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Adolescents' attitudes towards physical activity on prescription for prevention and treatment of cardiovascular disease and type 2 diabetes

Is there a relationship between a teen´s attitude and physical activity level?

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Abstract

Sjögren, M (2012). *Attitudes among adolescents towards physical activity on prescription as a prevention and treatment for cardiovascular disease and type 2 diabetes, is there a relationship between a teen´s attitude and physical activity level?* Faculty of health and occupational studies, department for work and - public health science. C- thesis in Public Health. The University of Gävle.

Purpose: In this study the aim was to investigate adolescents´ attitudes towards physical activity on prescription as a prevention and treatment for cardiovascular disease and type 2 diabetes, and to see if the participants' physical activity level influenced these attitudes . *Methods:* The study was quantitative and cross-sectional. Questionnaires were handed out to upper secondary school to students attending pre- health care program or manual materials handling program. *Results:* The study did not find a correlation between physical activity level and attitudes towards physical activity on prescription for the prevention and treatment for either disease. A difference in attitudes was found between students based on educational program, pre- health care students were more positive towards physical activity on prescription. *Discussion:* Attitudes seem to be influenced by educational program and pre-health care students were more positive. Due to an imbalance between sexes within the program it remains uncertain whether educational program or sex had the largest impact on attitudes towards physical activity on prescription. *Conclusion:* Further, research is needed to determine if educational program or sex is the most determining variable for attitudes towards physical activity on prescription. To be able to assess what group to target for future public health campaigns regarding physical activity on prescription, variables that affects attitudes needs to be investigated further.

Keywords: Adolescents, attitudes, cardiovascular disease, type 2 diabetes, physical activity on prescription, physical activity level.

Sammanfattning

Sjögren, M (2012). *Attitudes among adolescents towards physical activity on prescription for cardiovascular disease and type 2 diabetes, is there a relationship between a teen´s attitude and physical activity level?* Akademin för hälsa och arbetsliv, avdelningen för arbets och-folkhälsovetenskap. Högskolan i Gävle.

Syfte: Studiens syfte var att undersöka ungdomars attityder till fysisk aktivitet på recept som förebyggande och behandling av hjärt- och kärlsjukdomar och typ 2 diabetes, samt att underöka om attityderna influeras av fysisk aktivitetsnivå. *Metod:* En kvantitativ tvärsnittstudie genomfördes. Enkäter delades ut på en gymnasieskola, till studenter på vård och omsorgsprogrammet och praktiska program (industri och bygg) *Resultat:* Studien fann ingen korrelation mellan fysisk aktivitetsnivå och attityder till fysisk aktivitet på recept för någon utav sjukdomarna. En skillnad mellan attityder fanns mellan studenter baserat på utbildningsprogram; omsorgsstudenterna var mer positiva till fysisk aktivitet på recept. *Diskussion:* Det oklart om program eller kön påverkade attituderna till fysisk aktivitet på recept mest. *Slutsats:* På grund av obalansen mellan könen krävs vidare forsknng för att avgöra om program eller kön påverkar attityder mest, för att kunna veta till vilken grupp en folkhälsokampanj för fysisk aktivitet på recept eventuellt ska riktas åt,bör variabler som påverkar attityderna kring fysisk aktivitet på recept undersökas vidare.

Nyckelord: Ungdomar, attityder, hjärt- och kärlsjukdomar, typ 2 diabetes, fysisk aktivitet på recept, fysisk aktivitetsnivå.

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1. Introduction

The prevalence of physical inactivity is on the increase, and is classified as one of the top ten leading global causes for disease and death [1]. The World Health Organization (WHO) stated that a sedentary lifestyle is a risk factor, not only for death, but also for development of certain diseases for example cardiovascular disease (CVD) and type 2 diabetes [2] .Two million deaths each year are related to physical inactivity[1] , further physical activity plays an important role in reducing the risk of these diseases [1].

According to the WHO 60 % of the world´s population does not meet the internationally recommended benchmark of 30 minutes per day of moderate physical activity [3] and are therefore insufficient physically active [4].

In Sweden between years 2007-2010, 14 % of the population was reported to be sedentary by national standards [5]. In September 2000, the Swedish Medical Association (Svenska läkarsällskapet) adopted physical activity recommendations in line with the international recommendations. All individuals are recommended to be physically active for at least 30 minutes per day at moderate intensity [1]. It was also stated that a larger amount than 30 minutes of moderate physical activity per day provides additional health benefits [1].

If individuals changed their lifestyles to be more active it would have a large impact on the public health, since a number of non- communicable diseases would decrease, for example CVD and type 2 diabetes [6].

1.1 The Swedish public health goal increased physical activity

The Swedish public health work is based on eleven public health goals. The ninth goal is increased physical activity (ökad fysisk aktivitet). This is a national strategy for promoting physical activity in the population [7].

One of the purposes of the ninth goal is to use the Swedish health care system to promote physical activity to patients. This includes prescribing physical activity on prescription (PAP) as a prevention and treatment for certain diseases, for example CVD and type 2 diabetes [1].

1.2 Physical activity on prescription for the prevention and treatment of disease

In 2000 the Swedish government provided the National Institute of Public Health with a task to make a campaign in 2001 called set Sweden in motion (Sätt Sverige i rörelse) [8]. This was

the starting point for a long term strategy to make the Swedish population more physically active. A recommended duration of 30 minutes of moderate physical activity per day was the main message in the campaign. The message that physical activity can prevent a range of diseases and that physical inactivity is a major risk factor in premature death, was also spread to the population [8].

During the campaign physical activity on prescription (PAP) was released. PAP means that physical activity is prescribed to individuals in the prevention or treatment of disease, and is a tool for health care professionals to promote physical activity to patients. PAP can be prescribed by licensed health care professionals, for example doctors and physiotherapists [9].

The 2001 campaign was successful and resulted in a new commission from the government for a new campaign called keep Sweden moving which instructed the national institute of public health to continue working to promoting physical activity in 2003 and 2004. One of the main goals was to make the health care professionals in Sweden more aware of how to implement PAP as a treatment and preventative measure to patients [9].

Physical activity promotion is, without a doubt, a large part of the public health work in Sweden today. In 2004 it was the most important public health topic in several Swedish communities, and today PAP is prescribed all over Sweden [10].

