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Developing a training programme in physical activity counselling for undergraduate medical curricula: a nationwide Delphi study

Apichai Wattanapisit,[1,2] Prachyapan Petchuay,[1] Sanhapan Wattanapisit,[3] Titiporn Tuangratananon[4]

[1]Department of Clinical Medicine, Walailak University School of Medicine, Thasala, Nakhon Si Thammarat, Thailand
[2]Family Medicine Clinic, Walailak University Hospital, Thasala, Nakhon Si Thammarat, Thailand
[3]Family Medicine Unit, Thasala Hospital, Thasala, Nakhon Si Thammarat, Thailand
[4]International Health Policy Program, Thailand, Ministry of Public Health, Muang, Nonthaburi, Thailand

Correspondence to
Dr Apichai Wattanapisit;
apichai.wa@wu.ac.th

ABSTRACT

Objectives To identify the essential content and approaches for developing a training programme in physical activity (PA) counselling for undergraduate medical curricula.

Design A three-round Delphi survey was conducted to investigate four key topics: (1) contents of PA counselling in medical education; (2) teaching and learning methods; (3) medical school collaboration and (4) educational policy implementation. Round 1 collected opinions from the participants. Round 2 focused on scoring the opinions. Round 3 summarised the expert opinions. A mean score of 4 or above identified as an important item.

Setting All 23 medical schools in Thailand.

Participants Academic staff who were experts or in charge of medical schools in the fields of PA, health promotion or medical education.

Results A total of 20 representatives from 18 of the 23 Thai medical schools participated in the study (for a response rate of 78.2%). The top three most important indicators of knowledge were (1) the definition and types of PA (4.75±0.55), (2) the FITT principle (frequency, intensity, time and type) (4.75±0.55) and (3) the benefits of PA (4.65±0.67). The most important component of the training involved general communication skills (4.55±0.60). An extracurricular module (4.05±0.76) was preferable to an intracurricular module (3.95±0.94). Collaborations with medical education centres and teaching hospitals (4.45±0.78) and supporting policies to increase medical students' PA (4.40±0.73) were considered to be important.

Conclusion Knowledge and counselling skills are important for PA counselling. Building collaborations between medical education and health institutions, as well as implementing effective educational policies, are key approaches to the integration of PA counselling into medical education. Future research should focus on investigating the effects of training in PA counselling on the learning outcomes of medical students and the clinical outcomes of patients.

Strengths and limitations of this study

► The study had a 78.2% response rate (18 out of 23 medical schools) from the medical schools in Thailand.

► The characteristics of the Delphi study, using a series of questionnaires, helped to achieve the consensus of expert opinion and avoid problems arising from a few powerful participants and group pressures.

► The study sites did not include medical education centres and teaching hospitals, which were affiliated with the medical schools or universities.

patients' point of view, physicians are credible sources of health-related information and guidance.[2] PA counselling is an effective strategy to increase the PA level of patients.[3] A systematic review concluded that 1 out of 12 sedentary patients will become physically active after the promotion of PA in healthcare services.[4] PA can reduce risks of mortality and cardiovascular disease.[5 6] This leads to the concept that exercise and PA are important aspects of lifestyle in medicine.[7–9] However, important barriers to PA counselling include time constraints and a lack of knowledge and communication skills among healthcare professionals.[10] The WHO proposes a policy action to strengthen curricula of medical professionals to ensure effective integration of the health benefits of PA into the formal training.[11]

Inadequate training in PA topics may be one barrier to PA counselling. Medical curricula address a limited number of PA topics during undergraduate training, representing only 4.2 hours in the UK, 8.1 hours in the USA and 12.3 hours in Australia.[12–14] Given the time spent teaching PA topics, overall training in PA counselling is insufficient. A study conducted in Thailand found that during the 6-year curriculum, even when the curriculum

INTRODUCTION

Promoting physical activity (PA) in clinical settings is a promising approach to the reduction of physical inactivity.[1] From the

included 25 hours of instruction in PA topics, the training specifically addressing PA counselling is absent.[15] Thus, training in PA counselling is still limited at both undergraduate and postgraduate levels.[16 17]

Given the concept that 'exercise is medicine', exercise or PA should be regarded as an important aspect of treatment for every patient.[18] The UK approach, Making Every Contact Count, encourages healthcare professionals to talk with patients about their health and well-being during routine interactions.[19] According to these concepts, training in PA counselling can be instilled as a component of the patient care programme for medical students. The gap in knowledge involves how to best develop medical students' awareness and abilities to conduct PA counselling during their clinical rotations and ultimately in their postgraduate clinical practices. As a result, this study was designed to identify the essential content and approaches for developing effective techniques that can be incorporated into the undergraduate medical curricula for PA counselling.

