<td>Upper secondary</td>
<td>0.135**</td>
<td>1.450***</td>
</tr>
<tr>
<td>Non tertiary</td>
<td>0.185***</td>
<td>1.359***</td>
</tr>
<tr>
<td></td>
<td>(3.804)</td>
<td>(3.742)</td>
</tr>
<tr>
<td>Tertiary</td>
<td>0.169**</td>
<td>1.375***</td>
</tr>
<tr>
<td></td>
<td>(3.022)</td>
<td>(3.414)</td>
</tr>
<tr>
<td>Poorest (referne)</td>
<td>0.177</td>
<td>0.773</td>
</tr>
<tr>
<td></td>
<td>(1.921)</td>
<td>(1.577)</td>
</tr>
<tr>
<td>Middle</td>
<td>0.161</td>
<td>1.179**</td>
</tr>
<tr>
<td></td>
<td>(1.729)</td>
<td>(2.612)</td>
</tr>
<tr>
<td>Fourth</td>
<td>0.216*</td>
<td>1.378**</td>
</tr>
<tr>
<td></td>
<td>(2.303)</td>
<td>(3.148)</td>
</tr>
<tr>
<td>Richest</td>
<td>0.309**</td>
<td>2.004***</td>
</tr>
<tr>
<td>Language</td>
<td>Coefficient</td>
<td>Standard Error</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Lao (reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Khmu</td>
<td>-0.068</td>
<td>0.106</td>
</tr>
<tr>
<td></td>
<td>(-1.671)</td>
<td>(0.283)</td>
</tr>
<tr>
<td>Hmong</td>
<td>-0.196**</td>
<td>-1.288**</td>
</tr>
<tr>
<td></td>
<td>(-3.266)</td>
<td>(-2.927)</td>
</tr>
<tr>
<td>Other</td>
<td>-0.012</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>(-0.793)</td>
<td>(0.188)</td>
</tr>
<tr>
<td>Maternal age</td>
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<td>0.031*</td>
</tr>
<tr>
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<td>(-0.563)</td>
<td>(2.202)</td>
</tr>
<tr>
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<td>710</td>
</tr>
<tr>
<td>Pseudo R2</td>
<td>0.314</td>
<td>0.035</td>
</tr>
</tbody>
</table>

* t statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Source: LSIS (2011-12)
Table 5: Logistic regression analysis: Simple model distribute effects of maternal education

<table>
<thead>
<tr>
<th></th>
<th>Poorest</th>
<th>Second</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ANC</td>
<td>N.ANC</td>
</tr>
<tr>
<td>None (reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>0.175***</td>
<td>0.818***</td>
</tr>
<tr>
<td></td>
<td>(5.893)</td>
<td>(3.443)</td>
</tr>
<tr>
<td>Lower secondary</td>
<td>0.209**</td>
<td>0.304</td>
</tr>
<tr>
<td></td>
<td>(2.845)</td>
<td>(0.691)</td>
</tr>
<tr>
<td>Upper secondary</td>
<td>0.927</td>
<td>0.511***</td>
</tr>
<tr>
<td></td>
<td>(0.765)</td>
<td>(4.650)</td>
</tr>
<tr>
<td>Non tertiary</td>
<td>0.351</td>
<td>0.550***</td>
</tr>
<tr>
<td></td>
<td>(0.997)</td>
<td>(4.530)</td>
</tr>
<tr>
<td>Tertiary</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lao (reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Khmu</td>
<td>-0.048</td>
<td>-0.667*</td>
</tr>
<tr>
<td></td>
<td>(-0.841)</td>
<td>(-2.090)</td>
</tr>
<tr>
<td>Hmong</td>
<td>-0.290***</td>
<td>-1.649***</td>
</tr>
<tr>
<td></td>
<td>(-5.510)</td>
<td>(-4.841)</td>
</tr>
<tr>
<td>Other</td>
<td>-0.172***</td>
<td>-0.656*</td>
</tr>
<tr>
<td></td>
<td>(-3.343)</td>
<td>(-1.999)</td>
</tr>
<tr>
<td></td>
<td>-0.006*</td>
<td>-0.009</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------</td>
<td>--------</td>
</tr>
<tr>
<td></td>
<td>(-2.560)</td>
<td>(-0.412)</td>
</tr>
<tr>
<td>Observations</td>
<td>1004</td>
<td>270</td>
</tr>
<tr>
<td>Pseudo R-squared</td>
<td>0.094</td>
<td>0.030</td>
</tr>
</tbody>
</table>

* p<0.05, ** p<0.01, *** p<0.001

Source: LSIS (2011-12)
Table 6: Logistic regression analysis: Simple model distribute effects of maternal wealth

<table>
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<th></th>
<th>Poorest</th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ANC</td>
<td>N.ANC</td>
<td>BP</td>
<td>ANC</td>
<td>N.ANC</td>
<td>BP</td>
</tr>
<tr>
<td>None (reference)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>0.175***</td>
<td>0.818***</td>
<td>0.011</td>
<td>0.180***</td>
<td>0.372</td>
<td>0.080*</td>
</tr>
<tr>
<td></td>
<td>(5.893)</td>
<td>(3.443)</td>
<td>(0.492)</td>
<td>(4.572)</td>
<td>(1.539)</td>
<td>(2.525)</td>
</tr>
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<td>Lower secondary</td>
<td>0.209**</td>
<td>0.304</td>
<td>-0.03</td>
<td>0.324***</td>
<td>0.740*</td>
<td>0.165**</td>
</tr>
<tr>
<td></td>
<td>(2.845)</td>
<td>(0.691)</td>
<td>(-0.707)</td>
<td>(5.094)</td>
<td>(2.086)</td>
<td>(2.833)</td>
</tr>
<tr>
<td>Upper secondary</td>
<td>0.927</td>
<td>0.511***</td>
<td>0.38</td>
<td>0.368**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.765)</td>
<td>(4.650)</td>
<td>(0.617)</td>
<td>(2.600)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non tertiary</td>
<td>0.351</td>
<td>0.550***</td>
<td>1.198</td>
<td>0.222</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.997)</td>
<td>(4.530)</td>
<td>(1.115)</td>
<td>(1.024)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tertiary</td>
<td>3.988***</td>
<td></td>
<td></td>
<td></td>
<td>0.511</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(9.657)</td>
<td></td>
<td></td>
<td></td>
<td>(1.869)</td>
<td></td>
</tr>
<tr>
<td>Lao (reference)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Khmu</td>
<td>-0.048</td>
<td>-0.667*</td>
<td>-0.013</td>
<td>-0.077</td>
<td>-0.825**</td>
<td>-0.035</td>
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<tr>
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<td>(-0.841)</td>
<td>(-2.090)</td>
<td>(-0.325)</td>
<td>(-1.325)</td>
<td>(-3.060)</td>
<td>(-0.789)</td>
</tr>
<tr>
<td>Hmong</td>
<td>-0.290***</td>
<td>-1.649***</td>
<td>-0.074</td>
<td>-0.269***</td>
<td>-1.249***</td>
<td>-0.051</td>
</tr>
<tr>
<td></td>
<td>(-5.510)</td>
<td>(-4.841)</td>
<td>(-1.936)</td>
<td>(-4.659)</td>
<td>(-4.152)</td>
<td>(-1.103)</td>
</tr>
<tr>
<td>Other</td>
<td>-0.172***</td>
<td>-0.656*</td>
<td>-0.039</td>
<td>-0.170***</td>
<td>-0.207</td>
<td>0.009</td>
</tr>
<tr>
<td></td>
<td>(-3.343)</td>
<td>(-1.999)</td>
<td>(-1.068)</td>
<td>(-3.724)</td>
<td>(-0.815)</td>
<td>(0.227)</td>
</tr>
<tr>
<td>Maternal age</td>
<td>-0.006*</td>
<td>-0.009</td>
<td>0</td>
<td>-0.005</td>
<td>0.018</td>
<td>-0.005*</td>
</tr>
<tr>
<td>--------------</td>
<td>---------</td>
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<td>---------</td>
<td>-------</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td>(-2.560)</td>
<td>(-0.412)</td>
<td>(-0.197)</td>
<td>(-1.753)</td>
<td>(1.168)</td>
<td>(-2.006)</td>
</tr>
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<td>Observations</td>
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<td>985</td>
<td>798</td>
<td>368</td>
<td>792</td>
</tr>
<tr>
<td>Pseudo R-squared</td>
<td>0.094</td>
<td>0.030</td>
<td>0.01</td>
<td>0.086</td>
<td>0.026</td>
<td>0.037</td>
</tr>
</tbody>
</table>

t statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Source: LSIS (2011-12)
When mention about ethnic norms, it will encompass with such birth traditions. Hmong, one of the minority groups in Laos, is less likely to receive care compare to Lao in all three groups as well as Khmu and statistically significant at 10% and 1% levels. The marginal effect shows that, when other variables held constant, a chance of Khmu women to receive ANC during pregnancy is decreasing to 72% (rural with road) and 10.7% (rural without road).

To be noted, education and wealth played an important role on accessing to antenatal care in all level in rural with road area. However, to determinant health policies, we have control educational level and wealth index to see their impacts. As most of the simple are in rural with road areas, so this area is made as one of our classification.

**Maternal Education Distribution**

We will point out the impact of education on antenatal care approach, which will show an estimative result in Table 4. Among uneducated women, poverty reduction can increase a chance to receive more care 12% and is able to deliver at hospital 13.2% with 1% and 5% significant levels. It is worth to note that times mothers received care decreases 154% when mothers are the richest and statistically significant at 1% level. It is possible to say that there is an opportunity cost in each times they have an appointment to see a doctor. For a basic education, all level of wealth has a positive impact on antenatal care utilization. This estimation has the same result as a study in Pakistan (Mumtaz et al., 2013).

In all three groups of education, only Hmong tend to deliver at hospital less than Lao and statistically significant at 10%, 5% and 1% levels. Ethnic believes are an important barrier to access, even though, this impact is gradually decreasing when women reach higher education (Elo, 1992).

**Maternal Wealth Distribution**

Table 5 has restricted wealth index level of mothers in rural area with road. In all levels of education, it did help middle mothers enjoy their utility on using antenatal care and statistically significant at 10%, 5% and 1% levels. On the one hand, the poorest mothers still hold themselves to struggle with poverty barrier. It is very difficult for them when facing such a high cost involve with time travel and medical charges. As we mentioned above, educated mothers are more likely to be able accessing to antenatal care. A study of Aremu et al. (2011) also revealed the same result that educated mother could be more aware of health issue, thus delivery at hospital is the choice they had made. When we held other variables to be constantly, a marginal effect has increased to 82% for primary level and statistically significant at 1% level.
Many developing countries might face a belief obstacle that block development. We assume that some of those believes have both advantages and disadvantages. In this case, if pregnant women hesitate to seek a care regarding to ethnic fobidden, this is a disadvantage. Because pregnancy without antenatal care would lead to maternal mortality (WHO, 2014). In Lao PDR, some ethnicities do not permit an intervention from modern treatment. Our result also confirms on issue, among middle group, that 14% for Hmong women tend to deliver at home and statistically significant at 10% level.

**Maternal Ethnicity Distribution**

In recent sections had showed an influence of ethnic believes on maternal health cares. Result from Table 7 aims to evaluate the impact of this problem by control mothers in biggest minority groups in Laos and may have disadvantages on seeking antenatal care. Among Lao, all level of education did affect on one time ANC visit. It is increasing from 20% to 42% for primary level to Tertiary. However, this is not influencing them regularly to have an appointment to see a doctor. For Hmong, 16% and 18% for lower secondary level is increasing a chance of mothers receive care and choose to give birth at a hospital. This not means that promoting higher level of education is not necessary. But what we want to suggest is that basic education are more needed in this case of study. Compare to high level of education that cost a lot more than basic. Moreover, the rate of return is still low in remote areas, even if they finish higher education (Onphanhdala and Suruga, 2007; Onphanhdala, 2011). For our result, the rate of ANC receiving is increasing to 124% for only primary school level among Khmu women. It is definitely statistically significant at 1% level. Although, the highest rate of delivery with skill birth attendants for Khmu is 41% for upper secondary level and statistically significant at 5% level.
Table 7: Logistic regression analysis: Simple model distribute effects of maternal ethnicity

<table>
<thead>
<tr>
<th></th>
<th>Lao</th>
<th>Hmong</th>
<th>Kmu</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ANC</td>
<td>N.ANC</td>
<td>BP</td>
</tr>
<tr>
<td>None (reference)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>0.196***</td>
<td>0.127</td>
<td>0.032</td>
</tr>
<tr>
<td></td>
<td>(3.735)</td>
<td>(0.403)</td>
<td>(0.580)</td>
</tr>
<tr>
<td>Lower secondary</td>
<td>0.260***</td>
<td>0.644</td>
<td>0.193**</td>
</tr>
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<td>(4.380)</td>
<td>(1.840)</td>
<td>(3.036)</td>
</tr>
<tr>
<td>Upper secondary</td>
<td>0.368***</td>
<td>0.628</td>
<td>0.329***</td>
</tr>
<tr>
<td></td>
<td>(5.672)</td>
<td>(1.639)</td>
<td>(4.039)</td>
</tr>
<tr>
<td>Non tertiary</td>
<td>0.402***</td>
<td>0.845</td>
<td>0.291**</td>
</tr>
<tr>
<td></td>
<td>(5.620)</td>
<td>(1.765)</td>
<td>(2.709)</td>
</tr>
<tr>
<td>Tertiary</td>
<td>0.415***</td>
<td>2.314***</td>
<td>0.404**</td>
</tr>
<tr>
<td></td>
<td>(5.355)</td>
<td>(4.780)</td>
<td>(3.155)</td>
</tr>
<tr>
<td>Poorest (reference)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Second</td>
<td>0.11</td>
<td>0.155</td>
<td>0.084</td>
</tr>
<tr>
<td></td>
<td>(1.893)</td>
<td>(0.469)</td>
<td>(1.579)</td>
</tr>
<tr>
<td>Middle</td>
<td>0.224***</td>
<td>0.581</td>
<td>0.222***</td>
</tr>
<tr>
<td></td>
<td>(4.036)</td>
<td>(1.802)</td>
<td>(4.230)</td>
</tr>
<tr>
<td>Fourth</td>
<td>0.221***</td>
<td>0.682*</td>
<td>0.280***</td>
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<tr>
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<td>(3.813)</td>
<td>(2.067)</td>
<td>(5.110)</td>
</tr>
<tr>
<td>Richest</td>
<td>0.277***</td>
<td>1.172**</td>
<td>0.519***</td>
</tr>
<tr>
<td></td>
<td>(4.189)</td>
<td>(3.225)</td>
<td>(8.024)</td>
</tr>
<tr>
<td>Maternal age</td>
<td>0.000</td>
<td>0.024</td>
<td>-0.004</td>
</tr>
<tr>
<td></td>
<td>(0.055)</td>
<td>(1.876)</td>
<td>(-1.382)</td>
</tr>
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<td>754</td>
<td>1067</td>
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<td>Pseudo R-squared</td>
<td>0.1</td>
<td>0.020</td>
<td>0.131</td>
</tr>
</tbody>
</table>

