

## การศึกษาความต้องการและความจำเป็นต่อการศึกษาต่อเนื่องด้านเวชศาสตร์ครอบครัวของแพทย์และพยาบาลปฐบดีงานในชุมชน

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## Learning Needs Assessment on Family Medicine for Community Doctors and Nurses

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**หลักการและวัตถุประสงค์:** จำนวนแพทย์เวชศาสตร์ครอบครัวในประเทศไทยยังมีจำนวนไม่เพียงพอ กับความต้องการของประเทศไทย รวมทั้งเพื่อรองรับงานยังขาดความเข้าใจในงานเวชศาสตร์ครอบครัว การศึกษาทางไกลจะส่งเสริมให้แพทย์เวชศาสตร์ครอบครัวและบุคลากรสาธารณสุขที่อยู่ห่างไกลได้เพิ่มพูนความรู้และทักษะในด้านเวชศาสตร์ครอบครัว เพื่อส่งเสริมและสนับสนุนการทำงานเป็นทีม การศึกษานี้มีวัตถุประสงค์เพื่อสำรวจความต้องการและความจำเป็นต่อการเพิ่มพูนความรู้ในด้านดังกล่าวรวมถึงรูปแบบการเรียนการสอนที่ต้องการ

**วิธีการศึกษา:** การศึกษาภาคตัดขวางในแพทย์และพยาบาลทั้งหมดที่ปฐบดีงานในโรงพยาบาลชุมชนและโรงพยาบาลส่งเสริมสุขภาพประจำตำบลของจังหวัดขอนแก่น และสกลนคร ในช่วงเดือนตุลาคม 2558 ถึงเดือนมีนาคม 2559 จำนวน 1,350 ราย และใช้แบบสอบถามชนิดตอบเอง วิเคราะห์ข้อมูลทางสถิติใช้ SPSS version 20.0 ใช้ค่าความถี่ ร้อยละ ค่าเฉลี่ย ส่วนเบี่ยงเบนมาตรฐาน Pearson correlation coefficient, one-way analysis of variance และ Pearson Chi-square

**ผลการศึกษา:** มีผู้ตอบแบบสอบถามกลับ 526 ราย คิดเป็นอัตราตอบกลับร้อยละ 38.9 เป็นเพศหญิงมากกว่าชาย (ร้อยละ 89.2) มีช่วงอายุระหว่าง 24 ถึง 63 ปี ( $M = 42.21$ ,  $SD = 8.62$ ) และระดับการปฐบดีงานตั้งแต่ 1 ถึง 40 ปี ( $M = 19.86$ ,  $SD = 9.07$ ) เนื้อหาที่ต้องการให้มีการสอนสามอันดับแรกได้แก่

**Background and objectives:** The current numbers of Thai family doctors are inadequate and their works have not been sufficiently supported by their colleagues. There is a need to develop distant programs to keep updating knowledge and skills for rural and remote family doctors and provide education on family medicine to other healthcare professionals who work in the team in order to support the works of the family doctors. This study aimed to examine learning needs of community doctors and nurses on family medicine and preferences on educational methods.

**Methods:** A cross-sectional study was conducted with 1,350 doctors and nurses working in district hospitals and primary care centres in Khon Kaen and Sakon Nakhon provinces during October 2015 to March 2016. A self-administered questionnaire was used. Statistical analyses were performed using frequency, percentage, mean, standard deviation, Pearson correlation coefficient, one-way analysis of variance, and Pearson Chi-square.

**Results:** A total of 526 participants returned the questionnaire, giving a response rate of 38.9%. The samples of participating doctors and nurses were predominantly female (89.2%). Their age ranged from 24 to 63 years ( $\bar{x} = 42.21$ ,  $SD = 8.62$ ) and years worked in the practice ranged from 1 to 40 years ( $\bar{x} = 19.86$ ,  $SD = 9.07$ ). The top three most needed topics of learning were English for healthcare professionals (74.0%), type 2 diabetes (52.3%)

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ภาษาอังกฤษสำหรับบุคลากรสาธารณสุข (ร้อยละ 74.0) เบ้าหวานชนิดที่ 2 (ร้อยละ 52.3) และความดันโลหิตสูง (ร้อยละ 50.0) เกือบกึ่งหนึ่งของผู้ตอบแบบสอบถาม (ร้อยละ 49.8) มีความรู้และทักษะในหลักการเวชศาสตร์ครอบครัวแต่ไม่มั่นใจในการนำไปปฏิบัติถึงแม้ว่าสื่อในห้าของผู้ตอบแบบสอบถามไม่มีประสบการณ์ในการเรียนออนไลน์แต่ผู้ตอบแบบสอบถามสัดส่วนเดียวกันนี้ต้องการการเรียนรู้ผ่านวิธีนี้