METHODS
Study design
A Delphi survey method was conducted to gather opinions from expert medical educators in Thailand. The initial questions emerged from a roundtable discussion. A panel of experts, composed of eight specialist academics and practitioners from six institutions, was formed in July 2018; these experts were from the fields of PA, medical education, primary care, sports science, sports medicine, internal medicine, endocrinology, orthopaedics, as well as health promotion and health policy. This panel addressed four key topics: (1) the content of PA counselling in medical education; (2) teaching and learning methods; (3) medical school collaborations and (4) educational policy implementation.

The authors then conducted a three-round survey through online questionnaires. Round 1 was designed to collect additional opinions from the participants, round 2 focused on scoring the opinions and round 3 entailed producing a summary of the expert opinions.

Setting and participants
The authors sent letters to contact the deans of all 23 medical schools in Thailand to request the permission to conduct the study and the names of one to two eligible participants. The inclusion criterion was academic staff who were experts or in charge of medical schools in the fields of PA, health promotion or medical education. Medical school representatives who had participated in the initial roundtable discussion were excluded.

Data collection and analysis
The online questionnaires were sent to the participants' email addresses. Each round took about 1 month. If there was no response to the questionnaires within 2 weeks, the authors would send an email to remind the participants. The non-responders would be prompted again by a phone call 1 week after the second email. After that prompt, any non-responders were dropped from the study and no longer considered a potential source of data. After the completion of each round, the research team analysed data and developed the questions for the next rounds. Participants' names and institutions were coded to ensure confidentiality and anonymity. All data collection was conducted between August and December 2018. The study protocol was approved by the Human Research Ethics Committee of Walailak University (protocol number: WUEC-18-039-01).

Round 1
The questionnaire, using Google Forms (Alphabet, Mountain View, California, USA), provided some items that emerged from the roundtable discussion of the four key topics . The authors asked the medical school representatives to include additional opinions on each key topic using open-ended questions. Additionally, the authors offered participants to include their opinions to form additional key topics. The answers from round 1 were qualitatively analysed by the authors and confirmed by discussion within the research team. All the items that emerged after the round 1 analysis were collected as questions for round 2.

Round 2
The questionnaire, using Google Forms, was developed based on analysis of round 1. The authors asked the participants to score each item from 1 to 5 based on their opinions, in which a score of 1=not important; 2=slightly important; 3=moderately important; 4=important and 5=very important. The overall score for each item was calculated as a mean score with a SD. These calculations were performed using Excel software (a component of the Office 365 University package, Microsoft, Redmond, Washington, USA). Achieving consensus was considered by having 75% of participants' scores within two categories—important (score=4) and very important (score=5).[20] The data analysed from round 2 were ranked by mean scores and developed into the round 3 questionnaire.

Round 3
The items provided in the questionnaire, using Google Sheets (Alphabet, Mountain View, California, USA), were similar to the items provided in the round 2 questionnaire. However, in this round, the participants could see the sequences of items ranked by mean scores, item mean scores and SDs from the results of round 2, as well as their previous scores. In this final round, the participants were asked to confirm or change their scores. The final consensus criterion was defined as 75% of agreement among participants.[20] The consensus in this round meant that the item was considerd important or very important by at least 75% of experts. The mean scores and SDs were also calculated in this round. The items with mean