* p<0.05, ** p<0.01, *** p<0.001

Source: LSIS (2011-12)
When education is important, earning more money can help mothers to seek for care during their pregnancy as well. The rates of a chance to delivery at a hospital are 9% and 10% among Hmong and Khmu for poverty reduction with 10% statistically significant level.

Concluding Remark

This study analyzed the obstacles that block mothers on accessing to antenatal care visits in Lao PDR. This study confirms that mothers who came from wealth family would probably seek for health care more than the poor in all categories. In rural areas with road access, mothers who finished only primary school will be determined to seek for care compare to uneducated women. But in rural areas without road access, it calls for more effort to promote education among women, which at least finish upper secondary level. It will be differently for Hmong and Khmu would gain an opportunity to deliver at a hospital should have finished at least lower secondary school. However, overall, maternal residences are more influential on mothers’ health behavior decision compared to other factors. Urgent policy concern is to manage drug kits in the villages, drug revolving funds, and cost recovery in health facilities so that they are correctly and effectively managed and accepted by the community. Promoting Village Health Volunteers, or TBA, or some other type of health workers, e.g. a religious or traditional healers or herbalists receive some formal training and contributing to the primary health care program in that areas would make health services more accessible to all people.

To sum up, result suggests that the determinants of access to antenatal care are differed when we consider factors of residence, education, wealth and ethnicity for a classification. Therefore, suggesting that much greater efforts with careful tailored measurements on the part of the Lao government and relevant agencies are required in national policy if antenatal care is to reach women in different areas nationwide.

References


Factors Related to Complication Prevention Behaviors in Coronary Heart Disease Patients

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Sunthara Liangchawengwong, Ph.D****

Abstract

Coronary heart disease is a major cause of death among the Thai population. This study is a correlational descriptive research that aimed to identify the factors that are correlated with the complication prevention behaviors of patients with coronary artery disease. The study was conducted at a hospital in Ayutthaya province in Thailand from February to April 2015. A total of 92 individuals with coronary artery disease that met the inclusion criteria were studied, and the study was designed based on the Health Belief Model. The instruments used were a demographic questionnaire, a knowledge test, a stress assessment form, health belief questionnaires and the perceived warning signs interview form. Data were analyzed using descriptive statistics, Chi square statistical analysis, and the Pearson correlation coefficient.

The findings showed that most of the patients (71.7%) were male with a mean age of 69.78 years (SD = 12). The complication prevention behavior score was at a moderate level and most of them had a high level of knowledge and a low level of stress. Level of education and occupation were associated with the complication prevention behaviors. The stress factor had a negative correlation with the complication prevention behaviors at a statistically-significant level of p < .01. While the perceive self-efficacy had a positive correlation with complications prevention behaviors at a statistically-significant level (p < .01), perceived warning signs had a statistically-significant, negative correlation with the behaviors regarding the prevention of complications (p < .01). The patients who had perceived warning sign may not perform the behaviors. Therefore, stress and self-efficacy were important factors related to complication prevention behaviors.

The findings of the present study could be used as baseline data for healthcare teams, and it is suggested that self-efficacy and stress are important factors that should be recognized so that coronary patients can perform behaviors that prevent any complications that might occur.
Keywords: Prevention complication behavior, Health belief model, Perception of warning signs, Patients with coronary artery disease

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Introduction

Coronary heart disease (CHD) is an important problem in the world as well as in Thailand as it is a major cause of death among global population and Thai population. Study showed that as high as 17.3 million people or 30 percent of the global population died of CHD in 2008. It is expected that, in 2030, mortality from this disease will increase to 23.6 million people (World Health Organization [WHO], 2011). The United States had an incidence of CHD of about 1.5 million people or one case every 25 seconds in 2010 (American Heart Association [AHA], 2009). Up to 500,000 patients died per year. One-third of patients with acute myocardial infarction with an ST elevation (STEMI) died within 24 hours, and 50 percent died before reaching the hospital (Fauci et al., 2008)

CHD impacts on the patient and his/her family both physically and psychologically. Following his/her illness, a person will experience a reduced bodily capacity. A disability will have developed and he will not be able to work as he once did. Occasionally, threatening indicators will arise from symptoms of chest pains and various complications. The patient is thus put at risk for an unending and severe aggravation of his condition. The effect on his family will be the loss of its functioning head, who will be unable to work and support the family. Stress and anxiety will result from the huge expenses of hospital care (Bunker SJ, Colquhoun, 2003; Nuawapanit, 2509; Tongin, 2000). There is, in addition, an enormous economic impact thrust upon the Nation (Moliroekphuhm et al., 2007). Each year, the hospitalized care of patients with cardiovascular disease costs the Government approximately 1,070,575,799 baht (Thawonjaroenasap, 2009).

CHD is divided by clinical signs into two groups. One is stable angina and unstable angina (UA), and the other is acute coronary syndrome (ACS) with chief complaint being severe acute chest pain or chest pain at rest. The ACS is subdivided into two types: ST elevation myocardial infarction (STEMI), of which ECG abnormalities are characterized by ST segment elevation based on a minimum of two
leads of a contiguous lead or a novel LBBB because of acute coronary blockage, and non ST elevation myocardial infarction (NSTEMI), being acute coronary syndrome with no ST segment elevation (WHO, 2011; Sitthisuk, 2014).

