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Attitudes to physical activity on prescription among Vietnamese healthcare workers after a short training course

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Uppfattningar om fysisk aktivitet på recept hos vietnamesisk sjukvårdspersonal efter en kort kurs.

Bakgrund: Attityder till och kunskap om fysisk aktivitet (FA) inverkar på benägenheten hos sjukvårdspersonal att rekommendera FA till patienter. Det finns stark evidens för att FA är effektivt som prevention och behandling för många sjukdomar. Denna studie undersöker uppfattningar om FA hos vietnamesisk sjukvårdspersonal efter en kurs om Fysisk aktivitet på Recept (FaR). *Syfte:* Att studera deltagarnas attityder, kunskaper samt självförtroende gällande FaR, vidare deras upplevelse av patienters attityder till ökad FA samt socioekonomiska och hälsorelaterade barriärer mot ökad FA. *Material och Metoder:* En enkät distribuerades till 165 deltagare från olika provinser (storstad och landsbygd) i Vietnam, med en svarsfrekvens på 77 %. *Resultat*: Alla utom en deltagare rapporterade ökat eget intresse för FA som prevention och behandling och en majoritet ansåg att FaR är en viktig del av sjukvården. Kunskapsnivån rapporterades som ”varken bra eller dålig”, och en statistiskt signifikant skillnad i självrapporterad kunskap mellan provinser observerades. Patienterna uppfattades som positiva till att bli mer fysiskt aktiva, och ett flertal barriärer mot ökad FA rapporterades. *Slutsats*: Deltagarna föreföll ha en positiv attityd till FaR och uppfattade även att patienterna var positiva till ökad FA. Studien antyder att det kan ha funnits brister i kurskonceptet då deltagarna rapporterade en inadekvat kunskapsnivå efter kursen, dock kan ingen slutsats dras på grund av brist på data från innan kursen. Framtida studier bör vara prospektiva och inrikta sig på en objektiv utvärdering av kunskaper och färdigheter.

Attitudes to physical activity on prescription among Vietnamese healthcare workers after a short training course.

Introduction: Attitudes to and knowledge about physical activity (PA) influence the likelihood in healthcare workers to recommend PA to patients. There is strong evidence that PA is effective as prevention and treatment for many diseases. This study investigates perceptions of PA among Vietnamese healthcare workers after a short training course on Physical Activity on Prescription (PAP). *Aims:* To study the participants’ attitudes, knowledge and confidence regarding PAP and their perception of patients’ attitudes to and socioeconomic and health-related barriers to increased PA. *Material and Methods:* A questionnaire was distributed to 165 participants from different provinces (urban and rural provinces) in Vietnam, response rate 77%. *Results:* All but one participant reported greater interest in PA as prevention and treatment and a majority perceived PAP as an important part of healthcare. The knowledge about PAP was reported as “neither poor nor good”, and a statistically significant difference was observed for knowledge and province. Participants perceived patients to be positive to a more physically active life-style, and several barriers to increased PA were reported. *Conclusions:* The participants appeared to have a positive attitude to PAP and perceived their patients to be positive to increased PA. The study hints at deficiencies in the course since the participants had an insufficient knowledge level after the course. However, since we lack data from prior to the course it is impossible to draw a conclusion. Future studies should be prospective and include an objective evaluation of knowledge and skills.

Keywords: Physical activity; Prescription; Health Personnel; Attitude of Health Personnel; Health Knowledge, Attitude, Practice

Introduction

Physical activity (PA) is an important part of prevention and treatment of disease and premature death and can be an important component of modern healthcare (1,2). Attitudes to and the extent of knowledge about PA are strong predictors for the likelihood that healthcare workers will discuss and recommend life-style changes (3-7). Therefore, it is important to investigate if and how education, such as short training courses, influence attitudes and knowledge.

Factors influencing the recommendation and implementation of PA

Self-reported characteristics of healthcare workers and their attitudes to PA have been associated with the likelihood to recommend PA to patients (4). It has been suggested that knowledge about the benefits of PA and on how to recommend and prescribe PA to patients is a factor that affects PA counselling (5-7). Confidence of healthcare workers to recommend PA is also closely connected to their behaviour of doing so (8). Higher confidence may be acquired through a gain of knowledge about the benefits of PA (5) and sufficient training in how to use the resources that are available for recommending and prescribing physical activity.

Lack of time, lack of training on effective counselling techniques and no access to structured protocols have been recognized as major barriers for healthcare workers to recommend/prescribe PA (4,7). For those not recommending PA, firsthand experience of the positive health effects of PA in the clinical work was identified as an important motivating factor (4). Thus, attitudes, knowledge, confidence and specific experience are among the factors shown to influence healthcare workers likelihood to recommend PA to patients.

Patients' attitudes towards PA and their compliance with the advice they receive are also important factors that influence the implementation of a PA recommendation. Work among general practitioners in a southern French city has shown that non-compliance with a PA recommendation is a major problem in preventing and treating obesity (9). A patient's interests, support from family and cultural barriers are examples of factors that influence the promotion of activity (10). Practical factors, such as poor availability of appropriate facilities, are also important (9).

Physical inactivity and health

Physical inactivity is a widely discussed topic. A report from WHO (2009) identified physical inactivity as the fourth leading underlying risk factor of all-cause mortality (11). Only three factors were associated with higher risks of mortality (high blood pressure, tobacco use, and high blood glucose). Spending the major part of the day sitting (for example watching TV) is also associated with a greater risk of all-cause mortality (12). The human body needs frequent physical activity to function properly (13). Most of the body's organs and tissues are affected by exercise. Regular physical activity decreases many cardiovascular risk factors *e.g.* stimulates better function and structure of the blood vessels that serve the heart, changes the composition of lipoproteins, decreases blood pressure and improves insulin sensitivity (14-17), improves the function of the nervous system and thereby increases cognitive ability, leads to fewer symptoms of depression and has neuroprotective effects (18-22). Thus, an increase in PA increases quality of life and reduces all-cause mortality (23-25).

The WHO has issued global recommendations for sufficient physical activity to enhance cardiovascular fitness and prevent diseases (26). The recommendations are: "1. Adults aged 18-64 should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week, or do at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week, or an equivalent combination of moderate- and vigorous-intensity activity. 2. Aerobic activity should be performed in bouts of at least 10 minutes duration". Muscle-strengthening activities are also a part of the recommendation. The WHO considers physical activity to include leisure-time activities, transportation and occupational activity. Globally, 31 % of adults are physically inactive (13). Between 17 % and 34 % of people in South-East Asia and the Western Pacific, including Vietnam, are physically inactive (13).

It should be mentioned that there are contraindications to physical activity. Absolute contraindications include conducting exercise immediately after a myocardial infarction, unstable angina, severe aortic stenosis, congestive heart failure and during acute infections (27). Congenital cardiac anomalies and having poorly regulated blood glucose in patients with diabetes mellitus are examples of relative contraindications, where extra consideration must be taken before conducting exercise (27,28).

