Benefits of Undergraduate International Research Presentation in Thai Medical Students’ Perspectives

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**Abstract**

Research paper presentation is an important skill for enhancing learning achievement in the novel trend of medical student that experience in international session on different area of interests. This study aimed to explore the benefit of this learning skills in medical students’ perspectives. Thirty-two medical students who had been to international research presentations were sampled. This study used 15 items 5-Likert scale questionnaire involving 3 aspects: experiences, self-development and institutional development after content validation performed. Exploratory factor analysis revealed three domains that had Eigenvalue > 1.00 which were experiences/skills development, self-administration/knowledge management and future planning/faculty support (Eigenvalues = 3.680, 2.380 and 1.806). All three domains had factor loading > 0.300. Experiences/skills development and self-administration/knowledge management had towering impact on students' perspectives. Thus, the support from institute for students to perform a research paper presentation must be implemented in order to allow students’ progression.

**Keywords:** research; presentation; medical students; undergraduate

**Introduction**

Research is a foundation of medical advancement. Thus, implementing of research skill from the very start of medical career as medical students is important as this skill requires experiences and practices. World Federation of Medical Education considered research skills as one of quality standards of medical schools (MacCarrick, 2010).

Research has shown to be helpful for medical students in developing various skills incorporating into three domains of learning; cognitive, affective and psychomotor domains (Abu-Zaid and Alkattan, 2013; Madan and Teitge, 2013). The examples of skills stimulated by research activities were inquiring mind, core knowledge, critical appraisal and team work (Frishman, 2001; Burgoyne, O'Flynn and Boylan, 2010; Laidlaw et al., 2012). In one study, students who enroll in extracurricular research activities are more likely to have greater scientific output than students who does not (Reinders, Kropmans and Cohen-Schotanus, 2005). Other studies indicated that research activities have positive
impact on future career and can predict academic achievement (Brancati et al., 1992; Frishman, 2001).

Following the completion of research, there were various means to present the study result. Presentation in international stages is one of methods easily approached by medical students and should be implemented by institutes as well (Devi et al., 2010). The international academic conferences further shaping them into more professional physicians by enhancing confidence, allow them to explore knowledge in their field of interests, exchange knowledge with other health care providers and enhancing their skills such as English communication skill and management skill.

At Phramongkutklao College of Medicine in Bangkok, Thailand, research activities are included in the Department of community medicine. The institute highly encourage medical students to conduct research on their field of interests. There was high support for publications and international academic presentations. In addition to community medicine researches, students are encouraged to apply for elective researches in the field of their interests. Despite these supports from the institute, only some students are interested in research activities and even fewer interested in international academic presentations. Discouragements that prevent students participate in researches included lacks of English proficiency, doubtfulness of their abilities and misunderstanding of research processes.

As the study was conducted in Bangkok, Thailand, a country in Southeast Asia where English is second language. The lacks of English language communication skills; reading, writing and speaking, is one of the major factors that is capable of hindering students in Asian countries, especially Eastern Asia, where English is second language, especially in.

The purpose of this study is to identify the viewpoint of medical students who had experiences in international research presentations on how these presentations improve their own experiences, skills and institute's contribution.

**Methods**

1. **Study design**
An observational cross-sectional study was designed to assess perspectives of Phramongkutklao College of Medicine’s medical students who had experiences in international research paper presentations.

2. **Study population and setting**
The target population was medical students of Phramongkutklao College of Medicine, Bangkok, Thailand who had been to international research paper presentations. The list of students who had been to international presentations are retrieved from the college’s registry. This study included all medical students who had experiences in international research presentations into this study. There were no exclusion criteria in this study.

3. **Definition**
In this context, international research presentation or international academic presentation referred to the presentation, whether it is poster or oral, of students’ research in international academic conferences. The conferences can be either hosted in Thailand or abroad, but it must be internationally organized and English language must be used for presentation. The research fields involved are basic sciences, clinical sciences, health system sciences, epidemiology and medical education.