A study by the Heart Association of Thailand under the Royal Patronage (2012) found that the highest percentage (55 percent) of CHD patients had STEMI, followed by NSTEMI (33 percent) and UA (12 percent) (Srimahachota, 2012). The mortality rate of patients with STEMI in Thailand is up to 17 percent, unlike the situation in Europe and America with most patients having NSTEMI and UA (80 percent) while STEMI accounting for only 20 percent (Kolansky, 2009) with a mortality of 7-10 percent - lower than the rate in Thailand. Therefore, patients with CHD in Thailand experience more severity or are more likely to have complications. Most deaths among patients with CHD occurred outside the hospital, and up to 52 percent of the patients died before reaching the hospital; only 10-15 percent died in the hospital because of myocardial complications. The deaths in the hospital mainly occurred 30 days after symptoms (Fauci et al., 2008; Hengrasme, 2012). The cause of death of the patients, both outside and in the hospital was complications (AHA, 2009). In STEMI, one-third of the patients died within 24 hours after myocardial ischemia. Most patients with NSTEMI and UA had less severity and an incidence of death of 15 percent and encountered recurrent myocardial ischemia within 30 days after diagnosis. However, following discharge, as high as 30 percent of patients who had myocardial ischemia were likely to have relapse and had to be re-hospitalized within six months (Kolansky, 2009); so knowledge about complications will help find a way to prevent them (Hengrasme, 2012).

Common complications that cause recurrent disease and death in patients with CHD are chest pain, congestive heart failure, cardiac arrhythmias and sudden cardiac death (AHA, 2010; Sitthisuk, 2014). Risk factors of complications are, in addition to the disease pathology, mainly lifestyle or practice of patients (Center for Disease Control and Prevention [CDC], 2014), rendering the patients to be re-hospitalized. Lifestyle, behaviors or practice that have the effect of promoting the pathology of artery stenosis lead to myocardial ischemia and the occurrence of subsequent complications of the disease (Umpichit, 2009; WHO, 2012).

Behaviors that cause complications are categorized into six aspects, namely 1) eating, such as diet high in fat, food high in salt and sugar, 2) the lack of regular exercise, 3) the lack of follow-up treatment and medication compliance, 4) smoking, 5) alcohol consumption and 6) uncontrolled stress (Srikaew, 2000; Changlek et al., 2009; Hengrasme, 2012). As regards preventive behaviors, the theory of health belief model (Becker 1974, 1984) explains that beliefs or perception are the impetus for individual behaviors. The perception that makes individuals to protect their health plays a role in that if a person perceives susceptibility, severity affecting the
health/life/family, benefits of behaviors, barriers to prevention of complications and self-efficacy in prevention of complications, such perception will be an important factor that motivates patients with CHD to behave to prevent complications. (Glanz & Rimer, 2008).

Becker explained that, in addition to the perception factor, there are indirect stimuli to individual behaviors, or modifying factors, being differences as regards the sex, age and education level, and psychological factors, such as the personality, social status and knowledge about the disease. Additional incentives of behaviors of individuals include internal cues, namely the perception of own body conditions, such as disease symptoms, illness, not feeling well or the perception of warning signs, and external cues, namely the information through the media or to get advice from health care workers. Study on beliefs affecting the prevention of complications in patients with CHD is important because the illness from CHD is severe, with high mortality, thus greatly influencing beliefs, perception and, consequently, behaviors of patients. Inappropriate perception or beliefs may result in bad behaviors that affect the disease or its complications in many ways.

There are a number of patients with CHD in Thailand, with high mortality rate because of complications. Most of the previous researches looked into self-care of patients with coronary artery disease, comprising specific care and promotion of some behavioral changes. Although these yielded good results but still did not cover behaviors to prevent complications or their perception of warning signs about complication. The previous studies also did not clearly study the modifying factors, the perception factor or as to what factors induced behaviors to prevent complications in CHD patients. The researcher was, therefore, interested in studying factors related to complication prevention behaviors in these patients by using the concept of the health belief model theory (Becker et al., 1974). The obtained information will be used in planning and developing campaigns to prevent complications of CHD, keeping the patients safe from dangerous complications, maintaining their health and reducing their mortality rates effectively.

**Purposes of the Study**

1. To study the relationship between modifying factors (knowledge, stress) and complication prevention behaviors among patients with CHD.

2. To study the relationship between the perceived health beliefs and complication prevention behaviors among patients with CHD.

3. To study the relationship between the perceived warning signs of CHD complications and complication prevention behaviors among patients with CHD.
Hypothesis

Modifying factor of knowledge and stress, cognitive factors and inducements to recognize and act upon the warning signs of complications are relevant to the prevention behaviors that can forestall complications in patients with cardiovascular disease.

Method

The present study was a descriptive research design aimed to study factors related to complication prevention behaviors in CHD patients.

Populations and Sample Groups

The sample group here consists of 92 patients with cardiovascular disease. The inclusion criteria were 1) aged 40 or more years, 2) both the male and female and 3) agree to participate in this study. The sample would be excluded if they were in the critically and end stage of their illness. Patients in this group were diagnosed by a physician for cardiovascular disease, chest pains deriving from angina pectoris and-or acute myocardial infarction (or the dysfunction of the heart muscles). They had come for treatment of their conditions at the outpatient section of a hospital situated in the Province of Phra Nakhon Si Ayutthaya.

Research Instruments

The instruments consisted of four questionnaires, of which details were as follows

1. Modifying Factor Questionnaire, comprising 3 sections.

   Section 1 Demographic questionnaire that included such information as gender, age, occupation and length of illness, 10 items

   Section 2 Questionnaire on the knowledge of the disease and prevention of complications in patients with coronary artery disease, 15 questions on a two-level rating scale: yes having the score = 1 and no having the score = 0. A precision test yielded Cronbach’s alpha coefficient of 0.78.

   Section 3 Stress assessment questionnaire, which was modified from Suanprung Stress Test-20 (SPST-20) (Mahatnirunkul et al., 2002), comprising 20
items on a five-level rating scale: 5 = very frequently, 4 = often, 3 = sometimes, 2 = once in a while, and 0 = never happened before. A precision test gave Cronbach’s alpha coefficient of 0.85.

2. Questionnaire on the perception factor of patients with CHD, consisting of five perception aspects, namely complication susceptibility, severity and threat of the disease, benefits of behaviors to prevent complications, barriers to the behaviors and self-efficacy in the practice of the prevention. Evaluation used 49 health belief items on a five-level rating scale. A precision test gave Cronbach’s alpha coefficient of 0.85.

3. Questionnaire on perceived warning signs of complications, which complications include chest pain, heart failure, cardiac arrhythmias and sudden cardiac death, in 10 questions on a five-level rating scale: highest, rather high, moderate, rather low and lowest. A high level refers to high warning signs while a low level refers to low warning signs.

4. Questionnaire on prevention behaviors against complications from cardiovascular disease consisted of six areas of prevention. These areas were, namely, consumption of an appropriate diet, commitment to an exercise regimen on a regular basis, adhering to prescribed care and medication, quitting the smoking habit, abstention from the imbibing of alcoholic drink and stress control. Altogether, there were 32 questions that subdivided according to the manner in which they applied as either positive or negative statements. Responses were on a scale of five levels, with the higher scores indicating excellent complications prevention behaviors from cardiovascular disease and the lower scores indicating poor prevention behaviors. Objective testing revealed a Cronbach’s alpha coefficient of 0.81.

Methods to Data Collection

The data collection period was three months from February 2015 - April 2015. The process was as follows.