Sedentary patients run the highest risk of cardiac events during physical activity (28). The most common physical-activity associated injury is musculoskeletal injury (traumatic or

overuse), particularly when performing excessive and monotonous exercise (28). However, at a population level, the positive effects of regular PA massively outweigh the risks listed above (28). Type of PA, dose of PA and personal characteristics (such as health status) are factors associated with the risk of adverse events during exercise (28). Sedentary people will decrease their overall risk averaged over the day by a gradual increase in the frequency, duration and intensity of PA. Thus, individual considerations must be weighed in by the physicians and the patient when recommending PA and every recommendation must start with a gradual increase of the dose of PA (28).

Non-communicable diseases - a major health problem

A non-communicable disease (NCD) is one that is not passed from one person to another (29). The most widespread non-communicable diseases are cardiovascular conditions, cancers, chronic respiratory diseases and diabetes. Physical inactivity is one of four major risk factors for NCDs (30). The incidence of NCDs is increasing rapidly, and NCDs cause 63 percent of all deaths in the world (31).

NCDs are a major burden in countries of low- and middle-income, and 80 percent of deaths from NCDs occur in such countries (29). The WHO has predicted that global mortality from NCDs will rise by 15 percent in the ten years from 2010 (29). One of the regions that will be most affected is South-East Asia, where an increase by 20 percent has been predicted (29). It has been calculated that mortality will rise from 10.8 million people in 2010 to 15.4 million in 2015, for people younger than 70 years in 23 high-burden countries (32). Many deaths occur early in life, especially in countries of low- and middle-income (31). NCDs are thus a burden for these countries as they affect the economic situation and, consequently, general societal development (33). Vietnam is by the World Bank Atlas Method calculated to be a lower middle income country (34).

NCDs and physical inactivity in Vietnam

A wide and diverse spectrum of diseases is troubling Vietnam. In rural areas malnutrition is common, and in urban areas overweight and associated diseases are becoming prevalent. The prevalence of overweight and obesity in Ho Chi Minh City (one of Vietnam's biggest cities) in 2004 were 26.2 % and 6.4 %, respectively (35). Only 56.2 % of the population aged 25-64

years in Ho Chi Minh City carries out enough exercise to meet the criterion of "sufficient physical activity for disease prevention", which is comparable to the global recommendations for physical activity from the WHO (36). Urbanization, increased life expectancy and an increase in fast-food culture are possible reasons for the increased prevalence of NCDs in Vietnam (Dr T Huong, 25 September 2012, personal communication).

In Vietnam, as in other low- and middle-income countries (13,29,31-33), the relationship between NCDs and PA has not been studied extensively. Vietnam has not adopted a policy that addresses physical activity as a risk factor for NCDs (32), but a governmental action plan to combat NCDs is being actively implemented (32). Further work to prevent and treat NCDs in Vietnam is, however, necessary.

Physical activity on prescription

Several methods for increasing physical activity are available, such as a simple activity advice or counselling, exercise in groups, and physical activity on prescription (PAP). Giving a written prescription to a patient as a complement to verbal advice is more effective than verbal advice alone (37), which is one of the benefits of PAP. PAP can change the patient's behaviour regarding physical activity (23,38). The key element of PAP is an individualized recommendation for physical activity, which is accomplished through an individualized patient interview, a written prescription of physical activity, possible collaboration with an organizer of activities, and follow-up (39). Since 2003, a knowledge bank known as "Physical Activity in the Prevention and Treatment of Disease" (PAPTD) has been used in Sweden as an aid for writing a physical activity prescription (2). PAPTD, written by 95 experts led by Swedish Professional Associations for Physical Activity, is a scientific handbook on the effects of PA, and informs prescribers about what to recommend. The book was translated to Vietnamese in 2012 from the second edition of the Swedish book "FYSS" (2,40). PAP is the English version of the Swedish concept named "FaR" (39).

The early implementation phase of PAP in Sweden was studied in ordinary primary healthcare settings in order to evaluate the feasibility and effects of PAP (23). The study included patients of both sexes and all ages. Levels of physical activity, readiness for change and quality of life were major measurements, and these were estimated using questionnaires at baseline and after 6 months. Physical activity in daily life and exercise had increased

significantly at the 6-month follow up, as had both physical and mental qualities of life. Patients had passed from a preparation stage to stages of action and maintenance. Overweight older adults achieved significantly higher PA levels and less inactivity after receiving individualized PAP than those who received minimal intervention (written general information on the benefits of PA for health) (23). The intervention group in this study also experienced significantly better effects on weight, BMI, fat mass and cardio metabolic risk factors (HbA1c and cholesterol). PAP in structured programmes has similar compliance as treatment with pharmaceutical drugs for chronic diseases (23).

A course on physical activity on prescription in Vietnam

As part of the process to stimulate the prevention and treatment of NCDs in Vietnam, Vietnamese doctors, nurses and other healthcare professionals have attended courses in how to recommend and prescribe physical activity to their patients. The courses were arranged through a SIDA-funded collaborative project between Karolinska Institutet in Stockholm, Sweden, and Hanoi Medical University in Vietnam. In 2011 and 2012, the courses took place in Sweden (two courses), in the Phu Tho province of Vietnam (two courses), and in Hanoi (five courses). The core course was two days and included mainly lectures, but also patient cases and work-shops. Focus was on the method of prescribing PA (PAP) and on the knowledge bank PAPTD. The book PAPTD was translated into Vietnamese as part of the collaboration project (and it was printed after the sample data was collected, in November 2012). The course in Sweden was an extended course (twice the length of the core course) and included aspects of physical activity from a perspective of social economics and health economics, in addition to the subjects of the core course. The participants of the courses in Sweden were committed to work as supervisors during the courses in Vietnam, and were referred to as the TOT (Training Of Trainers) course participants. Those who attended the course in Vietnam are here labelled the non-TOT course participants (non-TOTs). The expected results from the courses on PAP were a Vietnamese population of healthcare workers with a higher level of awareness of the importance of physical activity and a start of an implementation phase of PAP in the Vietnamese healthcare.

Evaluation of training courses

When evaluating a training program, four levels of evaluation are necessary according to Kirkpatrick's model (41). The levels are reaction, learning, behaviour and results. Each level is equally important and has an impact on the next level. For the training courses on physical activity on prescription in Vietnam, reaction sheets and "Action plans" (where participants set up short and long term goals related to PA in healthcare and a plan to achieve them) were collected directly after the participants attended the course. In the present study, attitudes and knowledge were investigated, which along with skills constitutes learning. A change in attitudes, knowledge and/or skills is necessary to achieve a behavioural change. For a change in behaviour, the participants also need an encouraging climate and to receive rewards for their work. Therefore, a lack of behavioural change does not mean that the participants lack knowledge or positive attitudes. This is why the second level must be evaluated before changes in behaviour or final results are studied.