**สรุป:** การศึกษานี้นำเสนอภาพรวมข้อมูลเดิมสำหรับรูปแบบวิธีการและเนื้อหาต่อการศึกษาทางไกลของแพทย์และพยาบาลในชุมชน ซึ่งส่วนใหญ่ต้องการเพิ่มพูนความรู้ด้านเวชศาสตร์ครอบครัว ผลการศึกษาในครั้งนี้จะถูกนำไปใช้ในการพัฒนาเนื้อหาสำหรับการศึกษาทางไกลด้านเวชศาสตร์ครอบครัวผ่านโปรแกรมออนไลน์สำหรับบุคลากรสาธารณสุขในชุมชน

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## Introduction

Primary healthcare physicians are the first line doctors, serving people living in rural and remote areas of Thailand. Though these primary healthcare physicians are qualified (M.D), majority of them are not specialists in family medicine practices and are forced to practice without speciality training and knowledge that deforms the family physician system<sup>1</sup>. In Thailand, family medicine was introduced as a speciality in 1998<sup>2</sup> to emphasis on families by providing comprehensive primary care for patients belonging to all ages. The current number of family physicians is approximately 6,400 that is one family physician for every 10,000 people and certainly inadequate to meet the needs of the country, especially in rural and remote areas<sup>1</sup>. Thai family physicians, once complete training, usually work in the hospital settings. Therefore, it is not surprising that family medicine is still new to both Thai people and healthcare professionals in Thailand. Moreover, though, a primary care service centre is located in almost every district of Thailand, some only have doctors working in the centre whilst the majority of the centres are operated by the nurse practitioners.

The Royal College of Family Medicine in Thailand acts as a main organization in curriculum development and certifying the graduate physicians that is around 120 family physicians per year<sup>1</sup>. A current number of family

and hypertension (50.0%). In regard to the principles of family medicine, almost half of the participants (49.8%) had knowledge and skills, but were not confident in translating into the practice. Even though, four fifth of the respondents had no experience in a structured online learning before, the same proportions preferred this technique for their education.

**Conclusions:** The study provided a snap short of community doctor and nurse attitudes to distant learning program and their preferences on educational content and delivery styles. The information from this study will be used to guide the content included and level of information provided in the online program for primary healthcare professions.

**Keywords:** Learning needs assessments, family medicine, primary healthcare, community doctors, community nurses

doctors are inadequate to the needs of the country, especially in remote and rural areas. The efforts of several agencies have been in place to increase the number of family doctors such as the collaboration between the Ministry of Health, the Royal College of Family Physicians of Thailand and the National Health Security Office (NHSO). The collaboration has initiated a new approach to train medical practitioners aiming to equip them with experiences in family medicine through practical training in community hospitals or community-based primary care centres. If they fulfil the national learning experience requirements and pass the national examination, they will receive the Thai Board of Family Medicine certificates. Supporting mechanisms for learners in rural areas have been invested and coordinated between local district hospitals, regional hospitals and universities. A series of workshops and half-day studies throughout the year have been implemented to augment learning. The Ministry of Public Health has also set up a “Learning Center of Family Medicine and Primary Care Development District” in various regional hospitals. Many have declared the establishment of a community health centre in their provinces. The recent project of the NHSO has been launched aiming to increase the experiences in family medicine through practical training in community hospitals or community-based primary care centres (Family Practice Learning, FPL).

Despite all these projects, the numbers of family physicians are still not sufficient to meet the needs of the country. The training participants are also hampered by the workload. After training completion and return to work, the family doctors still have difficulties and lacks of supports from their colleagues who may not have the knowledge and skills to care for patients on the basis of family medicine principles. In addition, the healthcare service structure itself forces the family doctors to work in the hospital-based care where the discipline is opposite to the primary community-based approach<sup>3</sup>.

In order to increase knowledge and skills for the family doctors and other healthcare professionals and build partnerships to work as a team, which will lead to the goal of healthcare quality, efficiency and sustainability. In addition to making other healthcare professionals recognize the works of the family physicians, therefore, there is a need to develop continuing educational programs for quality improvement and continuing professional development in family medicine for community doctors and nurses.