1.3 Type 2 diabetes and physical activity

Globally type 2 diabetes is one of the most common non-communicable diseases [11]. According to a study published in 2007, the global prevalence of type 2 diabetes is high: an estimated 346 million people suffer from diabetes, and around 90 % of these have type 2 diabetes, this makes type 2 diabetes, the most common type of diabetes [12]. The prevalence is expected to increase in the future [13]. By 2025 the prevalence of type 2 diabetes is expected to be 380 million people [11].

There is evidence that physical inactivity is associated with the risk of developing type 2 diabetes [14]. Further, higher levels of physical activity are associated with a lower risk of developing type 2 diabetes. This is the reason why physical activity has been considered a cornerstone for the treatment and prevention of type 2 diabetes [14].

The required amount of physical activity recommended to prevent type 2 diabetes varies. According to one study individuals who are moderately physically active have a lower risk of developing type 2 diabetes than completely sedentary individuals. This indicates that a moderate activity level is associated with a reduced risk of type 2 diabetes [14].The moderate intensity recommendation has been confirmed in other studies as well [13, 15] although, increasing the intensity may provide individuals with additional benefits [14,15].

1.4 Prescription of physical activity for type 2 diabetes

Evidence of physical activity as a prevention of type 2 diabetes was established in early 1990´s [11].

A change in lifestyle, and foremost increased physical activity, is fundamental in the prevention and treatment of type 2 diabetes [1]. Regular physical activity among patients with type 2 diabetes results in increased insulin sensitivity, lower blood pressure and a better cholesterol profile [1]. One study even reported that lifestyle changes (physical activity and diet etc.) have the same effect as medicines [16].

PAP recommendation for patients with type 2 diabetes is approximately 30 minutes per day 5 times per week of moderate intensity. Additional health benefits can be achieved by a high intensity and resistance training two to three times per week [1]. Aerobic training should contain of 150 minutes moderate physical activity per week, and for additional health benefits another 90 minutes per week of high intensity aerobic training. This should be spread over three days [1].

1.5 Cardiovascular disease and physical activity

CVD is one of the most common public health diseases, with a prevalence of 200 000 people affected in Sweden in 2005 [1]. In 2005 CVD was listed as the most common disease that resulted in deaths among Swedish men and women [1].

A study conducted in Europe found a significant relationship between physical activity and the prevention and treatment of CVD, and that insufficient physical activity was a major risk factor for developing CVD [17]. As a result of decreasing amount of physical activity in the world, the incidence of CVD increases [17].

One hour per week walking (regardless of pace) is associated with a decreased risk of developing CVD compared with completely sedentary individual, this was found in a study on women [18]. The study made in Europe found the same association between modest physical activity and the prevention of CVD compared to sedentary individuals [17]. This suggests that a complete sedentary lifestyle is a major risk factor that can be reduced by modest measures [17].

Another study found that the higher intensity of physical activity, the lower risk for CVD [19] while another study found that vigorous activities showed the strongest reduction of the risk for CVD [20] .The total mortality of CVD due to insufficient physical activity decreases by up to 30 % for every 1000 Kcal/week of energy expenditure [21].

Physical activity can reduce the risk of CVD by up to 50 % [1]. The risk of developing a CVD is up to four times larger if you suffer from diabetes [1].

1.6 Prescription of physical activity for cardiovascular disease

In the end of the 18th century the association between CVD and physical activity as a treatment was established [1]. In 1960 the first heart treatments based on physical activity were adopted [1]. In 1980 the first official recommendations for physical activity for treatment of diseases were produced [1] .Physical activity and exercise has even been shown to be more effective than some surgical treatments for CVD [11].

Physical inactivity is considered to be one of the primary risk factors for developing CVD [1]. An estimated 30 minutes per day of physical activity works as a primary prevention, according to PAP recommendations [1]. Additional regular physical activity with aerobic training three to five times per week combined with resistance training, provide individuals with a treatment to patients who suffer from CVD, based on the individuals overall health state [1].

Physical activity as a treatment lowers the risk of mortality for patients with CVD [1]. There is a dose-response relationship between the duration of physical activity and mortality in CVD [1] . This means that increased physical activity leads to additional improvement in CVD [1].

The PAP ordination for treatment for patients with CVD is 30-40 minutes of aerobic physical activity, three to five times per week, at a moderate intensity. Combined with resistance training two to three times per week, based on the individuals, health state and ability [1].

1.7 Decreasing physical activity

The term physical activity is defined as all forms of activity that results in an increased energy expenditure [1] in this study. Further, sedentary lifestyles is defined as individuals who are insufficient physically active and does not meet the 30 minutes per day of moderate physical activity recommendations [10].

A prior study indicates that there has been a change in physical activity levels in the past decades, among adolescents in Sweden [46].

There are also indications that physical inactivity and sedentary lifestyles among young people today are increasing [22]. Seven out of ten adolescents in Sweden do not meet the requirement of 30 minutes per day of moderate physical activity. In the study Eurobarameter physical activity patterns were investigated among European countries [10]. The study found that Swedish people of all ages go for less walks than other Europeans and Swedes live more sedentary lifestyles compared with other Europeans [10].

The development of countries in the world in the past decades has resulted in a reduced demand of physical activity and this has influenced the physical activity behavior among all age groups including youth [23]. The modern society is constructed in a way that encourages sedentary behavior [22]. A risk factor is that adolescents are less physical active in their commute to school: a decline has been found in walking and cycling among this group [11]. Further, leisure time and spontaneous physical activity is on the decrease among youth [24] that spend more time in front of TV and computers [10,46].

Further, there is some indications of a polarization so that those who already were less physically active are becoming even less active and those who were very physically active seems to be getting even more physically active [10]. Attitudes towards physical activity may have had an impact on this behavioral change.

1.8 Attitudes towards physical activity

A study made in Europe had the aim to investigate attitudes towards physical activity among other topics [25]. Physical activity was not rated by the participants as one of top three facts that affect your health. The top three were: smoking, diet and stress. It was concluded that the variation in attitudes towards physical activity is a major problem when it comes to promoting physical activity to the population [25].

Attitudes towards physical activity are formed in youth, and in most cases continue to form throughout the life [26]. A positive attitude towards physical activity is associated with being regularly physically active [27]. Positive experiences of physical activity early in life can have an impact on positive attitudes [27].

Similarly, negative attitudes to physical activity have been shown to be a risk factor for physical inactivity [28]. The study also found that adolescents were an important population to target for measuring attitudes, because it is during these years that the physical activity level tends to decline [28]. The study underlines the importance of trying to understand attitudes behind sedentary behaviors, and emphasizes the importance of such attitude for public health [28].

