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Physical activity as a treatment in primary health care

The role of the GP and Somali women's views
and levels of physical activity

Gerthi Persson



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DOCTORAL DISSERTATION

by due permission of the Department of Clinical Sciences in Malmö, Faculty of
Medicine, Lund University, Sweden.

To be defended at Clinical Research Centre, Jan Waldenströms gata 35, Malmö
December 11, 2014, at 1:00 pm

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Associate Professor Eva-Carin Lindgren
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<i>Abstract</i> <p>Physical inactivity has been identified as the fourth leading risk factor for global mortality and healthcare systems play a major role in increasing physical activity among the population. Physical activity on prescription (PAP) is a non-pharmacological method used in Swedish healthcare to prevent and treat disease. Primary health care is the first level of care, in a strong position to work for increasing physical activity on a primary and secondary level among the population, patients and vulnerable groups. Somali women living in Sweden are vulnerable and susceptible to bad health, due to physical inactivity.</p> <p>The general aim was to increase the numbers of prescribed PAP, investigate GP's view and use of PAP and to elucidate facilitators and barriers to a physical active lifestyle among Somali women and their actual level of physical activity and inactivity. The thesis comprised four studies with three different designs conducted within primary health care in southern Sweden. The intervention in paper I was to alter routines prescribing PAP. Paper II and III were qualitative focus group studies where GPs views of PAP and Somali women's views of physical activity were elucidated. In Paper IV Somali women's physical activity levels were monitored.</p> <p>We found that an increase of PAP prescribed by GPs was possible when involving a physiotherapist to individualize the prescription. GPs see it as their responsibility to optimize the total use of healthcare resources to ensure the best possible access for those in need of care, and thus prescribing PAP is regarded by GPs as a task with low priority that should involve physiotherapists and nurses in the team. Somali women living in Sweden are a vulnerable group susceptible to non-communicable diseases indicating low levels of physical activity and sedentary behaviours. Life post migration gives little incentive to adopt a physically active lifestyle even though physical activity is considered to be a part of health. This thesis indicates that in order for PAP to become everyday practice among GPs there is a need to create routines involving personnel with knowledge of how to individualize the prescription, preferably a physiotherapist. Somali women living in Sweden need individualized, tailored interventions with respect for Somali traditions to meet global guidelines of physical activity.</p>			
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“Aqoon la’aani waa iftiin la’aan”

“Being without knowledge is to be without light.”

–Somali proverb

*To Rinus,
Denise, Sander and Bastiaan*

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- I Persson G, Ovhed I, Hansson EE. Simplified routines in prescribing physical activity can increase the amount of prescriptions by doctors, more than economic incentives only: an observational intervention study. *BMC Res Notes* 2010; 3:304.
- II Persson G, Brorsson A, Troein M, Hansson EE, Strandberg EL. Physical activity on prescription (PAP) from the general practitioner's perspective – a qualitative study. *BMC Family Practice* 2013, 14:128.
- III Persson G, Jama Mahmud A, Hansson EE, Strandberg EL. Somali women's view of physical activity – a qualitative study. *BMC Women's Health* 2014, 14:129.
- IV Persson G, Tornberg ÅB, Jama Mahmud A, Strandberg EL, Hansson EE. Immigrant Somali women's level of physical activity assessed by accelerometry. In manuscript.

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Thesis at a glance

Paper I: Simplified routines in prescribing physical activity can increase the amount of prescriptions by doctors, more than economic incentives only: an observational intervention study	
Aim	To determine whether a change in procedures increases the use of physical activity on prescription (PAP).
Methods	Observational intervention study
Results	The greatest increase of PAP was seen among physicians in the intervention group as compared to all other professionals in the control group.
Conclusion	Simplifying and developing PAP is a concrete way to increase the implementation of PAP in general practice.

Paper II: Physical activity on prescription (PAP) from the general practitioner's perspective – a qualitative study	
Aim	To explore and understand the meaning of prescribing physical activity PAP from the general practitioner's perspective.
Methods	Focus group study, qualitative content analysis
Results	Four categories evolved from the analysis: 1) The tradition makes it hard to change attitude 2) Shared responsibility is necessary 3) PAP has low status and is regarded with distrust 4) Lack of procedures and clear guidelines
Conclusions	GPs are uncertain about using PAP due to lack of education and it is an un-prioritized task. GPs rather refer to other professionals in the healthcare system to prescribe PAP. Routines and arrangements for PAP have to be created for PAP to gain credibility among GPs.

Paper III: Somali women's view of physical activity – a focus group study	
Aim	To explore and understand the perception of physical activity among Somali women.
Methods	Focus group study, qualitative content analysis
Results	Four themes evolved from the analysis: 1) Life in Somalia 2) Life in Sweden 3) Understanding and enhancing health 4) Facilitators and barriers of physical activity.
Conclusions	Leisure-time PA is not a natural part of life for a Somali woman. Facilitators and hindrance distinctive for the group were identified to increase the level of physical activity. Somali women are a heterogeneous group in need of tailored interventions with respect to Somali traditions.

Paper IV: Somali women's level of physical activity assessed by accelerometry	
Aim	To objectively measure the levels of health-enhancing physical activity as well as inactivity.
Methods	Descriptive study, accelerometry
Results	The study group had a high level of sedentary behaviour and physical activity levels which do not meet global recommendations for physical activity.
Conclusion	Somali women in Sweden show an increased risk of developing lifestyle-related diseases due to low levels of physical activity.

Authors' contributions

Paper I

Study design: Gerthi Persson, Eva Ekvall Hansson, Ingvar Ovhed

Data collection: Gerthi Persson

Data analysis: Gerthi Persson, Eva Ekvall Hansson, Ingvar Ovhed

Manuscript writing: Gerthi Persson

Manuscript revision: Eva Ekvall Hansson, Ingvar Ovhed

Paper II

Study design: Gerthi Persson, Eva Ekvall Hansson, Eva Lena Strandberg

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Data analysis: Gerthi Persson, Eva Lena Strandberg

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Manuscript revision: Annika Brorsson, Eva Ekvall Hansson, Margareta Troein, Eva Lena Strandberg

Paper III

Study design: Gerthi Persson, Eva Ekvall Hansson, Eva Lena Strandberg

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Data analysis: Gerthi Persson, Amina Jama Mahmud, Eva Lena Strandberg

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Manuscript revision: Amina Jama Mahmud, Eva Ekvall Hansson, Eva Lena Strandberg

Paper IV

Study design: Gerthi Persson, Eva Ekvall Hansson

Data collection: Gerthi Persson, Amina Jama Mahmud

Data analysis: Gerthi Persson, Åsa B. Tornberg, Eva Ekvall Hansson

Manuscript writing: Gerthi Persson

Manuscript revision: Åsa B. Tornberg, Amina Jama Mahmud, Eva Lena Strandberg, Eva Ekvall Hansson

Abbreviations

ACSM	American College of Sports Medicine
CDC	Centers for Disease Control and Prevention
EoP	Exercise on Prescription
FYSS	Fysisk aktivitet i Sjukdomsprevention och Sjukdomsbehandling [in English] Physical Activity in the Prevention and Treatment of Disease
GP	General Practitioner
HHS	U.S. Department of Health and Human Services
HLP	High-level Panel of eminent persons
IPAQ	International Physical Activity Questionnaire
MI	Motivational Interviewing
MVPA	Moderate- and Vigorous-intensity Physical Activity
NCD	Non-Communicable Disease
NICE	National Institute for Health and Clinical Excellence
PA	Physical Activity
PAP	Physical Activity on Prescription [in Swedish] Fysisk aktivitet på Recept (FaR)
PAR	Physical Activity Referral
PHC	Primary Health Care
PT	Physiotherapist
SBU	Statens beredning för medicinsk utvärdering [in English] The Swedish Council on Health Technology Assessment
SFAM	The Swedish College of General Practice
SNIPH	Swedish National Institute of Public Health
UN	United Nations
WCPT	World Confederation for Physical Therapy
WHO	World Health Organization

Introduction

Physical activity (PA) has significant health benefits and can be used for both health promotion and disease prevention. An increase in PA is one of the actions that would have the greatest positive impact on the health of the population and can be used for both health promotion and disease prevention (SNIPH 2010a). Physical inactivity has been identified as the fourth leading risk factor for global mortality after high blood pressure, tobacco use and high glucose levels (WHO 2010).

Increasing PA is a societal, not just an individual problem, and healthcare systems play a major role in reducing the burden of non-communicable diseases (NCDs). This is identified as a major challenge to healthcare systems and is addressed as one of the goals of the 2003 national Swedish public health policy by demanding the integration of health promotion and disease prevention into all care and treatment (Socialdepartementet 2002; Socialdepartementet 2007).

The population often comes into contact with the healthcare system on a regular basis, thus healthcare professionals are expected to play a key role in implementing the goal of “a more health-promoting health service”. The overall goal of the policy is to offer equal health services to the whole population (Socialdepartementet 2002; Socialdepartementet 2007). Healthcare providers also reach the groups in society that are the most sedentary and vulnerable, such as the low income group, the elderly and the ill.

Physical activity on prescription (PAP) is a method used in Swedish healthcare to increase PA in the population. As a base of knowledge the book “Physical Activity in the Prevention and Treatment of Disease (in Swedish, *Fysisk Aktivitet i Sjukdomsprevention och Sjukdomsbehandling* (FYSS)) gives guidelines and support for licensed personnel to prescribe PAP (SNIPH 2010a). The method offers the patient an individualized prescription for PA in a group or individual setting. This method has been increasingly used in recent years and was applied by all county councils in Sweden in 2008. Since 2012 the Swedish National Board of Health and Welfare has recommended the use of PAP in the “National Guidelines for Methods of Preventing Disease” (Socialstyrelsen 2012).

Several years have passed since the first edition of FYSS was published in 2003, yet PAP is still not used to the extent expected considering the existing evidence for the effect of PAP as a method to increase levels of PA.

Primary healthcare is the first level of care within the healthcare system and is in a strong position to work for increasing PA on a primary and secondary level among the population, patients and vulnerable groups. National Guidelines in Sweden for methods of preventing disease recommend licensed healthcare personnel to use PAP to enhance PA. General practitioners (GPs) have a key role as health providers and their attitude toward PAP is important for the credibility of the method.

Somali women living in Sweden are vulnerable and susceptible to bad health and in need of interventions to enhance health. To better understand Somali women's conditions it is essential to explore their views, experiences and how they perceive their situation in order to establish best-practice interventions.

The general aim of this thesis was to investigate GPs' views and use of PAP and to explore Somali women's views and actual level of PA.

Background

Health

Definition of health

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity according to WHO (WHO 1946). When the definition of health was created, in April 1948, the definition challenged political, academic, community and professional organizations devoted to improving or preserving health (Jadad et al. 2008). Its emphasis on “complete physical, mental and social well-being” was radical in its day for stepping away from defining health as the absence of disease. With an increasing burden of chronic disease, the definition is absolute and therefore unachievable for most people in the world (Godlee 2011). Recent attempts to define health focus on coping and adapting strategies to be able to function with fulfilment and a feeling of well-being with a chronic disease or disability. Health is the goal to achieve for healthcare services and the challenge for the future is how to build and sustain the human capacity to adapt and cope (Godlee 2011).

Health promotion

Five main strategies for health promotion were recognized by the Ottawa Charter for Health Promotion, and reorienting health services was one of them (WHO 1986). The challenge for healthcare systems is to provide comprehensive approaches to reducing the NCD burden by integrating health promotion, disease prevention and chronic care management. Health promotion is the process of enabling people to increase control over and to improve their health. It moves beyond a focus on individual behaviour towards a wide range of social and environmental interventions. WHO presents principles and strategies for health promotion to a variety of population groups, risk factors and diseases, in various contexts. The focus for the health promotion is on education, community development, policy, legislation and regulation. The principles are equally valid for the prevention of communicable diseases, injury and violence, and mental

problems, as they are for prevention of NCDs. In 2003 the Swedish Parliament presented a national health policy with eleven objectives covering the most important determinants of Swedish public health. The development of the public health policy and the determinants of health are presented regularly by the Swedish National Institute of Public Health, most recently in 2010 (Socialdepartementet 2002; SNIPH 2010b). To improve public health and decrease differences in health among groups in society, the proposition aims to create opportunities in society for good health on equal terms for the entire population. Two of the general objectives are increased PA and increased health promotion in healthcare.

Physical activity

The health benefits of PA are well known, and PA is fundamental to energy balance and weight control. Regular PA plays an important role in the primary and secondary prevention of several chronic diseases, e.g., cardiovascular disease, diabetes, cancer, hypertension, obesity, depression and osteoporosis. Physical inactivity contributes to the development of chronic diseases and premature death. The WHO has identified physical inactivity as the fourth leading risk factor for global mortality. Physical inactivity levels are rising in many countries, with major implications for the prevalence of NCDs and the general health of the population worldwide. Global recommendations on PA for health are formulated as primary prevention of NCDs through PA at population level (WHO 2010).

Definition of physical activity

The term PA is sometimes used interchangeably with exercise and physical fitness. PA is defined as “any bodily movement produced by skeletal muscles that require energy expenditure” (WHO 2010). The term exercise is a subcategory of PA that is planned, structured, repetitive and purposeful in the sense that the improvement or maintenance of one or more components of physical fitness is the objective (Caspersen et al. 1985). Physical fitness is defined as a set of components related to health, such as cardio-respiratory endurance, muscular endurance, body composition and flexibility (Caspersen et al. 1985).

Recommendation for physical activity

In the seventies the American College of Sports Medicine (ACSM) published the first general recommendations for exercise and PA (ACSM 1978). In 1995 the Centers for Disease Control and Prevention (CDC) published the more widely used guidelines stating that “Every US adult should accumulate 30 minutes or more of moderate-intensity physical activity on most, preferably all, days of the week” (Pate et al. 1995). As new research was added to the understanding of the biological mechanisms concerning the health benefits of being physically active, the recommendations were altered. The CDC recommendation was clarified and improved in many ways to avoid misinterpretations. The meaning of moderate and vigorous-intensity was addressed as well as 10 minutes as a minimum length of short bouts of PA to meet the recommendations of daily activity. Moderate- and vigorous- physical activity (MVPA) refers to the rate at which the activity is being performed and varies between people depending on an individual’s previous exercise experience and their relative level of fitness.

The importance of muscular strength and endurance was also recognized in the altered recommendations as well as the variety of activities that can be combined to meet activity five days per week as a minimum (Haskell et al. 2007). Present recommendations address three age groups: 5–17 years old, 18–64 years old and 65 years old and above. The age group 5–17 years old should accumulate at least 60 minutes of moderate- to vigorous-intensity physical activity daily. The age group 18–64 years old 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. Muscle strengthening activities should be done involving major muscle groups on two or more days a week. Finally, people 65 years old and above should follow the recommendations for the age group 18–64 years of age. Additionally, people with poor mobility should perform balance-enhancing exercises three or more days a week to prevent falls. When adults in this age group no longer can be recommended PA due to health conditions they should be as physically active as their abilities and conditions allow (WHO 2010).

Global physical activity and inactivity

Human movements represent a complex behaviour influenced by personal motivation, health and ability to move, genetic factors and the environment in which people live. Throughout human evolution the energy balance has been central, designing the human body for movement, although modern humans in the

western world have relatively low levels of PA compared to our ancestors (Hamilton et al. 2007; Hayes et al. 2005).

New technologies have enabled people to reduce the amount of physical labour needed to accomplish many tasks in their daily lives. However, the human body is still functioning as it did when heavy labour was a necessity for survival. The technological revolution has been a great benefit to many populations but it has also caused a major cost in contribution of physical inactivity to the global epidemic of NCDs (WHO 2011). Worldwide it is estimated that inactivity caused 9% of premature mortality or more than 5.3 million deaths in 2008 (Lee et al. 2012). It is well documented that leisure-time activity protects against mortality (Lee et al. 2001). PA from non-leisure activities, such as walking, household chores and work-related activity also has an effect on mortality (Arrieta et al. 2008).

Physical inactivity is a health-behaviour of major importance as it is strongly associated with obesity and a number of diseases such as metabolic disease and certain cancers (U.S. Dept. of Health and Human Services 1996; Warburton et al. 2006). Nevertheless, worldwide, one third of adults are physically inactive, with proportions ranging from 17% in Southeast Asia to about 43% in the Americas and the eastern Mediterranean. Inactivity is rising, women are more inactive than men and inactivity increases with age and is becoming more common in high-income countries (Arrieta et al. 2008; Lee et al. 2012). Urbanization is spreading and people's lifestyle continues to change, and during the past two decades PA patterns have been altered. An increase of leisure-time activity is seen whereas a decrease in daily commuting PA such as walking to and from work has occurred (Mäkinen et al. 2009).

Sedentary behaviour

Morris et al. conducted the first study of PA in the early 1950s among London's transport and post office employees (Morris et al. 1953). Their results showed a lower mortality rate from heart disease in physically active men (bus conductors and postmen) than in less active workers (bus drivers and telephone switchboard operators). This study provided evidence for the importance of PA in reducing mortality but later studies have come to question whether the time spent sitting explained the difference rather than being less physically active per se (Hamilton et al. 2007). Recent studies show evidence that sedentary behaviour such as sitting is a risk factor itself, related to premature death (Dunstan et al. 2012; Ekelund 2012).

Sedentary behaviour is not equivalent to physical inactivity; and should be regarded as two separate behaviours independent of each other, due to different consequences seen in biochemical and physiological mechanisms affecting our health (figure 1). PA involves muscle contractions in contrast to sedentary behaviour, which means absence of muscle contractions mainly by the body's greatest muscles around the buttocks and thighs (Ekblom Bak 2013). In addition to the international guidelines for exercise and PA it is recommended to avoid prolonged sitting. Regular short breaks with a couple of minutes of muscle activity are recommended for persons with a sedentary work situation or for those who spend a lot of time sitting during leisure time. Even those who are physically active according to the guidelines for recommended levels for PA will benefit from short breaks while sitting (Ekblom Bak 2013).