Previous studies examined the physicians' learning preferences regarding their continuing medical education. Face-to-face educational activities were the most frequently used<sup>4-6</sup> and the most preferred learning method<sup>4,6,7</sup>. Even though online learning method was a less preferred learning mode for physicians<sup>6-8</sup>, there are evidences showed an increase use of the online learning activities<sup>9-12</sup>.

Difficulties in online learning have been reported, including internet connection and technical difficulties<sup>13-15</sup>, lack of computer knowledge and skills<sup>13,16</sup>, lacks of interpersonal interaction<sup>17</sup>, program complexity and lack of feedback and cost of software and hardware<sup>13</sup>. However, online learning provided several benefits for healthcare professionals, particularly those worked in rural and remote areas, including convenience, flexibility and reduced travel cost and time away from the workplace<sup>18,19</sup>.

The purpose of providing continuing education for healthcare professionals is not only to educate, but also must lead to change in the performance of health services<sup>20</sup>. There are several steps<sup>20-22</sup> in developing an educational program, including assessing of the needs,

developing learning objectives, choosing appropriate learning and teaching methods, and measuring changes prior to contribute to the development of the services. Cook and Dupras<sup>22</sup> recommended ten steps to develop an online learning program, in which the first step is to explore the learning needs of the target learners<sup>20-22</sup>. There is evidence suggesting that the effectiveness of a learning program depends on the needs of learners<sup>23-25</sup> and many studies assessed learning needs prior to course development<sup>26,27</sup>. Online distance learning in family medicine has been provided by many academic centres of many countries<sup>28-30</sup>. However, the generalizability of overseas findings concerning the utilisation, preferences and learning needs of online distance learning to the Thai context and family medicine in particular is unknown. There are difficulties in generalising overseas findings to the Thai health care system, educational context and system given differences in the structure and funding of our health and educational system compared to the environments in which many of the studies have been conducted. To our best knowledge, educational needs in rural and remote doctors and nurses in Thailand in regard to their preferences on learning topics and educational techniques have not been explored, as well as the use of online learning mode in the education of rural and remote family physicians.

Therefore, this present study aimed to examine the learning needs of community doctors and nurses on family medicine and their preferences on educational methods. Other steps in developing an online learning will be further established. The results of this present study can be utilized to plan an appropriate continuing education for rural and remote family physicians in Thailand and also promote continuing professional development for rural and remote physicians in other disciplines in utilizing online learning techniques.

## Materials and methods

An 11-item questionnaire was developed in 2015, based on literature review and content of the Khon Kean University family medicine training program, piloted with 12 GPs and discussed with experts in the field.

The questionnaire included two sets of attitudinal questions, one open-ended question regarding the survey, the remaining eight were the questions about preferences on educational topics and methods, knowledge and skills in principles of family medicine, previous use of the structured online learning, availability of equipment for distant learning and demographic details. A copy of the questionnaire may be obtained from the principle author's email.

The community doctors and nurses from two provinces, Khon Kaen and Sakon Nakhon, were recruited through the Khon Kaen and Sakon Nakhon Provincial Health Offices. These two provinces were selected based on their affiliation to the family medicine training centres with the Faculty of Medicine, Khon Kaen University. The final questionnaire was mailed to all identifiable doctors and nurses in Khon Kaen and Sakon Nakhon provinces (n=1,350) who were practicing in district hospitals or subdistrict primary care centres during October 2015 to March 2016.

To achieve higher response rate, the participants were notified that the first ten respondents, each would receive a 500 Baht gift voucher for returning their survey on or before a set deadline. By March 2016, the data collection was completed. The Statistical Package for the Social Sciences (SPSS) v20 (SPSS Inc.; <http://www.spss.com>) was used for analysing data.

#### Statistical analysis

Descriptive statistics were used for demographic data and frequency calculation for all questionnaire items. The confidence in managing type 2 diabetes and hypertension were calculated based on five questionnaire items. Each item was rated on a 4-point Likert scales ranged from 1 (*not at all confident*) to 4 (*very confident*), creating a score from 5 to 20. Textual responses to the open-ended question regarding the survey were read multiple times to reveal emergent themes, then classified and coded accordingly.

Associations between confidence, age and years worked in the practice were examined using Pearson product-moment correlation coefficient. Differences of confidences in diabetes and hypertension management with age and years worked in the practice were

compared using a one-way between group analysis of variance (ANOVA). Chi-square test for independence was used to explore the relationship between age groups and the preferences on educational methods.