Participant code	Institution code	Gender	Age (years)	Specialty
P1	I1	Female	34	Family medicine
P2	I2	Male	49	Community medicine
P3	I3	Female	39	Physiology
P4	I4	Male	42	Physical medicine and rehabilitation
P5	I5	Female	39	Family medicine
P6	I5	Female	61	Health promotion
P7	I6	Female	33	Paediatrics
P8	I7	Male	53	Public health/epidemiology
P9	I8	Female	34	Family medicine
P10	I9	Female	48	Public health/health economics
P11	I10	Male	30	Family medicine
P12	I11	Female	32	Family medicine
P13	I12	Female	45	Family medicine
P14	I13	Male	43	Internal medicine
P15	I14	Male	38	Family medicine
P16	I14	Male	48	Physical medicine and rehabilitation
P17	I15	Female	40	Family medicine
P18	I16	Male	30	Family medicine
P19	I17	Male	39	Epidemiology
P20	I18	Female	33	Family medicine

Table 1 Participant codes and characteristics (n=20)

scores≥4 were considered to be important. The mean scores reflected the level of importance of items.

Patient and public involvement
The study did not involve patients as study participants. The presentation of the findings was anonymous to preserve confidentiality.

RESULTS
Baseline characteristics of participants
A total of 20 representatives from 18 of the 23 Thai medical schools, including both public and private institutions, participated, for a response rate of 78.2%. The participants were aged between 30 and 61 years (mean 40.5±8.2 years). A total of 11 (55.0%) were females and 10 (50%) specialised in family medicine (table 1). All participants were active throughout all the three rounds of the survey.

Content of PA counselling in medical education
Knowledge of PA and training in counselling were the two sub-topics regarding contents of PA counselling in medical education. In round 1, the items regarding knowledge of PA emerged from 7 to 23 items, and the items regarding training in counselling increased from 3 to 10 items. The top three most important areas of knowledge were (1) the definition and types of PA (4.75±0.55), (2) the FITT principle (frequency, intensity, time and type) (4.75±0.55) and (3) the benefits of PA (4.65±0.67). The top three most important topics for training the

students in counselling were (1) general communication skills (4.55±0.60), (2) counselling techniques (4.45±0.69) and (3) the 5 A's (ask, advise, assess, assist and arrange) (4.30±0.73) (table 2).

Teaching and learning methods
Several items regarding intracurricular activities, extra-curricular activities and evaluation were raised by the participants in round 1. There was a preference for training in PA counselling to be provided as an extra-curricular module (4.05±0.76) rather than an intra-curricular module (3.95±0.94). The top priorities for the intracurricular activities were (1) interactive activities (4.50±0.69), (2) interprofessional education (4.40±0.75) and (3) project-based learning (4.40±0.68). The most important extracurricular activities were online modules (4.35±0.67), followed by interactive activities (4.30±0.73) and interprofessional education (4.30±0.66). The important evaluation methods included (1) self-assessment and reflection (4.40±0.68), (2) student behaviours (4.20±1.11) and (3) clinical performance of students (4.20±0.77) (table 3).

Medical school collaborations
According to the initial survey, collaboration among organisations was a key to successful implementation of training in PA counselling. There were two organisations mentioned in the roundtable discussion. Subsequently, 12 additional items were offered during round 1. According to the final results, medical schools should collaborate