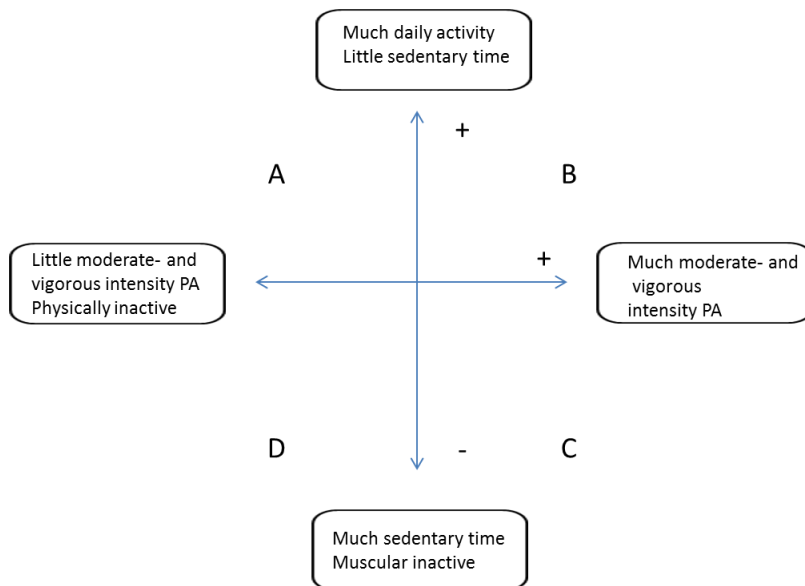


Figure 1. Sedentary time (vertical line) and moderate- and vigorous-intensity physical activity (MVPA) (horizontal line) are two behaviours of importance for health independent of one another. Plus sign = healthy behaviour with low risk of ill health, minus sign = risk behaviour for increased ill health. Four types of behaviour are illustrated in the figure: A) a person with a physically active everyday life with little MVPA; B) a person with a physically active everyday life and much MVPA; C) a person with a sedentary everyday life with much MVPA (a so-called couch potato); D) a person with a sedentary everyday life and little MVPA (Ekblom Bak et al. 2012). Reprinted with permission from Ekblom Bak

Assessment of physical activity

The methods of assessing PA can be summarized as self-reported or objective measures. The method to choose depends on whether to measure the PA behaviour or the energy expenditure (Ainsworth 2004). PA as a behaviour can be assessed with direct measures such as observations, PA records and logs or by indirect measures such as self-reported questionnaires and fitness tests.

Self-reported questionnaires have high feasibility and are often used in large populations since the method is inexpensive and fairly easy to administer. However the method has some limitations concerning reliability and validity (Shephard 2003). Other disadvantages are associated with the respondent's ability to remember the performed activity and the fact that people are likely to present themselves in a favourable light, leading to over-reporting of PA levels. Differential bias can also occur when subgroups have different frames of reference when reporting the activity. The questions asked in a questionnaire can be misinterpreted. Some authors have found that overestimation of PA occurs and should be taking into consideration when using self-reported questionnaires (Janevic et al. 2012; Hagstromer et al. 2007).

The most common self-reported questionnaires in use are the standardized instrument, the International Physical Activity Questionnaire (IPAC) and the Global International Physical Activity Questionnaire (GPAQ) (Bull et al. 2009; Craig et al. 2003). IPAQ is validated in 12 countries. The questionnaire comes in a short form with 7 items and a long form with 27 items, and shows acceptable measurement properties for monitoring population levels of PA according to Craig et al. (2003).

The IPAQ instrument assesses health-enhancing PA by asking questions about time spent in walking and other moderate to vigorous activities, lasting 10 minutes or more, in the seven-day period before administration of the test. All types of activity are included, whether they are part of work, leisure time or transportation. The long-form IPAQ has been validated in a Swedish context and compared with accelerometer measures in a population sample (Hagstromer et al. 2010). The study found significant correlations between the IPAQ and the accelerometer. Although large intra-individual differences were found and actual PA were systematically over-reported with IPAQ.

Objective measures can be obtained by pedometers and accelerometers as a direct way of measuring body movements. Pedometers measure vertical movements and assess the number of steps with the outcome in steps per day. Measurements using pedometers are simple, inexpensive and readily available and a perfect tool for self-monitoring, although insensitive to register walking at very low speed and movements involving activity other than walking and running. The

device is small and can be worn attached to a belt around the waist (Tudor-Locke et al. 2011). In the past decade, PA monitors have been successfully used in many large-scale population-based studies (Hagstromer et al. 2010; Pate 1995; Troiano et al. 2008). Some brands of pedometers have shown to be more accurate than others and can easily be used in public health and clinical applications to stimulate PA on an individual basis (Bohannon 2007; Tudor-Locke et al. 2008). A pedometer is one out of three tools recommended by the National Board of Health and Welfare for healthcare providers to use to enhance PA among patients. Other recommended tools to use are PAP and activity diaries.

Accelerometers are used to estimate the intensity of PA, and as an objective instrument the accelerometer may offer an accurate and feasible method of gathering detailed information on health-enhancing PA (Hagstromer et al. 2007). The data can be downloaded and converted into time spent in various intensities of PA and inactivity by applying accepted accelerometer-specific cut points. A uniaxial accelerometer detects acceleration in the vertical plane and a triaxial accelerometer reports activity in each of the three orthogonal directions. Accelerometers have been extensively tested for validity, reliability and are used in large studies. The most commonly used accelerometer, also used in this thesis, is the Actigraph® (Manufacturing Technology Inc. Fort Walton Beach, FL, USA) (Hagströmer 2007).

The accelerometer is commonly worn in an elastic band around the waist. Even though the device is easy to use, the data collections need careful monitoring to ensure compliance with instructions for using the device (Trost et al. 2005). Instruments combining accelerometer registration with heart rate monitoring are becoming more and more available and will in the future give more precise data concerning PA. As yet accelerometry is still the method of best practice since the combined method has yet to be validated (Hagströmer 2007).

PA can also be measured by heart rate monitors as the heart rate changes according to body movement, although heart rate also responds to other bodily mechanisms such as heat and stress. Individual calibrations are therefore needed when using heart rate as a monitoring method (Hagströmer 2007).

Another way to measure PA is by assessing energy expenditure. Double Labelled Water uses an isotope of hydrogen and oxygen in body fluid to determine the washout time for concentrations towards natural levels. Direct and indirect calorimetry measures the heat produced during PA (Hagströmer 2007).

Promoting physical activity

PA has a fundamental role in the prevention and treatment of chronic disease, and a sedentary lifestyle increases the risk of disease and premature death (U.S. Dept. of Health and Human Services 1996; WHO 2003). Promoting PA has therefore become an important task for society in general and for healthcare in particular. Promoting PA is a multi-directional task, on a sociopolitical and individual level. Environmental and policy strategies as well as individual behaviour and lifestyle modification strategies are needed. Examples of environmental and policy approaches to increase PA include everything from building-construction to walking and bicycle trails. Incentives that encourages and promotes PA should permeate life during work, school days and leisure-time (Task Force on Community Preventive Services 2005).

Different strategies have been developed globally, all with different contexts and components, to enhance and stimulate PA on an individual basis. Exercise referral schemes are used as a definition for a formalized process where a health professional refers a patient to an assessment, resulting in a tailored PA programme that meets the patient's need, including monitoring of the progress (NICE 2006; James et al. 2008). Many programmes include written or oral advice to promote a physically active lifestyle among patients. Target groups may differ and sedentary adults as well as patients with inactivity-related diseases such as diabetes, hypertension and obesity are addressed (Swinburn et al. 1998; Kallings 2011; Pavey et al. 2011; Rose et al. 2007).

Professional advice and guidance with continued support can encourage individuals to be more physically active in the short to midterm. Hillsdon et al. argues that it is necessary to identify which methods of exercise promotion work best in the long-term to encourage specific groups of people to be more physically active (Hillsdon et al. 2005). Some studies have shown various effects of exercise referral schemes depending on the context of the programme (Elley et al. 2004; Elley et al. 2003; Burton et al. 2012; Orrow et al. 2012). Factors important to the results of such schemes are the motivation of the patient to a behaviour change as well as the health professional's motivation to give counselling. Strategies to promote PA may be more successful if they reflect the patient's interests (Burton et al. 2012). Recent studies have also shown that men and physicians, often in high positions of power, show a less positive attitude to health promotion, and therefore may play an important role in the healthcare services' health promoting work (Johansson et al. 2010). According to several studies there is a positive association between a physician's personal health habits and the physician's tendency to counsel patients about their behaviour (Lewis et al. 1986; Lewis et al. 1991). The concept of "Practise what you preach" are in line with health-promotion activities such as counselling patients to a greater level of PA.

Physical inactivity is one of several lifestyle behaviours affecting health, where the use of tobacco, alcohol and unhealthy eating habits are also important to address when there is a risk of developing or showing symptoms of disease. A Swedish national survey has shown that 60% of men and 50% of women have one or more unhealthy behaviours (Socialstyrelsen 2009a). Socially exposed people often have several unhealthy behaviours, needing to be changed. The proportion of the population showing more than two unhealthy behaviours is 12% for women and 17% for men. Three unhealthy behaviours are seen in 5% of women and 9% of men (Socialstyrelsen 2009a). When patients are struggling to make several lifestyle changes, they should be encouraged to make PA changes first, as this lifestyle change generates a sense of well-being and motivation to self-management. Increasing PA can act as a gateway behaviour that produces positive effects in other behaviours (Malpass et al. 2009).

The Swedish Council on Health Technology Assessment (SBU) conducted a systematic review of the scientific literature to evaluate the effects and cost impacts of various methods for healthcare to promote PA (SBU 2007). The effectiveness of the measures with regard to the impact on the level of PA as the main objective was reviewed and counselling of adults was found to have the strongest evidence. All studies reviewed in the report had a follow-up time of at least six months, and an increase by 12–50% of PA levels was seen when counselling was used. When counselling included a prescription for PA, the use of a pedometer or activity diaries, an additional 15–50% increase in PA levels was seen.

Other methods and important areas that were identified to be effective were advice, theory-based behavioural interventions, supervised training in groups and individually adapted training programmes (SBU 2007).

Physical activity on prescription (PAP)

Physical activity on prescription (PAP) Fysisk aktivitet på Recept (FaR®), (in Swedish) is the Swedish version for promoting PA through healthcare services. PAP was first introduced when the Swedish National Institute of Public Health was commissioned by the Swedish government in 2001 to launch a campaign, “Sweden on the move”, to promote PA (Leijon et al. 2008; Raustorp A et al. 2014). The method meets public health guidelines for sufficient levels of PA in health promotion as well as prevention for individuals with a high risk of developing lifestyle-related diseases due to inactivity (Kallings 2011).

PAP is an individually adjusted written prescription of PA that all licensed healthcare providers in Sweden are recommended to use in order to prevent and treat illness. The method has been known to health professionals in Sweden for the

past 15 years and since 2008 all regions in Sweden have been using PAP (SNIPH 2010a).

In 2011 the Swedish National Board of Health and Welfare produced the National Guidelines for Methods of Preventing Disease by supporting patients in their efforts to change unhealthy lifestyle habits (Socialstyrelsen 2012). PAP is one of the tools recommended to use for insufficient PA. Locally adapted models exist but they all involve an individually adapted prescription following the recommendations and instructions adapted to disease or sedentary behaviour according to FYSS (SNIPH 2010a). The book FYSS is used as a tool when prescribing PA, it summarizes the latest evidence of the connection between PA and health, addressing specific groups of diagnosis.

PAP is prescribed by licensed health professionals with an adequate level of competency and sufficient knowledge of the patient's health status in order to carry out the task. The prescription should be individualized to fit the patient's needs and symptoms, and adapted with regard to the dosage (intensity, duration and frequency) and type of activity. Furthermore, the patient's actual disease, functional capacity, medicine interactions and potential contraindications for a certain activity should be taken into consideration (SNIPH 2010a). The prescriber is also responsible for the follow-up and revision of the prescription when necessary.

Despite national guidelines and recommendations, PAP is used sparingly. An estimate found that 50,000 prescriptions were issued in 2010 and 1/1000 healthcare visits generated a PAP. The major health professional groups prescribing PAP were physicians, physiotherapists (PTs) and nurses in primary care, but also professionals in specialist care use the method (SNIPH 2010b).

Physiotherapy and promoting physical activity

The definition of physiotherapy includes the promotion of health and well-being, the prevention, habilitation and rehabilitation of impairments. The PT's extensive knowledge of the body and its movement needs and potentials is crucial for determining strategies for diagnosis and intervention (WCPT 2014). PTs are experts in movement and function and work together with the client to overcome movement disorders to maximize people's quality of life, looking at physical, psychological, emotional and social well-being. PTs practice is grounded on evidence-based care and clinical experience guided by ethical principles. PTs are able to act as first contact practitioner, and patients may seek direct services without referral from another healthcare professional (WCPT 2014; Richter et al. 2012). Physiotherapy in this thesis focuses on promoting the health and well-being of individuals, emphasizing the importance of PA and exercise.

Counselling, coaching, education and exercise are tools used by the PT to improve and enhance PA. PTs are highly skilled in giving individualized instructions to patients in need to gain function and to increase PA. An individual prescription is dependent on the adaptation to the level of PA set for the patient's capacity. PA can be intimidating to people with little experience of physical strain when being physically active. The total amount of PA, a combination of intensity, duration and frequency, is related to various health variables in a dose-response relationship, making it crucial for the prescription to be as precise as possible in order to gain the most effect (SNIPH 2010a; HHS 2009). The beneficial effect of MVPA has been more clearly defined in recent years and it is therefore important for the patient to clearly understand what this level of activity really means. To rate the perceived exertion and to make the patient feel the desired level of intensity the Borg scale is an ideal tool to use (Borg 1998).

With PTs being the only health professionals using the Borg scale in a patient consultation, they are likely to give the patient an awareness of the sensations experienced when being physically active, a factor important for optimizing the effect of the activity. Another tool used by PTs is the pedometer, to enhance PA as recommended by the SBU report (2007; Raustorp 2013).

General practice

General Practice is the cornerstone of the healthcare system and is described by Hunsbæk as the first line of healthcare and the general practitioner (GP) as the first line doctor (2007).

The GP is a specialist trained to work in the front line of a healthcare system and to take the initial steps to provide care for any health problem(s) that patients may have.

The GP takes care of individuals' needs, irrespective of the patient's type of disease or other personal and social characteristics. It is the responsibility of the GP to optimize the total use of healthcare resources to ensure the best possible access for those in need of care. The GP meets the patient across the fields of prevention, diagnosis, cure, care, and palliation, using and integrating the sciences of biomedicine, medical psychology and medical sociology (Olesen et al. 2000). GPs save the system measurable millions by providing cost-effective care for the great majority of patients and efficient referral for the few who require consultant care (Phillips 1996). GPs are aware of their role as key providers and organizers of services within the entire healthcare system, ensuring that needs are met, even if it is not always they who meet these needs (McWhinney 1997). A patient's first

healthcare contact in Sweden is normally with a GP at a local healthcare centre. Patients can also seek care with other professionals in the healthcare system without a referral and therefore the GPs in Sweden do not play the same role of gatekeeping as they may do in other countries (Anell et al. 2012). Even when a patient shows a great level of reliance on the physician's recommendations, it is more effective if the advice is given as a detailed prescription. The effect increases further if the physician follows up the prescription (Weidinger et al. 2008).

Having a key role as a health provider within the system, it is important for the GP to have a positive attitude towards health promotion and in this context towards PA promotion. Some studies, however, have shown more or less willingness to take on a health-promoting role and some are sceptical about the effectiveness of intervention and have ethical concerns about giving lifestyle advice (Johansson et al. 2010; Jacobsen et al. 2005). As shown in this thesis, PAP as a method to increase the level of PA among patients is considered by GPs to be a non-prioritized task regarded with mistrust. Furthermore, the opinion of GPs is that PAP can be prescribed by other health professionals. The GPs' own BMI and personal health promotion behaviour is a strong predictor of attitudes toward obesity care, and GPs who exercise more and maintain a healthy diet are more likely to discuss exercise and weight with their patients (Spencer et al. 2006; Bleich et al. 2012; Abramson et al. 2000).

Vulnerable groups for developing non-communicable disease

Non-communicable diseases (NCDs) are fundamentally a socioeconomic issue, affecting both rich and poor people, but inflicting more illness and other consequences on the poor in all countries. The UN High-level Panel of Eminent Persons (HLP) has reported a unified development, agenda, Post-2015 NCD Alliance Analysis, to encourage a common action to reduce the global NCD burden by outlining universal goals for sustainable development with health as the main focus (United Nations 2013). The analysis has identified the most vulnerable groups in society, such as women, children, indigenous populations and people with disabilities. These groups experience disproportionate exposure to NCD risk factors, prevalence of NCDs and poor health outcome. The analysis also recognizes that health is a key dimension of poverty and that good health outcome only can be achieved through universal health coverage. The goal of the Swedish national public health objective is to create social conditions to ensure good health, on equal terms, for the entire population (Socialdepartementet 2007). As some authors have identified, the policy emphasizes the importance of focusing on the

groups most vulnerable to ill health (Linell et al. 2013; Axelsen et al. 2012). PA and health-promoting health services, as discussed in this thesis, are two of the eleven general objectives of the policy.

Several public health interventions focus on walking because of its acceptability and accessibility, particularly among populations with a low prevalence of PA. Walking is also the most common PA among the general population and in major subpopulations such as older persons and racial/ethnic minorities (Siegel et al. 1995). A study focusing on a multi-component PA programme shows an increase of PA over the short and long term among a group of ethnic minority men (Andersen et al. 2012). The findings indicate a need for PA intervention strategies targeting regional conditions, focusing on everyday activities, self-efficacy, physical environment, knowledge and skills to address vulnerable groups.