This study was approved by the Khon Kaen University Human Research Ethics Committee: Project number HE 581122. The return of an anonymous survey implies consent.

## Results

As displayed in Table 1, a total of 526 participants returned the questionnaire, giving the response rate of 38.9%. The sample of participating doctors and nurses were predominately female. Their age ranged from 24 to 63 years ( $\bar{x} = 42.21$ ,  $SD = 8.62$ ) and years worked in the practice ranged from 1 to 40 years ( $\bar{x} = 19.86$ ,  $SD = 9.07$ ).

**Table 1** Characteristics of participating doctors and nurses

Characteristics of participants	Number (%)
<b>Gender (n=526)</b>	
Males	57 (10.8)
Females	469 (89.2)
<b>Age (n=517)</b>	
≤30	73 (14.1)
31-40	140 (27.1)
41-50	199 (38.5)
≥51	105 (20.3)
<b>Years in practice (n=522)</b>	
≤10	106 (20.3)
11-20	163 (31.2)
21-30	187 (35.8)
≥31	66 (12.7)
<b>Profession (n=526)</b>	
Doctor	34 (6.5)
Nurse	492 (93.5)
<b>Workplace (n=526)</b>	
Khon Kaen	469 (89.2)
Sakon Nakhon	57 (10.8)
<b>Previous use of a structured online learning (n=520)</b>	
Yes	96 (18.5)
No	406 (78.1)
Not sure	18 (3.5)
<b>Availability of equipment for online learning (n=519)</b>	
To great extent	249 (48.0)
To some extent	243 (46.8)
Not ready	27 (5.2)

*Note.* Number of participants varies for each item due to missing responses.

### Learning needs

Table 2 displays the number of participants who know about the principles of family medicine. Almost half of the participants reported knowing and having applied knowledge and skills into their practice but not confident in doing so. Table 3 shows the participants' needs on learning topics. English language for healthcare professionals, type 2 diabetes and hypertension were the top three most needed for their learning topics.

**Table 2** Number of participating doctors and nurses knew about the principles of family medicine

Knowing about principles of family medicine (n=508)	N (%)
Don't know	173 (34.1)
Know but never applied into the practice	58 (11.4)
Know, have applied but not confident	253 (49.8)
Know, have applied and confident	24 (4.7)

**Table 3** The participating doctors' and nurses' needs on the topic of learning

Topic (n=526)	N (%)
English language for health care professionals	389 (74.0)
Type 2 diabetes	275 (52.3)
Hypertension	263 (50.0)
Community geriatrics	260 (49.4)
The principles of family medicine	248 (47.1)
Introduction to research methods	227 (43.2)
Motivational interviewing	205 (39.0)
Learning and teaching in family medicine	157 (29.8)
Medical ethics	105 (20.0)
Others	45 (8.6)

Note. Participants could list more than one topic.

### Preferences on educational methods

Table 4 showed outlines of the participants' preferences on educational methods for family medicine program. Structured online programs were the most frequently preferred format for family medicine program, and face-to-face, seminars and workshops were the second most preferred.

**Table 4** The participating doctors' and nurses' preferences on the methods of learning

Educational methods (n=525)	N (%)
Structured online programs	413 (78.5)
Face to face, seminars, workshops	323 (61.5)
CD/DVD ROM	161 (30.7)
Google hangout	155 (29.5)
Role play and interactive program	87 (16.6)
Others	14 (2.7)

Note. Participants could list more than one preferred format.

### Preferences on educational methods on age and profession

A chi-square test for independence indicated the aged group of 43-50 years were significantly more likely to utilise google hangout and CD/DVD Rom than those aged under 43 and those over 50,  $\chi^2$  (Chi-square) (3, n= 516) = 18.32, p<0.001, Cramer's V= .19 (medium effect size) and  $\chi^2$  (Chi-square) (3, n= 516) = 8.91, p=.03, Cramer's V= .13 (medium effect size), respectively.

A chi-square test for independence indicated no differences in preferences on educational methods between nurses and doctors.

### Preferences on educational topics on professions

A chi-square test for independence indicated the participating nurses are significantly more likely to prefer the educational topics of type 2 diabetes, hypertension and community geriatrics than the doctors,  $\chi^2$  (Chi-square) (1, n= 516) = 14.50, p<0.001, Cramer's V= .17 (medium effect size);  $\chi^2$  (Chi-square) (1, n= 516) = 16.63, p<0.001, Cramer's V= .19 (medium effect size); and  $\chi^2$  (Chi-square) (1, n= 516) = 14.39, p<0.001, Cramer's V= .17 (medium effect size), respectively.