1. The researcher met the head of nursing department and the head of outpatient clinic to explain objectives and process of the research, to request for cooperation in the research conduct and to inform of the characteristics of samples so the nurse at the treatment unit selected for the researcher the data of the samples only and did not disclose the information of other patients. The researcher selected qualified samples and asked one of the staff to introduce the researcher. Then the researcher introduced herself, clarified the objectives and asked for collaboration in the research participation based on the principle of protection of rights of research participants.
2. When the samples had consented and signed the informed consent form, the researcher described how to respond to each questionnaire in detail and asked for truthful response. After that, the researcher interviewed all samples herself by spending 30 - 45 minutes per sample. Data integrity was checked and then analyzed statistically.

Advocacy

The research project was approved by the human research ethics committee panel 2, Thammasat University, as per the approval letter number 137 / 2557. Prior to the data collection, the researcher protected rights of all subjects based on the principle of research participation by letting them know that they had the right to accept or reject the participation and to withdraw at any time without any effects on their medical care. The informed consent form was signed, and confidentiality of the sample group was kept. The information was used for the benefit of the study only.

Data Analysis

1. The modifying factors, comprising the gender, age, occupation, education level, duration of illness and knowledge about the disease, were analyzed using descriptive statistics, namely frequency, percentage, mean, range and standard deviation (SD).

2. Data on the prevention of complications in patients with CHD were analyzed using descriptive statistics, namely percentage, mean and SD.

3. The relationship between the modifying factors and the complication-preventive behaviors was analyzed using Chi-square and Pearson's product moment correlation coefficient.

4. The relationship among the perception factors of patients with CHD, consisting of 1) perceived susceptibility to complications, 2) perceived severity and threat of complications, 3) perceived benefits of the practice of prevention of complications, 4) perceived barriers to the practice and 5) perceived self-efficacy in the practice, was analyzed using Pearson's correlation coefficient.

5. The relationship between the perception of complication warning signs and the preventive behaviors of patients with CHD was analyzed using Pearson’s correlation coefficient.
Results

There were a total of 92 CHD patient subjects; 66 and 26 of which were men and women (71.7 and 28.3 percent, respectively), with an average age of 69.78 years. Most were older than 61 years (58.7 percent). Seventy subjects completed elementary education (76.1 percent), followed by 15 subjects secondary education (16.3 percent), 3 subjects Bachelor's degree (3.3 percent), 3 subjects no education (3.3 percent), 1 subject post-graduate education and 1 subject vocational certificate (1.1 percent each). Most were unemployed (70.7 percent). At the next lower level were business people and employees (9.8%), and agriculturalists (6.5%). The majority had experienced periods of illness ranging from one to five years (67.4%). At the lowest level were those who had been ill for a period of six to ten years (27.2%) and those who were ill for a period of 16-20 years (2.2%). From the average score on subject knowledge pertaining to disease and prevention of complications, it was discovered that, at the higher level ($\bar{X}=13.71$, $SD=1.06$), the average stress score of the majority of the sample group was at a low level ($\bar{X}=23.93$, $SD=8.90$).

The complication prevention behavior score was at a moderate level. When taking into account individual aspects, it was discovered that the behavior of quitting smoking and abstention from the imbibing of alcoholic drink had the highest value ($X=3.69$, $SD=0.53$), scoring on a very high level. The next highest score occurred in the adherence to prescribed medication and care ($X=2.72$, $SD=0.42$), a high-level score in its own right. On the behavior of eating a good diet ($X=2.12$, $SD=0.73$), the score was in the moderate level. Likewise, the behavior of exercise and stress control was also in the moderate level. The relationship between modifying factors and prevention behaviors against complications revealed that there is no correlation of cofactors pertaining to a person’s gender, age, livelihood and duration of illness with prevention behaviors against complications. With regard to educational level, it was found that; overall, a significant statistical correlation does exist with complications prevention behaviors – at a level of 0.05.

As for the relationship between the perception factors of the CHD patients and complication-preventive behaviors, it was found that the perceived self-efficacy possessed a positive correlation with the behaviors with a coefficient of 0.399 and $p = 0.05$.

The relationship between the perceived warning symptoms of complication and prevention behaviors against complications reveals a negative correlation with the prevention behaviors. The correlation value of this relationship is – 0.394 and has a statistical significance level of 0.05. In conclusion, The patients who had perceived warning sign may not perform the behaviors. Therefore, stress and self-efficacy were important factors related to complication prevention behaviors.
Table 1: Relationship between modifying factors (age, period of illness, knowledge and stress) and complication prevention behaviors (N = 92)

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
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<tbody>
<tr>
<td>1. Age</td>
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<tr>
<td>2. Duration of illness (months)</td>
<td>0.209*</td>
<td>1</td>
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<td>3. Knowledge</td>
<td>-0.202</td>
<td>-0.143</td>
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<td>4. Stress</td>
<td>0.118</td>
<td>-0.060</td>
<td>-0.017</td>
<td>1</td>
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<tr>
<td>5. Prevention behaviors</td>
<td>0.111</td>
<td>-0.021</td>
<td>-0.190</td>
<td>-0.343(**)</td>
<td>1</td>
</tr>
</tbody>
</table>

**p<0.01; *p<0.05
Table 2: Relationship between perception factors and warning symptoms of the sample group, together with complications prevention behaviors

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<tr>
<th>Variable</th>
<th>1</th>
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<tbody>
<tr>
<td>1. Perception of susceptibility</td>
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<td>2. Perception of severity</td>
<td>0.351</td>
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<td>3. Perception of benefits</td>
<td>0.076</td>
<td>0.235</td>
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<td>4. Perception of barriers</td>
<td>0.409</td>
<td>0.008</td>
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<td>5. Self-efficacy</td>
<td>0.210</td>
<td>0.284</td>
<td>0.11</td>
<td>0.02</td>
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<td>6. Perception of warning signs</td>
<td>0.113</td>
<td>-</td>
<td>0.00</td>
<td>0.1</td>
<td>-0.088</td>
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<td>7. Complication Preventive</td>
<td>-0.190</td>
<td>0.118</td>
<td>0.09</td>
<td>0.02</td>
<td>0.410</td>
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**p<0.01; *p<0.05

Discussion

The sample group was largely characterized by people of the male sex, a feature that may derive from the fact that males incur incidences of acute myocardial infarction at five to six times the rate of their female counterparts in the same age groups. Men may develop acute myocardial infarction below the age of 40 (Sitthisuk, 2012). The average age of the sample group was 69.78 years (SD=12.00). For the most part, ages ranged from 61 to 80 years (58.7 percent). The study revealed that incidences of cardiovascular disease and the development of complications increased at a rate that depended on age (Framingham heart study, 1999), with the further revelation that 50 percent of those who were over the age of 65 had come down with heart and blood diseases. Those who had finished elementary school numbered 70
people (76.1 percent). These were followed by those who had finished high school, numbering 15 persons (16.3 percent). Three participants held a bachelor’s degree (3.3 percent), while one person held an advanced degree (1.1 percent). A majority (69.6 percent) did not work at an occupation. Duration of illness for most ranged from one to five years (67.4 percent), followed by periods from six to ten years (27.2 percent).