The attitudes and knowledge about the concept of PAP after the training courses held for Vietnamese healthcare workers and the Vietnamese patients' barriers to turning activity advice into practice had not been studied. The effects of the courses were therefore evaluated, with the expectation to obtain useful information about how to improve the structure of the courses to achieve a better effect in the Vietnamese healthcare context. Another expectation was to gain understanding of the attitudes to PAP that must be overcome in the Vietnamese population of healthcare workers and patients. Further, it could provide a basis for the next step forward in the combat against the rising incidence of life-style related NCDs in Vietnam and other developing countries.

Aims

The overall aim of this study was to investigate perceptions of PA among Vietnamese healthcare workers after a course on PAP. The specific aims were to investigate the attitude to PAP, to assess self-reported knowledge about PAP and confidence to recommend PA, to identify areas in which the course participants report a lack of knowledge and to investigate the course participants' perception of patients' attitudes to increased PA and patient socioeconomic and health-related barriers to adhere to a prescription of PA. These outcomes would be compared between TOT/non-TOT course participants, physician/non-physician participants and Hanoi/Phu Tho participants.

Materials and Methods

Population

Healthcare workers who had participated in the training courses in Sweden (TOTs) or in Vietnam (non-TOTs) comprised the study population, and consisted of 12 and 161 participants, respectively. All participants were selected to have specialities relating much to PAP, an interest in PAP and a wish to apply the concept in their daily work. Furthermore, TOTs were selected from those holding key positions in the Vietnamese healthcare system relating to PAP, and good knowledge in English as well as an ability to teach were also considered. TOTs had also committed to teach PA. The participants in both groups were working mainly in Hanoi (urban area) and in the Phu Tho province (rural area), Vietnam. Eight participants were excluded (medical students at Hanoi Medical University) since they had attended only a part of the original course. Six participants who lived and worked in provinces far from Hanoi were also excluded. The total population after exclusion was 159 participants (TOTs=12, non-TOTs=147).

Study design

The study design was cross-sectional and semi-quantitative with no control group. The data were collected through a questionnaire.

Data collection/ Questionnaire administration

The questionnaires were distributed and collected at the workplaces of the participants, 6-14 months after the courses, with the assistance of Vietnamese medical students from Hanoi Medical University. These students contacted the participants in advance and made an appointment or offered guidance directly to the participants' workplaces. The questionnaire was distributed with brief verbal information in Vietnamese about the aim of the study, making it clear that participation was voluntary and that the data would be handled anonymously. The participants were given the time they required to complete the questionnaire. Each completed questionnaire was put into an envelope that was sealed and numbered. Some participants completed the questionnaire directly on site, while others were given a questionnaire in an envelope to complete when they had the time. The time taken for

participants to complete and submit the questionnaire ranged from 20 minutes to one week. Participants who submitted a completed questionnaire was given a compensation of USD 3.

Questionnaire

A questionnaire (see appendix 1) was written based on: 1) literature on the subject (42,43), 2) guidance from an expert on surveys, and 3) feed-back from a statistician. The questionnaire included questions of the participants' self-evaluation of: change in interest in PA after the course on PAP, perceived importance of PAP in the healthcare, level of knowledge about benefits with PA, level of knowledge about how PAP should be used, areas within their professional expertise on PA that the wish they had more knowledge about, confidence to prescribe PA, perceived patients' attitudes to increased PA, and perceived patients' barriers to adhere to a prescription of PA.

The questionnaire had a total of 10 questions. Eight questions were to be responded to on a 5-point Likert-type scale ranging from "Very poor, Very unconfident, Very negative" and similar formulations, to "Very good", "Very confident" and "Very positive", respectively. The remaining two questions had seven alternatives and the opportunity for a short written answer from the participants. The first of the two questions asked which areas of PA that the participants wish they had more knowledge about, and participants were requested to choose a maximum of three alternatives in reply to this question. The alternatives listed were as follows: "how to use PAPTD", "how to use PAP", "benefits of physical activity", "which diagnoses that can be treated", "amount of physical activity to recommend", "what type of physical activity to recommend", "I consider myself to have sufficient knowledge", or "other, namely". The second of the two questions asked about participants' perception of patients' barriers for adhering to a PA prescription, and participants were requested to rank three alternatives from the most important to the third most important. The alternatives listed were as follows: "patients lack time to exercise", "patients lack money to fulfil my prescription", "patients feel a lack of acceptance of physical activity in their circles", "patients have no access to appropriate facilities", "patients' medical conditions limit their ability to perform exercise", "patients have a lack of motivation", "I haven't perceived any limitations or difficulties", or "other, namely".

Background questions were included in the questionnaire to provide information on when and where (Sweden or Vietnam) respondents had attended the course, their age, gender, profession, work tasks and length of education. A cover page consisting of information about the study and contact details was included. The questionnaire was translated into Vietnamese.

Non-response analysis

There were 36 subjects (23 %) who dropped out from the study because they could not be reached during the period of the data collection, since they were on maternity leave, had changed their workplace or were on a business trip (see Figure 1). See table A in appendix 2 for the number of questionnaires collected at each workplace.

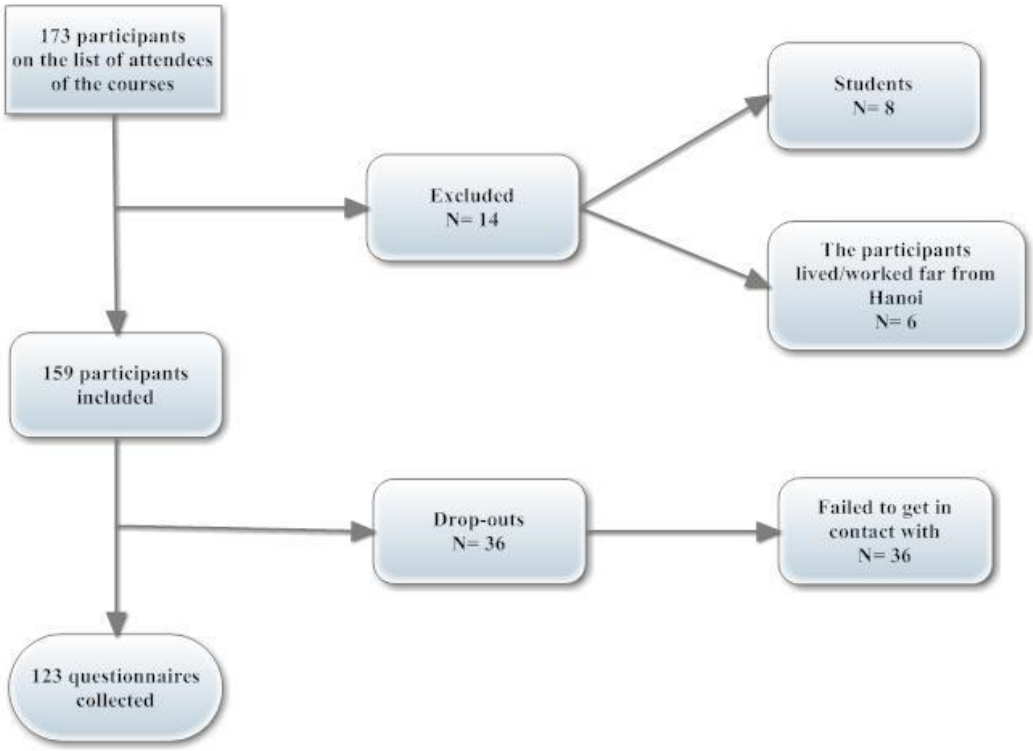

Figure 1. Flow-chart with number of participants in the study.