Somali immigrants

Immigrants are identified as a vulnerable population and factors such as socioeconomic background, immigrant status, limited language proficiency, residential location, stigma, marginalization, traumatic events prior to migration, and access to healthcare affect the degree of vulnerability (Derose et al. 2007; Warfa et al. 2012). Studies around the world show that immigrants are not a homogeneous group and therefore need culturally tailored interventions to produce better outcomes than generalized interventions (Derose et al. 2007; Gele et al. 2013; Renzaho et al. 2010).

The main immigrant groups in Sweden are people from Syria, Somalia and Afghanistan and constituting 14% of Sweden's 9.6 million inhabitants. In 2013 people from Somalia constituted 10% of the immigration (Statistiska Centralbyrån 2014).

Since 1991, thousands of Somali families have immigrated to different parts of the world. In recent years Sweden and the Netherlands have been the major host countries for Somali refugees and in 2009 and 2010 just under 50% of asylum applications by Somalis were made in these countries together. People born in Somalia constitute 0.4% of the Swedish population. In the UK the corresponding figures is 0.17%, in the Netherlands 0.16% and in the United States 0.03%. Somali immigration to Sweden of any significance began in the late 1980s but more than 70% of Somali residents living in Sweden arrived after 2000. In 2012 nearly 44,000 Somali-born people lived in Sweden, 90% of the 5,644 applicants were accepted and the immigration from Somalia continues, due to the country's unstable status (At home in Europe 2014). The majority of Somalis living in

Sweden have no children, reflecting the age profile of the population: 50% are between 16 and 30 years of age. Somali families tend to be large and about 20% have four or more children, making it even more important to identify interventions effective in stimulating good lifestyle behaviours to prevent future ill health and disease.

Somali immigrant women in Sweden

Being a woman and moreover an immigrant makes Somali women living in Sweden susceptible to develop ill health (United Nations 2013; Taylor et al. 1998). Challenges related to culture and the relationship between socio-economic factors and post-migration exist, which need to be addressed by health professionals to ensure the delivery of successful health outcomes (Renzaho 2004).

The impact of migration itself is a risk factor for developing diseases such as overweight and diabetes. Urbanization, adopting a sedentary lifestyle and the availability of fatty foods together with other characteristics associated with living environments in a wealthy host country seem to be contributory causes (Misra et al. 2007; Agyemang et al. 2009; Goel et al. 2004). Several studies show a higher incidence of overweight and obesity among women than among men, and the prevalence of overweight seem to increase with the length of stay in the new home country (Goel et al. 2004; Oza-Frank et al. 2010). Decision making within the Somali community is led by a male clan member but women are increasingly gaining a stronger position in society, especially because they have become the main bread winners according to one study (Gundel 2006).

On the other hand unemployment among Somali women in Sweden is very low yet still the traditional role of the woman is to take care of the children and the household (At home in Europe 2014). Women have the ability to influence the health of the whole family and prevention efforts may be more successful when interventions for women are in focus (Agyemang et al. 2009).

Culture

The English anthropologist Edward B. Tylor first used the term culture in his book, published in 1871 to describe processes of socialization and defined the term as “that complex whole which includes knowledge, belief, art, law, morals, custom, and any other capabilities and habits acquired by man as a member of society” (1958). Since then many ways to define culture have evolved. In 1952 culture was defined as patterns and behaviours acquired and transmitted by

symbols, constituting the distinctive achievements of human groups (Kroeber et al. 1963). More recent definitions say that “culture is the shared knowledge and schemes created by a set of people for perceiving, interpreting, expressing, and responding to the social realities around them” (Lederach 1995).

Culture within healthcare

Healthcare organizations are inherently multicultural, given the wide variety of professionals, subgroups, divisions and teams operating within them. The clinical culture is based on the deep socialization experience in the professional school in which knowledge is based primarily on the biological sciences and the need for professional discretion in deciding how best to treat one’s patients (Ferlie et al. 2001). The challenge for healthcare is to bring together professionals from very different backgrounds and cultures. Organizational culture within healthcare systems can be defined in three levels according to Schein (2004). At the surface level are the observable behaviours and artefacts a documentary crew would capture when looking at any piece of the healthcare system. An observer could extract patterns of behaviour or norms, but it would be difficult to understand what is happening without talking to people about the meaning of these activities. The second level of culture comprises the beliefs and values that participants espouse, what they are willing and able to verbalize. The third and deepest level of culture is underlying assumptions, often taken for granted and unarticulated, that have developed over time through successful collective problem solving. The deepest level of culture is just as real as the other levels and often more important for understanding why things happen or fail to happen. A hospital, for example, is not a single culture but rather a fragmented collection of occupational cultures such as medicine, nursing, rehabilitation and management (Van Maanen et al. 1982).

Edmondson found that even similar work groups in the same nursing unit or operating room can have different cultures based around leadership style. He also found that individuals and groups are likely to retain diverse cultural elements within a more or less uniform organizational culture, despite leaders who may try to meld those bits and pieces into a single identity and culture (Edmondson 2004).

Cultural competency

To move towards cultural competence, healthcare providers and other programme staff should understand the ethnic and cultural needs of the populations they serve. Providing effective care involves taking the time to learn from patients what is important to them in the experience of illness and treatment. According to the

medical anthropologist Arthur Kleinman, finding out “what is at stake” for the individual will provide crucial information to use in communication and in tailoring a treatment plan (Kleinman et al. 2006). Culture does matter in the clinic, and providers must remember that they too bring a cultural perspective to the patient-provider relationship. Increasing staff knowledge of the cultural and ethnic backgrounds of populations served is one important aspect of diagnosis, treatment and care. Culture is often made synonymous with ethnicity, nationality and language, but culture also involves patterns of learned beliefs, values and behaviour that are shared within a group. We all belong to more than one culture, which may, for example, be social, professional or religious. The concept of culture goes beyond race, ethnic background, and country of origin. Culture shapes the way we approach our world and affects interactions between patients and clinicians (Betancourt 2004). By far the most important question to ask a patient, according to Betancourt, would be what matters most to him or her in the experience of illness and treatment to avoid stereotyping and to focus on the patient as an individual (2004).

Somali culture

Arabs and Persians developed trading posts along the Gulf of Aden and the Indian Ocean early on, and in the 10th century the area was settled by Somali nomads spreading throughout the Horn of Africa. The territory has been under occupation by Britain and Italy and was granted independence by the United Nations (UN) in 1960 when the Somali Republic was formed. President Siad Barre came to power in a military coup, and when anti-government groups were formed the president fled the country in 1991, starting the great emigration of Somali refugees. The civil war has continued since then in the absence of a strong central government (Samatar 1992).

Somali people are descendent from a nomadic population and many members of tribes and clans still live a nomadic life, whereas others live in cities and urban centres. While city dwellers are accustomed to settled culture, tribal traditions and customs are prevalent in their relationships and interaction. Somali culture is a patriarchal system where men are the centre of Somali society and hold the cultural authority. Traditionally, the basic unit in Somali culture is the extended family, with more than two generations in the same family. Whether living in an urban or nomadic setting, the extended family system is practised and preserved and can include a nuclear family of nine or ten members living in the same house.

Beside culture, religion is a way of life, and 99% of Somalis are Sunni Muslims. Somalis represent the fourth largest group of Muslims in Sweden after people from Iraq, the Balkans and Iran. Somalis rely on Islam as a source of

strength and reference for their daily life. The religion's doctrine provides guidance on how to live and behave correctly in public and in private. As both tribal and Muslims, some Somalis practise polygamy. This practice however depends on the economic abilities to support additional wives and therefore the practice varies (Tiilikainen 2007).

Religion influences Somali dietary practices and “halal” foods are foods that one is allowed to eat. Halal foods include all foods of plant origin and some of animal origin such as lamb, goat, camel, cow and chicken when slaughtered in the proper way. Traditional Somali staple food is high in fat, protein, carbohydrates and sugar. “Haram” are forbidden foods or drinks, including pork, blood and animals not slaughtered in the proper way, alcohol and drugs, and foods that might contain pork such as animal shortening and gelatin. Fasting is a common religious expression and is also a common dietary factor for Somalis.

Folk medicine is deeply seated in Somali culture. Regardless of whether modern medicine is available, traditional medicine is used as a reference for health needs (Louis 2014).

Literacy is low among Somali men (36%), and women (14%), but women in urban areas are educated and many have professional careers. Some 60–70% of Somalis living in Sweden have only primary or unknown level of education (At home in Europe 2014).

Implementation

The word “implement” comes from the Latin “implere” meaning to fulfil or to carry into effect (Oxford English Dictionary 1987). Implementation is defined as an act of carrying an intention into effect such as a set of activities designed to put into practice an activity or programme of known dimensions (Fixsen 2005). Implementation occurs at different levels; individual, clinical, organizational and community and interacts to determine the public health or population-based impact of a programme or policy (Glasgow et al. 1999).

Implementation of programmes promoting PA by health professionals should be based on broad cooperation and also include actors outside the healthcare system. To be effective it needs to be rooted in the operation, preferably in a policy decision (SNIPH 2010a). Methods to enhance PA such as PAP have been shown to need strategies for implementation, just as any new method requires. Implementation of PAP by health professionals means prescribing PAP to patients in need of an increased PA. For the patient it means complying with the prescription and implement a physically active behavior.

Russell and co-authors propose a model for evaluating interventions that assesses five dimensions: reach, efficacy, adoption, implementation and maintenance (Glasgow et al. 1999). Reach and adoption concern the numbers and characteristics of the participants – patient or health professional – in the intervention. To gauge efficacy two outcomes should be measured according to Russell. First, behavioural outcomes for the participant such as PA but also outcomes for health professionals delivering interventions such as approaching patients, counselling and making follow-up calls. Implementation refers to the extent to which a programme is delivered as intended. Measurement of participant adherence is necessary for interpreting the outcome. Maintenance is a challenge at both individual and organizational level. Health promotion practice or policies need to be routine and part of the everyday culture and norms of an organization. On an individual level relapse following initial behaviour change is ubiquitous. Steptoe et al. also argued that it is crucial to understand the beliefs and practice of those primary health professionals (working at the frontline) to fully appreciate and understand whether public health policy changes have been implemented effectively (1999). The Precede-Proceed model proposed in 1974 by Dr. Lawrence W. Green is another accepted and useful model for developing, implementing and evaluating health programmes by assessing health and quality of life needs (Green et al. 2005).

Behavioural change

Behaviour change is an ongoing process and patients need support from health professionals to bring about and sustain a change of a physically inactive lifestyle. To understand the stages of change individuals go through, while changing health behaviours, Prochaska's trans-theoretical model is commonly used. The model was first developed to be used for behavioural change in psychotherapy, focusing on smoking cessation, but it has also been used with a focus on physical inactivity (Spencer et al. 2006). The model includes five different stages of change: pre-contemplation, contemplation, preparation, action and maintenance. The shift from one stage of change to another takes place through various processes of change according to Prochaska. The shift between stages can either take place moving forward in the change or take place in reverse. Often changes in both directions are needed when behavior-modifications are made (Prochaska et al. 1994).

An individual's drive to change behaviour also depends on the faith in his or her own self-confidence or self-efficacy with regard to his or her own ability to make a life change. Positive experiences, positive role models, support from other people together with a positive physical and emotional state can lead to a stronger

faith in the individual's own ability to change behaviour. Although PA itself can generate feelings of negative physical state such as aches and pains which need to be handled by the patient (SNIPH 2010a). A supportive approach from health professionals when such feelings occur will ease the transition for the patient to a physically active behaviour. Compliance with a prescription of PA requires the patient to change to a less sedentary lifestyle, but it also requires a behavioral change among health professionals when adopting a non-traditional approach to treating patients.

Aims

The general aim of this thesis was to increase the numbers of PAP prescriptions, to investigate GPs' view and use of PAP and to elucidate facilitators and barriers to a physically active lifestyle among Somali women and their actual level of PA and inactivity.

The specific aims were:

- I. To describe the methodology used and determine whether a change in procedures increases the use of PAP.
- II. To explore and understand the meaning of prescribing PA from the general practitioner's perspective.
- III. To explore and understand Somali women's view of health and PA.
- IV. To measure Somali women's level of PA.

Material and Methods

The thesis uses a mixed method including one intervention, two qualitative studies and one quantitative descriptive study, in order to respond to the research questions and the aim of the thesis. Using mixed methodological methods can lead to a deeper understanding of the research field than a mono-method approach (Shaw et al. 2010; Johnstone 2004). The concept of mixing methods originated in the late 1950s when Campbell and Fiske used multiple methods to study the validity of psychological traits (Creswell 2003). Mixed methods research in primary care was introduced as a procedure to collect qualitative data before quantitative data where variables are unknown, or using qualitative methods to expand quantitative results to advance study aims (Creswell et al. 2004). In mixed methods, observations and interviews (qualitative data) are combined with traditional surveys (quantitative data). Recognizing that all methods have their limitations, researchers felt that biases inherent in any single method could neutralize or cancel the biases of other methods (Dures et al. 2011).

The first study in this thesis investigated whether it was possible to increase the amount of PAP prescribed by physicians by involving PTs in the procedure. The findings of this study were used in the second study to further explore GPs' views of prescribing PAP. The result of the first study also implied that no foreign-born patients were prescribed PAP, and thus the aim of the third study was to explore Somali women's views of PA. Somali women were identified as a group at risk of developing lifestyle related diseases. The fourth study was a descriptive study aiming to find out the actual PA level among Somali women. An overview of the four studies is shown in Table 1.

Table 1. Overview of the design, participants, data collection and data analyses of the papers included in the thesis

	Study I	Study II	Study III	Study IV
Design	Intervention	Qualitative	Qualitative	Descriptive
Participants	GPs from PHC centres in the south of Sweden n=57	GPs from PHC centres in the south of Sweden n=15	Somali women living in the south of Sweden n=26	Somali women living in the south of Sweden n=61
Data collection	Observational intervention	Focus group	Focus group	Descriptive
Instruments	Numbers of PAP	Semi-structured interview guide	Semi-structured interview guide	Accelerometry
Data analyses	Chi-squared test	Qualitative Content Analysis	Qualitative Content Analysis	Means, SD proportions, median, logistic regression analysis, and Mann-Whitney U-test

Study design

Study I was an observational intervention study with a non-randomized control group. The results were analyzed with a chi-squared test.

Study II was a qualitative study using focus groups as a method for collecting data. The results were analyzed with qualitative content analysis.

Study III was also a qualitative study using a focused ethnographic approach with focus groups as a method for collecting data. The results of the study were also analyzed with qualitative content analysis.

Study IV was a descriptive study with levels of PA described in a population. The results were analyzed and presented as means, standard deviations (SD) and proportions, or median and 25th–75th percentile for skewed data. Logistic regression analysis was performed with the level of significance set at $P < 0.05$ for all analyses.

Study population and area

The participants in the four studies came from three areas in southern Sweden. The largest area, Malmö, is the third largest city in Sweden with about 313,000 inhabitants. Växjö is a university town with about 85,800 inhabitants and Blekinge is the smallest county in Sweden with 152,800 inhabitants. Karlskrona is the provincial capital of Blekinge with 64,300 inhabitants. GPs working at some of the 39 public, Primary Health Care (PHC) clinics located in Malmö, Växjö and Blekinge were included in the studies (studies I, II). GPs, nurses and PTs work at the clinics along with secretaries and laboratory personnel. Immigrant Somali women living in the three areas participated in two studies (studies III, IV). In 2012 almost 44,000 Somali-born people were living in Sweden, making up 0.4% of the Swedish population. In 2011 there were 1,551 Somali-born individuals in Malmö. In Växjö and Karlskrona combined there were a couple of hundred people of Somali descent.

Study I

All public PHCs in the county of Blekinge were included in the study. At that time 57 GPs were employed and PAP had been introduced as a method to increase PA among patients. Eleven of the GPs were included in an intervention group, while the remaining 46 GPs represented the control group.

Study II

Forty-three GPs with experience of PAP from 16 healthcare centres were purposively selected to participate. The selection included both male and female GPs of different ages, with a varying number of years in the profession, working in publicly financed health centres located in urban and rural areas. Fifteen GPs from three counties agreed to participate, forming three focus groups.

Study III

Somali women from Malmö, Växjö and Karlskrona were invited to participate in four focus groups. They were invited by snowball recruitment through a contact person in the local Somali community. The selection included 26 women ranging from 17 to 67 years of age. The average time living in Sweden was 11.5 years, ranging from 1 to 23 years. Some participants knew each other and some had never met before.

Study IV

A total of 70 women between 18 and 63 years of age, of Somali descent, from Malmö, Lund, Kristianstad and Växjö were recruited to participate in the study. They were invited by snowball recruitment through a contact person in the local Somali community in 2013 and 2014. Eight women declined to wear an accelerometer, one accelerometer was lost during use and 23 women were excluded from the study due to insufficient wear time. Data from a total of 37 women were analysed. They were 21 to 45 years old (median age 30). The final analytic sample with eligible data included 25 participants. Figure 2 shows a flow chart of the study.