Knowledge and stress data from the sample group indicated an average score of 13.71 on knowledge of disease and prevention of complications (SD=1.06). Meanwhile, the score on knowledge was at a high level, with a calculated value of 98.9 percent among 91 persons. As regards the stress score of the sample group, they were found to have an average stress value of 23.93 (SD=8.90), while the stress score was at a low level for 58 cases, with a calculated value of 63.0 percent. Second to these were those with a stress score at a mid-level, with a calculated value of 35 percent among 33 cases.

From the study on the relationship between cognitive factors and prevention behaviors against complications in patients with cardiovascular disease, results showed that these factors entail risk cognition, recognition of severity and threat awareness. Benefit recognition and recognition of obstacles in prevention behaviors against complications had no bearing on the prevention behaviors themselves, possibly because members of the sample group had already been informed of these things by their doctors and nurses as a matter of course.

The self-efficacy perception factor had positive relationship with complication-preventive behaviors with the correlation coefficient of 0.399 and p = 0.05 This finding supports the concept of Pajares and Miller (1994) in that the extent of the perceived self-efficacy was a mental variable that influenced the effort to make one’s own intended success. Such perception is a judgment about one’s ability to express specific behavior in each situation. Furthermore, Bandura (1997) also said that the perceived self-efficacy was the confidence that one had the ability to express the desired behavior and to accomplish or obtain the desired result. If people had the expectation that a behavior yielded the desired result and had the confidence that they were capable, they would do that behavior successfully. On the other hand, if one learned that such action would have a beneficial result to oneself but doubted his/her ability to fulfill the action, they would be inclined not to express that behavior.

As regards the relationship between the perception of warning signs and complication-preventive behaviors, cues to action are known to stimulate or expedite proper actions. Internal cues refer to perceived state of bodies, such as the perception of physical conditions, discomforts and fatigue. The external cues from the present study on the perception of warning signs that could be referred to as the cues for complication-preventive behaviors were found to have negative relationship with the behaviors with a correlation coefficient of -0.343 and p = 0.1. A possible cause may
be that patients with cardiovascular disease do not, for the most part, recognize warning symptoms before the actual symptoms develop. The result is the emergence of a variety of symptoms generated by the diseased condition of cardiovascular disease patients. It has been found that there is no showing of any symptoms whatever in what is called “silent myocardial ischemia (or, silent myocardial infarction),” which is often detected in patients afflicted with congenital or chronic diseases. Moreover, it was also found that patients with cardiovascular disease experience intense chest pains (typical angina pectoris) that are characterized completely by the texts and reference books; only about 30 percent are affected by this symptom (Sitthisuk, 2014). For the reasons stated above, patients in the sample group may not be able to discern either warning symptoms or the actual symptoms themselves.

There were no statistically significant relationship between perceived susceptibility, perceived severity, and perceived benefit of the patients with coronary heart diseases. This may be because all the sample had been educated regarding diseases and self care behaviors however, the information the samples receive might be not enough for them to perform their behaviors. The findings of this study supported the hypothesis that stress, perceived self-efficacy and perceived warning sign were related to complication prevention behaviors in coronary heart disease patients.

**Suggestions for Application**

1. In caring for patients with CHD, nurses should be aware of and understand factors correlated with the complication prevention so that they can be used as a guideline in promoting the self-care of the patients.

2. The acquired information may be used by nurses as a basis in further establishing an optimum guideline on the promotion of complication-preventive behaviors in CHD.

**Suggestions for the Next Research**

1. Study of effects of programs to promote the self-efficacy, to control the stress and to encourage behavioral prophylaxis of CHD complications

2. Study of effects of the promotion of the self-efficacy and behaviors in preventing complications of CHD
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Introduction

The wave of urbanization is inevitable worldwide with pronounced changes easily seen in middle-income countries. These changes involve the nature of previously known rural areas transforming themselves to urban areas through new economic zones and new residential communities. Regions in Thailand and Laos are facing the consequences of urbanization, especially in dimensions of population’s health status and healthcare delivery still, the nature of underlying problematic changes within each nation differs in some way. Although Thailand, an upper-middle-income country being announced by the World Bank for the first time in 2011, may have a better healthcare delivery system and overall population’s health status comparing to Laos, a lower-middle-income country by the World Bank, both countries are facing challenges in improving population’s health status and healthcare delivery system on their own basis. A common blueprint that both countries can adapt as a shared common ground to elevate the health status in urbanized area seems next to impossible, until health decentralization in both countries is proposed. Health decentralization can increase accessibility to essential healthcare, people participation in health promotion activities as well as health policy formulation and implementation process.

Objective

The objectives of this study are meant to

1. Propose a blueprint for health status improvement through health decentralization in urbanized area of Laos and Thailand
2. Evaluate the self-perceived health status of people in urbanized area of Laos and Thailand.

Method
The study was carried out during 2014 under the support of the National Research University Project of Thailand. In the first phase, the data in this study was obtained by using multiple focus group technique. In each country, two focus groups were intentionally selected, one group comprised of health personnel which represent the caregivers and the other group comprised of open public and mid-level managers of the Ministry of Education which represents the public or healthcare consumer. Four focus groups were performed and evaluated in total, concerning both countries. The focus groups on Thailand’s site were launch during April-May 2014, whereas the Lao’s sites were launched during November 2014. Each focus group has approximately 20 members sharing the conversation. All focus groups were assigned to discuss independently to 6 given constructed questions. Each focus group was time limited to 45 to 60 minutes with the use of audio-recording. The researcher acted as a facilitator, which are prohibited from influencing the conversations during the focus groups. The data were evaluated and analyze using content analysis method and put into meaningful categories.

**Table 1 : Constructed Question**

<table>
<thead>
<tr>
<th>Constructed question * (used in all focus groups)</th>
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<tbody>
<tr>
<td>1. Identify the main concerns of health status after urbanization?</td>
</tr>
<tr>
<td>2. What is your perception of health service in your country?</td>
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<td>3. How can population’s health status be improved by the community sector?</td>
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<td>4. How can healthcare system improved?</td>
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<td>5. What is your idea on health decentralization?</td>
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<tr>
<td>6. What is your idea about the things in common and differences about health service in Thailand and Laos?</td>
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In the second phase, the author proposed a common blueprint for urbanized area’s health status improvement after using content analysis method for the focus groups, as well as SWOT analysis of the current health service situation. The hallmark of this study was to use the shared common ground of healthcare delivery philosophy, knowledge on urbanization impact on health status, underlying health services delivery and health decentralization to create a shared blueprint in the two countries, despite of the difference in competency and health infrastructure.
Results

In phase 1, focus groups were conducted on both sites, i.e. Thailand’s site and Lao’s site. Each site has focus group which represent the caregiver position (CT for Thailand’s site, CL for Lao’s site) and the healthcare consumer / public position. (PT for Thailand’s site PL for Lao’s site) The constructed questions used were able to deliver the study’s results categorized into the following 2 domains

1. Perceived health status and health service delivery upon urbanization
2. Decentralization of health service

Domain1 : Perceived health status and Health service delivery upon urbanization

Pathumthani Province stood for urbanized area on Thailand’s site in the study due to the likeliness to Vientiane, the capital city of Laos, in terms of growing economy and the density (as well as the way of living) of the population. The issues for the Thailand’s site were mostly the consequences of a growing aging society, in which healthcare sectors were limited in giving a tailored-made health service to this population. The accessibility to healthcare in all age group after acquiring illness was convenient due to the introduction of the National Universal Coverage Program during the previous decade. The drawbacks of the program laid upon people questioning the quality of care provided, especially care for the elderly.