### Attitudes on GPs' confidence on type 2 diabetes management

The total mean score for the confidence on type 2 diabetes management was 11.61 (SD 2.57) with the maximum score of 20. The participants reported feeling somewhat confident for all aspects of type 2 diabetes management (Table 5).

**Table 5** Level of the doctor and nurse confidence in providing type 2 diabetes care

Items	Mean <sup>a</sup> (SD)
Screening, test and diagnosis	2.34 (0.66)
Assisting patients in lifestyle modification	2.38 (0.63)
Effective use of medications	2.34 (0.65)
Managing complications	2.31 (0.63)
Effective use of insulin	2.23 (0.69)

Note.<sup>a</sup>Mean was calculated from 4-point Likert scales ranging from 1 (*not at all confident*), 2 (*partially confident*), 3 (*fairly confident*) to 4 (*very confident*).

#### Attitudes on GPs' confidence on hypertension management

The total mean score for the confidence on hypertension management was 11.75 (SD 2.68) with a maximum score of 20. The participants reported feeling somewhat confident for all aspects of hypertension management (Table 6).

**Table 6** Level of the doctor and nurse confidence in providing hypertension care

Items	Mean <sup>a</sup> (SD)
Screening, test and diagnosis	2.37 (0.66)
Assisting patients in lifestyle modification	2.40 (0.62)
Effective use of medications	2.33 (0.67)
Managing complications	2.33 (0.65)
Managing hypertensive emergencies	2.32 (0.66)

Note.<sup>a</sup>Mean was calculated from 4-point Likert scales ranging from 1 (*not at all confident*), 2 (*partially confident*), 3 (*fairly confident*) to 4 (*very confident*).

#### Associations between confidence in type 2 diabetes and hypertension management, age, and years worked in the practice by Pearson product-moment correlation coefficient

There were significant associations between confidences in type 2 diabetes management with age (-0.091,  $p = 0.04$ ) and with a number of years worked in the practice (-0.111,  $p = 0.01$ ). The significant associations were also found in confidences in hypertension management with age (-0.105,  $p = 0.02$ ) and a number of years worked in the practice (-0.137,  $p = 0.002$ ).

**Differences in confidences between groups:** There was no statistically significant difference between the age groups (Group 1: 36 years or less; Group 2: 37-42 years; Group 3: 43-50; Group 4: 51 years and above) and confidences in type 2 diabetes care:  $F (3, 500) = 1.32$ ,  $p=0.27$ . The results were similar between these age groups and confidences in hypertension care:  $F (3, 502) = 2.17$ ,  $p=0.09$ .

There was also no statistically significant difference between the groups of years worked in the practice (Group 1: 13 years or less; Group 2: 14-20 years; Group 3: 21-28; Group 4: 29 years and above) and confidences in type 2 diabetes care:  $F (3, 505) = 2.009$ ,  $p=0.11$ . However, there was a statistically significant difference between these four groups of years worked in the practice and confidences in hypertension care:  $F (3, 507) = 2.88$ ,  $p=0.036$ . Despite reaching statistical significance, the actual difference in mean scores between the groups was quite small. The effect size calculated using eta squared, was 0.02. Post-hoc comparison using the Tukey HSD test indicated that the mean score for group 1 ( $M 12.20$ ,  $SD 2.56$ ) was significantly different from Group 4 ( $M 11.26$ ,  $SD 2.70$ ). Group 2 ( $M 11.92$ ,  $SD 2.77$ ) and 3 ( $M 11.60$ ,  $SD 2.61$ ) did not differ significantly from either Group 1 or 4.

For the open-ended question asking the participants to provide comments on the survey, the participants overwhelmingly commented on the structured online learning program for family medicine which can be divided into three main themes. Firstly, the respondents wished the program will have established soon and before launching the program, they needed to be informed. In addition, they needed more information on the enrolment fee of the program and if possible the certificate of completion should be provided. Secondly, most of the respondents were in agreement of the advantages of the distant program, including a good method to keeping up-to-date, flexibility at their own place and time, serve their learning needs, and reduce cost and time away from the work place. The third theme was about the feedback on the questionnaire itself. The respondents reported that the questionnaire was short, precise and easy to understand.