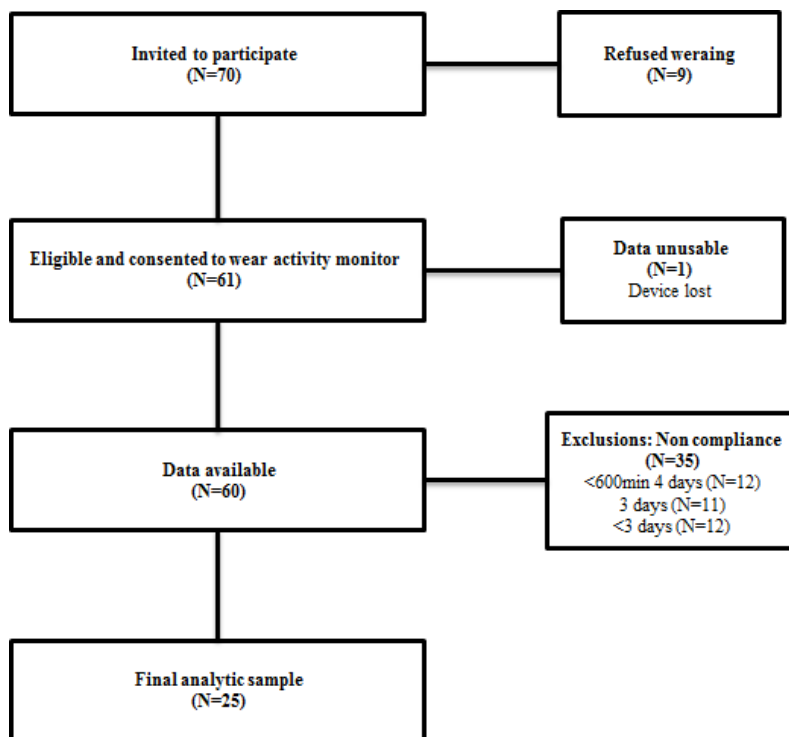


Figure 2. Flow chart of paper IV

Procedures

Study I

The study was an observational intervention study conducted from 2006 to 2007, carried out as an improvement project at a PHC clinic in Karlskrona, Sweden. The clinic testing the prescribing of PAP was selected as the intervention clinic and the remaining PHC clinics in the province of Blekinge became a control group. The intervention consisted of a physician initiating PAP. The prescription was sent electronically to a PT. The patient was scheduled for a motivational interview within a couple of days. During the appointment the patients decided, with guidance from the PT, what type of PA to perform in order to influence their condition. Besides the type of activity to perform, the duration and intensity were prescribed. The control group continued to prescribe PAP using existing referral routines involving the GP counselling the patient without support from the PT. The number of PAP prescriptions was counted using data collected from computerized medical journals.

Study II

Three focus groups were performed in 2011, to obtain qualitative data on GPs' views of PAP. The groups comprised a total of 15 GPs and two of the groups took place in PHC clinics in Malmö and Växjö. The third group took place at Blekinge Centre of Competence in Karlskrona. Forty-three GPs from 16 healthcare centres with experience of prescribing PAP were purposively selected and invited by e-mail to participate. Different ages, with a varying number of years in the profession, working in publicly financed health centres located in urban and rural areas, were represented in the groups. Twenty-eight GPs declined participation, with shortage of time stated as the most common reason. A semi-structured interview guide was used and the interviews lasted 75–90 minutes each. The focus of the discussion was to talk about the views of prescribing PAP. After an opening presentation each participant answered the question: “On what level are you physically active”? Then a voluntary participant was asked to share the experience of prescribing PAP. This started a free association. The role of the moderator was to lead the discussion and the assistant made field notes and ensured that everyone had the opportunity to speak. The interviews were audio taped and transcribed verbatim by a secretary.

Qualitative content analysis was used to analyse the material and started with the moderator and assistant reading through all transcriptions. Meaning units were

identified as a first step and were then condensed and coded as they were expressed by the participants and perceived by the moderator and assistant independently of each other. On the basis of the codes, subcategories were used as an intermediate stage to develop categories. The other authors read all the material, reflected, commented and confirmed that they contained data supporting the findings.

Study III

Four focus groups were conducted in the autumn of 2012 and spring of 2013. A total of 26 women ranging from 17 to 67 years of age were invited to participate by snowball recruitment. Some participants knew each other, while others had never met before. Two of the focus groups were conducted at community centres and two were conducted in the homes of two participants. A semi-structured interview guide was used and the interviews lasted 75–90 minutes each. The topic of the focus groups was to discuss the concept of PA and individual experience. The women had different proficiency in speaking Swedish; a few preferred to speak Swedish and the majority preferred to speak Somali. A bilingual moderator led all four groups, allowing the participants to discuss the topic in the language of their choice. An assistant with no knowledge of Somali kept field notes and ensured that everyone had the opportunity to speak. After an opening presentation, the topics were presented in Somali and in Swedish and the participants were invited to share their thoughts about health and PA. The conversations were recorded digitally and lasted 75–90 minutes each. The Swedish conversation was transcribed verbatim by a secretary. A nurse with Somali as a native language listened to the Somali conversation and transcribed it verbatim. The verbatim text was then translated into English by the Somali-speaking nurse. For each interview the bilingual moderator made written summaries in Swedish of the Somali parts of the discussions. The assistant listened to the recordings and read through the English and Swedish texts to clarify any obscurities.

Qualitative content analysis was used to analyse the material. To get a feeling of the totality, two of the authors read through the transcriptions and listened to the recordings several times separately and analysed the material individually. Meaning units were identified as a first step and a third author participated in developing subcategories, categories and themes from the condensed data as they were expressed by the participants and perceived by the authors independently of each other. On the basis of the codes, subcategories were used as an intermediate stage to develop categories and themes. All authors read the material, reflected, commented and confirmed that they contained data supporting the findings.

Triangulation was accomplished through multiple methods of data collection including field notes and interviews.

Study IV

The study was a descriptive study with the aim of presenting levels of PA and inactivity among women with Somali descent living in Sweden. The participants were asked to wear an accelerometer to monitor their PA. The women wore the monitor in an elastic belt around the waist during waking hours for a period of 7 days with a weekend day included. Variables studied were accumulated PA, relations between waist-circumference, subject's characteristics and levels of PA.

Data analysis and statistical methods

An overview of the analysis and statistical methods is presented in table 1.

Chi-squared test was used in paper I to evaluate the significance of differences between groups.

Papers II and III were qualitative studies and latent content analysis was used to elucidate GPs' views of prescribing PAP (paper II) and Somali women's views of PA (paper III). The data were analysed by identifying meaning units that were condensed and coded. Categories and themes were developed on the basis of the codes (Graneheim et al. 2004).

In paper IV several statistical analyses were performed. Subject characteristics were described, with means and standard deviations (SDs). A skewness/kurtosis test was used for all data to check for normality and data were presented as median and 25th–75th percentile when data were not normally distributed.

The population was divided into four groups depending on the amount of eligible data. Since the sample size was small (25 participants with eligible data), Mann-Whitney U-test was used to test statistical differences between groups.

Logistic regression analyses were applied to identify possible associations between an individual's characteristics and level of PA. The dependent variable, 150 min of MVPA/week and 30 min of MVPA/day, was used. Age, waist circumference, years living in Sweden, number of children, occupation and marital status were used as independent variables.

In Papers I and IV statistical significance was set at $p < 0.05$, the confidence intervals were 95% and analyses were performed using STATA 13.0 software programme.

Ethical considerations

Data in Paper I were collected from medical files and no names of physicians included in the study were identified. The study was classified as a quality improvement project and did not require ethical approval according to Swedish law. Papers II, III and IV were approved by the regional ethical review board in Lund (2010/703, 2011/517, 2013/211). The participants in these studies participated voluntarily and were informed of their rights to end their participation at any time. All participants provided written informed consent. The material was de-identified and coded to guarantee confidentiality.

Results and comments

Simplified routines in prescribing PAP (*paper I*)

Results

One PHC centre and a control group consisting of six PHC centres serving 149,400 inhabitants in the County of Blekinge were included in the study. All licensed professionals had the possibility to prescribe PAP, but the study addressed PAP prescribed by GPs. At baseline no significant difference was seen between the two groups looking at the total numbers of prescribed PAP. In 2007 the increase of PAP in the intervention group was significant ($p=0.0011$) compared to 2006 (table 2). The control group showed no significant change ($p=0.0751$). PAP prescribed by physicians increased eightfold in the intervention group compared to the control group. The greatest increase of PAP was seen among physicians in the intervention group as compared to all other professionals in the control group. An economic incentive when prescribing PAP was introduced in both groups at the beginning of the study.

Table 2. Differences in numbers of PAP 2006 compared to 2007 within the groups and differences between the two groups in 2006 and 2007.

	Intervention group	Control group	
	PAP/total numbers of consultations	PAP/total numbers of consultations	p-value
2006	8/19 035	58/84 554	<0.1894
2007	68/20 339	82/88 175	<0.1894
p-value	<0.0011	<0.0751	

Differences in numbers tested by chi-square test

Comments

This observational intervention study was performed as an improvement project at one of the PHC centres in Karlskrona. All other PHC centres in Blekinge constituted a control group and thus no randomization was done, a limitation of the study. PTs were used in the process of carrying out the prescription, conducting the motivational interview and counselling the patient. The intervention showed that the PT appears to be an important team member for enhancing prescriptions initiated by GPs. Five out of seven PHC centres reached the target to receive the financial reward, indicating that the target was rather modest.

Since the study was performed, PAP as a method has been developed and implemented widely in the whole country. Numbers of PAP prescribed by health professionals continue to increase, but still the method is an underused method in healthcare.

GPs' views of prescribing physical activity (*paper II*)

Results

The latent content analysis resulted in four categories with two to three codes per category (Table 3).

The first category was: *The tradition makes it hard to change attitudes* with the codes *prevention is part of the task*, *habitual behaviour* and *pharmacological training*. Traditionally it is part of a general practitioner's everyday work to talk with the patient about being physically active. Depending on the cause of the consultation the patient receives information about the importance of PA and the GPs stress the importance of PA for health. The participants agreed that it is the responsibility of the GP to enhance PA, but no tradition of prescribing PA exists. Diabetes and hypertension were considered to be better diagnoses to treat with an increased level of PA instead of pharmaceuticals, but GP have no tradition of telling the patient in detail how to become more physically active. Oral advice is considered sufficient, thus prescribing PA is not deemed necessary. Regardless of the number of years in the profession, the participants agreed that medical training is geared to natural science and lacks teaching about non-pharmacological methods, which results in uncertainty about using PAP.

The category *Shared responsibility is necessary* included the codes *someone else's task*, *patient's role and expectations* and *society's attitude*. The participants

felt that the responsibility for increasing the level of PA is shared by the care team, the patient and society. Lack of time makes it necessary to work as a team and refer the patient to nurses and PTs for advice about the dose and intensity of PA. A team effort was also considered necessary to support the patient in making a lifestyle change. All focus groups highlighted that the patient also has responsibility for his or her own situation and it is up to the patient to make a change. Participants felt that even society is responsible for creating opportunities in the environment to be physically active and for schools to give children a good head start to a physically active life.

The category *PAP has low status and is regarded with mistrust* consisted of three codes: *high workload*, *low priority*, and *scepticism about PAP*. Due to GPs' pressured work situation the participants found it difficult to prioritize PAP when time was scarce. A certain frustration was revealed concerning the fact that GPs prefer to work more with primary prevention than everyday practice allows them to do. Scepticism about the effect of a PAP emerged and the method lacks credibility and significance for the patient according to the participants. There is mistrust that a piece of paper (PAP) can lead to a necessary behaviour change.

Table 3. Codes and categories derived from the analysis

Code	Category
Prevention is part of the task	The tradition makes it hard to change attitudes
Habitual behaviour	
Pharmacological training	
Someone else's task	Shared responsibility is necessary
Patient's role and expectations	
Society's attitude	
High workload	PAP has low status and is regarded with suspicion
Low priority	
Scepticism about PAP	
Vague routines	Lack of procedures and clear guidelines
Unclear processes	

The category *Lack of procedures and clear guidelines* included the codes: *vague routines* and *unclear processes*. All participants were unanimous that routines and guidelines for prescribing PAP are necessary in order to make the

method into a GP's daily practice. Some of the participants called for a coordinator to assist the necessary behaviour change.

Comments

As the aim of the study was to explore and understand the meaning of prescribing PA from the general practitioner's perspective, a qualitative approach was determined to be appropriate to elucidate our topic. Focus groups were chosen as a method suited for data collection and induced a discussion among the participants that shed light on GPs' views of PAP. The first edition of "Physical Activity in the Prevention and Treatment of Disease" (FYSS) was published in 2003 and all counties in Sweden have been using PAP since 2008. Yet the method is sparsely used among GPs and has not been adapted into everyday practice.

Somali women's views of physical activity (*paper III*)

Results

The latent content analysis resulted in four main themes and ten categories (Table 4).

The themes *Life in Somalia* and *Life in Sweden* elucidate differences in life the women experienced living in the two countries. In both countries life is filled with similar daily routines, but in Somalia the chores are done together with other women whereas in Sweden the chores are done alone by each woman. Even though life in Sweden means having access to household appliances, the women feel that the chores take longer time. Access to convenience doing household chores makes daily life lose its incentive for daily PA. Access to supermarkets, running water and household appliances reduces the incentive for daily PA.

The theme *Health* elucidated the understanding of factors influencing and enhancing health. Somali traditions and views of health differ from the way Swedes perceive factors affecting health, and the understanding of health is based on experience, tradition and misconceptions. Health was described as being able to do everything a person desires to do and it was considered a gift from God to achieve and to nurture. The participants emphasized the importance of socialization among friends which may not increase physical health but contributes to enhancing mental health.

The theme *Physical activity* identified facilitators and factors affecting PA. Daily life in Somalia incorporates PA and it is not performed for health purposes including leisure-time activity. Immigrating to Sweden results in less PA since life no longer offers an incentive for daily PA. The study sample equates PA with working out at a gym. The participants who have tried to go to a gym stress the importance of the companionship of other women and the need of support to stay physically active. Barriers to PA are fear of walking alone, feeling unsafe, religion and cultural factors.

Table 4. Themes and categories derived from the analysis

Theme	Category
Life in Somalia	Extended family essential for everyday life
	Traditional way of living
Life in Sweden	Single-mother household
	Traditional culture prevails
	No further need to move
Health	Faith in God
	Misconception
	Enhancing health
Physical activity	Facilitators
	Factors affecting physical activity

Comments

A qualitative approach was used to meet the aim of the study. Focus groups were used to collect data on Somali women’s views of PA. The purpose of focus groups is to collect data through discussions that stimulate a lively collective interaction with spontaneous expressive opinions. To make a comfortable atmosphere in the group, a language of the participant’s choice was accepted for the focus group interview. Most of the discussions took place in Somali and only the moderator was Somali-speaking. To bridge the language barriers the verbatim transcripts

were translated by a native Somali nurse thoroughly familiar with focus group interviewing.

Somali women's levels of physical activity (*Paper IV*)

Results

Seventy women of Somali descent agreed to participate in the study. A total of 44 subjects were excluded due to insufficient wear time (n=35), refusal to wear monitor (n=9) and monitor lost when used (n=1). The population was divided into four groups (A, B, C and D). Group A had sufficient monitor wear time (4 days ≥ 600 min) whereas groups B–D (B, 4 days < 600 min; C, 3 days ≥ 600 min; and D, 3 days < 600 min) showed non-compliance to wear-time criteria. Age, waist circumference, marital status, number of children and employment did not affect levels of PA. Table 5 shows levels of PA and sedentary time of group A. Group A registered a median of 11 hours and 35 min of sedentary time per day and performed in median 29 minutes of MVPA per day, with no time spent in vigorous intensity. Eighteen (72%) of the women performed 150 min of MVPA/week and eight (32%) performed 30 min of MVPA/day. Four participants performed continuous PA for 30 minutes whereas nine participants accumulated the 30 minutes of activity divided into 4 or more periods. In group A the prevalence of waist circumference ≥ 88 cm was 72% and 42% in groups B–D (< 0.0349).

Comments

Only 25 women showed sufficient monitor wear time, making the sample small. It may reflect the difficulty in complying with the use of a monitoring device to be worn on a daily basis. Our findings indicating a total sedentary lifestyle may be assumed to be more accurate than of self-reported questionnaires.

Table 5. Physical activity and sedentary time of participants with sufficient monitor time

Data available 4 days ≥ 600 min	N=25
Number of days monitored	6.2 (3)
Registered time ($\text{min} \cdot \text{d}^{-1}$)	760 (71)
Sedentary ($\text{min} \cdot \text{d}^{-1}$)	681 [545–901]
MVPA ≥ 3 METs ($\text{min} \cdot \text{d}^{-1}$)	29 [16–50]
Moderate intensity, 3–6 METs	29 [16–50]
Vigorous intensity, >6 METs	0 [0–4]
150 min of MVPA/week	18
75 min vigorous physical activity/week	0
30 min of MVPA/day	8

Mean (SD) or median [25th–75th] percentile for skewed data

General discussion

The purposes of this thesis was to study how PAP is experienced by GPs, possible ways to increase numbers of PAP prescribed by GPs and Somali women's views and levels of PA. The study population included GPs working at PHC centres in southern Sweden and Somali women residing in the same areas.

Ever since the introduction of PAP, the method has been an issue of particular interest to me. Being a PT, my concern about increasing PA levels among patients and the population in general is fundamental. After a couple of years with the possibility to prescribe PAP we found that the method was not utilized in the county of Blekinge. It was thus decided to start an improvement project to boost the method, and I knew that the topic would be a research question. General practitioners are the key providers and organizers of services within the entire healthcare system, even if it is not always they who meet these needs (McWhinney 1997). Further, the trust placed in GPs is the highest among all professionals within the healthcare system. Therefore their support and involvement in prescribing PAP is essential for the outcome of the method. We found that it was possible to significantly increase the numbers of PAP prescribed by GPs' by making minor changes in prescribing routines. To study the GPs' views and experience of PAP became the next topic of the thesis due to the result of Paper I.

Over the years I have been involved in numerous projects with patients of different gender, age and nationality, with the aim of increasing PA. My experience and pre-understanding as a PT is that vulnerable groups such as immigrant women are more likely to show a sedentary behaviour and difficulties in increasing the level of PA. In addition, results from paper I showed that PAP was not a method used to increase the PA level of the non-Swedish population. By experience, women from Somalia appear to be a difficult group to reach with PA interventions. Therefore the final two studies in this thesis focus on Somali women's views and levels of PA.