Statistical analysis

Participants were recruited from two groups (TOTs and non-TOTs) depending on if they had attended the course in Sweden or in Vietnam. The participants were also categorized into four groups of professions: 1) Physician (including physicians with shorter (2 years) education), 2) Nurse (included nurses and midwifes), 3) Medical collaborator/volunteer, and 4) Other (included mainly lecturers and researchers). Groups 2-4 are also referred to as non-physicians.

The data were entered and stored in Microsoft Excel data sheet. For the statistical analyses, IBM SPSS Statistics version 21 (IBM Corporation, US) was used. All data are presented using descriptive statistics with frequency and proportion for all categorical variables including missing values. Comparisons between groups with regard to categorical outcome variables were made using the Chi-square test. This method is commonly used for analysis of categorical data (44). Correlation was estimated using the Spearman's rank order correlation coefficient, which is a non-parametric test for analysis of ordinal categorical data. We used this method, because this is only based on ranks in both variables, and we did not assume that there was a linear relation between the two variables analysed. All tests were two-sided and $p<0.05$ was regarded as statistically significant. Participants with single unanswered questions in the questionnaire were excluded from the analysis of those specific questions, referred to as missing data.

Ethical considerations

Ethical aspects considered during the preparation of the present study included that the participants could have felt pressured to take part and that the anonymity of the participants could have been violated when data was collected and handled. Since it was made clear that the researchers conducting this study did not include the superiors of the participants nor any governmental agency and that the financial compensation was very moderate (3 USD/participant) we assumed that the people asked to participate did not feel that they were pressured to take part for reasons other than the wish to help improve the course. The rate of participation may have been positively affected by the fact that the researchers came from Karolinska Institutet, who was a stakeholder of the course.

To avoid violation of participants' anonymity, the questionnaires did not include any questions about personal information such as name and address. When the participants had filled out the questionnaire, they put it in an anonymous envelope that was coded with a number. The number was linked neither to the participant nor to the hospital that the participant worked. The participants were informed that completing the questionnaire was voluntary and they had the opportunity to ask questions, both at site and afterwards via e-mail. Written information about the study and our contact information were handed out together with the questionnaire.

Results

In total, 123/159 (77%) participants submitted a completed questionnaire. There were 55/123 (45%) respondents in Hanoi and 64/123 (52%) respondents in Phu Tho. Two participants worked in other provinces and two participants had missing data, and were therefore excluded from the analysis comparing these two groups. The questionnaire was completed by 10/12 (83%) of the TOTs and 110/147 (75%) of the non-TOTs. Three participants were not possible to categorize to TOT/non-TOT course participants (non-eligible) and were therefore excluded from the analysis comparing these two groups. Characteristics of the responding participants are presented in Table 1.

Table 1. Demographic characteristics of participants.

		N	%
Age group (years)	younger than 20	1	1
	21-35	58	47
	36-50	48	39
	51-65	15	12
	older than 65	1	1
Gender[a]	Male	42	34
	Female	79	64
Course	TOT	10	8
	non-TOT	110	89
	non-eligible	3	2
Occupation	Physician	66	54
	Nurse	39	32
	Volunteer/medical collaborator	10	8
	Other	8	7
Length of health care education	1 year or less	1	1
	more than 1 year, less than 2 years	10	8
	2-3 years	20	16
	more than 3 years	92	75
Length of work within health care (years)[b]	0-1	6	5
	2-5	37	30
	6-15	32	26
	more than 15	46	37
Province[c]	Hanoi	55	45
	Phu Tho	64	52
	Other	2	2

For the responding Vietnamese healthcare workers who attended a course on PAP (n=123). Numbers are presented as the number of responding participants (N) and percentage of n (%).

Abbreviations: TOT = Training of Trainers, this group attended the course in Sweden; non-TOT = attended the course in Vietnam; PAP =Physical Activity on Prescription

a. There were 2 subjects with missing data.
b. There were 2 subjects with missing data.
c. There were 2 subjects with missing data.

Attitudes to PA

A majority of the participants ranked PAP to be of high importance in healthcare and no differences of statistical significance could be detected between TOTs and non-TOTs (p=0.300) (see Table 2). All but one participant reported a greater interest in PA as part of healthcare after the course on PAP.

Table 2. Perceived importance of PA in healthcare among TOT and non-TOT participants.

		Course[a]						
		TOT (n=10)		non-TOT (n=110)		Total (n=120)		p-value
		N	%	N	%	N	%	
Perceived importance of PA in healthcare	Very unimportant	0	0	0	0	0	0	0.300
	Somewhat unimportant	0	0	0	0	0	0	
	Neither important nor unimportant	0	0	7	6	7	6	
	Somewhat important	2	20	42	38	44	37	
	Very important	8	80	61	55	69	58	

Scores are based on 5-point scales. Total population n=123. Numbers are presented as number of responding participants (N) and percentage of n for each categorical group (%). Comparison between groups with regard to all 5 categorical variables using chi-square test, with $p<0.05$ regarded as statistically significant.

Abbreviations: TOT= Training of Trainers, this group attended the course in Sweden; non-TOT group = attended the course in Vietnam; PAP= Physical Activity on Prescription; PA= Physical Activity.

a. There were 3 subjects who were non-eligible.

Knowledge and confidence

TOT/non-TOT course participants

There was almost no difference between TOTs and non-TOTs regarding self-reported knowledge about the benefits of PAP or how PAP should be used (see Table 3) (p=0.985 and p=0.854, respectively). Overall, most of the participants ranked their knowledge to be "neither good nor bad". No differences in confidence to recommend/prescribe PA between TOTs and non-TOTs were observed (p=0.884). In the total sample, a correlation with confidence was observed for both knowledge on benefits of PAP (r_s=0.641, $p<0.01$) and for knowledge on how to use PAP (r_s=0.624, $p<0.01$) in the total population.

Table 3. Self-reported knowledge about PAP and confidence to recommend/prescribe PA among TOT and non-TOT course participants.