Table 2 Content of physical activity counselling in medical education

Item	Round 2 agreement*, mean±SD	Round 3 agreement*, mean±SD
Knowledge of physical activity: 23 items		
1. Definition and types of physical activity†	85%, 4.55±1.00	95%, 4.75±0.55
2. FITT principle (frequency, intensity, time and type)†	85%, 4.50±1.05	95%, 4.75±0.55
3. Benefits of physical activity†	80%, 4.45±1.05	90%, 4.65±0.67
4. Recommendations on physical activity for health†	85%, 4.35±1.04	95%, 4.60±0.60
5. Physical activity in patients with non-communicable diseases	95%, 4.45±0.76	100%, 4.55±0.51
6. Pre-screening for physical activity participation†	85%, 4.40±0.88	100%, 4.50±0.51
7. Injury prevention from physical activity	85%, 4.35±0.88	85%, 4.40±0.75
8. Integrating the knowledge about physical activity in daily living and healthcare services	80%, 4.40±0.82	95%, 4.40±0.68
9. Health risks associated with physical activity participation†	85%, 4.30±0.86	100%, 4.40±0.50
10. Physical activity in the elderly	95%, 4.35±0.75	100%, 4.40±0.50
11. Methods of physical fitness tests (ie, strength, endurance, agility and balance)	75%, 4.30±0.86	85%, 4.35±0.75
12. Basic exercise physiology and physiological responses in exercise	75%, 4.30±0.86	75%, 4.30±0.86
13. Assessment of the intensity of physical activity (ie, metabolic equivalent, heart rate zone, etc)	75%, 4.25±0.85	75%, 4.15±0.81
14. Physical activity in patients with neurological disorders	70%, 4.05±0.83	80%, 4.15±0.75
15. Physical activity monitoring and assessment (eg, using self-administered questionnaires and mobile devices)	65%, 4.15±0.93	80%, 4.15±0.75
16. Tools and teams for facilitating physical activity counselling†	70%, 4.05±0.94	85%, 4.10±0.64
17. Physical activity in patients with heart diseases	80%, 4.05±0.83	85%, 4.10±0.64
18. Associations between physical activity and nutrition	70%, 4.00±0.79	80%, 4.05±0.60
19. Environmental management for promoting physical activity	70%, 4.05±1.05	80%, 4.00±0.65
20. Evidence-based medicine regarding physical activity topics	60%, 4.00±0.92	60%, 3.90±0.85
21. Epidemiology of physical activity in population	65%, 3.75±1.02	55%, 3.75±0.79
22. Physical activity in palliative patients	65%, 3.80±0.83	55%, 3.65±0.81
23. Global Action Plan on Physical Activity 2018–2030 (WHO)	50%, 3.75±0.85	35%, 3.50±0.76
Training in counselling: 10 items		
1. General communication skills	80%, 4.35±1.04	95%, 4.55±0.60
2. Counselling techniques†	80%, 4.25±0.91	90%, 4.45±0.69
3. The 5 A's (ask, advise, assess, assist and arrange)	75%, 4.10±0.91	90%, 4.30±0.73
4. Psychology of behaviour change†	90%, 4.30±0.80	90%, 4.25±0.64
5. Motivational interviewing	60%, 4.00±1.12	75%, 4.10±0.91
6. Practices to overwhelm barriers to physical activity counselling (eg, time constraints and systemic barriers)†	65%, 3.90±0.91	75%, 4.05±0.76
7. Leadership skills	75%, 4.05±0.89	75%, 4.00±0.73
8. Evaluation and management of patients with clinical difficulties	65%, 3.90±0.91	60%, 3.80±0.77
9. Concepts of behavioural science	55%, 3.75±1.12	50%, 3.70±1.03
10. Cognitive behavioural therapy	50%, 3.50±1.00	50%, 3.55±1.05

*Percentage of participants who scored 4 and 5 for each item.
†Item emerged from the roundtable discussion.

with (1) medical education centres and teaching hospitals (4.45±0.78), (2) the Society of Medical Students of Thailand (4.39±0.72) and (3) Thai Health Promotion Foundation (4.38±0.74) (table 4).

Educational policy implementation
The top three ranks of educational policy implementation were (1) support policies to increase medical students' PA (4.40±0.73), (2) assess PA levels of all medical students (4.36±0.85) and (3) provide active environments (4.35±0.79) (table 5).

DISCUSSION
The nationwide survey that was performed in this study gave insight into the key elements that are important for PA counselling in medical education, teaching and learning methods, medical school collaboration and educational