“...The old are receiving the same type of care as the normal population,
I mean the same treatment, the method and procedures that sometimes are inconvenient for old people."  (PT2)

“Most of our patients are the elderly, with multiple chronic disease.
Some aggressive investigations and long waiting time are not suitable for them”  (CT16)

“A lot of patients come for service daily, overcrowded hospitals and primary care units have negative impact on quality of service “  (CT3)

On the Lao’s site, contrary to many reports, health status was perceived as getting better concerning lower maternal mortality and better amount of children getting vaccination, despite of the availability of health care service. Limited health
personnel were major concerns from both the caregiver focus group and the public focus group. In terms of chronic disease burden, concerns were much lesser than infectious disease such as lower respiratory tract infection (eg. tuberculosis and infectious diarrhea). The proportion of the elderly age were not high enough to contribute a major concern for chronic disease. Poverty was also a major concern and restrict people to seek service.

“In WHO’s reports of high malnutrition in children and high maternal mortality rate, (for me) I think we are getting better and better.” (PL7, CL27, CL3)

“Urbanization makes affordability and accessibility to (health) service better” (CL2)

“If people earnings are better, their health will be better” (PL2)

On the Thailand’s site, whereas universal coverage has been established more than a decade covering from primary care to some degree of tertiary care, urbanization seemed to be a threat, in contrast to the Lao’s site, that urbanization was a helping hand for affordability and accessibility to health services.

“Becoming a city make life easier, especially when we are ill.” (PL1)

“Urban areas in Laos, even Vientiane, are not like Bangkok. They are more like suburbs. This may cause social problems, but not health problems.” (CL14)

Domain 2: Decentralization of health services.

Decentralization of health services was not new in both Thailand and Laos, but the meaning of decentralization may extend further.

The focus groups in both countries raised “decentralization” as

a) Transferring health services to local areas with central monitoring and evaluation.
b) Increase community participation

c) Coordination between conventional and traditional health services

d) Ministry of Health and Ministry of Education should together elevate health literacy

According to the focus groups, decentralization of health services in both countries were considered as a failure due to the vision upon decentralization as formulating health administration structure alone without empowering community or finding other stakeholders. In the Lao’s healthcare provider focus group, it was stated that foreign agencies as stakeholders help the country lifted it burden to be more on track of the Millennium Development Goals (MDG), in contrast to Thailand’s scenario of the effort to be self-efficient by blending community sector and traditional medicine to the health delivery system.

“I am not sure what is health decentralization, but it should be more than setting primary care units (PCUs) around the provincial hospital” (CT 7)

“Foreign stakeholders are more accountable than our traditional/herbal doctors, but our people who are poor have no choice” (PL7)

“We have health volunteers who help in health promotion. This increases our people’s health literacy” (PT16)

“In our country, primary education can help our health literacy, especially for the poor” (PL1)

According to Phase 1’s results, the author used descriptive analysis to deliver SWOT analysis of both countries’ health status and delivery of health service.

**Table 2**: SWOT analysis of health status

<table>
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<tr>
<th>SWOT</th>
<th>Thailand</th>
<th>Laos</th>
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| **S** | -universal coverage  
- well established health infrastructure  
- health decentralization recognized, with pronounced community | - Ministries involved  
- foreign agencies aid (eg. World Bank)  
- becoming lower-middle income country |
In the second phase, establishment of a common blueprint would benefit in outlining strategies and initiatives for health status improvement, in which several concepts of health decentralization acted as key players. The blueprint was consisted of connections of 3 pillars and 1 tool as the followings:

a) 1\textsuperscript{st} pillar : Center for Healthy Community Development

The center is formed with the components of multidisciplinary stakeholders, divided into 3 levels, the smallest level at the neighborhood level, followed by the provincial/state level at the midpoint and the national level as the highest level. These centers evaluate their community’s demographic data, perceptions in various fields including health, values and norms in their own level and shared the information with other levels. The information will also be useful in reforming health education (2\textsuperscript{nd} pillar) and providing health sectors with essential information, in order to come up with the right policies and campaigns. The 1\textsuperscript{st} pillar may act as the community “know-how”.

b) 2\textsuperscript{nd} pillar : Health education reform

Academics such as schools, vocational schools and universities must aid their students in achieving standard health education to acquired the desired level of health literacy. Health education needed to be reformed can be divided into 3 levels. University will be the mentor of secondary schools. In the same manner, secondary schools will mentor and support primary schools. This would emphasize extra-curriculum activities on health as well as the intra-curriculum contents. The health sector (3\textsuperscript{rd} pillar) and the Center for healthy community (1\textsuperscript{st} pillar) will aid in sharing their information, which will guide the way on how health education should be to serve the desired outcomes in health education.
c) 3rd pillar: Decentralization of health sectors

Health sectors have a clearer image in decentralization since most healthcare systems are organized into 3 levels of care, i.e. primary care, secondary care and tertiary care. Redistributing the proportion of resources and budgets among these 3 sectors would be the key concern to make accessibility and quality of care be able to reach out to the population with equity. Understanding the community at all levels would bring out promising outcomes if information is shared with the community know-how (1st pillar) and feedback of the population’s health literacy seeking health services would help the academics to reform their health education curriculum, which in return increase the ability to maintain and promote health of the population.

These 3 pillars are interconnected by using Information technology tools (the “1 tool” referred in the blueprint) and wider range of mass communication, in which Thais and Laotians in urban areas are getting more and more skillful in accessing these devices and technology.

Figure 1: Blueprint for Health Status Improvement by Health Decentralization

In the blueprint, various forms of decentralization is stated, initially from decentralization within each pillar which has 3 levels within it, followed by the collaboration of the 3 pillars which include in decentralize their authorities and functions to other pillars. In the blueprint, the Center for healthy community, academics and health sectors are important stakeholders.
Discussion

The study is not intended to compare the health status of Thailand’s urban area with Lao PDR’s urban area, but is intended to look into the likeliness of unmet demand on healthcare services in both countries and proposed a blueprint to enhance population’s health status by using common grounds, as in this study mentioned for health decentralization. An aging society is entering the Thai population, resulting in higher demand of elderly healthcare, despite of a moderate to well organized healthcare system with universal coverage program.

Chronic diseases become a burden with tug-of-war on budgeting between fulfilling primary care needs to tertiary care needs. In the findings from this study, the quality of medical treatment provided by the universal coverage program (UC) reaches the acceptable standard. The points remained to be questioned is the non-medical care that is needed along with medical treatment such as health literacy, resources allocation, etc. Decentralization of health services by transferring health services to local government or local healthcare providers may not be a problem in a country with universal health coverage for two decades.