		Course[a]						
		TOT (n=10)		non-TOT (n=110)		Total (n=120)		p-value
		N	%	N	%	N	%	
Knowledge about benefits of PAP	Very poor	0	0	3	3	3	3	0.985
	Poor	1	10	10	9	11	9	
	Neither poor nor good	5	50	54	49	59	49	
	Good	3	30	35	32	38	32	
	Very good	1	10	8	7	9	8	
Knowledge about how to use PAP	Very poor	0	0	5	5	5	4	0.854
	Poor	0	0	7	6	7	6	
	Neither poor nor good	6	60	61	55	67	56	
	Good	3	30	30	27	33	28	
	Very good	1	10	7	6	8	7	
Confidence to recommend/prescribe physical activity	Very unconfident	0	0	4	4	4	3	0.884
	Somewhat unconfident	1	10	5	5	6	5	
	Neither confident nor unconfident	3	30	42	38	45	38	
	Somewhat confident	4	40	36	33	40	33	
	Very confident	2	20	23	21	25	21	

Scores are based on 5-point scales. Total population n=123. Numbers are presented as number of responding participants (N) and percentage of n for each categorical group (%). Comparison between groups with regard to all 5 categorical variables using chi-square test, with $p<0.05$ regarded as statistically significant.

Abbreviations: TOT= Training of Trainers, this group attended the course in Sweden; non-TOT group = attended the course in Vietnam; PAP= Physical Activity on Prescription; PA= Physical Activity.

a. There were 3 subjects who were non-eligible.

Province

There were differences in self-reported knowledge between participants working in Hanoi and in Phu Tho (see Table 4). The Phu Tho participants reported significantly stronger ability on how to use PAP compared to Hanoi (p=0.043). There were tendencies to the Phu Tho participants having better knowledge on benefits of PAP (p=0.066) and better confidence (p=0.069).

Table 4. Self-reported knowledge about PAP and confidence to recommend/prescribe PA among Hanoi and Phu Tho participants.

		Province[a]						
		Hanoi (n=55)		Phu Tho (n=64)		Total (n=119)		p-value
		N	%	N	%	N	%	
Knowledge on benefits of PAP[b]	Very poor	3	5	0	0	3	2	0.066
	Poor	7	13	4	6	11	9	
	Neither poor nor good	27	49	32	50	61	50	
	Good	16	29	21	33	38	31	
	Very good	1	2	7	11	9	7	
Knowledge on how to use PAP	Very poor	5	9	0	0	5	4	0.043*
	Poor	5	9	2	3	7	6	
	Neither poor nor good	30	55	37	58	70	57	
	Good	13	24	19	30	33	27	
	Very good	2	4	6	9	8	7	
Confidence to recommend/prescribe physical activity	Very unconfident	4	7	0	0	4	3	0.069
	Somewhat unconfident	3	5	3	5	6	5	
	Neither confident nor unconfident	23	42	21	33	47	38	
	Somewhat confident	14	25	27	42	41	33	
	Very confident	11	20	13	20	25	20	

Scores are based on 5-point scales. Total population n=123. Numbers are presented as number of responding participants (N) and percentage of n for each categorical group (%). Comparison between groups with regard to all 5 categorical variables using chi-square test, with $p<0.05$ regarded as statistically significant (marked with (*)).

Abbreviations: PAP= Physical Activity on Prescription.

a. There were 2 subjects from other provinces and 2 subjects with missing data.
b. There was 1 subject from Hanoi with missing data.

Occupation

There was generally a difference in confidence between different occupational groups (p=0.048). Of the physicians, 7/66 (11%) were unconfident, while 3/57 (5%) of the non-physicians were unconfident.

Lack of knowledge

Areas the participants have reported they wished they had more knowledge on, within their professional expertise on physical activity, are presented in Table 5.

Table 5. Areas of reported lack of knowledge within the participants' professional expertise on physical activity.

	N	%
Which diagnoses that can be treated with PAP	76	62
Amount of PA to recommend	69	56
How to use PAPTD	62	50
What type of PA to recommend	45	37
Benefits of PA	36	29
How to use PAP	28	23
I consider myself to have sufficient knowledge	4	3

Total population n=123. Numbers are presented as number of responding participants (N) and percentage of 123 (%). Respondents may have selected more than one area.

Abbreviations: PA= Physical Activity; PAPTD= Physical Activity in the Prevention and Treatment of Disease; PAP= Physical Activity on Prescription.

The participants working in Hanoi reported a significantly greater need for more knowledge about how to use PAP (p=0.047), consistent with the lower reported ability. However, for knowledge about benefits of PA the situation was reversed, with Phu Tho participants having a stronger wish for more knowledge (p=0.024) (see Table 6).

Table 6. Areas of reported lack of knowledge within Hanoi and Phu Tho participants' professional expertise on physical activity.

	Province[a]						
	Hanoi (n=55)		Phu Tho (n=64)		Total (n=119)		p-value
	N	%	N	%	N	%	
Which diagnosis that can be treated with PAP	36	65	39	61	76	62	0.611
Amount of PA to recommend	32	58	34	53	69	56	0.580
How to use PAPTD	25	45	36	56	62	50	0.240
What type of physical activity to recommend	18	33	24	38	45	37	0.587
Benefits of PA	11	20	25	39	36	29	0.024*
How to use PAP	17	31	10	16	28	23	0.047*
I consider myself to have sufficient knowledge	3	5	1	2	4	3	0.240

Total population n=123. Numbers are presented as number of responding participants (N) and percentage of n for each categorical group (%). Comparison between groups with regard to a categorical variable using chi-square test, with $p<0.05$ regarded as statistically significant (marked with (*)). Respondents may have selected more than one area.

Abbreviations: PA= Physical Activity; PAPTD= Physical Activity in the Prevention and Treatment of Disease; PAP= Physical Activity on Prescription.

a. There were 2 subjects from other provinces and 2 subjects with missing data.

Patients' attitudes and barriers

The majority of all participants (75/123, 61%) perceived patients to be positive to a more physically active life-style. In Phu Tho, 46/64 participants (72%) reported positive attitudes of their patients compared to 27/55 participants (49%) in Hanoi (p=0.119) (see Table 7).

Table 7. Vietnamese healthcare workers' perception of their patients' attitude towards becoming more physically active.

		Province[a]						
		Hanoi (n=55)		Phu Tho (n=64)		Total (n=119)		p-value
		N	%	N	%	N	%	
Perceived attitude of patients on becoming more physically active[b]	Very negative	0	0	0	0	0	0	0.119
	Negative	2	4	2	3	4	3	
	Neither negative nor positive	23	42	16	25	39	33	
	Positive	24	44	37	58	61	51	
	Very positive	3	5	9	14	12	10	

The difference between Hanoi and Phu Tho. Total population n=123. Numbers are presented as number of responding participants (N) and percentage of n for each categorical group (%). Comparison between groups with regard to all 5 categorical variables using chi-square test, with $p<0.05$ regarded as statistically significant.

a. There were 2 subjects from other provinces and 2 subjects with missing data.
b. There were 3 subjects from Hanoi with missing data.