Main findings

The main findings in this thesis were that PAP is not a method widely used among GPs. PAP is considered a task of low priority and is regarded with mistrust, although it became clear that minor changes in routines when prescribing PAP made it possible to increase the numbers of PAP prescribed by GPs. Somali women immigrants to Sweden are a group at risk of developing lifestyle-related NCDs. As a result of migration the women have lost their incentives to be physically active on a daily basis and show a completely sedentary lifestyle. Patients rely highly on advice given by health professionals, and GPs have the greatest credibility, thus the GPs' attitude towards PAP is important for compliance with PAP. PAP prescribed by GPs was encouraged by having the GP initiate the prescription and letting a PT supplement the prescription with information regarding frequency, intensity, duration and type of activity (Paper I). GPs' views of PAP were explored to elucidate the reasons for the sparse use of PAP (Paper II). Somali women are a vulnerable group susceptible to developing NCDs. Physical inactivity is one risk factor for developing diseases. Women's views of PA were explored to gain knowledge of how to promote PA for Somali women (Paper III). The levels of PA among immigrant Somali women were measured by accelerometry (Paper IV).

Methodological considerations

Qualitative and quantitative methods were used to elucidate the topics of this dissertation. An overview of the methods chosen is presented in Table 1 in connection with the presentation of the Material and Methods.

We used an observational intervention design to study whether a change of routines could affect the numbers of PAP prescribed by physicians (Paper I). We chose an explorative approach to understand GPs' views of PAP (Paper II) and a focused ethnographic approach to shed light on Somali women's views of PA (Paper III). Both studies used focus group interviews and latent content analysis. We used a quantitative descriptive study to seek information about Somali women's level of PA and inactivity (Paper IV).

The research question determines what approach to use although combining qualitative and quantitative methods in a study or a thesis can increase the understanding of the topic (Curry et al. 2009). The underlying logic of mixing is that neither quantitative nor qualitative methods are sufficient in themselves to capture the trends and details of the situation. When used in combination, both

quantitative and qualitative data yield a more complete analysis, and they complement each other.

Paper I is an intervention study with a control group, although without randomization, thus the inclusion criteria for the two groups differ. The PHC clinic constituting the intervention group was selected since it had been decided that an improvement project was to take place at the centre. The control group was all other PHC centres in the county. Since the intervention took place at a single clinic, the location constituted boundaries to avoid influence from the intervention group on the control group. A significant difference in prescribed PAP was seen between the intervention and the control group, even though the project was initiated by the board of directors and initially lacked backing among the personnel at the clinic.

In Papers II and III focus groups were used to collect data. The method of data collection is well known and tested as a way to seek an understanding of how people with similar experiences feel and think about a specific issue (Krueger et al. 2009).

Forty-three GPs were purposively selected and invited by e-mail in paper II, to give a strategic sample. Fifteen agreed to participate including both male and female GPs of different ages, with a varying number of years in the profession, working in publicly financed health centres located in urban and rural areas.

Paper III used a snowball sampling strategy to recruit participants. The sampling method has been shown to be appropriate and effective in securing the involvement of members of vulnerable populations (Sadler et al. 2010; Heckathorn 2011). However, when purposive sampling is used one must be cautious when interpreting the results since the views of the non-participants can be different from those of the sample participating in the study. The study is bilingual and represents a cultural diversity, a limitation since misinterpretations may exist (Hunt et al. 2004). Another limitation is the procedure of translation where only one translator was used, and to compensate for this the translations were checked by a researcher and translator cognizant with the customs, values, beliefs and language of the respondents (Hunt et al. 2004).

Snowball recruitment was also used in Paper IV, where the aim of the study was to recruit one hundred participants. Seventy women participated but there was a total of 44 dropouts, the greater part due to insufficient wear time (n=35). The high dropout frequency (42%) is comparable to earlier studies using accelerometry (Hagstromer et al. 2007). No statistical differences were seen as far as subject characteristic and levels of PA between the groups with eligible monitor wear time and the group with insufficient data. Therefore even if the sample size is small it gives an intimation of the groups actual levels of sedentary time and PA.

A methodological aspect common to all four studies is my pre-understanding of PA. Being a PT, my knowledge rests upon a physiotherapeutic framework and thus my results are influenced by my understanding of my reality from my own professional, historical, cultural, ideological, gender-based and linguistic understanding of PA (Ohman 2005). The pre-understanding may display a bias as well as it can represent strength, being familiar with the topic. My intention during the work of the dissertation has been to maintain a balanced viewpoint.

Assessment of validity and reliability differs between quantitative and qualitative methods, thus it is equally important. Qualitative research always involves some degree of interpretation and it is important to propose measures to achieve trustworthiness (Graneheim et al. 2004).

Validity in qualitative research determines whether the research truly measures what it was intended to measure or how truthful the research results are (Creswell 2003). The truth value of the findings in qualitative research applies to internal validity. If the findings are applicable it concerns external validity or transferability (Lincoln et al. 1985). Transferability essentially refers to other situations and contexts where results are most likely to be relevant and applicable (Malterud 1998).

Reliability in quantitative research is the consistency of your measurement, or the degree to which an instrument measures the same way each time, whereas the reliability of qualitative research concerns dependability (Creswell 2003). The term dependability relates to how data can change over time and the ability of the researcher to be flexible and change perspective in accordance with the emerging process (Graneheim et al. 2004). The strategy is to document the research process and described in detail and preserved for future audits. It should thus be possible for outsiders to follow all steps and decisions in the process (Lincoln et al. 1985). Triangulation in two ways, were used to ensure reliable results. It was also used to make up for the existing pre-understanding. Triangulation means involving members of the research team to discuss the results and clarify one's values and theoretical framework as a researcher. Another way is to communicate the results back to the participants in the study. The results of the qualitative studies included in this thesis cannot be generalized, but our findings may be transferable to similar contexts where GPs and Somali women with similar experience of PA and PAP might have equal views.

Considerations of the results

Healthcare services have a responsibility besides treating illness, to support vulnerable groups in need of a behaviour change to maintain and improve health.

Medical facilities are well positioned for health promotion by promoting wellness, preventing chronic disease, and shaping community health norms (Belay et al. 2012). PAP is one method to use when patients show physical inactivity and require a lifestyle change. GPs participating in our study (Paper II) showed a positive attitude and agreed on the importance of working with health promotion. In conformity with other studies, confidence and enthusiasm about giving advice is generally high, but knowledge of current PA recommendations is low. In general, health professionals routinely discuss and advise patients about PA regardless of the presenting condition, but other health professionals appear to be more likely than GPs to offer routine advice (Douglas et al. 2006). A Swedish study shows a gender difference between health professionals who believe that health promotion and disease prevention are the responsibility of the entire health service (Johansson et al. 2010). Women are more likely to recognize the responsibility of PHC to work with promotion, and PHC personnel were more likely than hospital employees to report that health services should make prevention the priority rather than treatments. Further, the study reveals that the most common barriers to health promotion roles in daily practice were reported to be heavy workload, lack of guidelines, and unclear objectives, although a heavy workload emerged as a greater problem for all professional groups who work at PHC centres (Johansson et al. 2010).

Willingness to work with health promotion varies among health professionals, especially among GPs. Compelling evidence exists that the health of physicians matters and that physicians' own PA practices influence their clinical attitudes towards PA (Lobelo et al. 2009; Holtz et al. 2013). It is my own conviction that we should practise what we preach. As one study argues, in order to prepare future physicians to effectively prescribe exercise to their patients it is important to encourage student participation in strenuous PA and encourage academic training in the area of exercise counselling (Raustorp et al. 2014).

Besides a positive attitude towards health promotion and personal experience of PA, it is important to regard PAP as an evidence-based method. There is still an ongoing debate about the value of using PAP despite the recommendations by the National Board of Health and Welfare. Subgroups of the Swedish College of General Practice continue to question the evidence of PAP and argue for the insignificance of the method (Lövtrup 2014). The attitude may be an explanation for the modest use of PAP. In 2012 only 1/1000 visits to the physician generated a PAP, a very small number considering that 70% of all doctor consultations in general practice involve NCD symptoms, potentially able to generate a prescription (Socialstyrelsen 2009b).

On the other hand the Swedish Medical Association call for political initiatives for clear guidelines with prioritized targets for a future sustainable health and health care service (Andersson et al. 2014).

Some participants questioned if “a piece of paper” really can make a patient, change behaviour, certainly a legitimate question to ask (Paper II). Several factors affect the result of the method and a prescription itself does not automatically lead to an increased level of PA or change of a sedentary behaviour. Finding the target group who will benefit the most from PAP may be difficult (Romé 2014).

Health professionals other than physicians show a higher degree of willingness to work with health promotion (Johansson et al. 2010). When taking into consideration the heavy workload existing in primary care, particularly the physicians’ long to-do list, one can argue for a use of other healthcare professional competence. PTs are more likely to be willing to work with health promotion (Johansson et al. 2010) besides having the professional knowledge of how to individualize PA information. Results from one of our studies showed a significant increase of PAP when GPs and PTs used a team approach (Paper I).

Some argue that asking questions about a patient’s lifestyle is an intrusion in the individual’s integrity, but a survey revealed that 9 out of 10 patients in primary care preferred PA to drug treatment if the outcome was the same (Kallings et al. 2003). Another survey showed that 84% of patients in primary care wanted support from health professionals to change lifestyle behaviours instead of drug treatment (HSN 2007). These findings conform to our results that Somali women call for support to increase levels of PA.

Immigrant women are one of many groups identified as vulnerable and susceptible to developing lifestyle-related diseases. Somali women living in Sweden, the focus of this thesis are a group experiencing tremendous life changes as a result of migration. In the native country PA is mainly performed during work and transportation and PA during leisure time is rare. The opposite situation applies in Sweden. Along with urbanization of countries, global changes are seen in PA patterns. Several studies point to an increase of adults’ leisure-time activity in the past 20–30 years in high-income countries, and a decline in work-related and transportation PA (Mäkinen et al. 2009; Sjol et al. 2003; Stamatakis et al. 2008).

Slowly but surely we seem to be losing our natural PA patterns that we so desperately need in order to stay healthy, as our findings confirm. Only populations living a traditional agricultural lifestyle such as the Amish people, show more daily PA than recommended and more activity than the average contemporary US adult. PA measured with pedometers showed that the average number of steps taken by Amish men and women was 18,425 and 14,196 steps per

day respectively. The recommended cut-point for adults is 11,000 to 12,000 steps per day for men and 8,000 to 12,000 steps per day for women, depending on age (Tudor-Locke et al. 2011; Tudor-Locke et al. 2008; Bassett et al. 2004).

Records from 2008 found that worldwide, around 31% of adults aged 15 and over were insufficiently physically active (WHO 2011). Further, a US report found differences among states, gender, age and ethnicity, ranging from 27% in Colorado to 13% in Tennessee and West Virginia. Women, Hispanics, older adults and obese adults were less likely to meet the guidelines. The most vulnerable of a group show the least amount of PA, findings agreeing with to our results. However, PA level is often difficult to measure, and accurate assessment of energy expenditure is not always possible. It is also difficult to compare results from different studies due to various ways of collecting data. In general population studies use self-reported measures, which entail the risk of overestimation (Janevic et al. 2012; Hagströmer 2007).

New findings altered the global recommendations for PA in 2010 and the concepts of frequency, duration, intensity, type and total amount of PA needed for health enhancement and prevention of NCDs was specified (WHO 2010). In our study, 72% of the women with sufficient registered time (Paper IV) met the weekly recommended levels of MVPA, 32% registered 30 minutes per day MVPA and none of the participants showed any vigorous-intensity PA. Our results indicate low levels of PA. Results from other studies using accelerometry indicate similar findings and a wide range of results from 5% to 52% of the participants accumulating 30 minutes of MVPA per day (Hagstromer et al. 2007; Troiano et al. 2008). Current levels of PA in the US and Sweden show that nearly 50% of adults are getting the recommended amounts of MVPA per day (Folkhälsomyndigheten. 2014; CDC 2014).

Migration from a rural to an urbanized country involves a change of lifestyle that normally takes decades to adapt to. Somali women have lost their daily PA pattern through migration, without finding any replacement for it. Walking occurs daily around the world and is used at work and for transportation. It is reported to be the most preferred PA and is also the most common PA among the general population and in major subpopulations such as older persons and racial/ethnic minorities (Raustorp et al. 2014; Siegel et al. 1995). Walking is one of the simplest, most effective and inexpensive physical activities to perform. Yet, the general opinion of the definition of being physically active is that some form of exercise equipment is required. The participants in our study (Paper III) expressed the same view. Health-enhancing PA all comes down to the intensity of the activity. In order to meet the recommended guidelines for PA, walking is the activity to prefer. As long as the guidelines are not met, additional activities where exercise equipment is required are like icing on the cake. Traditionally only

children engage in leisure-time activity in Somalia, therefore one cannot expect working out at a gym to be the first choice of activity chosen by Somali women. One can argue that it is important to adapt to the lifestyle of the new home country, but lower rates of obesity and sedentary behaviour among children living in a traditional African culture in Australia compared to those who are assimilated or living in a marginalized native culture have been observed (Renzaho et al. 2008). Traditional values and habits appear to have a value and need to be rooted in health promotion programmes to reinforce the good aspects of traditional way of living and to identify the marginalized clusters and address their needs. By walking at a health-enhancing pace and making walking into a daily activity, the risk of developing diseases due to insufficient PA can be reduced.

Trends in PA in the western world are that people have a tendency to spend more and more time in a sedentary mode. Findings from our study (Paper IV) show that the participants are sedentary more than 11 hours of their waking time per day. Sedentary behaviours (typically in the contexts of TV viewing, computer and game-console use, workplace sitting, and time spent in cars) have emerged as a new focus for research on PA and health, although it is still very much in its infancy. Strong evidence nevertheless exists that unbroken periods of muscular unloading associated with prolonged sedentary time may have harmful biological consequences (Hamilton et al. 2004; Bey et al. 2003). Even when adults meet PA guidelines, sitting for prolonged periods can compromise metabolic health. Hamilton et al. coined the phrase “active couch potato” to describe a person who is physically active in spurts but at the same time have a sedentary behaviour in between activity (Hamilton et al. 2008). According to Dunstan, “too much sitting is distinct from too little exercise” (Dunstan et al. 2012) or “prolonged sitting can be regarded as a risk for developing disease whereas regular PA can be seen as a behaviour of prevention” (Ekblom Bak 2013).

Facilitators and factors affecting PA were identified, and all participants (Paper III) expressed the need for support and feeling safe and secure. These findings relate well to the results of other studies showing social support to be an overwhelmingly positive determinant of PA for all groups of women (Eyler et al. 2002). Once people are active, high levels of social interaction, interest and enjoyment are associated with improved levels of retention, with different types of PA scoring differently on these factors (Withall et al. 2011). These factors need to be taken into consideration when interventions are designed.

Other risks for showing insufficient PA, are low income, low education, racial and ethnic minority background and being disabled (Taylor et al. 1998; Socialstyrelsen 2012; Marmot et al. 2008). Income is the best predictor of health and life expectancy (WHO 2003; Mellor et al. 2002; Raphael 1998). The cornerstone of taking care of your health is having resources to do so, as well as

having self-esteem or feeling good about yourself. If you don't care about yourself, you are unlikely to care for your health. Investment in one's own health can be measured on an individual level by using Willingness to Pay (WTP) for the change in health (Drummond 2005). The WTP for the health improvements of exercise is influenced by a higher education level, income and BMI and the highest WTP for a health outcome of PA is for an immediate health improvement (Rome et al. 2010).

Somali women participating in our study said that they needed support to attain and maintain a higher level of PA but had no experience of PAP (Papers III). The relations between PA, sedentary behaviour and health must also be recognized to be likely to perceive a need to change a behaviour. Somali women in need of support may not benefit from PAP as a sole intervention to increase PA levels. However, when using PAP, it is crucial for compliance that physicians are supportive of the prescription. Using a team approach when prescribing PAP can emphasize the message from healthcare professionals.

Implications for clinical practice and future research

The studies in this thesis have expanded our knowledge of GPs' experience and views of PAP and strategies to increase numbers of PAP prescribed by GPs. Furthermore, new light was shed on barriers and facilitators for Somali women to be physically active, and on the group's level of PA. The results of this thesis can be used in clinical practice in various ways:

- To implement routines where PTs will be involved in prescribing PAP so that the therapists' specific knowledge will come to use.
- To integrate education about PAP at all levels of medical training.
- To plan and implement new strategies for information and implementation in order to create a perception of the importance of being physically active on a health-enhancing level.
- To create sustained support for Somali women to maintain a more physically active lifestyle.

Major gaps still exist in how to make PAP a method in everyday practice and how to increase levels of PA among Somali women. Future research topics from the work of this thesis may focus on:

- Process-oriented research to gain knowledge of best practice using PAP with the aim of using PHC teams effectively.

- Research with a focus on vulnerable groups in most need of support to increase PA levels and decrease sedentary behaviour.
- Studies focusing on interventions for Somali women to increase daily PA levels and minimize sedentary behaviour. Primarily, there is a need to raise awareness of the harmful effects that a sedentary lifestyle has for health. If the need for a change is recognized, the individual is more likely take part in suggested interventions and become ready to change behaviour.
- To respect the ethnic and cultural needs of vulnerable groups when designing programmes to enhance PA.

Conclusions

The findings of the studies presented support for a number of conclusions with regard to the aim of this thesis:

- Alterations in routines prescribing PAP can increase the numbers of PAP prescribed by GPs.
- By involving PTs when prescribing PAP the workload of the GPs will be eased and the therapists' specific knowledge of PA will be used.
- The evidence of PAP is questioned by GPs and PAP is identified by GPs as a method of minor importance with low status and no relation to GPs' scientific education.
- PAP is regarded by GPs as a task that should be performed by someone else in the healthcare system.
- PA is regarded as an important factor for health by Somali women, although climate, lack of motivation and time are universal barriers to being physically active among Somali women. Specific barriers for the group are tradition and religion.
- Facilitators to Somali women's PA are safe surroundings, support from people and the company of fellow Somali women.
- Somali women's daily PA pattern has been lost when migrating and replaced with a convenient lifestyle with access to household appliances, Adult women have no tradition of engaging in leisure-time activity.
- Somali women showed a high prevalence of sedentary behaviour, and an increase of PA is required by the group in order to meet global guidelines of PA.