Community empowerment can be partly said as target accomplished from the work of health volunteers. The pronounced weakness is inadequate health literacy concerning the establishment of positive health behaviors and eliminating negative health behaviors in both sick and well population. Health education should not be the responsibility confined to organizations within the Ministry of Public Health alone, as shown in Lao PDR, in which certain health policies and campaigns operates various sectors.

In Laos, perceptions of health status from the focus groups show satisfaction, in contrast to various reports, including reports from World Bank Group (WBG) and WHO. Laos is expecting a universal health coverage program by 2020, by that time foreign agency’s aid in financial support and investment in public infrastructure, particularly in health and education may take Lao PDR to a great leap forward. Prolonged duration before Laos enter an aging society will even make the situation better. Health decentralization in Laos need to transfer health service to local areas, especially mountainous area where people are in poverty, along with strengthening traditional medicine to acceptable standard which are widely used in 70% of the population in order to collaborate with the health system. Laos may have Thailand as an example model for this. Urbanization in both countries also means higher income, accessibility to public service and not only as health threat.

The author would like to proposes a blueprint for enhancing health status in urban areas by health decentralization as the followings.

1. Health decentralization should includes
   a) Transferring authority and responsibility of health service to local areas with central supervision
b) Move community participation to community empowerment

c) Market for healthcare and non-healthcare stakeholders from public as well as private sectors to participate in health system (e.g. collaborated policies between Ministry)

2. Information technology and other forms of technology should be emphasized in the process of health decentralization.

3. Effectiveness of health decentralization should be measured by

   a) Accessibility and affordability of healthcare consumers
   b) Availability of services
   c) Health literacy
   d) Health status of population

As mentioned earlier, health decentralization is not new. Refocusing and reorientation on decentralization will decrease financial burden than just putting monetary and human capital into the healthcare or social system. At the macroscopic view, Thailand and Lao PDR, especially Thailand, do not need more budgets in operating the system, but rather a reform on healthcare management and so-called “think out of the box”, which the author views as more essential. According to TDRI (Thailand Development Research Institute) and Gill (2007), Thailand fall into the middle-income trap, in which lack of investment on research and development is also responsible. The nature of innovation fall into non-technological and market innovations, which push Thailand into the upper-middle income country. The lack of process and product innovation inhibit Thailand to become a high income country. This is the reason why the author raise the point in using information technology and other forms of technology to navigates health decentralization to improve the health status of the population in urban areas, whereas using such technology is common.

Conclusions

Thailand and Laos may have different population health status conditions with different backgrounds of health system, still a common blueprint using health decentralization can be shared.

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Factors Determining the Nurses’ Knowledge, Attitudes and Practice towards Infection Control in Japan

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Abstract

Training for Nurses is needed to cope with the ever-worsening problem of healthcare-associated infections (HAI) by providing a better picture of conditions on-site and by providing nurses unfettered opportunities to practice the prevention of HAI. The objective of our study was to assess the knowledge, attitudes and infection control practice among Japanese nurses and clarify the issues of infection control training. The questionnaire was answered by registered nurses. We developed a structured questionnaire based on the CDC guidelines and it included demographic variables and questions about knowledge (n=17), attitudes (n=18), and practices (n=18) associated with hand-washing, personal protective equipment (PPEs), disposal method for sharps, isolation precautions and intravascular catheter management. More than half nurses (59.2%) had an infection control education at nursing school and most (91.8%) have been received some formal infection control training every two to ninety six months (mean 10.3±9.35 month). The mean knowledge score was 15.2 out of 17. Nurses who had undergone appropriate training had significantly higher scores for knowledge, attitude and practices (p<.05). Furthermore, nurses who had a full-time infection control nurse in their hospitals also had higher scores for attitudes and practices (p<.05). We believe that full-time infection control nurses have much to contribute to improve nurse’s attitudes and practices. Our study illustrates the need to create more effective training and to improve infection control practices in Japan.

Keywords: Nurses’ knowledge, Attitudes, Practice, Infection control.
Introduction

Infection control refers to efforts to protect patients, their families, and medical personnel from HAI. The ultimate goal of infection control is to prevent HAIs. Infection control is predicated on Standard Preventive Measures as set forth by the US Centers for Disease Control (CDC) and the UK’s Evidence-based Practice in Infection Control (EPIC). Each member of the medical staff must have knowledge of & attitudes befitting infection control and put them into practice. Nurses in particular play a central role in infection control, so training programs are needed so that nurses have the correct skills and knowledge to prevent HAIs. The objective of our study was to assess the knowledge, attitudes and infection control practice among Japanese nurses and clarify the issues of infection control training.

Design

The study protocol and questionnaire form will be sent to 132 participating hospitals which affiliated with faculties of medicine or research institutes registered with the University Hospital Medical Information Network in Japan addressed to hospital directors or head nurses (nursing supervisors). 42 university hospitals agreed to this research.

Data collection

Practices were also assessed on a 5-point Likert scale. “Always” 5 points, “often” 4 points, “sometimes” 3 points, “rarely” 2 point, and “never” 0 points. The total scores on the 18 practice questions ranged from 18 to 90.

Analysis

Demographic data and mean scores of knowledge, attitudes and practices were analyzed using the Kruskal–Wallis test corrected for ties and followed by two-tailed Mann–Whitney tie-corrected tests.

Results

More than half of the nurses (59.8%) had an infection control education at nursing school and most (91.1%) have been received some formal infection control training every 2 to 96 months (mean 10.5±9.62 month). Mean knowledge score was
14.9 out of 17 (minimum 7 and maximum 17). Regarding to the knowledge score, significant differences appeared in hospital beds, work experiences and with regard to the attitudes score, significant differences appeared in having a full-time infection control nurse. As for the practices score, significant differences appeared in work experiences and formal infection control training (after qualified).

Although standard precautions (89.2%), hand hygiene (87.0%), and transmission (70.3%) were highly covered by the formal infection control training, isolation precautions (33.2%), surveillance (31.3%), aseptic technique (24.6%) and device-related infections (23.8%) were poorly covered (Figure 1).

Areas of poor knowledge, such as contact precautions (39.2%) and peripheral intravenous cannula management (61.0%), correlated with poor attitude (78.7% and 63.5%) and poor practices (67.6% and 60.5%).

**Discussion**

Although nurses who had work experiences 6 to 10 years had significantly higher scores, there were no significant differences from the other demographics. Dobashi (2008) reported that nurses who had undergone appropriate training had higher scores for knowledge, however, our data suggested that basic infection control/prevention knowledge were widely prevailing among nurses in university hospitals because related subjects of the formal infection control/prevention training were provided frequently.

Full-time infection control nurses affected to improve nurse’s attitudes and practices. Despite having a good knowledge and attitude, goggles were not consistently worn. Furthermore, our study suggests that well-structured infection control education program affecting the attitude should be initiated.

**Conclusions**

We believe that full-time infection control nurses have much to contribute to improve nurse’s attitudes and practices. Our study illustrates the need to create more effective training that will affect nurses’ attitude to improve infection control practices.