The most frequently reported barrier for patients to turn a prescription of PA into practice was that patients have no access to appropriate facilities, as reported by 69/123 (56%) participants. Patient's lack of time and lack of motivation were both reported by 68/123 (55%) participants (see Table 8).

Table 8. Vietnamese healthcare workers' perception of their patients' barriers to turning activity advice into practice.

	N	%		N	%
Patients have no access to appropriate facilities	69	56	*most important*	27	22
			second most important	26	21
			third most important	16	13
Patients lack time to exercise	68	55	*most important*	38	31
			second most important	13	11
			third most important	17	14
Patients have a lack of motivation	68	55	*most important*	23	19
			second most important	29	24
			third most important	16	13
Patients' medical conditions limit their ability to perform exercise	50	41	*most important*	10	8
			second most important	23	19
			third most important	17	14
Patients feel a lack of acceptance of PA in their circles	29	24	*most important*	6	5
			second most important	10	8
			third most important	13	11
Patients lack money to fulfil my prescription	25	20	*most important*	6	5
			second most important	12	10
			third most important	7	6
I haven't perceived any limitations or difficulties	6	5	*most important*	3	2
			second most important	1	1
			third most important	2	2
Other	3	2	*most important*	2	2
			second most important	0	0
			third most important	1	1

Ranking for every statement from the most important to the third most important. Total population n=123. Numbers are presented as number of responding participants (N) and percentage of 123 (%). Respondents may have selected more than one statement.

Abbreviations: PA= Physical Activity

Discussion

Attitudes to and knowledge about physical activity among Vietnamese healthcare workers were studied to evaluate a course on physical activity on prescription (PAP). Participants appeared to have a positive attitude to PAP but reported a low level of knowledge about benefits of PAP and how PAP should be used, and the knowledge appeared to be related to whether the participants worked in a large city or in a more rural province.

As expected, participants rated PAP to be of high importance in healthcare. Similar results were seen from the questionnaires distributed directly after the courses (November 2011 in

Vietnam), where a majority reported that the course was appropriate for his/her needs as a practitioner and for the Vietnamese healthcare context in general (G Beckvid Henriksson, 21 December 2012, personal communication). The awareness and positive attitudes appear to persist among the course participants. This is promising for the future of PAP in Vietnam, not least since awareness of PA as an important health factor is positively associated with providing activity advice (3). Moreover, the courses resulted in a greater reported interest in PA as part of healthcare which was also mentioned as strength in previous evaluation forms (Action Plans from April 2012) (G Beckvid Henriksson, December 2012, personal communication). In summary, the results on importance of PAP and interest in PA indicate that healthcare workers' attitude to PAP is in general positive (3).

The participants' motivation, an essential factor for learning (45), could be assessed by studying the participants' attitudes on the importance of PAP in the healthcare and their confidence to recommend PA. Motivation is based on an understanding of the value of the course, and an expectation that it will be possible to implement the method (45). Since this is a new concept in Vietnam, it might take time before practitioners are receptive to learning by fully believing in the value of PAP and being able to picture the method as a part of the future healthcare in Vietnam.

Since no differences were found between the TOT (Training of Trainers courses, conducted in Sweden) and the non-TOT course participants, the course in Vietnam can, from the perspective of the respective participant group, be assumed to have been of similar quality as the course in Sweden. This was unexpected since the courses in Sweden were extended courses and, moreover, the participants had more academic experience. The lack of difference might be explained by the small number of TOTs, making a statistical comparison more difficult with an enhanced risk of type II-error.

A higher level of knowledge after the course is desirable, since more than half of the population report their knowledge to be "neither good nor bad", both TOTs and non-TOTs. This might indicate that there is a serious deficiency in the course concept or that the participants considered their knowledge level after the course only, since they were not explicitly asked whether the course had increased their knowledge. Since there are neither objective nor subjective data available on the participants' knowledge before or directly after the course to compare with, it is impossible to say whether the participants started with a very

low level of knowledge, and actually have improved to their present level, or if the course failed to provide more knowledge, or if the knowledge has been lost over time. Since the time span from the course participation to the response to the questionnaire of the present study varied between participants, it is difficult to generalize and come to a conclusion whether and, if so, how much knowledge was lost over time. However, it has been suggested that knowledge and attitudes could stand over time, but skills can be lost (46). Moreover, a fraction of the study population had management or teaching positions in the healthcare or university system of strategic and political importance for the overall goal of the project, but did not have a professional position that involves prescription of PA. These participants might have lost their knowledge and skills due to a lack of exposure in their daily work (47). Therefore, an objective evaluation of the knowledge and skills of the participants is desirable.

A need for knowledge about which diagnoses that can be treated with PAP and amount of PA to recommend was clearly expressed. Even though advice on specific diagnosis was reported as a strength of the course, participants also thought too little time was spent on this subject, indicating that it needs to be further emphasized (reaction sheets from November 2011) (G Beckvid Henriksson, December 2012, personal communication). Moreover, previous studies also show that lack of knowledge on which medical conditions to treat is a problem (48).

The evidence-based 600-page handbook on PA (PAPTD) that includes guidelines on what to prescribe at several diagnoses was not yet printed when the questionnaires were collected. An English version of PAPTD was free to download, but considering the low proficiency in English among many of the health care workers and a limited access to computers for practitioners in Vietnam, it might not have been used. Furthermore, participants reported dissatisfaction with the written material from the course (reaction sheets from November 2011). Thus, most of the healthcare workers had little or only the translated course material (including power-point presentations translated to Vietnamese) to rely on after the course. The written information should therefore be improved, and one must also be sure that the information reaches the practitioners. In Vietnam, the translated book PAPTD should be used at an early stage of future courses and, in addition to this, promoted and advertised to all practitioners.

Short training courses are only one way to gain knowledge and skills on the method of PAP, and might not be the best. A study on a frequently used scale for rating general functioning of

children showed no improvements of clinical relevance in the practitioners' ability to use the scale after education (seminars and computer-based training), compared to the control group (49). Thus, education does not always lead to a gain of knowledge or skills. Active learning, such as work-shops and patient cases, has been focused on as a more effective way to learn (45). This was also suggested from several non-TOT participants (G Beckvid Henriksson, 21 December 2012, personal communication), as more practical sessions were desired. The course might benefit from adopting the theory of "Problem Based Learning" (50), which has been suggested to have better knowledge retention compared to traditional learning (51). Also, simulated patient cases can be used to practice and to evaluate skills (52,53). This could lead to a more reliable gain of knowledge and skills which is essential when implementing the method.