Summary in Swedish

Fysisk inaktivitet är globalt sett den fjärde största riskfaktorn för att dö i förtid. Fysisk aktivitet har både hälsofrämjande och sjukdomsförebyggande egenskaper och sjukvården har en viktig uppgift att fylla med att öka den fysiska aktiviteten hos befolkningen. Fysisk aktivitet på Recept (FaR) är en metod för att främja den fysiska aktiviteten hos patienter och sedan 2008 används metoden av alla landsting och regioner. Metoden innebär att ett individuellt anpassat recept ordinerar gällande intensitet, frekvens och duration på en aktivitet som ordinator och patient tillsammans kommer överens om är lämplig att utföra. Trots att den fysiska inaktiviteten kostar samhället 6 miljarder om året och att endast 40 procent av befolkningen i åldrarna 18–64 år motionerar regelbundet, är FaR en metod som används i liten utsträckning av sjukvårdens medarbetare. All legitimerad sjukvårdspersonal har rätt att förskriva FaR och läkarnas inställning och agerande är av största vikt för att få ett önskat resultat av FaR eftersom läkarkåren har störst trovärdighet hos patienten.

FaR syftar till att stimulera patienter till en beteendeförändring i form av ökad fysisk aktivitet. Socialt utsatta grupper visar en hög risk för att utveckla sjukdom och ohälsa på grund av otillräcklig fysisk aktivitet. Kvinnor som emigrerar från Somalia är en av flera grupper som löper stor risk att drabbas av ohälsa. Immigration i sig själv är en risk för att drabbas av ohälsa och somaliska kvinnor har en låg fysisk aktivitetsnivå. Det övergripande syftet med avhandlingen var att utforska FaR som behandling i primärvård, allmänläkarens roll vid förskrivning samt somaliska kvinnors uppfattning om och nivå av fysisk aktivitet.

I den första studien ville vi studera om det var möjligt att öka antalet FaR ordinerade av allmänläkare. Alla offentliga vårdcentraler i Blekinge delades upp i två grupper. I den första gruppen ingick en vårdcentral där förskrivningsrutinerna av FaR förändrades. I den andra gruppen ingick övriga vårdcentraler som fortsatte att förskriva FaR enligt rådande rutiner. Interventionen bestod av att allmänläkaren initierade FaR och rekommenderade patienten att uppsöka en sjukgymnast för vidare handläggning. Besöket hos sjukgymnasten innebar att typ av aktivitet tillsammans med intensitet duration och frekvens bestämdes i samråd med patienten. Antalet FaR förskrivna av allmänläkare ökade signifikant på den vårdcentral där interventionen ägde rum.

Med hänsyn till studiens resultat ville vi fördjupa oss i allmänläkarens syn på FaR. I den andra studien ville vi få en förståelse av allmänläkarens upplevelse och erfarenhet av att ordinera FaR. Sammanlagt genomförde vi tre fokusgruppsintervjuer i tre landstingsområden i södra Sverige. För analys av intervjumaterialet användes latent innehållsanalys.

Vi fann att allmänläkarnas gemensamma uppfattning var att fysisk aktivitet upptar en stor del av patientkonsultationen och deltagarna ansåg att det är allmänläkarens ansvar att informera om vikten av att vara fysiskt aktiv. Det förebyggande arbetet har hög prioritet, men att förskriva FaR är inte en prioritet. Traditionellt sett är utbildningen till läkare naturvetenskapligt inriktad och saknar undervisning om icke farmakologiska metoder såsom FaR, vilket resulterar i en osäkerhet i att använda metoden.

Trots att allmänläkarna anser att den fysiska aktiviteten är viktig fanns det reservationer mot att förskriva FaR och en misstro mot metodens effekt. Allmänläkarens arbetsbörda är en källa till frustration och att förskriva FaR betraktas som en onödig arbetsuppgift som andra yrkeskategorier kan ägna sig åt.

Utlandsfödda invånare anses som en utsatt grupp i samhället som löper ökad risk att drabbas av sjukdom och ohälsa. En av orsakerna till den ökade risken är en otillräcklig fysisk aktivitet. I den tredje studien ville vi få en djupare förståelse för somaliska kvinnors syn och erfarenhet av fysisk aktivitet. Sammanlagt genomförde vi fyra fokusgruppsintervjuer med kvinnor boende i Malmö, Karlskrona och Växjö. Latent innehållsanalys användes för att analysera materialet. Emigration innebar stora förändringar för kvinnorna boende i Sverige och stora skillnader fanns mellan livet i hemlandet och i Sverige. Trots olikheter fanns det även likheter såsom att hitta tid till att sköta hem och familj och tid för sin egen hälsa. Den somaliska storfamiljen som ger trygghet och stabilitet finns inte till hands i Sverige, vilket gör livet svårare. Vi fann att hälsa är betraktad som en gåva från Gud och den fysiska aktiviteten ansågs viktig, men att leva hälsosamt anses vara individens eget ansvar. Somaliska kvinnors erfarenhet och traditioner utgör grunden för den kunskap som används för att leva hälsoförebyggande och uppfattningen om hur man lever hälsosamt skiljer sig från det västerländska synsättet.

Fysisk aktivitet i Somalia utgörs av den aktivitet som utövas i samband med arbete och transport och fysisk aktivitet i andra sammanhang är det bara barn och ungdomar som ägnar sig åt. Den dagliga fysiska aktiviteten har gått förlorad och ersatts av en stillasittande livsstil. Det förefaller som om fysisk aktivitet uppfattas som en positiv upplevelse men förutsättningar måste finnas för att aktiviteten ska komma till stånd. Kvinnorna anser att en säker, trygg och bekväm miljö är nödvändig för att vara fysiskt aktiv. Dessutom främjas möjligheten till att fortsätta

att vara fysiskt aktiv om det finns tillgång till en coach och om man har sällskap av andra kvinnor.

I den fjärde studien ville vi beskriva hur mycket fysisk inaktivitet och stillasittande som förekommer i somaliska kvinnors vardag. Sjuttio kvinnor, mellan 18 och 63 år, boende i Skåne och Kronoberg tillfrågades att delta och rekryterades via somaliska intresseorganisationer. Den fysiska aktiviteten mättes med hjälp av en accelerometer som bars av deltagarna i en vecka under dygnets vakna timmar. Midjemått mättes med måttband och deltagarna fick besvara frågor om sin sociala bakgrund. Av de tillfrågade accepterade 61 kvinnor att delta och 25 deltagare bar accelerometern i tillräckligt många timmar och dagar för att materialet skulle anses vara godtagbart för att analysera. Det fanns inga signifikanta skillnader mellan gruppen vars data analyserades och de övriga, avseende midjemått eller social bakgrund. Utav de resultat som analyserades var kvinnorna stillasittande i 11 timmar och 35 minuter per dag. Arton av 25 kvinnor uppfyllde de internationella rekommendationerna för fysisk aktivitet, med att vara aktiva i måttlig intensitet, 150 minuter i veckan. 8 kvinnor var aktiva 30 minuter/dag och hälften av dessa registrerade aktivitet i pass om minst 10 minuter medan övriga visade aktivitet i pass mindre än 10 min per tillfälle. 72 % av deltagarna i gruppen med tillräcklig accelerometerregistrering hade ett midjemått ≥ 88 cm.

Sammanfattningsvis pekar avhandlingen på FaR som en metod i behov av ytterligare implementering för att få fotfäste bland allmänläkare. FaR syftar till en beteendeförändring hos patienter som visar brist på fysisk aktivitet, men kräver att förutsättningar finns för vårdpersonal att förskriva FaR. Traditionellt sett är vården styrd av ett farmakologiskt synsätt vilket innebär att icke farmakologiska metoder inte prioriteras. Allmänläkarna hyser en del skepticism mot FaR, men metoden förefaller bli mer använd om läkare och fysioterapeuter/sjukgymnaster samarbetar kring förskrivandet. Invandrarkvinnor är en befolkningsgrupp i risk för att utveckla ohälsa och en orsak till risken är bristen på fysisk aktivitet. En konsekvens av emigrationen förefaller vara en förlust av den vardagliga fysiska aktiviteten som fanns i hemlandet och gruppen kan vara i behov av stöd för att förändra ett stillasittande beteende.

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Paper I

RESEARCH ARTICLE

Open Access

Simplified routines in prescribing physical activity can increase the amount of prescriptions by doctors, more than economic incentives only: an observational intervention study

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Abstract

Background: Physical inactivity is one well-known risk factor related to disease. Physical activity on prescription (PAP) has been shown in some studies to be a successful intervention for increasing physical activity among patients with a sedentary lifestyle. The method involves motivational counselling that can be time-consuming for the prescribing doctor and might be a reason why physical activity on prescription is not used more frequently. This study might show a way to make the method of prescribing physical activity more user-friendly. The purpose is to determine whether a change in procedures increases the use of physical activity on prescription, and thus the aim of this study is to describe the methodology used.

Results: The observational intervention study included an intervention group consisting of one Primary Health Care (PHC) clinic and a control group consisting of six PHC clinics serving 149,400 inhabitants in the County of Blekinge, Sweden.

An economic incentive was introduced in both groups when prescribing physical activity on prescription. In the intervention group, a change was made to the process of prescribing physical activity, together with information and guidance to the personnel working at the clinics. Physical therapists were used in the process of carrying out the prescription, conducting the motivational interview and counselling the patient. This methodology was used to minimise the workload of the physician. The chi-2 test was used for studying differences between the two groups. PAP prescribed by doctors increased eightfold in the intervention group compared to the control group. The greatest increase of PAP was seen among physicians in the intervention group as compared to all other professionals in the control group. The economic incentive gave a significant but smaller increase of PAP by doctors.

Conclusion: By simplifying and developing PAP, this study has shown a concrete way to increase the implementation of physical activity on prescription in general practice, as opposed to what can be gained by an economic bonus system alone. This study indicates that a bonus system may not be enough to implement an evidence-based method.

Background

Based on current knowledge and understanding of the relationship between physical activity and health, it is important for the health care system to provide information regarding methods of treating and preventing illness through physical activity [1].

Physical inactivity is estimated to cause 6% of the burden of disease for men and 3% for women in Sweden [2]. The standard treatment for illnesses caused by decreased physical activity and an unhealthy diet is drugs, hence the cost of drugs is high. Drugs to reduce blood pressure, blood lipids and blood sugar account for 15% of the total amount of Swedish drug costs [3]. WHO has estimated that 80% of heart and cardiovascular disease, 90% of non-insulin-dependent diabetes and 30% of all cancer can be prevented merely by a change of life-style. This would include altering bad eating

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habits, quitting smoking and participating in the desired amount of physical activity [3].

As a primary care provider it is essential to influence patients to become more aware that lifestyle changes will make a difference in reducing lifestyle-related diseases. By using Motivational Interviewing (MI) the care provider recognises the fact that patients who need to make lifestyle changes shows different levels of readiness for a behaviour change [4]. In addition to using MI, the doctor can prescribe physical activity. Prescribing physical activity, in Sweden referred to as PAP (Physical Activity on Prescription), has been shown to be one method to enhance the importance of physical activity as a treatment for a number of diagnoses [5]. Several ongoing studies will determine the effectiveness of PAP [5-7]. The book "FYSS" describes evidence for physical activity on a primary as well as a secondary level of prevention. Physical activity may be used as a complement, or even a substitute, for drugs treating several diagnoses [8]. Compliance with PAP is 56% according to a non-randomised study performed in Östergötland, Sweden [9]. Prescriptions of drugs show a compliance of 50% [9]. Studies demonstrate that PAP and doctors referrals to an exercise specialist are two cost-effective methods among many healthcare-based interventions aimed at promoting physical activity in primary health care [10,11]. According to the Surgeon General, 30 minutes of daily exercise is recommended [12]. A Swedish national survey of physical activity revealed that 46% of women and 42% of men aged 18 to 84 were physically active with moderate intensity less than 30 minutes a day [13]. Determinants for level of physical activity are: age, level of education, ethnic origin, urban or rural living and physically inactive friends [14].

There appears to be sufficient evidence for PAP as an effective method for increasing physical activity [5,6,9,10,15,16]. However, since it also appears that PAP is insufficiently used in Primary Health Care (PHC) [8,15,16] it seems important to elucidate methods for promoting the use of PAP in PHC. The aim of this study was to ascertain whether involving a physical therapist to perform the motivational interview and to determine duration, intensity and activity could increase the amount of PAP, compared to an economic incentive only.

Methods

Material

This is an observational intervention study of pilot character conducted from 2006 to 2007. The County of Blekinge is divided into eight PHC clinics serving 149,400 inhabitants. The intervention group consisted of one PHC clinic with 11 family physicians serving 19,877 inhabitants in one town with 49.0% women and 7.8% born outside of Sweden. The control group was

composed of six PHC clinics with 46 family physicians serving 80,592 inhabitants, 49% living in the country, 49.0% women, 8.7% non-Swedish-born residents. One of the clinics was excluded from the study because they had been using PAP prior to the intervention. This study was made possible when the PHC clinic forming the intervention group decided to change routines for prescribing physical activity. The intervention clinic is also the largest unit in this area and was therefore selected to become the intervention group. The remaining PHC clinics in the region were selected as a control group. The foreign population showed a high incidence of lifestyle-related symptoms and diseases, but unpublished data from another study show that non-Swedish-born residents did not receive a high rate of PAP. When needed, an interpreter was used in those cases where a prescription was written.

Intervention

The intervention consisted of a doctor initiating PAP. The prescription was sent electronically to a physical therapist. The patient was scheduled for a motivational interview within a couple of days. During the appointment the patient decided, with guidance from the physical therapist, what type of physical activity to perform in order to influence his or her condition. Besides the type of activity to perform, the duration and intensity were prescribed. All personnel in the intervention group received quarterly information regarding numbers of prescribed PAP.

The control group continued to prescribe PAP using existing referral routines involving the doctor to do the counselling of the patient without support from the PT. The intervention and the control group used the same prescription form.

Concurrently with the start of the study, both groups were introduced to a bonus system for prescribing PAP. A target for prescribed PAP was connected to the number of patients listed per clinic. The target included prescriptions from all personnel including nurses and physical therapists. This study will only look at PAP prescribed by doctors. If the target was met, the clinic was awarded a sum ranging from SEK 7,700 (\$1,000) to SEK 25,900 (\$3,400), depending on the size of the clinic. Thus a first level of intervention was common to both groups. This study measured the second level of intervention. The second level was a change in routines for the doctor when prescribing physical activity. The doctors were able to receive assistance with the consultation regarding the type, duration and intensity of activity.

Statistics

A chi-2 test was used to measure the differences in number of PAP in 2006 compared to 2007 within the groups and differences between the two groups in 2006

and 2007. Statistica version 9 was used for statistical analyses.

Ethics

The study was made possible as an improvement project at the PHC clinic. All data concerning PAP activity were collected from computerised medical journals with the approval of the directors of the clinics no individuals were identified in the data. The number of PAP prescriptions was counted and no other information concerning patient data was made accessible. The prescribing physician, nurse and physical therapist were anonymous.

Results

Table 1 shows the differences between the two groups according to the proportion of PAP prescriptions and the difference between the two groups according to the change of prescribed PAP between 2006 and 2007. The increase of prescriptions in the intervention group was significant ($p = 0.0000$). The increase in the control group was less and not significant ($p = 0.0751$). In 2006, the intervention group prescribed PAP 8 times during a total of 19.035 consultations. This was not significantly different from the control group prescribing PAP 58 times during a total of 84.554 consultations ($p = 0.1894$). However, in 2007 a significant difference was seen between the two groups ($p < 0.000$). In the intervention group, a change was seen from 4.20 PAP in 2006 to 33.43 PAP/10,000 consultations in 2007, whereas the control group showed an increase from 6.86 PAP in 2006 to 9.30 PAP/10,000 consultations in 2007. Five out of seven PHC clinics reached the target for receiving the financial reward, indicating that the target was rather modest.

Discussion

Analysis of this intervention study over 2 years showed an increase of PAP prescribed by physicians when a change of routine was made. The purpose of the change was to minimise the workload for doctors when using PAP as a treatment for lifestyle-related conditions. By involving a physical therapist to do the motivational interview and to suggest activity, duration and intensity, the likelihood of using PAP as a treatment increased.

The intervention made a favourable impact on the number of PAP prescriptions and a significant increase of prescriptions was seen in the intervention group. An increase of prescriptions was also seen in the control area, but this was not significant.

A bonus system connected to money was introduced in the intervention and control area concurrently. It may be expected that this bonus system has had a similar impact on prescription rate in all participating areas. The authors have unfortunately not been able to control for any potential confounding factors other than the economic incentive, a limitation in the study. In addition to the introduction of the bonus system, PAP was made accessible by computer, which made it easy to use for both the intervention group and the control group prior to the intervention. This study did not measure compliance with PAP, or the long-term effect of prescribing physical activity, since the only aim was to increase the numbers of PAP prescriptions by doctors. It may be seen as an attempt to stimulate the use of PAP at PHC clinics in the County of Blekinge. As seen in this study, it is important for health professionals to work together when influencing the patient to change lifestyle [17]. We were unable to randomise the population in the study, and thus the results should be viewed with caution.

As in this study, other studies also show an increase of prescriptions after small modifications to the method along with computerised development [9]. Nevertheless, there was a significantly better result for PAP prescribed by doctors in the intervention group.