It is stated that attitudes towards a certain topic will influence how an individual will act in the physical activity context [28]. This means that an individual is less likely to participate in physical activities if they have a negative attitude towards physical activity [28]. There is a significant relationship between attitudes towards physical activity and levels of physical activity [28].

1.9 Summary

Regular physical activity provides health benefits in terms of prevention and treatment of certain diseases. Physical activity plays an important role in preventing and treating CVD and type 2 diabetes, and can contribute to improving the public health [29] .These are some of the reasons why PAP is being prescribed to patients as a prevention and treatment for disease.

Sedentary lifestyles are increasing and some suggests that attitudes towards physical activity can be an indicator on an individual's physical activity level. One factor that could affect attitudes and therefore physical activity level is whether the individual believes physical activity is effective in the prevention and treatment of disease. Conversely, attitudes towards and the effectiveness of PAP maybe influenced by physical activity level.

It is important in terms of future public health to understand why people live sedentary lifestyles. One way to find out is to investigate attitudes towards PAP to find out if individuals believe physical activity can work as a prevention and treatment of disease, this may say

something about their general attitudes towards physical activity and their physical active behaviors.

There is a gap when it comes to understanding attitudes towards physical activity as a prevention and treatment of disease. No prior study has investigated adolescent's attitudes towards PAP for CVD and type 2 diabetes, in Sweden.

2. Purpose

The aim of the study was to investigate attitudes among adolescents towards PAP as prevention and treatment for CVD and type 2 diabetes, and to determine whether a relationship exists between a adolescents ´s own physical activity level and their attitude towards PAP.

A secondary purpose was to investigate if educational program influence attitudes towards PAP as a prevention and treatment of disease.

2.1 Hypotheses

The hypothesis was that there is a relationship between a participant´s own physical activity level and attitude towards PAP.

3. Methods

3.1 Study design

The study design was quantitative and cross- sectional.

3.1.1 Quantitative study

In a quantitative study, empirical and quantifiable data is collected, summarized and analyzed by using statistics [30]. In a quantitative study it is possible to number the study material [31]. It is also possible to speak for larger groups, even though the sample is not that large, if the sample is representative for the population [31].

3.1.2 Cross- sectional study

The main purpose with this study was to measure attitudes towards PAP for CVD and type 2 diabetes at a certain time, then comparing attitudes with how physically active the participants were at a certain time. To be able to do this a cross- sectional study design filled the purpose,

by measuring at one point in time [32]. The main disadvantage with this type of study is that it is not suitable for investigating causations; it is more likely find associations. It is important that the participants (the sample) are representative of the entire population to which the results will be generalized. It is also important to keep in mind that there will be missing data that may affect number of participants in the end [32].

3.2 Data collection

Data was collected by questionnaires (see appendix 1). The questionnaire assessed: physical activity level. Attitudinal questions: regarding PAP as a prevention and treatment of CVD and type 2 diabetes, and how important and fun the participant thought physical activity was.

To ensure that the questionnaire was age appropriate a small pilot test was made involving two 17 year olds (one male and one female). The questionnaire were revised based on comments received about some of the questions

3.2.1 Missing data

Specific incomplete answer were excluded for analysis if there were no data, but if there was data from the subject, on other questions, it was used rather than an excluded since the subject did not have complete data on all of the questions.

3.3 Selection and definition of sample and arena

The sample consisted of male and female upper secondary school students. The age range was 16-18. Participants were either attending the pre-health care (PHC) program (2 classes of 60 students) or a program leading to manual materials handling (MMH) program (industry program and building program, 2 classes of 50 students). The reason why these programs were chosen was that they provided the study with a width of programs. Two different educational program also made it possible to compare attitudes between programs.

The study was conducted at Polhemskolan, an upper secondary school situated in Gävle, Sweden. The school environment was appropriate and made it possible to reach a large group of adolescents.

3.3.1 Recruiting sample

Contact was made with the specific program, due to the difference in the type of education and width between educational programs. To recruit participants contact was made with the department head for the PHC program and the physical education teacher for the MMH program at Polhemskolan. They agreed to let their students participate in the study and specific subject recruitment was then done within these groups as a convenience sample [29]. The questionnaires were handed out on the 18th of April and collected 23rd of April.

3.4 Distribution of the questionnaires

A meeting was arranged with the teachers before the questionnaires were given to the teachers to distribute. At this meeting the teachers were informed about the study and how to administrate the questionnaires.

The teachers received an information letter (see appendix 2). In this letter they were, among other thing, instructed how to ensure confidentiality of the survey. Teachers were instructed to collect completed questionnaires without looking through the answers and seal the set of questionnaires in an envelope to be returned to the researcher.

The students were given an information letter (see appendix 3) that included information about PAP, CVD and type 2 diabetes. It also included information regarding the purpose with the research, the primary researcher and the department and university conducting the study. Contact information to researcher and researcher's supervisor was also provided.

Participants were informed that the questionnaires were anonymous, confidential and voluntary [33].

3.5 Data handling, data analysis and items to be measured

Data from the questionnaires were entered in to Excel, where custom equations were written to score the questions. Data were then imported to the SPSS statistics program to test hypotheses.

3.5.1 Body mass index

Questions were asked about height and weight to be able to assess BMI. The reason why these questions were asked was to ensure that the sample was representative to the population.

The standard formula used to calculate BMI [34]: $$\mathrm{BMI} = \frac{weight(\mathrm{kg})}{height^2(\mathrm{m}^2)}$$

This equation was entered in to Excel so that the calculations could be done automatically once the numbers were filled in.

In SPSS the mean BMI was calculated. The WHO classification scale (see figure 1) was used to categorize BMI levels [34].

Figure 1: *BMI classification*

	Principal cut-off points
Underweight	<18.50
Normal range	18.50 - 24.99
Overweight	≥25.00
Obese	≥30.00

*Source [34]

3.5.2 Assessing physical activity

To assess the participants physical activity level the International Physical Activity Questionnaire (IPAQ) short version survey was used [35]. The IPAQ was constructed to asses physical activity level among individuals aged 15-69. The full IPAQ measures; leisure time physical activity, domestic and gardening activities and work related physical activity [35]. The IPAQ short version assesses three types of physical activity; walking, moderate intensity activities and vigorous intensity activities.

The IPAQ short version was selected because it is a validated survey and provides a validated scoring system [32] (see appendix 4). The IPAQ survey short form has been shown to have

acceptable test reliability in prior studies. For example in a 12 country evaluation study [36], it has also been used for a larger scale study like the Eurobarameter which measured physical activity level among Europeans [37] and a survey that measured physical activity levels in 51 countries, conducted by the WHO [37].