## Discussions

This present study examined the learning needs on family medicine of community doctors and nurses from selected two provinces, i.e., Khon Kaen and Sakon Nakhon. These two provinces were selected based on the location of the main affiliated institutions for the training program. The response rate of this present study is moderately low, which is a relatively typical response rate for research in medical practitioners<sup>31-34</sup>. In this present study, 47.1% of the respondents needed to learn about principles of family medicine. In case of the best case and worst case analysis, the proportions of the participating doctors and nurses who needed to learn about family medicine were 79.4% and 18.4%, respectively, which are not in the 95% confidence interval (95%CI 42.9, 51.4). Therefore, this limits the conclusions that may be drawn from the findings.

The participants were all interested in a distant learning program for family medicine. Almost half of respondents knew about but not confident in applying the principles of family medicine into the practice. The topics of interest varied from chronic diseases management through research. Surprisingly, English for healthcare professionals was the most commonly needed topic. This may be possibly explained that participating physicians and nurses may have visits by their foreigner patients or in preparing Thailand for the medical hub, AEC and the global market<sup>35</sup>. Other reasons may be a need for self-quality improvement. The second and third rank topics of interest were diabetes and hypertension. These two topics were in a focus may be because they are the commonly problems encountered in primary care, their complications cause risk of hospital admission and then higher healthcare cost<sup>36,37</sup>.

The average level of the participants' confidence in type 2 diabetes management and hypertension management were somewhat confidence. Exploring more for each aspect of type 2 diabetes and hypertension management, the participants also had somewhat confidence in each. Despite the education about type 2 diabetes and hypertension management has been in a focus for decades, the participants remain not very confident in their routine practice. However, this study

did not explore more in details about this issue of why participants are not confident in the management of type 2 diabetes and hypertension. Even though education about these two topics has been overwhelmingly provided for healthcare professionals, knowledge and level of confidence may not be consistently associated<sup>38</sup>. The level of confidence in the present study somehow explains the needs in these learning topics.

The present study showed that the level of confidence has reduced as their rising age and years worked in the practice. This may be possibly explained by the time constraints due to day-to-day workload, as a result having no time to update knowledge and skills or difficulties to access the available educational programs because of distance barriers. This is similar to previous two studies<sup>39,40</sup>.

The first three most commonly selected educational methods were structured online program, face-to-face deliveries and CD/DVD ROM. The participants selected the online may be explained by that to overcome geographical barriers in accessing the education and the day-to-day workload. For these reasons, the online or CD and DVD ROM suit their context. However, the face-to-face mode is still in the second ranking, this may be because of participants' familiarity of this educational technique. This is not surprised, since the face-to-face activities have been the healthcare professional preferred methods of learning over recent decades<sup>5-7,41</sup>. Therefore, to develop learning and teaching techniques that suit the target learners, the combination of both online and face-to-face may be applied. Further research is needed to identify the features of face-to-face activities that may be combined into the structured online learning.

The present study results showed that the age group of 43-50 years were significantly more likely to utilise google hangout and CD/DVD ROM than those aged under 43 and those over 50. The possible reason may be because google hangout comprises a component of face-to-face whereas CD/DVD ROM are easy to be obtained and can be repeatedly viewed in any place and anytime.

Even though, only one fifth of the participants had previous experiences in the structured online learning, the most commonly selected educational method was the structured online program. Thus, the lacks in experiences in online learning did not obstruct participants to select this learning method. However, a study of Ruf and colleagues<sup>15</sup> concluded that previous use of online program was the best predictor for the current use. Even though, the proposed learners for our online program of family medicine are quite ready for this method of learning, previous studies<sup>42,43</sup> suggested that the learners should be provided face-to-face computer and IT skills training before launching an online program. The training for those who needed, may involve instructions on how to use the program and practical, interactive experience via tutorials. The present study showed a very small numbers of participants who did not have computer and/or internet to support this online learning. The target participants may therefore be enquired about their needs on computers and/or internet prior launching of the program.

This study is a first step in developing an effective online learning program. According to Cook and Dupras's practical guidelines<sup>22</sup> to develop effective web-based learning, we have to perform many further steps such as determining technical resources and needs, evaluating pre-existing software, securing commitment from all participants and identifying and addressing potential barriers to implementation, etc.

## Conclusions

The study provided a snap short of community doctor and nurse preferences on educational content and delivery styles and their attitudes toward distant learning program. The information from this study will use to guide the content included and level of information provided in the online program for primary healthcare professions in order to achieve the goal of their quality improvement and continuing professional development.