The PAP process as described made it less time-consuming [18] for the doctors and facilitated the use of the method, although more time was consumed together with the PT doing the motivational interview. A part of the population in both groups consisted of non-Swedish-born residents. Unpublished data show that very few of the non-Swedes have received PAP and when it occurred an interpreter was used. We believe that it has not affected the results of the study. By using a team approach, lifestyle change is emphasised [1-3,8,18]. As seen in this study, it is important for health professionals to work together when influencing the patient to change lifestyle [17]. Other clinicians such as the nurse play an important role when it

Table 1 Differences in number of PAP 2006 compared to 2007 within the groups and differences between the two groups in 2006 and 2007

	Intervention group	Control group	
	PAP/total numbers of consultations	PAP/total numbers of consultations	p-value
2006	8/19.035	58/84.554	<0.1894
2007	68/20.339	82/88.175	<0.0000
p-value	<0.0011	<0.0751	

Differences in numbers tested by chi-2 test

comes to counselling the patient to a lifestyle change [16]. Physicians and nurses in counselling sessions are likely not to comment on or react to patients' statements regarding factors that encourage or discourage their use of physical activity [19]. It has yet to be shown which health professional makes the greatest impact on patients' change of lifestyle when it comes to counselling patients on appropriate physical activity. We believe the message's impact concerning lifestyle change becomes much greater if both the family physician and the physical therapist are involved when prescribing, similar to previous studies [18]. When promoting a physically active lifestyle, there are two points of particular importance. First, the patient should be informed of his/her health and any feasible methods of treatment. Second, the patient should, when appropriate, be given information on methods to prevent injury or illness [13]. To use PAP as a treatment along with counselling the patient to an increasingly less sedentary lifestyle might in the short term need more time than prescribing a drug for a life-style-related disease-time the doctor lacks in the clinic, whereas for the physical therapist the main assignment is to promote physical activity. We believe the message's impact concerning lifestyle change becomes much greater if both the family physician and the physical therapist are involved when prescribing, similar to previous studies [18]. When promoting a healthy lifestyle, it is necessary for the physician to support the message of becoming more physically active [17].

Confusion prevails regarding the nomenclature when prescribing physical activity, as some studies refer to Exercise on Prescription, EoP [6,7] whereas others refer to Physical Activity on Prescription, PAP [5,15], or Physical Activity Referral, PAR [16], and we hope that the choice of words can be defined since the context and meaning seem to vary in the studies.

According to the Swedish Institute of National Health, preventive efforts account for only 5% of Swedish health care costs [10,13]. Among other methods, prescribing physical activity is an evidence-based method in primary and secondary prevention, yet few patients are treated with PAP, according to findings that this study also indicates [20,21].

Data from our study included 8 out of 9 PHC centres in the County of Blekinge, a small population but a homogeneous intervention and control group in a geographically defined area. Future randomised controlled studies involving many PHC clinics as an intervention group might give more knowledge about how to increase the frequency of PAP.

Many factors are likely to influence why doctors choose or choose not to use PAP as a treatment, but still primary

care must continue to promote appropriate referral pathways [22]. A systematic review finds PAP acceptable and feasible to doctors, and most patients are willing to receive a prescription [16]. How will the health care system respond to a sedentary patient? A team approach with a prescription written by the doctor coupled with a physical therapist doing a motivational interview may be one important feature when trying to reinforce the message of a necessary change of lifestyle. Whether or not this change of referral pathway will result in a lifestyle change remains to be proved. There is a lack of knowledge regarding what type of patients can successfully be encouraged to adopt a less sedentary lifestyle. Methods need to be developed to identify patients who will gain the most from preventive counselling.

In summary, a change to an alternative pathway of prescribing physical activity will stimulate the doctor to prescribe PAP. The pathway described made it less time-consuming [18] for the doctor and facilitated the use of the method, although more time was consumed together with the PT doing the motivational interview. This observational study merely describes a way to increase prescriptions of PAP.

Conclusion

By simplifying and developing PAP, this study has shown a concrete way to increase the implementation of physical activity on prescription in general practice, as opposed to what can be gained by an economic bonus system alone. This study indicates that a bonus system may not be enough to implement an evidence-based method.

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Authors' contributions

GP participated in the design of the study, performed the statistical analysis and drafted the manuscript. IO participated in the design of the study and helped to draft the manuscript. EEH helped to draft the manuscript. All authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

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Paper II

Physical activity on prescription (PAP) from the general practitioner's perspective – a qualitative study

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Abstract

Background: Physical activity on prescription (PAP) is a successful intervention for increasing physical activity among patients with a sedentary lifestyle. The method seems to be sparsely used by general practitioners (GPs) and there is limited information about GPs' attitudes to counselling using PAP as a tool. The aim of the study was to explore and understand the meaning of prescribing physical activity from the general practitioner's perspective.

Methods: Three focus group interviews were conducted with a purposive sample of 15 Swedish GPs in the south of Sweden. Participants were invited to talk about their experience of using PAP. The interviews were transcribed verbatim, analysed using qualitative content analysis.

Results: The analysis resulted in four categories: The tradition makes it hard to change attitude, Shared responsibility is necessary, PAP has low status and is regarded with distrust and Lack of procedures and clear guidelines. Traditionally GPs talk with patients about the importance of an increased level of physical activity but they do not prescribe physical activity as a treatment. Physician's education focuses on the use of pharmaceuticals. The responsibility for patients' physical activity level is shared with other health professionals, the patient and society. The GPs express reservations about prescribing physical activity. A heavy workload is a source of frustration. PAP is regarded with distrust and considered to be a task of less value and status. Using a prescription to emphasize an increased level is considered to be redundant and the GPs think it should be administered by someone else in the health care system. Scepticism about the result of the method was also expressed.

Conclusions: There is uncertainty about using PAP as a treatment since physicians lack education in non-pharmaceutical methods. The GPs do not regard the written referral as a prioritized task and rather refer to other professionals in the health care system to prescribe PAP. GPs pointed out a need to create routines and arrangements for the method to gain credibility and become everyday practice among GPs.

Keywords: Focus group, Physical activity, Prescription, Primary health care, Promotion

Background

Evidence shows that physical activity can be used to promote health and to prevent and treat over 30 physical and mental illnesses [1]. An increase in physical activity is one of the measures that is said to have the greatest positive effect on public health [1]. Physical activity has been identified as the most important health-related behaviour to change, and patients ask health care staff for

support in making lifestyle changes [2]. The health care system is in a good position to work for an increase in physical activity among the population, partly because many individuals have contact with the health service each year, and partly because they trust it [1]. Primary health care also reaches the groups that are most sedentary and vulnerable in society, for example young adults, single people, and immigrants. Lifestyle advice from general practitioners (GPs) has been shown to have a positive effect on the health of the population [3].

Physical activity on prescription (PAP) is an individually adjusted written prescription of physical activity

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that all health care providers in Sweden recommend their employed physicians to use in order to prevent and treat illness [1]. The Swedish National Institute of Public Health estimates that 28 000 PAPs were prescribed in 2009 and the use continues to rise [4]. PAP means that authorized health care staff issues an individual written prescription for the intensity, duration, and type of activity that the patient should perform in order to minimize a sedentary lifestyle [5]. The method is based on several theory-based behavior change models, but is primarily inspired by the transtheoretical model and social cognitive theory. The models describe progress through stages of change such as contemplation, preparation, action and maintenance as well as self-efficacy [1]. The routines for prescription and the layout of the prescription itself have been developed to resemble prescriptions for medicines, as a way to enhance the significance of the prescription. In Scandinavia as well as in other countries variants for prescribing physical activity exist [6-9]. There is evidence that PAP is a cost-effective method for use in primary care [10,11]. Physicians' attitudes and their ability to communicate with patients have a significant impact on patient compliance. However, physicians are the professional group with the least positive attitude to doing preventive work in health care [12,13]. A Danish study found that doctors have ethical misgivings about showing concern for their patients' lifestyle [14]. A study from the USA has found that only 35 per cent of patients with unhealthy habits regularly receive advice from doctors [15]. When advice is given it is more effective if the doctor presents his recommendations about physical activity as a detailed prescription. The effect increases further if the doctor follows up the prescription [16]. Despite studies showing that PAP is an effective complement to or substitute for medication, it seems as if PAP is not used to its full potential [17,18]. Attempts have been made to stimulate the use of PAP, and it was found possible to increase the number of prescriptions by doctors when they collaborated with physiotherapists in prescribing physical activity [19]. The use of PAP from a GP perspective, however, does not appear to have been studied previously.

The aim of the study was to explore and understand the meaning of prescribing physical activity from the general practitioner's perspective.

Methods

Forty-three GPs from 16 health care centres with experience of PAP were purposively selected and invited by e-mail. The selection included male and female GPs of different ages, with a varying number of years in the profession, working in publicly financed health centres located in urban and rural areas. Private health care centres were excluded due to lack of routines for

prescribing PAP. Fifteen GPs from three counties agreed to participate, forming three focus groups. Some participants knew each other and some had never met before; in the smallest group all the participants were acquainted. No economic incentive was given for participation. Twenty-eight GPs declined participation, with shortage of time stated as the most common reason. Information about the participants in the focus groups is shown in Table 1. The non participants represented both genders and all age groups from every health care centre.

Data collection was done via focus groups. Based on the discussions in the focus groups, we searched for shared thoughts, opinions, and a meaning that can increase our understanding of how GPs view the prescription of physical activity. Focus groups are a semi-structured interview form with 7-12 participants who have some experience of the topic [20]. This data collection method is well known and tested as a way to seek an understanding of how people with similar experiences feel and think about a specific issue [20]. A focus group conversation invites discussion through participation. According to Morgan, the conversation generates data that is rich in viewpoints since the lively collective interaction can provoke more spontaneous expressive emotional opinions than an individual interview [21].

Three focus groups were conducted with the aid of a semi-structured interview guide according to Kvale [22]. The guide included open-ended questions allowing a fluid conversation regarding the topic. After an opening presentation each participant answered the question 'On what level are you physically active?' Then a voluntary participant was asked to share the experience of prescribing PAP. This started a free association of the theme. The focus groups were conducted in 2011 immediately after the end of the working day in a room that was familiar to the participants so that an inviting atmosphere could be created. One focus group was led by one of the authors, GEP. Two focus groups were conducted by two of the authors, GEP as a moderator and ELS as an assistant. The moderator led the discussion and the assistant kept field notes and ensured that everyone had the opportunity to speak. The conversations lasted 75-90 minutes and were transcribed verbatim by a secretary. GEP listened to the recordings and read through the texts to clarify any obscurities. The first author (GEP) and EEH are physiotherapists, ELS is a behaviour scientist with experience of qualitative research. AB and MT are both GPs with experience of qualitative research and analysis.

Analysis

The material was analysed with the aid of qualitative content analysis [23]. To get a feeling of the totality,

Table 1 Number of focus groups, population and participating GPs

Focus group I-III	Population	No. of GPs (men/women)	Experience from general practice	
			<10 years	>10 years
I Small town/countryside	64.100	6 (3/3)	2	4
II City	305.000	4 (0/4)	0	4
III Town	83.100	5 (1/4)	2	3

GEP and ELS read through the transcriptions and listened to the recordings several times separately. The text was analysed individually by the authors to ensure credibility. Meaning units were identified as a first step and were then condensed and coded as they were expressed by the participants and perceived by the authors independently of each other. On the basis of the codes, subcategories were used as an intermediate stage to develop categories. We sought a deeper understanding of the meaning of the statements, and we met twelve times to discuss the coding of the meaning units, the subcategories and the categories until consensus was reached.

Two of the authors (GEP and ELS) participated in all steps. The other authors read all the material, reflected, commented and confirmed that they contained data supporting the findings.

Ethical considerations

Ethical approval was granted by the regional ethics board in Lund, registration number 2010/703. The aim of the study and the focus group methodology was presented in the information letter, and informed consent was obtained from the participants. All the GPs took part voluntarily after working hours and were informed of their right to end their participation at any time. The material was de-identified and coded to guarantee confidentiality.

Results

The results are presented in four categories with two to three codes per category (Table 2).

The tradition makes it hard to change attitude

The shared view of the participants was that physical activity is essential for people’s health. It is traditionally a part of a doctor’s everyday work to talk about the importance of being physically active with patients who display a risk of developing illness. The participants said that they brought up physical activity when talking to the majority of patients. Depending on the reason for the consultation, the patient received varying amounts of information about the importance of physical activity as a way to affect their health status. The participants said that physical activity took up a large part of the consultation. In their view it is the doctor’s responsibility to inform people about the importance of being physically

Table 2 Meaning units, codes and categories derived from the analysis

Meaning units	Code	Category
"We are supposed to work preventively, it's one of our major tasks, yet it's so difficult." (B22)	Prevention is part of the task	The tradition makes it hard to change attitudes
"We are brought up to learn that diseases are treated by medical measures, which means that drugs often come first. Even if you try to change your attitude, the old ways hang on." (B22)	Habitual behaviour	
"We are schooled in a multitude of pills." (A14)	Pharmacological training	
"Since we don't have much time to sit and talk about physical activity, I tend to refer patients to physiotherapists." (B21)	Someone else's task	Shared responsibility is necessary
"Physical activity is hard. Not everybody wants to take that path. You have to have the patient with you in all treatment contexts." (B24)	Patient's role and expectations	
"Patients have said themselves in the last few months, 'But can't I have a prescription?' It's interesting that wishes are expressed to me but I wasn't the one who mentioned it." (B8)	Society's attitude	
"The structure of society can be changed by building cycle paths." (C34)	High workload	PAP has low status and is regarded with distrust
"To get through as many patients as possible in as short a time as possible, that's our role." (C37)	Low priority	
"It's easy to forget, quite simply, among all the pills." (A15)	Scepticism about PAP	
"I suppose we're not so convinced that it's the actual PAP prescription that makes a difference." (A19)	Vague routines	Lack of procedures and clear guidelines
"I can find it a bit complicated as it has been done, five different mobile phone numbers to choose among." (C12)	Unclear Processes	
"There's no institution for prescriptions for physical activity corresponding to what there is for ordinary prescriptions." (B14)		

active, but there is no tradition of prescribing physical activity. One doctor put it as follows:

"I always emphasize that it is important to take action with patients who show risk of or already have developed illness."

There was a feeling of constantly having a focus on physical activity, or as one doctor put it:

"We talk about physical activity every day, every hour, back and forwards, for every condition."

The participants said that the meeting with the patient is important and that being a GP means ensuring in the encounter that the patient understands the importance of physical activity. The importance of putting forward one's personal opinion of the significance of physical activity was stressed as a way to motivate patients to be more physically active. The doctors also said that they set a good example by being physically active themselves. In addition, the doctors considered that preventive work takes high priority and that the identification of high-risk lifestyles is part of a doctor's responsibility for making a diagnosis and encouraging a desirable change in lifestyle. On the other hand, the GPs thought that actually prescribing physical activity is not necessary; the doctor's responsibility is to talk about the importance of physical activity for achieving a change of behaviour in the form of a higher level of physical activity.

The GPs' opinion was that physical activity in certain contexts can be preferable to pharmacological treatment. This applies, for example, to hypertension and diabetes for secondary preventive purposes. Moreover, the participants thought that virtually all pathological states benefit from increased physical activity, but doctors have no tradition of telling patients how to go about this in practice. Although there is knowledge about the importance of physical activity, the doctors felt that it takes time to change a treatment strategy from being geared to prescribing drugs to replacing or supplementing this with PAP. It may feel like a challenge to wait before starting pharmacological treatment, which usually leads to a quick recovery compared to improvement as a result of increased physical activity, which takes longer to see. The GPs thought that it would take a change in professional role for doctors and for other staff if PAP is to be used to a greater extent. There is ample knowledge of the importance of physical activity for health, but PAP is rarely used by doctors. The health care system often conveys double standards according to one of the doctors, who observed:

"We talk about this (physical activity), but we write prescriptions (for drugs). We talk about this, but we refer people to surgery for overweight, we talk about this, but we treat blood pressure, we talk about this, but we prescribe sleeping pills. You can mention one area after the other where we have double standards."

Regardless of the number of years in the profession, the participants agreed that medical training is geared to science and lacks teaching about non-pharmacological methods, which results in uncertainty about using PAP. An experienced doctor expressed:

"I basically think that we don't have any training in this, we have just been taught about molecules and pills for five and a half years."

Younger GPs were able to tell about many occasions during their studies when physical activity was mentioned as first-line treatment for several diagnoses. On the other hand, there was no training in how to prescribe and dose PAP.

Motivational interviews (MI) were brought up as a possible method for stimulating a change in behaviour. Training in MI is not a part of the basic education of a doctor. The participants thought that MI is an art form taking not only education but a great deal of practice to master. Moreover, the GPs thought that it takes time and requires skill to meet the patients where they are in order to achieve a change in behaviour.

Shared responsibility is necessary

The responsibility for increasing the level of physical activity is shared by the care team, the patient, and society. The participants felt that they lacked time for a dialogue with the patient about the dose and intensity of physical activity but the GPs felt responsible for underlining the importance of physical activity to promote health and treat illness. One GP explained:

"We have a nurse who has motivational interviews or health conversations."

The responsibility for motivating the patient to engage in more physical activity is shared by several professions in health care and the doctors agreed that teamwork is necessary. It was considered suitable to refer to nurses and physiotherapists for advice about the dose and intensity of physical activity. According to the participants, increased physical activity is a major lifestyle change and it requires efforts by several professions to motivate increased physical activity. Shared goals and outlooks in health care were considered necessary to achieve results.

Even when the doctor recommends treatment with physical activity, the patient sometimes asks for medicine. Not all patients are prepared to change their lifestyle. Patients' different needs for intervention were discussed, and it is far from always sufficient to increase physical activity to regain health. The participants thought that patients themselves have a great responsibility for their health and changes in lifestyle. The doctors must be able to make demands of the patients, or as one GP put it:

"We should perhaps be more unambiguous and say no, you have responsibility for your health, the responsibility for your health is yours alone, it's best for you to do this or that, to take responsibility for your health."

The GPs thought that health care alone should not be responsible for promoting the citizens' physical activity. Society's attitude to medications must be changed so that it becomes generally accepted that drugs are not always necessary to get well. School has a great responsibility for making it possible for children to engage in physical activity, and society must stimulate an active physical life, for example, by building cycle paths and playgrounds and offering subsidized physical activities near residential areas. Everyone must take responsibility. One doctor said:

"The optimal thing really would be to have a society where people move."