3.5.2.1 Categorizing and analyzing physical activity levels

To categorize the participant's physical activity levels the IPAQ scoring system was used (see appendix 4). The data was cleaned according to IPAQ scoring system (see appendix 4) with the exception that the participants who had reported frequency and not duration or vice versa was reported as zero instead of missing value which the IPAQ data cleaning suggested. The reason why this modification was made was to avoid missing values and exclude some answers from the analysis. This modification was done in another study, when the aim was to measure physical activity level by using the IPAQ [35].

A participant´s physical activity level could be categorized as low, moderate or high. To be categorized as "high" the participant had to achieve vigorous intensity activities of at least 3 days a week, or 7 days or more of any combination of walking and moderate intensity or vigorous intensity activities [35]. To be categorized as "moderate" the participant had to achieve at least 3 days of 20 minutes per day, or 5 or more days of moderate intensity activity involving at least 30 minutes per day [35]. To be categorized as "low" neither of these criteria's above were achieved [35].

Prior to entering the categorized data material to SPSS the data was numbered as 1 for low, 2 for moderate and 3 for high. In Excel a custom "if" statement equation were written to generate categorical scores. Depending on score MET minutes a participant had [35]. A score was given and then automatically categorized as 1, 2 or 3.

In SPSS a cross tabulation and Chi- Square test was run to see if there was a difference in attitudes towards PAP as a prevention and treatment of CVD and type 2 diabetes, between the physical activity level groups (low, moderate or high). A Kappa test was run in SPSS to test the hypothesis if physical activity level was correlated to attitudes towards PAP as a prevention and treatment of CVD and type 2 diabetes.

3.5.3 Assessing attitudes towards physical activity on prescription as a prevention and treatment of cardiovascular disease and type 2 diabetes

To assess attitudes towards PAP as a prevention and treatment of CVD and type 2 diabetes the researcher developed 7 questions since no sufficient validated questions were found. Questions were asked about PAP as a prevention and treatment for both diseases, if the participant would prefer medicines or physical activity for each disease and if they believed physical activity could have the same effect as medicines.

3.5.3.1 Categorizing and analyzing attitudes

Responses from questions measuring the attitudes regarding PAP were entered in to Excel numerically. If the participant answered "yes" or "physical activity" on a question it was numbered "1" for a *positive attitude*, if the participant answered "no" or "medicines" on a questions it was numbered "2" for a *negative attitude* and if the participant answered "don´t know" it was numbered "3" for a *uncertain attitude* or "4" for *a combination of physical activity and medicines.*

Attitudes were then compared with physical activity level and educational program. To see if there was a difference in attitudes depending on physical activity level and educational program. Cross tabulations and Chi-Square tests were run in SPSS to test these hypotheses. To test if there was a correlation between physical activity level and attitudes towards PAP as a prevention and treatment of CVD and type 2 diabetes, a crosstabulation and a Kappa test was run in SPSS.

3.5.4 Assessing attitudes from visual analog questions

No sufficient validated questions were found that assessed the attitudinal questions of interest, so specific questions were designed by the researcher. To investigate how important and fun the participants considered physical activity to be, two visual analog scale (VAS) questions were created.

The scales were 10 centimeters long and no numbers were marked on the line scale. On the line at each ends descriptive anchors were provided. If the participants put their mark more towards the left they did not believe it was that important or fun and if they put their mark more towards the right they thought it was either very important or very fun. The participants

could randomly mark the scale between both ends depending on how important or fun they thought physical activity to be. In a similar study a VAS was used to assess attitudes towards CVD promotion among nurses [39] .

3.5.4.1 Categorizing and analyzing the visual analog questions

Continuous VAS scale data were first scored then categorized. To score the ranking on questions number four and five a ruler was used to measure the distance from the line edges where the participants had put their mark. The data was measured to the nearest millimeter.

To categorize the answers each line scale was divided in to three parts, following the example of the reference in a similar study with similar questions [39] In that study a seven centimeter (cm) scale was used and data were then categorized in three bins: 0-2 cm was considered as "agree", 3-5 cm was considered as "neutral" and 6-7 cm was considered as "disagree". The prior study using VAS made the middle bin larger than the two bins on each end of the scale [39].

In this study the middle category was also larger than the two categories. The answers were categorized for question 4 (how important is it to be physically active?) as < 25 mm for "not important", 26-75 mm "moderately important" and >75 mm "very important". For question 5 (how fun do you think physical activity is?) the same intervals were used to assess "not fun", "moderately fun" or "very fun", respectively.

To categorize the data in Excel an "if" statement were entered in to Excel (if x was less than or equal to 25 mm it was numbered as "1" for "not important" or "not fun", if the mm was more than 25 mm and less than 75 mm it was numbered "2" for "moderately", if the mm was larger than or equal to 75 mm it was numbered as "3" for "very important" or "very fun").

To compare if there was a difference in ranking of the questions compared with educational program a crosstabulation was made in SPSS and a Chi-Square test was used.

4. Ethical consideration

The teachers were informed about the purpose and aim of the study, this information was also given to the participants through the teachers and in the information letters that came with the

questionnaires. Participants were also informed that it was voluntary to answer the questionnaire and they could at any time withdraw from the study without any specific reason [32, 41] (See appendix 3). The teachers were informed during the meeting that the students had the right to receive the study when it was finished [41]. The participants and teachers were informed that the study was confidential**.** The data was only allowed to be used in the study as planned and not for any other purpose. Aggregated data was reported and not individual to make it impossible to identify the participants' identity.

The information sheet to the teachers included information that the completed questionnaires should be put directly in to an envelope that were attached and seal immediately. The questionnaires were stored and kept confidential until collected [32, 41].

5. Results

5.1 Study population description

A total of 120 questionnaires were handed out for teachers to distribute: 60 to the pre- health care program (PHC) and 60 manual materials handling program (MMH). In the PHC program 58 students participated (96 % response rate) and 27 students from the MMH program participated (45 % response rate). The total number of participants was 85 students (71 % response rate). The age range was 16-18. A description of the study population is shown in table 2.

Table 2: *Study population*

Program	Women	Men	Total (N)	BMI
PHC	48	9	57	22.3
MMH	3	24	27	23.4

**One participant did not specify sex*

According to BMI guidelines the mean BMI for this the sample was within the "normal weight" category. The BMI range for the sample was 17-34, this means that some of the participants was categorized as "underweight" (<18, 5), "overweight" (>25) and "obese" (>30) (41).