Table 3 Teaching and learning methods

Item	Round 2 agreement*, mean±SD	Round 3 agreement*, mean±SD
Intracurricular activities: 17 items		
1. Interactive activities (eg, workshops)†	85%, 4.45±0.76	90%, 4.50±0.69
2. Interprofessional education	80%, 4.25±0.91	85%, 4.40±0.75
3. Project-based learning	80%, 4.30±0.92	90%, 4.40±0.68
4. Online modules†	80%, 4.25±0.79	90%, 4.30±0.80
5. Problem-based learning	75%, 4.25±0.97	90%, 4.25±0.79
6. Team-based learning	85%, 4.15±0.99	85%, 4.20±0.83
7. Case-based learning	80%, 4.15±0.88	85%, 4.20±0.70
8. Assignment (eg, short films and media)	65%, 4.00±0.97	80%, 4.15±0.75
9. Clinical practices in home healthcare (home visits)	80%, 4.15±0.88	90%, 4.15±0.75
10. Clinical practices in ambulatory settings	75%, 4.15±0.93	85%, 4.10±0.79
11. Video demonstration of physical activity counselling	65%, 4.05±0.89	65%, 4.00±0.86
12. Training in physical activity counselling should be one of the intracurricular modules	65%, 3.90±1.02	65%, 3.95±0.94
13. Teaching during exercise classes/activities	70%, 4.00±0.92	70%, 3.90±0.72
14. Self-directed learning†	55%, 3.80±0.95	55%, 3.80±0.83
15. Role plays	65%, 3.80±1.01	65%, 3.70±0.92
16. Lectures†	50%, 3.60±0.82	60%, 3.65±0.88
17. Exercise physiology laboratory	50%, 3.70±0.92	60%, 3.65±0.75
Extracurricular activities: 10 items		
1. Online modules†	90%, 4.30±0.80	90%, 4.35±0.67
2. Interactive activities (eg, workshops)†	75%, 4.20±0.83	85%, 4.30±0.73
3. Interprofessional education	80%, 4.25±0.79	90%, 4.30±0.66
4. Elective modules	80%, 4.15±0.75	80%, 4.10±0.85
5. Health promotion activities (eg, sports clubs and sports competitions)	75%, 4.00±0.86	80%, 4.10±0.72
6. Training in physical activity counselling should be one of the extracurricular modules	75%, 4.05±1.00	75%, 4.05±0.76
7. Observation in workplaces (ie, rehabilitation clinics and health promotion clinics)	80%, 4.05±0.83	80%, 4.05±0.69
8. Self-directed learning†	60%, 3.85±1.04	75%, 3.95±0.83
9. Extracurricular assignments (eg, VDO clips)	65%, 3.75±0.79	80%, 3.95±0.60
10. Seminars or group discussions	70%, 3.95±0.89	65%, 3.80±0.70
Evaluation: 11 items		
1. Self-assessment and reflection	75%, 4.20±0.95	90%, 4.40±0.68
2. Student behaviours (students' physical activity participation)†	75%, 4.25±0.85	75%, 4.20±1.11
3. Clinical performance of students†	75%, 4.10±0.91	80%, 4.20±0.77
4. Students' physical fitness	60%, 3.70±1.34	65%, 3.95±1.19
5. Academic performance (eg, grades and scores)†	75%, 4.00±0.97	70%, 3.90±0.97
6. Curriculum evaluation (ie, numbers of subjects included physical activity topics)	50%, 3.75±1.07	55%, 3.80±0.95
7. Log book	55%, 3.60±1.14	60%, 3.75±1.02
8. Research or assigned projects	65%, 3.90±1.12	65%, 3.75±0.91
9. Levels of satisfaction of the training	50%, 3.70±1.03	55%, 3.70±0.98
10. Oral presentations	50%, 3.55±1.00	55%, 3.65±1.04
11. Patient outcomes (eg, physical activity levels and clinical outcomes)	50%, 3.70±1.13	45%, 3.60±1.10

*Percentage of participants who scored 4 and 5 for each item.
†Item emerged from the roundtable discussion.

policy implementation. The definition and types of PA and general communication skills were the most important contents of PA knowledge and training in counselling.