4. **Data collection**
This study used online standardized questionnaire which was distributed to subjects through e-mails. The
questionnaire included a 5-score rating questionnaire involving 15 items regarding students’ benefits from international research presentation. The questionnaire was piloted in testing group before being used in this study.

5. Data analysis and interpretation
Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was used for calculate appropriateness of the data for factor analysis. KMO test value > 0.500 is ruled as proper. Exploratory factor analysis was used to extract domains from medical students’ viewpoint. Domains that had Eigenvalues more than 1.000 were considered major domains. Factor loading was used for evaluation of how impact each item had on students' perspectives as well as for assessing impacts each major domain had upon their perspectives. Factor loading of 0.300 or higher would be considered to have high impact over medical students’ viewpoint. One-way ANOVA was used for comparing differences in students’ perspectives toward each domain.

6. Ethical consideration
Institutional Review Board Royal Thai Army Medical Department exempted the ethical approval of this study with the reference number R168q/60_Xmp. The consents to participate in this study was verbally obtained from all participants. The procedure of verbal consent was allowed for studies which were exempted from ethical approval which included studies about medical education and curriculum assessment.

Results/Analysis

1. Baseline characteristics
There were 32 students which were enrolled into this study. Male participants were 56.250%. Most students (40.625%) had experiences to international research presentation during their fifth year. There were 56.250% of participants who were first authors in their research. Most students (68.750%) had experience in poster presentation. Baseline characteristics were displayed in Table 1.

2. Appropriateness of data for factor analysis
KMO value of this study’s data was 0.547. The value was greater than 0.500, thus the data of this study was appropriate for factor analysis.

3. Domains of perspectives and their Eigenvalues
Three domains that affected students’ perspectives were revealed; experiences and skills development, self-administration and knowledge management and future planning and faculty support. Experiences and skills development had Eigenvalues of 3.680. Self-administration/knowledge management had Eigenvalue of 2.380. Future planning and faculty support had Eigenvalue of 1.806.

4. Mean score and comparison
Mean score of each domain was calculated. Mean of experiences and skills development was 4.242 ± 0.824. Mean score of self-administration and knowledge management was 4.352 ± 0.809. Mean score of future planning and faculty support was 3.833 ± 1.158. One-way ANOVA showed that there were significant differences in perspectives between each domain (p < 0.001). Dunnett T3 test demonstrated significant differences in perspectives between future planning and faculty support and self-administration/knowledge management (p = 0.045). The result was shown in Table 2.

5. Impact on students’ perspectives
All three domains were calculated for impact factors. Experiences and skills development had factor loading of 0.859; self-administration and knowledge management had factor loading of 0.834; and future planning and faculty
support had factor loading of 0.506.

Each item was separately analyzed for factor loading on students’ perspectives. In experiences and skills development domain, the item ‘In international research presentation, you received concepts for development of new knowledges and innovations in the field of your interest.’ had highest factor loading of 0.809. The item ‘You developed rational and systematic thinking from the process of preparation of research presentation.’ had highest factor loading (0.889) in self-administration and knowledge management domain. In future planning and faculty support domain, the highest factor loading of 0.796 belonged to the item ‘You applied experiences received from international research presentation in routine works and education.’ The entire factor loading of each item in the questionnaire is shown in Table 3.

**Table 1: Baseline characteristics of medical students who had experiences in international research presentation**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>18 (56.250)</td>
</tr>
<tr>
<td>Female</td>
<td>14 (43.750)</td>
</tr>
<tr>
<td><strong>Academic year which had experience to presentation</strong></td>
<td></td>
</tr>
<tr>
<td>Second year</td>
<td>3 (9.375)</td>
</tr>
<tr>
<td>Third year</td>
<td>6 (18.750)</td>
</tr>
<tr>
<td>Fourth year</td>
<td>6 (18.750)</td>
</tr>
<tr>
<td>Fifth year</td>
<td>13 (40.625)</td>
</tr>
<tr>
<td>Sixth year</td>
<td>4 (12.500)</td>
</tr>
<tr>
<td><strong>Authorship</strong></td>
<td></td>
</tr>
<tr>
<td>First author</td>
<td>18 (56.250)</td>
</tr>
<tr>
<td>Co-author</td>
<td>14 (43.750)</td>
</tr>
<tr>
<td><strong>Presentation type</strong></td>
<td></td>
</tr>
<tr>
<td>Poster presentation</td>
<td>22 (68.750)</td>
</tr>
<tr>
<td>Oral presentation</td>
<td>10 (31.250)</td>
</tr>
</tbody>
</table>
Table 2: Comparison between three domains’ effect on medical students’ viewpoint toward international research presentation