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## References

1. Wiwanitkit V. Family medicine in Thailand: System, training, and obstacles. *Med J DY Patil Univ* 2016; 9: 4-6.
2. Williams RL, Henley E, Prueksaritanond S, Aramrattana A. Family practice in Thailand: will it work? *J Am Board Fam Pract* 2002; 15: 73-6.
3. Murtagh J. Murtagh's general practice, 5<sup>th</sup> edn. North Ryde, NSW: McGraw-Hill Australia Pty Ltd. Chapter 1, the nature and content of general practice; 2011: 2-13.
4. Cobb SC. Comparison of oncology nurse and physician use of the internet for continuing education. *J Contin Educ Nurs* 2003; 34: 184-8.
5. Younger P. Internet-based information-seeking behaviour amongst doctors and nurses: A short review of the literature: Review Article. *Health Info Libr J* 2010; 27: 2-10. doi: 10.1111/j.1471-1842.2010.00883. x.
6. Vollmar H, Rieger M, Butzlaff M, Ostermann T. General Practitioners' preferences and use of educational media: a German perspective. *BMC Health Serv Res* 2009; 9: 31. doi:10.1186/1472-6963-9-31.
7. Bower EA, Girard DE, Wessel K, Becker TM, Choi D. Barriers to innovation in continuing medical education. *J Contin Educ Health Prof* 2008; 28: 148-56.
8. Stancic N, Mullen P, Prokhorov A, Frankowski R, McAlister A. Continuing medical education: What delivery format do physicians prefer? *J Contin Educ Health Prof* 2003; 23: 162-7. doi:10.1002/chp.1340230307.
9. Casebeer L, Brown J, Roepke N, Grimes C, Henson B, Palmore R, et al. Evidence-based choices of physicians: a comparative analysis of physicians participating in Internet CME and non-participants. *BMC Med Educ* 2010; 10: 42. doi:10.1186/1472-6920-10-42.
10. Wong G, Greenhalgh T, Pawson R. Internet-based medical education: A realist review of what works, for whom and in what circumstances. *BMC Med Educ* 2010; 10: 12. doi: 10.1186/1472-6920-10-12.
11. Harris JM, Sklar BM, Amend RW, Novalis-Marine C. The growth, characteristics, and future of online CME. *J Contin Educ Health Prof* 2010; 30: 3-10. doi: 10.1002/chp.20050.
12. Hammoud M, Gruppen L, Erickson SS, Cox SM, Espey E, Goepfert A, et al. To the point: Reviews in medical education online computer assisted instruction materials. *Am J Obstet Gynecol* 2006; 194: 1064-9.