In a phase of implementation of PAP, the patients' attitudes and barriers are important to understand (9,10). The attitudes of the Vietnamese population to PAP remains unknown, but this study shows that from the perspective of the healthcare providers, patients are positive to a more physically active life-style. Interestingly, patients were perceived to be more positive to PA in rural Phu Tho, than in the city of Hanoi. It is difficult to determine whether this finding is applicable on other rural and urban areas, and if it is influenced by the healthcare workers' attitudes, since they themselves were very positive to PAP. As the lack of appropriate facilities was considered the top barrier for patients to adhere to a prescription, one explanation could be that there are very few areas in Hanoi where people can perform physical activity. Availability of fitness centres has been recognized as a useful tool for increasing PA (9). However, the definition of an "appropriate" facility can vary as a result of climate and cultural differences on how to perform physical activity, and therefore an analysis on what kind of facilities that are most appropriate for the Vietnamese people is needed.

One out of ten physicians regarded themselves unconfident, which was a higher rate than for non-physicians. Lack of time for administrative work is a problem Vietnamese physicians are struggling with every day because of the heavy workload in their clinical work (Dr T Huong, 25 September 2012, personal communication). This might affect their capacity to learn and implement new methods. Lack of time has been observed as a problem in other healthcare settings as well (3,54). It could be worthwhile to consider focusing the education on PAP on nurses and other healthcare workers, such as medical volunteers in the Vietnamese rural healthcare. In some healthcare settings, nurses already promote PA more frequently than do

physicians (4), but more education for nurses is necessary (55). This study had a rather small population and included very few cases of unconfident physicians, thus more studies and studies with a larger population are necessary to confirm or refute this observation.

As expressed during several meetings that the author attended in Vietnam, healthcare workers appear to be concerned for the patient's safety when exercising, which could be a barrier for providing an activity advice. The well-documented benefits of PA on health, risks associated with exercise and how to minimize these risks must therefore be further emphasized (23-25,27,28). Lack of rewards for the practitioners' efforts to implement PAP could also be a barrier to providing activity advice (3). More recognition and support from higher public authorities, medical colleagues as well as the public at large is probably necessary to successfully implement the method in the Vietnamese healthcare, as these have been recognized as important factors in other healthcare settings (4). With support from the community, it might be possible to deal with barriers recognized in this study, such as the lack of appropriate facilities for being physically active.

Strengths and limitations

Since we lack demographic data on the total study population, it is not possible to co determine whether respondents are representative for the total study population or to discover any systematic bias in the missing cases. The non-randomized selection of the participants could have influenced the results and thus the conclusions of the study. To achieve the most effective implementation of PAP in the Vietnamese healthcare, the participants were selected for having an interest in PAP as well as a speciality related to PAP. Thus, the selection bias of participants could have contributed to the positive results on attitudes. The validity of a questionnaire conducted retrospectively (6-14 months after course) may be also questioned.

The personal characteristics of healthcare workers and their personal exercise behaviour have been shown to affect their attitude to PA (3,6,9). This aspect was not considered in this study. Because of the non-randomized selection of participants, it is questionable if the results are applicable to Vietnamese healthcare workers in general and the study might have limited relevance for other healthcare contexts. Since there are no similar studies on this subject in Vietnam to compare with, it is not possible to predict the relevance for the Vietnamese healthcare.

The design of the questions, the design of the questionnaire as a whole and the administration of the questionnaire (56) were other possible biases of the study. The questionnaire was developed without earlier experience on questionnaire construction and it was not pretested. Translation of the questionnaire to Vietnamese adds to the risk of ambiguous questions, and no back-translation was made. In addition to this, there can be cultural differences in how one perceives questions. To limit this risk, the questionnaire was inspected by Vietnamese colleagues. As for the short verbal information in Vietnamese, there is no guarantee that the information given to the participants was what it was intended to be. Therefore the value of the study might have been perceived as obscure, which could have influenced the motivation of the participants to complete the questionnaire. Since it was difficult to obtain permission to collect data on the hospitals in Vietnam as a foreigner, Vietnamese medical students collected the questionnaires independently in most cases. Consequently, the researcher could not fully control the questionnaire distribution.

The financial compensation (3 USD/participant), even though modest, was introduced after advice from the Vietnamese colleagues in the project to increase the willingness to take part. The compensation might have affected the participants to give positive answers, or answers that they believe the researchers wish for, a bias known as social desirability (57). Social desirability can be measured with scales such as the "Marlowe Crowne Social Desirability Scale", to validate the impact on the responses (58). This could be used in future evaluations with self-reported measurements.

In addition to this, biases of self-reported data, such as the conscious and subconscious reactions that leads to certain answer (56), need to be considered. When using a scale format with odd number of categories, for example, many participants choose the alternative in the middle (which is often the most neutral). This, together with the fact that the questionnaire did not have an alternative answer for those who "did not know", could have contributed to that a large group of participants choose the alternative "neither good nor bad". Another issue with questionnaires is the risk of emotive and leading questions (56). Importance and interest are positive words and might have led to a higher proportion of positive answers. Primacy bias, the tendency to choose the first few response options, could affect the results of the questions with the possibility to choose more than one option (56), but it does not seem to have made a substantial difference. In addition, in any statistical analysis, for a certain statistical limit there is an inherent risk of a false positive result. In this study, there is a risk of false significant p-

values, type-I errors, as a result of the many variables studied. Although, more than 5 percent of the results where significant (3/17), with a significance level of 0.05. Moreover, the variables correlates, which increase the likeliness that all significant values are not a result of type-I-error.

A knowledge-test could have been a possible complement to get an objective view of the participants' knowledge, and it would have been desirable to perform a pre-test of the questionnaire to identify biases that could be eliminated. Moreover, it would have been desirable to have data from before and directly after the participants attended the course, since this study lacks the ability to verify a change in attitudes and knowledge. Nevertheless, the results contribute to an understanding of the present situation, and the study is not the only to use this method to study attitudes and knowledge (3).

This study had a relatively high response rate and investigated a relevant and important question for the implementation of PAP in Vietnam. It provided useful information on how to improve educational courses on PAP. Understanding the participants' attitudes to and knowledge about PAP after the course will also be of use to those who will present and lead PAP into the rest of the Vietnamese healthcare system. It contributes to present knowledge about healthcare workers attitudes to and knowledge about PA (3-7), but is relatively unique since it is performed in a developing country. The results can be useful to those doing similar projects in countries that are troubled by the steady rise in incidence of NCDs. Another study was conducted, studying PAP in the daily practice of the Vietnamese healthcare workers, which together with this study will give a comprehensive picture of how PAP is received and implemented in the Vietnamese healthcare.

Future research recommendations

Based on the findings of this study, my recommendation is to consider whether short training courses alone are the most effective way to get a successful implementation of the concept of PAP in the Vietnamese healthcare. Another important question is whether the level of knowledge acquired is enough to achieve a behavioural change, that is, to make participants recommend PA to their patients. The behavioural change is the next step in the Kirkpatrick's pyramid of evaluation (41) and needs to be further studied.