<table>
<thead>
<tr>
<th>Experience and skills development (A)</th>
<th>Self-administration and knowledge management (B)</th>
<th>Future planning and faculty support (C)</th>
<th>Levene Statistic</th>
<th>p</th>
<th>F</th>
<th>p</th>
<th>Mean difference comparisons</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.242 ± 0.824</td>
<td>4.352 ± 0.809</td>
<td>3.833 ± 1.158</td>
<td>22.176</td>
<td>&lt;0.001</td>
<td>7.839</td>
<td>&lt;0.001</td>
<td>A &gt; B 0.517</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>B &gt; C 0.045*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A &gt; C 0.105</td>
<td></td>
</tr>
</tbody>
</table>

*significant at p-value 0.05 at 95% confidential interval

Table 3: Domains, questionnaire items and impacts of international research presentation in students’ perspective

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvalue</th>
<th>Domain</th>
<th>Questionnaire item</th>
<th>Factor loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.680</td>
<td>Experiences and skills development</td>
<td>In international research presentation, you received concepts for development of new knowledges and innovations in the field of your interest.</td>
<td>0.809*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>In international research presentation, you develop new knowledges from discussion with experts.</td>
<td>0.724</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>During research conduction, you discovered new knowledge.</td>
<td>0.762</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>You developed confidence from international research presentation.</td>
<td>0.558</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>You developed English communication skills from research preparation and international research presentation.</td>
<td>0.341</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>You used new knowledge and experiences acquired for institute development.</td>
<td>0.086</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>You used new knowledge and experiences acquired for exchanging and discussing with colleagues.</td>
<td>0.059</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Institute received reputation from your presentations in international stages.</td>
<td>0.245</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>You had managed and planning your method for research presentation effectively.</td>
<td>0.181</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>You had inspired your colleagues to conduct research activity for international presentations.</td>
<td>0.102</td>
</tr>
<tr>
<td>2</td>
<td>2.380</td>
<td>Self-administration and knowledge management</td>
<td>You had managed your time and learning properly during research preparation and international research presentation.</td>
<td>0.990</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>You developed rational and systematic thinking from the process of preparation of research presentation.</td>
<td>0.889</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>You used new knowledge acquired from international research presentation for planning and writing full manuscripts and further researches.</td>
<td>0.770</td>
</tr>
<tr>
<td>3</td>
<td>1.806</td>
<td>Future planning and faculty support</td>
<td>Administrator boards of the institute adequately support you for international research presentation.</td>
<td>0.539</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>You applied experiences received from international research presentation in routine works, education and pursuing future career.</td>
<td>0.996*</td>
</tr>
</tbody>
</table>

* Items with highest factor loading in each domain

Discussion

Research activities is mandatory in the current Phramongkutklao College of Medicine’s curriculum; however, presentations and publications were compulsory, thus most students were less likely to further their researches after the completion of research course. This study addressed benefits of undergraduate medical researches along with perspectives of medical students who decide to pursue their research path.

In this study, medical students’ perspectives of their developments were assessed. Most students had experiences to international research presentation during their fifth year. During fifth year, all of the students had passed through all major subspecialties subjects which included internal medicine, surgery, obstetrics-gynecology, pediatrics and psychology during their fourth year as well as basic sciences during their pre-clinical years. The learning curve of medical students increases by their years and the steepest is during their clinical training (Thompson and Rogers, 2008). Thus, fifth year medical students are more likely to have adequate clinical knowledge for applying into their research. Also, during fourth year, students are required to conduct a group research during their rotation in community medicine. The community medicine subject includes proposal writing, research methodology, statistical analysis and manuscript writing in the curriculum. As a sequence, all students who has completed their fourth year will have at least one research ready for publication or presentation. Moreover, it is due to untightened learning schedule during the fifth year that allows students to attend international academic conferences. Previous studies indicated that in addition to allowing students to conduct research, they should be given opportunities for presentations and discussions as well (Devi et al., 2010). In this context, our institute greatly support research presentation by students, especially in international stage, by providing fund and permission for personal leave.