Training in PA counselling could use either intracurricular or extracurricular modules. Interactive activities, such as workshops, were the most important intracurricular

Table 4 Medical school collaborations

Item	Round 2 agreement*, mean±SD	Round 3 agreement*, mean±SD
Medical school collaborations: 14 items		
1. Medical education centres and teaching hospitals	80%, 4.40±0.94	85%, 4.45±0.78
2. The Society of Medical Students of Thailand†	85%, 4.30±0.88	90%, 4.39±0.72
3. Thai Health Promotion Foundation	80%, 4.30±0.91	90%, 4.38±0.74
4. Collaborative Project to Increase Production of Rural Doctor	70%, 4.15±0.97	85%, 4.36±0.76
5. Collaborations among health and sports sciences students/faculties (faculty levels—within a university)	80%, 4.30±0.94	80%, 4.34±0.85
6. Networks of university health promotion (university levels—within a country or regions)	75%, 4.15±0.94	80%, 4.29±0.84
7. Consortium of Thai Medical Schools†	75%, 4.15±0.94	90%, 4.29±0.71
8. Ministry of Public Health	60%, 3.85±1.02	65%, 4.08±0.90
9. Institute of Physical Education	60%, 3.80±0.98	65%, 3.95±0.92
10. Introduce the physical activity research collaboration among Thai medical schools via Medical Research Network of the Consortium of the Thai Medical schools (MedResNet)	65%, 3.80±0.94	60%, 3.91±0.88
11. Collaborations among health professional councils (eg, Physical Therapy Council, and Thailand Nursing and Midwifery Council) (professional levels)	65%, 3.65±1.02	65%, 3.86±0.90
12. Conduct surveys on physical activity among Thai medical students	65%, 3.80±1.04	65%, 3.86±0.90
13. University Sports Board of Thailand	60%, 3.85±0.91	60%, 3.85±0.91
14. International Federation of Medical Students' Association—Thailand	50%, 3.65±1.06	55%, 3.68±1.06

*Percentage of participants who scored 4 and 5 for each item.
†Item emerged from the roundtable discussion.

activities, while online modules were the most meaningful extracurricular activities. The emphasis on evaluation was self-assessment and reflection by medical students. To drive the training in PA counselling in medical education, collaboration among institutions was needed, including good collaboration between medical education centres and teaching hospitals. Policies to increase the awareness

of medical students about the importance of PA for health had the highest priority.

Overall, the participants recognised about two-thirds of the items as being important (with a mean score of ≥4). This reflected the importance of training in PA counselling in medical education. The evidence from the study supported the concept that training in PA counselling

Table 5 Educational policy implementation

Item	Round 2 agreement*, mean±SD	Round 3 agreement*, mean±SD
Educational policy implementation: 10 items		
1. Support policies to increase medical students' physical activity (eg, leisure time and healthy behaviours)†	80%, 4.25±1.04	85%, 4.40±0.73
2. Assess physical activity levels of all medical students (ie, annual check-ups)	80%, 4.25±1.00	85%, 4.36±0.85
3. Provide active environments (eg, walkable areas, bicycle lanes and parks, and recreational areas)†	80%, 4.25±1.04	80%, 4.35±0.79
4. Test medical students' physical fitness and body composition†	80%, 4.20±0.87	85%, 4.34±0.73
5. Promote medical students' physical activity†	85%, 4.25±0.83	90%, 4.34±0.66
6. Integrate physical activity topics and counselling in preclinical and clinical subjects (educational policies)	85%, 4.25±0.95	80%, 4.23±0.89
7. Promote role models (eg, medical teachers and residents)	65%, 3.85±0.99	70%, 4.04±0.91
8. Establish medical student health leaders to promote and design physical activity in daily life	70%, 3.85±0.93	65%, 3.84±0.84
9. Introduce physical activity topics into the national medical licensing examination	55%, 3.60±1.07	55%, 3.67±1.02
10. Use a physical activity credit to assess physical activity behaviours	55%, 3.65±1.03	50%, 3.60±1.14

*Percentage of participants who scored 4 and 5 for each item.
†Item emerged from the roundtable discussion.

during medical education improved the knowledge, skills and attitudes of the medical students.[16] Trained physicians were more likely than untrained physicians to discuss PA benefits.[21] Although lifestyle aspects of medicine were deemed important, the majority of medical schools did not include the topic of lifestyles and PA in their curricula.[22] One possible reason was that no structured models to integrate lifestyle medicine topics into medical education were available.[23] The findings that emerged from this study could help to develop future educational programmes. Another possible explanation of the lack of training in PA counselling was the inadequacy of awareness. Stakeholders should educate medical schools, universities, academics and students to regard PA as an important factor for health maintenance and inactivity as a risk factor for the development of illnesses. Additionally, stakeholders should reinforce knowledge, capacity and skills in the promotion of PA through training programmes and opportunities.[11]