Conclusion

A change in attitudes or knowledge of the healthcare workers is necessary for a change in behaviour, thus, future objective evaluations of knowledge after the course is necessary since the results from this study may suggest an insufficient knowledge acquisition. However, the participants appeared positive to PAP, regardless of whether the course has had an impact or not. It should be pointed out that the present study suffers from certain biases and short-comings, wherefore further studies are needed to assess the usefulness of the training courses on PAP. A prospective study design is recommended for future research. Nonetheless, this study provides some insights about how a method to prescribe PA is received in a lower middle income country.

Student collaboration

Since this project aimed to evaluate the same original project as student colleague Agnes Thede, we partly collaborated during our projects. However, our aims differed as we studied different parameters, i.e. different data sets albeit from the same study subjects. My project studied attitudes to and knowledge about physical activity on prescription among the healthcare workers, whereas Agnes' project aimed to evaluate the daily practice of the healthcare workers regarding physical activity on prescription. Together we travelled to Vietnam and handed out and collected the questionnaire.

As parts of the background were the same we collaborated when writing some sections of Introduction. Parts of Material and methods were similar since we both used a questionnaire and had the same population, but the questionnaire had two different sections that were separately connected to our aims. The statistical analyses were performed separately, as we had different data. Results and discussion were written individually.

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Appendix 1

To the participants in the training courses on physical activity on prescription.

This questionnaire is given to you to evaluate the impact of the training course you attended in 2011-2012. The courses were a part of a collaborative project between Karolinska Institutet in Stockholm, Sweden, and Hanoi Medical University in Vietnam. In the training course you learned a method called 'Physical activity on Prescription' (PAP), to use in your daily practice. You also learned to use a knowledge bank called 'Physical activity in Prevention and Treatment of Disease' (PAPTD/FYSS).

We are two medical students from Karolinska Institutet that are involved in this project as a part of our medical degree. Prof. Carl Johan Sundberg and Dr. Tran Thi Thanh Huong are our supervisors for this project.

If you have any questions, don't hesitate to contact us.

Thank you very much for participating!

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Please tick one box if no other instruction is given, or write your answer at the line below the question. We appreciate your help!

1. Age (years):

□ less than 20 □ 21-35 □ 36-50 □ 51-65 □ more than 65

2. Gender: □ Male □ Female

3. When and where did you take the course in PAPTD/FYSS and PAP?

□ August 2011 in Sweden
□ November 2011 in Vietnam
□ February 2012 in Sweden
□ April 2012 in Vietnam

4. What is your profession?

□ Medical Doctor
□ Nurse
□ Midwife
□ Collaborator
□ Student
□ Other_____

5. What is your work task? (more than one tick is accepted)

□ Independent handling of patients
□ Assisting other professionals
□ Prescribing physical activity
□ Other_____

6. What is the length of your health care education?

□ 1 year or less
□ More than 1 year, less than 2 years
□ 2-3 years

□ More than 3 years

7. How long have you been working with health care?

□ 0-1 year
□ 2-5 years
□ 6-15 years
□ More than 15 years

8. Where is your workplace located?

Commune _____

Province_____

Question 9-16 of the questionnaire is related to the project of my student colleague Agnes Thede.

17. I consider my knowledge on the benefits of using physical activity on prescription to be…

□ Very poor
□ Poor
□ Neither poor nor good
□ Good
□ Very good

18. I consider my knowledge on how to use physical activity on prescription, as a resource for prevention and treatment of disease, to be…

□ Very poor
□ Poor
□ Neither poor nor good
□ Good
□ Very good

19. In what area/areas of your professional expertise on physical activity, do you wish you had more knowledge? *(Maximum 3 ticks are accepted)*

□ How to use PAPTD/FYSS

□ How to use PAP

□ Benefits of physical activity

□ Which diagnoses that can be treated

□ Amount of physical activity to recommend

□ What type of physical activity to recommend

□ I consider myself to have sufficient knowledge

□ Other, namely _____

20. How confident are you when recommending /prescribing physical activity?

□ Very unconfident

□ Somewhat unconfident

□ Neither confident nor unconfident

□ Somewhat confident

□ Very confident

21. How do you rate the importance of physical activity on prescription in the health care?

□ Very unimportant

□ Somewhat unimportant

□ Neither important nor unimportant

□ Somewhat important

□ Very important

22. After the course in physical activity on prescription, how did your interest for physical activity (as part of the health care) change?

□ I have much less interest

□ I have less interest

□ There is no difference in my interest

□ I have somewhat greater interest

□ I have much greater interest

23. In general, which attitude would you say your patients have towards becoming more physically active?

□ Very negative
□ Negative
□ Neither negative nor positive
□ Positive
□ Very positive

24. Which limitations or difficulties have you perceived that <u>your patients</u> may have had when you recommended/prescribed physical activity? *(Maximum 3 ticks are accepted. Please rank your answer: 1=most frequently perceived 2= second most frequently 3= third most frequently)*

___ Patients lack time to exercise

___ Patients lack money to fulfil my prescription

___ Patients feel a lack of acceptance of physical activity in their circles

___ Patients have no access to appropriate facilities

___ Patients medical conditions limit their ability to perform exercise

___ Patients have a lack of motivation

___ I haven't perceived any limitations or difficulties

___ Other, namely _____

Thank you for your co-operation!

Appendix 2

Table A. Questionnaire administration. List of locations, workplaces by frequency of participants and drop outs in the study population.

Location	Workplace	Total (n=159)	Collected (n=123)	Drop-outs (n=36)
Hanoi	Vietnam Sports Hospital	31	27	4
	National Hospital of Geriatrics	29	16	13
	Hanoi Medical University	11	6	5
	Thăng Long University	3	3	0
	Vietnam Association of Public Health	2	2	0
	National Institute of Nutrition	2	1	1
	Bạch Mai Hospital	1	1	0
	Ministry of Health	1	1	0
	National Endocrinology Hospital	1	0	1
	Health Centre of Ministry of Agriculture	1	0	1
	Tuệ Tĩnh Hospital	1	0	1
	Hospital of Rehabilitation	1	0	1
	National Heart Institute	1	1	0
	National Hospital of tropical diseases	1	0	1
	NCDs prevention & Health Promotion	1	1	0
Phu Tho province	General Hospital of Phú Thọ	40	35	5
	Medical station Nông Trang precint	10	8	2
	Medical station Tiên Cát precint	7	7	0
	Hospital of Nursing and Rehabilitation	4	4	0
	Việt Trì Preventative Medicine Centre	2	1	1
	Hospital of Traditional Medicine and Pharmacy	2	2	0
	Phú Thọ Health Department	1	1	0
	Phú Thọ Preventative Medicine Centre	1	1	0
	Medical station Tân Đức precint	1	1	0
	Medical station Sông Lô precint	1	1	0
	Medical station Vân Phú precint	1	1	0
	Medical station Thụy Vân precint	1	1	0
	Medical station Bến Gót precint	1	1	0