This study found that cognitive and experiences and skills development and self-administration and knowledge
management had high impact on medical students’ viewpoint toward international research presentation. Knowledges, experiences and skills are highly developed through creation of knowledges during researching process, forming cognitive skills (Anderson and Sosniak, 1994; Krathwohl, 2002; Krathwohl and Anderson, 2009; Murdoch-Eaton et al., 2010). Moreover, medical students have opportunities to form their knowledge from discussion with experts during their presentations and attending conference sessions (Houlden et al., 2004).

Noticeably, the impact of the item ‘You developed English communication skills from research preparation and international research presentation.’ dropped greatly compared to other items in the same domain. A previous study stated challenges in supervising English as second language Asian medical sciences students (Melles, 2007). It is suspected that due to English is second language in Thailand, as well as other East Asian countries, both supervising by advisors and conducting and presenting researches by students is difficult tasks. Due to these difficulties, most students are kept from joining research activities. Students who already possessed good to excellent ‘start-up’ English language backgrounds - which is a very small proportion compared to the entire students at Phramongkutklao College of Medicine - are more productive in conducting and presenting researches. Therefore, English language skills development was not highly developed in students who were already good to excellent in English language communication.

As international research presentation is an optional activity at Phramongkutklao College of Medicine, thus, students who has experience in international research presentation must take more efforts than their colleagues to complete the entire process of research conduction. As a result, students pursuing research activities are very prone to develop administrative skills such as time management and problem solving (Burgoyne, O'Flynn and Boylan, 2010).

In future planning and faculty support aspect, researches also facilitates students to acquire physician-scientist professions (Abu-Zaid and Alkattan, 2013) and access to research career path (Fang and Meyer, 2003), or at least, progression through their medical career (Burgoyne, O'Flynn and Boylan, 2010). Previous study showed that students' interests in scientific fields increased after conducting research (Russell, Hancock and McCullough, 2007). The mean score of this domain was lower than the other 2 domains. This finding highlighted the lack of support from faculty which is emphasized by the low impact factor of the item ‘Administrator boards of the institute adequately support you for international research presentation’ This suggested that elective research courses were a part of important steps of higher medical education and, thus, should incorporated various branches of medical sciences, either basic or clinical sciences, to allow students’ exploration into the field of their interests. Supports from faculty should be reinforced as well in order to enhance students to conduct undergraduate researches.

There were some limitations in this study. First, the analysis did not differentiate between each year. The perspectives of students could be varying between each year due to different experiences in research activities exposure as well as their abilities to infiltrate their medical science knowledge into their research. Second, the authorships could affect students' perspectives. Generally, the first authors were those who write the whole manuscript and usually involved in most stages of their studies, while the co-authors were usually contributors to some parts of their studies. There could be differences in perspectives and skills developed between first author and co-author. Third, some students even develop their researches into full manuscripts for publications. The data of medical students who had academic publications were not collected due to very limited number of them.

**Conclusion**

To conclude, international research paper presentation highlights the growth of medical students’ experiences and skills development and self-administration and knowledge management. Support from institute for research
Conduction and presentation and advices for students’ future planning in research field are important considerations. Importance of English language communication should be aware and implemented in English as second language countries.

Take Home Messages

- Research skills are important for medical students to gain medical professionalism.
- All students should have adequate access to research courses.
- Research must be integrated into the curriculum.
- Institute must provide opportunities for their medical students to present or publish their researches in international stage.
- Other skills, such as communication and English language, should be trained as well in order to reinforce medical students’ accomplishment in their whole process of research conduction.

Notes On Contributors

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Appendices

None.

Declarations

The author has declared that there are no conflicts of interest.

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Ethics Statement

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