The findings of the present study revealed many considerations for the development of training in PA counselling in medical education. Accordingly, in terms of medical education, designing an appropriate programme of learning was necessary. Many items were considered to be important for knowledge and necessary for the acquisition of good counselling skills. Therefore, the newly designed programmes should focus on the knowledge base of the learners and the baseline training needed for most of the medical students, who are non-specialists. One challenge for inserting any new topic into the medical curriculum is the problem of curriculum overload. Assuring appropriate content and sequences of the topics presented to the medical students is necessary to ease their academic burden and avoid information overload.[24] Moreover, a well-designed PA module with a limited duration (1.5 hours) can improve the competence in counselling of medical students.[25] To achieve the learning outcomes that are necessary to meet the students' PA counselling needs, it must be recognised that competent communication with patients will require specific knowledge and skills, including (1) content—what to do with communication reactions, (2) process—how communication interactions occur and (3) perceptual skills—how that impacts communication, including feelings, thoughts and attitudes.[26] This can be achieved using several teaching, learning and evaluation methods.[27 28] According to the results of the study, the important evaluation methods covered three domains, including knowledge of PA, PA behaviours and clinical skills.

An emerging key topic involved building collaborations among medical schools and other organisations. These collaborations can increase opportunities for developing faculty, sharing resources across institutions and enriching the combination of the knowledge, innovation and experiences.[29] Important items for educational policy implementation included 7 out of the 10 policies recognised as helpful to increase PA in medical students. Previous evidence supported a strong association between medical students' PA behaviours and PA counselling attitudes and practices.[30 31] In other words, physically active medical students are more likely to counsel their patients about PA. This is a notion to develop PA counselling via promoting PA behaviours among medical students. Advocating for an educational policy to improve the PA behaviours of medical students requires a specific understanding of medical students' initial PA behaviours, as well as facilitating and barrier factors for PA.[32]

Strengths and limitations of the study

There were some strengths of the study. First, the study had a 78.2% response rate (18 out of 23 medical schools) from the medical schools in a national-level survey. Moreover, all participants remained engaged throughout the study. A strategy used in the study to maintain the participation was sending extra prompts with specific reminder content.[33] Second, the characteristics of the Delphi study, using a series of questionnaires, helped to achieve the consensus of expert opinion and avoid problems arising from a few powerful participants and group pressures.[34 35] Third, although the findings did not provide a ready-to-use PA counselling module, they did lead to more specific components of PA education and training than are available with the previous non-specific components provided by the Medical Council of Thailand.[36] The findings also are adaptable and transferable from the national level in the Thai context to the international level for developing a new approach to this aspect of medical education.

Three limitations of the study were identified. The study sites did not include medical education centres and teaching hospitals, which were affiliated with the medical schools or universities. However, medical education centres and teaching hospitals were identified as a potential part of a collaboration to develop the training in PA counselling. Another limitation was that half of the participants specialised in family medicine, which might be skewed. It might be useful to include more sport and exercise specialists in this survey. A reason that could explain this result because training in non-communicable diseases, lifestyle medicine and health promotion during family medicine rotations is common practice in Thailand. Lastly, the findings were based on expert opinions about medical education that could not reflect the efficacy and effectiveness of clinical practices and patient outcomes.

CONCLUSIONS

This is the first study conducted at a national level in Thailand to identify ways to develop training programmes for PA counselling in undergraduate medical education. The definition and types of PA, the FITT principle and benefits of PA are essential training for medical students. Moreover, training in PA counselling skills should include general communication skills, counselling techniques and the 5 A's. Both intracurricular and extracurricular activities are required. Building collaborations between

medical educators and health institutions, as well as implementing effective educational policies, are additional approaches that will be needed to inculcate PA counselling in clinical practice. Future research should focus on implementing training programmes for the undergraduate medical curriculum and to investigate the learning outcomes of medical students. In addition, there is a need to elucidate the clinical outcomes in patients that are the endpoints of the training.

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