5.2 Distribution of physical activity level

The distribution (percent) of physical activity level (IPAQ) within each educational program is shown in table 3.

Table 3: *Distribution of physical activity level between educational programs*

Program	Low	Moderate	High
PHC	37%	29%	32%
MMH	14%	25%	59%

No difference was found between programs in physical activity level.

Similarly data were regrouped by sex and no difference was found in physical activity level.

5.3 Attitudinal questions regarding physical activity on prescription compared with physical activity levels

The main purpose with this study was to investigate a potential relationship between physical activity level and attitudes towards PAP as a prevention and treatment for CVD and type 2 diabetes. To address this question, the data for both educational programs was pooled together and divided by IPAQ score.

In the questionnaire there were three or four options regarding attitudes towards PAP (positive, negative, uncertain or combination), depending on question.

After running the Chi Square tests the number of counts in some cells was below 5 which indicate that one of the requirements of running the Chi Square test was violated. Therefore a regrouping of the data was made. The data was categorized in to two groups one for a "positive attitude" and another for a "not positive attitude" which included all negative, uncertain and combination.

A summary of the Chi Square test examining a difference between attitudes depending on physical activity level and kappa values examining a correlation between physical activity levels is shown in table 4. The table shows the number of percent of participants (in each physical activity category: low, moderate or high) who had a positive or negative attitude.

Table 4: *Attitudes towards PAP as a prevention and treatment for CVD and type 2 diabetes compared with physical activity level.*

Attitude question:	Physical actvity level (IPAQ)	Positive attitude	Not positive attitude	Correlation Kappa Test p- values
PAP as prevention – CVD	Low	88 %	12 %	*P = 0.801*
	Mod	100 %	0 %	
	High	88 %	12 %	
PAP as Treatment- CVD	Low	72 %	28 %	*P = 0.379*
	Mod	70 %	30 %	
	High	70 %	30 %	
Medicines vs. physical activity - CVD	Low	0 %	100 %	*P = 0.317*
	Mod	4 %	96 %	
	High	9 %	91 %	
PAP as prevention- type 2 diabetes	Low	68 %	32 %	*P = 0.960*
	Mod	62 %	37 %	
	High	67 %	33 %	
PAP as treatment- type 2 diabetes	Low	44 %	56 %	*P = 0.794*
	Mod	62 %	38 %	
	High	30 %	50 %	
Medicines vs. Physical activity Type 2 diabetes	Low	0 %	100 %	*P = 0.093*
	Mod	8 %	92 %	
	High	12 %	87 %	
Medicines vs. physical activity	Low	38 %	58 %	*P = 0. 905*
	Mod	40 %	60 %	
	High	45 %	55 %	

No difference was found between physical activity level and attitudes (all p-values >0.05) No correlation was found between physical activity level and any of the questions assessing attitudes towards PAP.

5.4 Attitudinal questions regarding physical activity on prescription compared with educational program

The secondary purpose of this study was to measure if attitudes towards PAP as a prevention and treatment for CVD and Type 2 diabetes (see D2) were different between programs. Table 5 shows the percentage of participants who had a positive attitude and a not positive attitude

towards PAP among program. In the questionnaire there were three options for attitudes (positive, uncertain and negative). Attitudes were divided in to three groups (positive attitude, uncertain and negative attitude) after running a Chi Square test the number of counts in some cells was below 5 which violated the requirements for the Chi Square. Therefore a regrouping of the data was made. The data was categorized in to two groups one for a "positive attitude" and another for a "not positive attitude" (which contained data from negative and uncertain attitude responses).

Table 5: *Distribution of Attitudes for physical activity on prescription as a prevention and treatment for CVD and type 2 diabetes between programs.*

	Prevention CVD		**Treatment CVD**		**Prevention D2**		**Treatment D2**	
Attitude	Positive	Not pos.	Positive	Not pos.	Positive	Not pos.	Positive	Not pos.
PHC	95%	5%	79%	21 %	77%	23%	61%	39%
MMH	85%	15%	52%	48 %	40%	60%	31%	69%
Total	91%	8%	70%	30 %	66%	34%	52%	48%

A difference in attitudes towards PAP as a prevention for type 2 diabetes (D2) was found between educational programs (P=0.001). But no difference was found between programs in attitude towards PAP as prevention for CVD. There was a difference in attitudes towards PAP as a treatment for CVD (P= 0.014),nd towards PAP as a treatment for type 2 diabetes (D2) (P=0.010) between programs.

As a whole, these results indicate that participants attending PHC program were more positive towards PAP as a treatment and prevention for both CVD and type 2 diabetes.

5.4.1 Regrouping data for sex to compare with attitudes

The distribution between sexes within each educational program was not balanced. Therefore similarly, data were regrouped by sex to test if there was a difference based on sex.

A difference in attitudes towards PAP as a prevention for type 2 diabetes (D2) was found (P= 0.000) in that women were more positive than men. No difference was found between sexes

and attitudes towards PAP as prevention for CVD. This indicates that women were more positive towards PAP as a treatment for both CVD and type 2 diabetes and for PAP as prevention for type 2 diabetes. A difference in attitudes for PAP as a treatment for CVD was found (P=0.016) women were more positive than men. A difference in attitudes towards PAP as a treatment for type 2 diabetes was found (P=0.015) women were more positive than men.

5.5 Attitudinal questions regarding physical activity as important and fun (VAS questions) among educational program

Table 6 shows ranking in percent for how important the participants thought physical activity was for the different categories by educational programs.

Table 6: *Ranking of physical activity as important among program*

Program	Not important	Mod. important	Very important	P value
PHC	7%	9%	73%	*P = 0.105*
MMH	0%	37%	63%	

No difference was found between the programs (> 0.005), in attitude towards physical activity as important. Most part of the participants ranked physical activity as very important.

Table 6 shows ranking in percent for how fun the participants thought physical activity was for the different categories by educational programs.

Table 7: *Ranking of physical activity as fun among program*

Program	Not fun	Mod. fun	Very fun	P value
PHC	7%	44%	49%	*P = 0.286*
MMH	0%	56%	45%	

There was no difference between educational programs (> 0.005). Although it was a slight trend that a larger percent of the participants attending the PHC program ranked physical activity as “very fun” and most adolescents attending the MMH program ranked physical activity to be “moderately fun”.

6. Discussion

6.1 Result discussion

6.1.1 Body mass index

This study's samples mean BMI was within the "normal weight" category (22.7).