13. Gagnon MP, Légaré F, Labrecque M, Frémont P, Cauchon M, Desmartis M. Perceived barriers to completing an e-learning program on evidence-based medicine. *Inform Prim Care* 2007; 15: 83-91.
14. Pelayo M, Cebrian D, Areosa A, Agra Y, Izquierdo JV, Buendia F. Effects of online palliative care training on knowledge, attitude and satisfaction of primary care physicians. *BMC Fam Pract* 2011; 12: 37. doi: 10.1186/1471-2296-12-37.
15. Ruf D, Kriston L, Berner M, Harter M. General practitioners and online continuing medical education - which factors influence its use? *Ger Med Sci* 2009; 7. doi: 10.3205/000067.
16. Janes R, Arroll B, Buetow S, Coster G, McCormick R, Hague I. Rural New Zealand health professionals' perceived barriers to greater use of the internet for learning. *Rural Remote Health* [Internet]. 2005; 5: 436 [cited 2016 Jun 13]. Available from: <http://www.rrh.org.au/articles/subviewnew.asp?ArticleID=436>
17. Sargeant J, Curran V, Allen M, Jarvis-Selinger S, Ho K. Facilitating interpersonal interaction and learning online: linking theory and practice. *J Contin Educ Health Prof* 2006; 26: 128-36.
18. Wutoh R, Boren SA, Balas EA. eLearning: a review of Internet-based continuing medical education. *J Contin Educ Health Prof*. 2004; 24(1): 20-30.
19. Curran VR, Fleet L. A review of evaluation outcomes of web-based continuing medical education. *Med Educ* 2005; 39: 561-7.
20. Hays RB, Veitch C. Continuing medical education for general practitioners. Queensland, Australia: School of Medicine, James Cook University. Chapter 1, Continuing medical education and divisions; 1999: 5-17.
21. Minasian-Batmanian LC. Guidelines for developing an online learning strategy for your subject. *Med Teach* 2002; 24: 645-7.
22. Cook DA, Dupras DM. A practical guide to developing effective web-based learning. *J Gen Intern Med* 2004; 19: 698-707.
23. Davis DA, Thomson MA, Oxman AD, Haynes RB. Changing physician performance: A systematic review of the effect of continuing medical education strategies. *JAMA* 1995; 274: 700-5.
24. Stein LS. The effectiveness of continuing medical education: eight research reports. *J Med Educ* 1981; 56: 103-10.
25. Starke I, Wade W. Continuing professional development supporting the delivery of quality healthcare. *Ann Acad Med Singapore* 2005; 34: 714-6.
26. Cantillon P, Jones R. Does continuing medical education in general practice make a difference? *BMJ* 1999; 318(7139): 1276-9.
27. Ward J. Continuing medical education. Part 2. Needs assessment in continuing medical education. *Med J Aust* 1988; 148: 77-80.
28. Department of General Practice, School of Primary Health Care, Monash University [cited May 17, 2016]. Available from: <http://www.med.monash.edu.au/general-practice/prospective/graduate.html>
29. Postgraduate study, the University of Edinburgh [cited May 17, 2016]. Available from: <http://www.ed.ac.uk/studying/postgraduate/degrees/index.php?r=site/view&id=870>.
30. Skye EP, Wimsatt LA, Master-Hunter TA, Locke AB. Developing online learning modules in family medicine residency. *Fam Med* 2011; 43: 185-92.
31. Cummings SM, Savitz LA, Konrad TR. Reported response rates to mailed physician questionnaires. *Health Serv Res* 2001; 3: 1347-55.
32. Asch DA, Jedrziewski MK, Christakis NA. Response rates to mail surveys published in medical journals. *J Clin Epidemiol* 1997; 50: 1129-36.
33. Grava-Gubins I, Scott S. Effects of various methodologic strategies: survey response rates among Canadian physicians and physicians-in-training. *Can Fam Physician* 2008; 54: 1424-30.
34. Britt H, Miller GC, Charles J, Henderson J, Bayram C, Pan Y, et al. General practice activity in Australia 2008-09. BEACH: Bettering the evaluation and care of health. General Practice Series No. 25. Cat No. GEP 25. Canberra: Australian Institute of Health and Welfare; 2009.
35. Pandey I, Sinhaneti K. A study of required English skills for healthcare personnel in Bangkok-based international hospitals. *JEVR* 2013; 4: 184-92.
36. Chaikledkaew U, Pongchareonsuk, P, Chaiyakunapruk N, Ongphiphadhanakul B. Factors affecting health-care costs and hospitalizations among diabetic patients in thai public hospitals. *Value Health* 2008; 11(suppl 1): S69-74.
37. Mohan V, Seedat Y, Pradeepa R. The rising burden of diabetes and hypertension in Southeast Asian and African Regions: Need for effective strategies for prevention and control in primary health care settings. *Int J Hypertens* 2013; 409083. doi:10.1155/2013/409083.
38. Tracey JM, Arroll B, Richmond DE, Barham PM. The validity of general practitioners' self assessment of knowledge: cross sectional study. *BMJ* 1997; 315(7120): 1426-8.

39. Khan AR, Al Abdul Lateef ZN, Khamseen MB, Al Aithan MA, Khan SA, Al Ibrahim I. Knowledge, attitude and practice of ministry of health primary health care physicians in the management of type 2 diabetes mellitus: a cross-sectional study in the Al Hasa District of Saudi Arabia, 2010. *Niger J Clin Pract* 2011; 14: 52-9.
40. Sher A, Jawad F, Basit A. Diabetes related knowledge, attitude and practices of family physicians in Pakistan. *J Pak Med Assoc* 2002; 52: 465-70.
41. Booth B, Lawrence R. Quality assurance and continuing education needs of rural and remote general practitioners: how are they changing? *Aust J Rural Health* 2001; 9: 265-74.
42. Mamary EM, Charles P. On-site to on-line: Barriers to the use of computers for continuing education. *J Contin Educ Health Prof* 2000; 20: 171-5.
43. Curran V, Lockyer J, Sargeant J, Fleet L. Evaluation of learning outcomes in web-based continuing medical education. *Acad Med* 2006; 81(suppl 10): S30-34.