According to a Cohort study on Swedish children (1985-87 for girls) and (1973-75 for boys) showed the mean BMI for girls 15 years old to be 21.1 and for boys 15 years old to be 20.9 [42]. The sample for this study was slightly higher in BMI but still in the same BMI category, which makes the sample representative BMI wise.

6.1.2 Physical activity level and attitudes

The main purpose with this study was to investigate if attitudes towards PAP as prevention and treatment method for CVD and type 2 diabetes, were related to a teen´s physical activity level. The hypothesis was that the physical activity level was related to attitudes. The study found that there was no correlation between physical activity level and attitudes towards PAP. No difference between physical activity levels and attitudes towards PAP as a prevention and treatment of the disease was found among the participants.

This result was surprising since previous studies found that an attitude towards a certain topic influence how you act and that a positive attitude towards physical activity is related to a more physically active lifestyle [28, 26] . If this relationship had held true it would mean that students who were more positive towards PAP would be more physically active.

6.1.3 Educational program and attitudes

Another variable that were investigated as a possible influencer on attitudes were educational programs. What program the participant attended seemed to influence attitudes to a larger extent than the participants´ physical activity level. PHC participants were more positive than MMH participants for PAP as a prevention and treatment for type 2 diabetes and treatment for

CVD. No difference in attitudes was found between programs for PAP as a prevention of CVD.

Due to the unbalance between sexes within each educational programs (within the PHC program 85 % were women and 15 % were men. Within the MMH program 88 % were men and 12 % were women). It was unclear whether program or sex had the largest impact on attitudes. Therefore the data was regrouped by sex. The results showed that there was a difference between sexes as well. When comparing attitudes towards PAP between sexes, women were more positive than men towards PAP as a prevention and treatment for type 2 diabetes and treatment for CVD. No difference in attitudes was found between sexes for PAP as a prevention of CVD.

Variation in attitudes is a problem when it comes to promoting physical activity [25]. In this study there seem to be variation in attitudes towards PAP as a prevention and treatment of disease. The variations were not based on physical activity level in line with the hypothesis. Instead, attitudes were influenced by what educational program the participant attended. PHC participants were more positive towards PAP, this could suggest that an interest for health care could influence attitudes. The PHC participants probably had more knowledge regarding treatment and prevention of certain diseases; they might also have been more familiar with PAP than the MMH participants.

However, as outlined above, it could be that the differences in attitudes were in fact sex based due to the unbalance as mentioned above. To examine to which group a public health intervention could be implemented to promote PAP as a prevention and treatment of disease, further research is needed to determine this.

6.1.4 How fun and important is physical activity?

Another aspect that was investigated was how important and fun the participant thought physical activity was, to find out if these variables affected attitudes or physical activity level. When comparing the results from the ranking with educational program and sex no difference was found, although there seemed to be a trend that among both program and sexes to rank physical activity as “very important”. In terms of public health this indicates that adolescents in Gävle consider physical activity to be important, this is an attitude that indicates that they believe in the importance of being physically active.

6.1.5 The results in terms of physical activity on prescription

Future possible health care workers were more positive towards PAP. I believe it is of importance that future PAP prescribers are positive; this could suggest that this method will be used more in the future. Further, one study found that doctors and nurses who are physically active are more prone to prescribe PAP [43]. A positive attitude towards PAP may generate the same behavior.

It is also interesting to investigate what possible receivers of PAP think about the method. To establish this method even more I believe it is important that both prescribers and receivers have a positive attitude. According to this study's findings this was not the case. In terms of PAP this means that the method has to be promoted more towards future receivers.

Attitudes towards PAP is stated to influence how well PAP is perceived by the patient, in order for PAP to be successful it is crucial that the patient is dedicated to make lifestyle changes [1]. In terms of this study I believe attitudes can help determine the dedication a patient has for PAP, this is why it is important in terms of PAP to investigate potential variables that may influence attitudes. This study found that educational program can be one potential factor.

6.1.6 The result in terms of public health

If individuals became more physically active it would have a huge impact on the public health [6]. But, how do you make a population more physically active? One way could be to implement a health intervention to encourage this behavior, like the one conducted in Sweden (sätt sverige I rörelse) that had the aim to make the Swedish population more physically active [8]. Variations in attitudes towards physical activity is a problem when it comes to promoting physical activity and it is important to continuing research on factors that influences positive and negative attitudes towards physical activity so interventions can be targeted to the right population [28] . PAP can be one indicator on attitudes towards physical activity in general, if they believe in PAP they probably have a general positive attitude towards physical activity, this motivates why PAP is an interesting variable to investigate attitudes towards.

Let's say that a future public health intervention was created to make adolescents more positive towards PAP as a prevention and treatment of disease, where could this intervention be implemented and to what group, regarding to this study's findings?

Since physical activity level does not influence attitudes, according to my findings it would not be optimal to implement interventions based on physical activity levels. I do know that both programs and sex were related to attitudes. Although, at this point I do not know whether programs or sex were the largest influencer on attitudes depending on the imbalance between sexes within each program.

Based on this study's findings either educational programs or sex could be the largest influencer on attitudes. Either way, schools would be a suitable arena since all of the different programs and sexes are represented there. According to one study schools are a good arena to make youth more physically active, they found that a school environment that encourages physical activity results in students being more physically active [(44)]. If schools are a suitable arena to make students more physically active, perhaps promoting PAP and informing students about PAP as a prevention and treatment for diseases would be appropriate. An intervention that combined PAP education and encourages physical activity may influence student's attitudes to a more positive one.

Further research is needed to determine the strongest influencer on attitudes to that a public health intervention could be targeted to the right population and to the most suitable arena. Even though, this study´s findings show some indication on two variables that may influence attitudes and to what population and arena a public health intervention could be targeted.

6.2 Method discussion

6.2.1 Strengths

The strength of the selected method was that it was possible to reach out to a group of 120 adolescents; a quantitative study filled the purpose well. And the response rate of 85 participants provided me with a rather large sample. Further, the size of the sample indicates some generizable results for adolescents in Gävle. Even more generizable results would benefit a similar study and this could be achieved by including adolescents from all over Sweden.

I choose a broad range of program because I wanted to investigate two extreme groups, one that is likely to have an interest in health care and PAP (PHC) and a group that might not have any interest in PAP at all. The question is if the study would have found the same results if "middle of the road" students' attitudes were investigated as well. The broad range provided the study with data from two extremes which was interesting to research, even though, a broader set of programs would have provided a wider set of data.

6.2.2 Limitation and weaknesses

The balances between the sexes within the program were not optimal, most participants attending PHC program were women and most participants attending MMH program were men. This made it difficult to determine whether difference in attitudes was based on program or sex. In eventual future studies a more even distribution of sexes within each program may be considered.

There was no random selection of participants, since the particular classes were chosen for the study. To be able to speak for all adolescents in Gävle the sample would have to be randomly picked to represent the entire population, even though the aim of this study was not to speak for all adolescents in Gävle, but for the chosen sample. The sample selection provided the study with results that could speak for the chosen program at Polhemskolan, although my founding does can indicate some interesting results on a larger population due to the size of my sample.

A question that was aimed to be in the questionnaires was age. I do know that the age range was 16-18. Although I could not calculate the mean age which would have been an interesting aspect. To be able to see if there was a difference in attitudes and ages, this was not one of the purposes and since they all were so close in age I doubt I would find anything sensational.

To assess physical activity level the IPAQ short version survey were used, this is a validated survey but confounders may have influenced results [32]. When the participants answered the physical activity questions they had to speak for the past 7 days. For example those who answered in a way that they were categorized as "low", illness, injury or other variables may have influenced their answer. Due to possible confounders it is impossible to state that the participants categorized as"low" are always low, it is only possible to speak for their physical activity levels in the past seven days. A recall bias could also be a factor in this study, the

participants might had a hard time remembering how physically active they were in the last 7 days [32].

To be able to understand questions regarding attitudes it was necessary to understand the terms “PAP”, “cardiovascular disease” and “type 2 diabetes”. In the introduction letter information about these terms were described and the participants were urged to read through them to be able to answer the questions. If the participant did not already know what PAP, CVD and type 2 diabetes were and did not read through the instructions it may have influenced their answers in different ways. The PHC students might have had a larger knowledge in this area and were not as dependent on reading through the introduction letter to understand the questions as the MMH students, even if the importance of reading through definitions were underlined.

7. Conclusion

This study did not find a correlation or difference between physical activity levels and attitudes towards PAP as a prevention and treatment for CVD and type 2 diabetes. However, this study found that participants attending PHC program at Polhemskolan were more positive towards PAP as a treatment for both CVD and type 2 diabetes and prevention for type 2 diabetes. Due to the imbalance in sexes in the two programs sampled, it is not possible at this point in time to say whether the differences were in fact due to education or due to sex: the same patterns were found when examining the data by education program as when examining the data by sex. Accordingly what this mean for future health campaigns is that more research is needed to investigate whether sex or programs are the strongest influencer on attitudes.

8. Suggestion for further research

A suggestion for further research is to continuing investigating variables that influences attitudes towards PAP or physical activity. In future studies I encourage investigating attitudes from several types of educational program and participants from all over Sweden, this would provide even more generizable results.

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Appendix 1: Questionnaire

1 . Tänk nu på alla de **mycket ansträngande** aktiviteter du utförde under de **senaste 7 dagarna**. **Mycket ansträngande** fysisk aktivitet innefattar aktiviteter som upplevs som mycket arbetssamma och får dig att andas mycket kraftigare än normalt. Tänk *enbart* på de aktiviteter som du utfört under minst 10 minuter i sträck.

1 a. Under de **senaste 7 dagarna**, hur många av dessa dagar har du utfört arbete som är **mycket ansträngande** såsom tunga lyft, tyngre bygg- och trädgårdsarbete, aerobics, löpning eller cykling i högre tempo?

_____ **dagar**

☐ Ingen sådan aktivitet ➡ Hoppa över fråga 1 b

1 b. Hur mycket tid tillbringade du, i genomsnitt under en sådan dag, på **mycket ansträngande** fysisk aktivitiet?

_____ **minuter**

☐ Vet ej

2. Tänk nu på alla de **måttligt ansträngande** aktiviteter du utförde under de **senaste dagarna.** **Måttligt ansträngande** fysisk aktivitet innefattar aktiviteter som upplevs som arbetsamma och får dig att andas något kraftigare än normalt. Tänk enbart på de aktiviteter som du utfört under minst 10 minuter i sträck.

2 a. Under de **senaste 7 dagarna**, hur många av dessa dagar har du utfört arbete som är **måttligt ansträngande** såsom cykling, simning, måttligt bygg- och trädgårdsarbete eller annat i måttligt tempo? Inkludera ej promenader.

_____ **dagar**

☐ Ingen sådan aktivitet ➡ Hoppa över fråga 2 b

2 b. Hur mycket tid tillbringade du, i genomsnitt under en sådan dag, på **måttligt ansträngande** aktivitet?

_____ **timmar**

_____ **minuter**

☐ Vet ej

3. Tänk nu på all tid du **promenerat** under de **senaste 7 dagarna.** Detta inkluderar promenader på arbetet, under transporter och under fritiden.

3 a. Under de **senaste 7 dagarna**, hur många dagar har du **promenerat** i minst 10 minuter i sträck?

_____ **dagar**

☐ Inga promenader ➡ Hoppa över fråga 3 b

3 b. Hur mycket tid per dag tillbringade du, i genomsnitt en sådan dag, på **promenader**?

_____ **timmar**

_____ **minuter**

☐ Vet ej

4. Hur viktigt tycker du att det är att vara fysiskt aktiv? (markera på linjen)

inte alls **mycket**

5. Hur roligt tycker du att det är att vara fysiskt aktiv? (markera på linjen)

inte alls **mycket**

6. Tror du att fysisk aktivitet är effektivt för att förebygga hjärt- och kärlsjukdomar?

❑ *Ja* ❑ *Nej* ❑ *Vet ej*

7. Tror du att fysisk aktivitet på recept kan vara effektivt som behandlingsmetod mot hjärt- och kärlsjukdomar?

❑ *Ja* ❑ *Nej* ❑ *Vet ej*

8. Om du fick en hjärt- och kärlsjukdom skulle du då föredra medicinering eller fysisk aktivitet som behandlingsmetod?

❑ *Mediciner* ❑ *Fysisk aktivivtet* ❑ *En kombination* ❑ *Vet ej*

9. Tror du att fysisk aktivitet är effektivt för att förebygga diabetes typ 2?

❑ *Ja* ❑ *Nej* ❑ *Vet ej*

10. Tror du att fysisk aktivitet på recept kan vara effektivt som behandlingsmetod mot diabetes typ 2?

❑ *Ja* ❑ *Nej* ❑ *Vet ej*

11. Om du fick diabetes typ 2 skulle du då föredra medicinering eller fysisk aktivitet som behandlingsmetod?

❑ *Medicine* ❑ *Fysisk aktivivtet* ❑ *En kombination* ❑ *Vet ej*

12. Tror du att fysisk aktivitet på recept kan ha samma effekt som mediciner?

❑ *Ja* ❑ *Nej* ❑ *Vet ej*

13. Kön

❑ *Man* ❑ *Kvinna*

14. **Längd (cm)**

_____

15. **Vikt (kg)**

_____

Tack för din medverkan!

Appendix 2: *Information letter to teachers*

Hej!

Tusen tack för att du hjälper till att dela ut enkäter till min undersökning om fysisk aktivitet på recept (FaR) för sjukdomarna diabetes typ 2 och hjärt och kärlsjukdomar.

Instruktioner:

Dela ut informationsblad till alla elever, be dem gärna läsa igenom det som står och påpeka gärna vikten av att läsa igenom definitionerna för att kunna få mer förståelse för enkätfrågorna. Dela ut enkäterna till samtliga elever.

Informationsbrevet får elevena behålla och ta med sig hem. De ifyllda enkäterna lägger du i bifogad plastficka i det tomma kuvertet. Eftersom enkäten är konfidentiell får du som lärare inte under några omständigheter läsa igenom enkätsvaren. Förslut sedan kuvertet direkt och låt dem ligga tills jag kommer och samlar in dem.

Du och eleverna får närsomhelst ringa mig under tiden om det uppstår några frågor som rör enkäten. Telefonnummer: 070 996 08 96.

Tack ännu en gång,

Moa Sjögren

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***Appendix 3**: Information letter students*

Hej,

Jag heter Moa Sjögren och studerar folkhälsovetenskap vid högskolan i Gävle. Jag skriver en uppsats handlar om attityder och uppfattningar hos ungdomar kring fysisk aktivitet som förebyggande och behandling av sjukdomarna diabetes typ 2 samt hjärt- och kärlsjukdomar.

Läs igenom begreppen nedan för att kunna svara på frågorna!

Fysisk aktivitet på recept: Är precis vad det låter som. Legitimerad personal inom sjukvården kan skriva ut fysisk aktivitet på recept(FaR) som del av behandling, behandling eller i förebyggande syfte mot sjukdomar.

Definition av Diabetes typ 2: Är en sjukdom som innebär att kroppen har svårt att reglera blodsockret till följd av att kroppen har svårt att producera insulin (som är ett hormon som reglerar blodsockret).

Definition av hjärt- och kärlsjukdomar: Hjärt- och kärlsjukdomar är ett samlingsnamn för sjukdomar i hjärtat och blodkärlen. Hjärtinfarkt och stroke är oftast akuta händelser och huvudsakligen orsakas av en blockering som hindrar blodet från att strömma till hjärtat eller hjärnan.

Deltagandet i enkäten är frivillig och du kan närsomhelst välja att inte fortsätta svara eller avbryta ditt deltagande. Din identitet kommer inte att kunna avslöjas och all information från enkätsvaren kommer endast att användas till den här studien och inte i något annat syfte.
Enkäten består av 19 frågor som handlar om dina vanor kring fysisk aktivitet och din inställning till fysisk aktivitet som metod för att förebygga och behandla sjukdomarna Diabetes typ 2 samt hjärt och kärlsjukdomar**.** Tänk på att läsa igenom definitionen (ovan) för att få information om sjukdomarna**.**

Spara gärna det här brevet om du skulle ha frågor under tiden efter du deltagit i studien, kontaktuppgifter finnn nedan.

Tack för din medverkan,

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Appendix 4: International physical activity questionnaire. Short version scoring system and data cleaning [35]

MET Values and Formula for Computation of MET-minutes/week

The selected MET values were derived from work undertaken during the IPAQ Reliability Study undertaken in 2000-20013. Using the Ainsworth et al. Compendium (*Med Sci Sports Med* 2000) an average MET score was derived for each type of activity. For example; all types of walking were included and an average MET value for walking was created. The same procedure was undertaken for moderate-intensity activities and vigorous-intensity activities. The following values continue to be used for the analysis of IPAQ data: Walking = 3.3 METs, Moderate PA = 4.0 METs and Vigorous PA = 8.0 METs. Using these values, four continuous scores are defined:

Walking MET-minutes/week = 3.3 * walking minutes * walking days
Moderate MET-minutes/week = 4.0 * moderate-intensity activity minutes * moderate days
Vigorous MET-minutes/week = 8.0 * vigorous-intensity activity minutes * vigorous-intensity days

Total physical activity MET-minutes/week = sum of Walking + Moderate + Vigorous METminutes/ week scores.

Categorical Score

Category 1 Low

This is the lowest level of physical activity. Those individuals who not meet criteria for Categories 2 or 3 are considered to have a 'low' physical activity level. 3 Craig CL, Marshall A, Sjostrom M et al. International Physical Activity Questionnaire: 12 country reliability and Validity *Med Sci Sports Exercise* 2003; August *Revised November2005* 6

Category 2 Moderate

The pattern of activity to be classified as 'moderate' is either of the following criteria:
a) 3 or more days of vigorous-intensity activity of at least 20 minutes per day
OR
b) 5 or more days of moderate-intensity activity and/or walking of at least 30 minutes per day
OR
c) 5 or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum Total physical activity of at least 600 MET-minutes/week.
Individuals meeting at least one of the above criteria would be defined as accumulating a minimum level of activity and therefore be classified as 'moderate'.
See Section 7.5 for information about combining days across categories.

Category 3 High

A separate category labeled 'high' can be computed to describe higher levels of participation. The two criteria for classification as 'high' are: a) vigorous-intensity activity on at least 3 days achieving a minimum Total physical activity of at least 1500 MET-minutes/week

OR
b) 7 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum Total physical activity of at least 3000 MET-minutes/week. See Section 7.5 for information about combining days across categories

Data cleaning [35]

I. Any responses to duration (time) provided in the hours and minute's response option should be converted from hours and minutes into minutes. II. To ensure that responses in 'minutes' were not entered in the 'hours' column by mistake during self-completion or during data entry process, values of '15', '30', '45', '60' and '90' in the 'hours' column should be converted to '15', '30', '45', '60'and '90' minutes, respectively, in the minutes column. III. In some cases duration (time) will be reported as weekly (not daily) e.g.,VWHRS, VWMINS. These data should be converted into an average daily time by dividing by 7. IV. If 'don't know' or 'refused ' or data are missing for time or days then that case is removed from analysis.