PAP has low status and is regarded with distrust

The participants expressed frustration about the pressure of their work situation. The intense working tempo was considered to result in difficulties in finding time for motivational interviews and prescriptions of physical activity. Some expressed a sense of inadequacy when it came to influencing patients to increase their physical activity. The participants said they wanted to do more primary preventive work and felt frustrated that secondary prevention takes up the greater part of a doctor's working day. One experienced doctor said:

"I can contribute what I as a person think is correlated to health, but then I can't do much more. For the individual that you have in front of you in that encounter and with his or her problems, it feels as if you have very little to contribute. It feels as if we ought to come in much earlier for the problems that our patients have. If we had come in earlier we would have had more chance of making a difference. When we see the patient it is at the level of secondary prevention instead of primary prevention."

It emerged from the conversations that PAP has low status and low priority as a treatment option. Pharmaceutical treatment is used in the first instance and enjoys good support from the medical establishment. One doctor pointed out that routines and working methods for the handling of drugs are so solidly established that it is easy to forget alternative treatments. Colleagues, nurses, and patients expect quick treatment results, which can mean that medication takes priority over treatment with physical activity. Moreover, the participants felt that physical activity is not medicine but something obvious that should not need to be prescribed:

"I have a lot to say about this (PAP) and I was a bit doubtful when it (physical activity) came on prescription, since I view this as self-evident."

There is distrust about PAP, as some doctors thought that the method lacks credibility and significance for the patient. The method is an attempt at a simple solution to a complex lifestyle problem, or as one GP put it:

"We know that physical activity is good but I'm not sure that a slip of paper is enough."

Another doctor said:

"We don't prescribe PAP because we don't believe in the slip (the prescription)."

Even though the participants were convinced that physical activity is an important factor in preventing and treating illness, many were doubtful that a prescription can make a difference. Others thought, in fact, that PAP appeared to have some magical quality for the patient, which the majority of the GPs said they could not understand. While the doctors said that there was an excessive belief in PAP, in their experience the credibility and significance of the method nevertheless increases for the patient and for the doctor if the prescription resembles a prescription for medicine. The appearance of the prescriptions for drugs has changed a few years ago, so the PAP no longer resembles a drug prescription. The change was perceived as a reduction in the significance of the method, or as one doctor put it:

"The power has gone out of the prescription now that it's been changed to an ordinary paper."

The doctors questioned the degree of compliance with the method and the equivalence of the outcome to pharmacological treatment. The opinion was that the expected effect of increased activity takes time and can therefore be difficult to compare with other treatments.

There was uncertainty among the doctors as to which diseases and conditions to treat with physical activity and how to prescribe PAP. The actual prescribing of physical activity was deemed to be an unnecessary task for doctors. Some participants were sceptical about the existing evidence for PAP and doubts about the long-term effect.

"Is there evidence that the effect of physical activity persists?"

Lack of procedures and clear guidelines

It was clear from the statements that the routines for PAP vary. The doctors expressed some frustration over vague prescription routines. They called for a coordination function where the patient could get assistance for the behaviour change needed to increase the level of physical activity.

There were no clear guidelines for keeping records of prescriptions of physical activity. The doctors wished for cooperation with other health care staff and feedback from contact persons outside health care who provide physical activity. One doctor said, with some exasperation:

"I don't know who to refer to or how to act."

Discussion

Summary of the results

Reasons such as attitudes, lack of training, distrust and organizational issues appeared to prevent GPs from prescribing PAP. Ambivalence was evident in the discussions. Physical activity was considered important for health and it was important for GPs to acknowledge the need to influence patients to increase their physical activity. Prescribing physical activity was a task that doctors did not feel comfortable performing. They thought that it is a natural task for doctors to talk about physical activity, but prescribing it is a job for someone else. It was felt that a written prescription for physical activity can be significant for the patient, but there was distrust about the potential of PAP to make a difference. Pharmacological treatment is traditionally the method used for lifestyle-related diseases, and the doctors did not think they were adequately trained or experienced in prescribing physical activity. The doctors wanted clear guidelines and processes for PAP. They said that there are physiotherapists and nurses who are more skilled to use the method. It is not just the health care staff that has a duty to promote health; society and patients themselves have a great responsibility.

Discussion of the method

The aim of the study was to explore and understand the significance of prescription of physical activity from a GP perspective. The GPs were purposively selected to

have experience of the topic discussed [24]. We conducted three focus groups to collect data, a number recommended in recently published studies [25,26]. Focus groups and the method for analysis have been shown in previous studies to be credible and appropriate for studying GPs' experiences [25]. The selection was confined to southern Sweden and none of the focus group reached the minimum numbers of participants, a limitation and a weakness of the study. However the participants were given good opportunity to share experiences and insights of the topic [20]. A large number of GPs declined to participate with lack of time as a reason not to take part in the study. The views of the non-participants can be different from the GPs participating in the study. We tried, however, to achieve a representative composition as regards experience, age, gender, and rural/urban location and the result from all three focus groups was consistent. Women were over-represented in the groups, but this may reflect how female doctors show more interest in preventive work [12]. The result cannot be generalized but may be transferable to similar contexts.

From three counties in southern Sweden, 43 GPs were invited personally by e-mail, which may be a limitation of the study since it could mean that only doctors with a special interest in the issue agreed to participate. As a physiotherapist working with the prescription of physical activity, GEP has a pre-understanding that GPs find PAP of minor significance. The other authors in the multidisciplinary research team makes up for the pre-understanding that GEP represents.

Discussion of the results

The participating GPs share basically the same view of PAP. As in other studies, the participants found it important for doctors to influence patients to engage in more physical activity [27,28]. The dialogue with the patient was highly valued, but PAP was not a task to which doctor's assigned high priority. They thought that physical activity is obviously desirable for everyone and were therefore doubtful about the necessity to prescribe it.

The doctors talked about their own physical activity but felt that it can be difficult to practise what one preaches. This study has not investigated whether physically active doctors use PAP more than physically inactive doctors, but some studies indicate that personal physical activity can make a doctor more inclined to influence patients to increase their level of physical activity [29,30].

During the conversations it became clear that there was insufficient knowledge about how to use PAP. It may reflect how the profession of doctor is more medically orientated, confirming what has been suggested by many

and namely, that education about non-pharmacological methods is inadequate. Other studies have shown similar results [31,32]. The doctors thought that motivational interviews are an art, and studies testify that doctors lack sufficient training in giving advice on lifestyle [33,34].

Health care is to a large extent organized on the basis of the development of medical competence [35]. PAP was developed when the Swedish National Institute of Public Health was commissioned by the Swedish government to make 2001 into Physical Activity Year, in consultation with authorities and organizations [36]. The non-medical origin of the method may be an explanation to why the prescription of physical activity encounters resistance from doctors. Earlier studies have shown that directives from authorities are not always well received. A sense of ownership and autonomy with regard to one's professional role is an important motivational factor for the use of new methods [37].

The GPs thought it was their duty to talk about the importance of physical activity, but that prescribing it is a task for someone else. Earlier studies have shown that a whole team has the best long-term effect in achieving behavioural change in the patient, compared with intervention by just a doctor [38]. Doctors and nurses are usually associated with a health-promoting professional role, but other professions such as psychologists, counsellors, and physiotherapists have knowledge about attitudes to promote health and prevent illness.

In the health care system the competition between different professions can be perceived as hard [35]. There is sometimes a struggle about who should be permitted to prescribe medicines, but when it comes to PAP we find the opposite situation: it is a task that doctors would prefer not to perform. Doctors have reservations about using PAP because they give priority to other tasks. The method may be important for the patient, but doctors would rather have someone else in health care performing the task. Obstacles and difficulties in cooperation need to be identified from a GP perspective and from the point of view of other staff categories. Through increased cooperation between professions, the competence of different staff categories can be utilized and the use of PAP can increase [19].

This study with a qualitative approach aimed to shed light on GP's perspective on how to use PAP. A greater understanding of the GP's perspective on PAP could give opportunities to stimulate the implementation of the method in primary care.

It is a long term process to implement effective programs and new models such as PAP [39]. For more than a decade, research has pointed out obstacles that must be overcome to optimize advisory work in primary

care, and the results indicate a number of organizational and individual obstacles that need to be overcome [27]. The Swedish National Board of Health and Welfare recently published national guidelines for preventive methods to support the use of PAP [40]. Our study indicates a lack of clear organizational guidelines at management level and on the level of everyday practice. Support for health-promotion work is of great importance for healthcare. Routines and processes must be made more explicit if PAP is to gain in credibility and become a natural and high-priority treatment option for doctors.

Conclusion

Doctors have inadequate training in non-pharmacological methods, which means that there is uncertainty about prescribing physical activity. PAP is not a priority for GPs because other tasks are considered more important. It was deemed suitable to refer to nurses and physiotherapists for prescriptions of physical activity. The competences of different professions need to be utilized to achieve optimum teamwork in PAP, which would be in keeping with the inter-professional character of primary care. The GPs point out that the proper conditions have to be established in society and in the health service to increase the level of physical activity among patients and to support primary and secondary preventive work.

Abbreviations

PAP: Physical activity on prescription; GP: General practitioner; WHO: World Health Organization.

Competing interests

The authors declared that they have no competing interests.

Authors' contributions

GEP, ELS, EEH and MT conceived the design of the study. GEP and ELS carried out data collection, analysed data and drafted the manuscript. AB, EEH and MT performed a corroborative analysis and contributed to the development of the manuscript. The final manuscript was read and approved by all authors.

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Paper III

RESEARCH ARTICLE

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Somali women's view of physical activity – a focus group study

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Abstract

Background: Physical inactivity presents a major public health challenge and is estimated to cause six to ten percent of the major non-communicable diseases. Studies show that immigrants, especially women, have an increased risk of non-communicable diseases compared to ethnic Swedes. Somali immigrant women have increased rates of overweight and obesity, low fitness levels and low levels of cardiorespiratory fitness compared to non-immigrant women. These findings suggest that Somali women are at increased risk of developing lifestyle-related diseases. Few studies explore determinants of physical activity among Somali women. The aim of this study was to explore Somali women's views and experiences of physical activity after migration to Sweden.

Methods: A qualitative focused ethnographic approach was used in this study. Four focus groups were conducted with twenty-six Somali women ranging from 17 to 67 years of age. Focus group discussions were recorded, transcribed verbatim and analysed using qualitative content analysis.

Results: The analysis resulted in four main themes and ten categories: **Life in Somalia** and **Life in Sweden, Understanding and enhancing health** and **Facilitators and barriers to physical activity**. Great differences were seen between living in Somalia and in Sweden but also similarities such as finding time to manage housework, the family and the health of the woman. The extended family is non-existent in Sweden, making life more difficult. Health was considered a gift from God but living a healthy life was perceived as the responsibility of the individual. Misconceptions about enhancing health occurred depending on the woman's previous life experience and traditions. There was an awareness of the importance of physical activity among the participants but lack of knowledge of how to enhance activity on an individual basis. Enhancing factors to an active lifestyle were identified as being a safe and comfortable environment.

Conclusions: Some barriers, such as climate, lack of motivation and time are universal barriers to an active lifestyle, but some factors, such as tradition and religion, are distinctive for Somali women. Since traditional Somali life never involves leisure-time physical activity, one cannot expect to compensate for the low daily activity level with leisure-time activity the Swedish way. Immigrant Somali women are a heterogeneous group with individual needs depending on age, education and background. Tailored interventions with respect to Somali traditions are necessary to achieve an actual increase in physical activity among migrant women of Somali origin.

Keywords: Migration, Focus group, Physical activity, Primary health care, Somalia, Women

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Background

Non-communicable diseases, (NCDs) are responsible for two-thirds of all deaths globally in 2011, and World Health Organization, (WHO) predicts an increase by 15% globally between 2010 and 2020 [1]. Most NCDs are strongly associated and causally linked with four behaviours: tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol [1]. One third of the adult population is physically inactive causing a risk of overweight and obesity [2]. Obesity is a problem worldwide, spreading in all socioeconomic groups in society. Evidence shows a strong connection between an increase in weight and a low physical activity level in relation to food intake [3]. Several studies indicate that immigrant women show an increased prevalence of unhealthy behaviours and risk of poor health status [1,2]. The sedentary lifestyle can be a remnant from their country of origin or might be brought about by stressful migration and acculturation into a new social and cultural environment [2]. Somali immigrant women have increased rates of overweight and obesity, low fitness levels and low levels of cardiorespiratory fitness compared to non-immigrant women [4]. These findings suggest that Somali women are at increased risk of developing lifestyle related diseases [5]. It is therefore important for primary healthcare practitioners to facilitate healthy behaviours such as an increased level of physical activity to prevent the risk of developing disease.

Individuals who emigrate from their country of birth are generally healthier than those who do not. However, the healthy immigrant effect tends to wear off with time [6]. For decades Somalia has been affected by catastrophic events due to civil war [7]. Millions of its people have been left displaced and the process of migration, sense of dislocation and alienation contributes to stress. Limited data are available about risk factors of Somali immigrants, but the group experience major changes in lifestyle and face a number of challenges when adapting to their new country, making them more vulnerable to poor health [8]. The Somali population has made a transition, from a primarily pastoral and nomadic to a more sedentary lifestyle with a dramatic change in the daily pattern of physical activity [5].

During the past 10 years 35,100 Somali natives sought asylum in Sweden, a country with 9.5 million people. In 2012 there were 43,966 people from Somalia living in Sweden, 75 percent of them over the age of 16 and under 40 [9,10].

Some studies offer valuable insight into Somali women's need for health professionals to accommodate cultural beliefs into health prevention [11-13]. Studies from the United States and New Zealand explore determinants of physical activity among Somali women, and identify barriers and issues concerning designing physical activity

programmes [5,8]. However there is a lack of in depth information and understanding of the groups' preconditions to increase physical activity levels and reduce sedentary behaviour. The aim of this study was therefore to explore and understand the perception of physical activity among Somali women.

Methods

Design and sample

To get a holistic understanding of Somali women's views on physical activity and health, we chose a focused ethnographic approach [14]. The main component of the theoretical position of focused ethnography is the emphasis on understanding the participants' experiences. Unlike traditional ethnography which requires prolonged periods of data collection in the field, the study focused examining specific issues in a single social situation among a limited number of people within a defined period of time [15]. The principle of holistic understanding implies that people's views and actions must be understood within the context as well as the time and space in which they occur [16].

Snowball methods were used to recruit participants [16]. Key persons in Somali women associations in the Southern region of Sweden played a key role in identifying and recruiting participants in the different towns. Inclusion criteria were, women over the age of 18, born in Somalia and living in Sweden. Leaflets with information about the study aims and contact information for researchers in Somali and Swedish languages were handed to the key persons in the women's associations. A date and time for the focus group discussions was set with the help of the same key people. Women who met the criteria and who turned up at the specific time, participated in the focus groups in respective city, thus no specific screening was performed. A total of 26 women between 18 and 67 years participated in four focus groups in three cities; one large city of 338 000 inhabitants and two smaller cities of 60 – 114 000 inhabitants in the south of Sweden. Demographic data are reported in Table 1. Majority of participants knew each other but there were few who had never met before.

Table 1 Participant characteristics

	Group 1 large city N = 7	Group 2 large city N = 6	Group 3 small city N = 5	Group 4 small city N = 8
Age	42 ± 3.2	26 ± 2.0	31 ± 2.6	39 ± 14.3
Years in Sweden	20 ± 5.8	4 ± 2.3	9 ± 3.4	13 ± 8.3
Somali primary language	7	6	5	8
Single	4	3	2	3
Employed	6	0	0	4
Student	1	6	5	4

Mean ± SD.

Focus group discussion methodology was chosen as it seeks explanations of social and cultural phenomena based on the perspectives and experiences of people being studied. It is therefore compatible with the ethnographical approach adopted in this study [16]. A focus group conversation also invites discussion through participation and often results in groups dynamic which according to Morgan, generates data that is rich in viewpoints as the lively collective interaction can provoke more spontaneous expressive emotional opinions than an individual interview [17].

Data collection procedure

Data was collected using a semi-structured interview guide under a period of 4 months in 2012 and 2013. Open ended questions were used to allow a fluid conversation about the topic [18]. The interview guide was inspired by Krueger's practical guide how to conduct focus groups, [19] and Halcomb *et al.* how to undertake focus group research with culturally and linguistic diverse groups [20]. The interview-questions were developed based on experience and pre-understanding as a physiotherapist that Somali women appear to have a low level of physical activity. The questions were piloted to check for cultural appropriateness and linguistic understanding prior to conducting the focus groups [20]. Venues for the focus groups were chosen by participants themselves. In the largest city, one focus group was conducted at the Somali Community Centre, the remaining two groups were held in the homes of two participants. In the smallest city the focus group was held at the school where the participants study Swedish language.

The participating women had different proficiency on speaking Swedish; a few preferred to speak Swedish and the majority preferred to speak Somali thus the instruction was to discuss the topic in the language of their choice. All focus groups were held by AJM, a nurse and bilingual moderator of Somali descent with a PHD degree and significant knowledge of conducting focus groups. When choosing a facilitator of focus group with a diverse cultural background the person need to be respected, credible and preferably a member of the cultural group [21,22]. GEP, a physiotherapist and a Swedish native, kept field notes of the interactions occurring and ensured that everyone had the opportunity to speak.

The focus of the discussion was 'views of health and physical activity'. After an opening presentation, health was introduced in Somali and in Swedish, as the first topic, and the participants were invited to share their thoughts. Health was first discussed since the concept is similar in Somali culture. The concept of physical activity needed some explanation and was defined as any bodily movement associated with work, during transportation or leisure time. Following the initial questions a discussion

took place with focus on the relation between health and physical activity, experience of physical activity, enablers as well as barriers to be physically active. Based on the discussions, we tried to elicit shared thoughts, opinions, and a meaning that could increase our understanding of how Somali women viewed health and physical activity. Once each topic was discussed AJM made a summary in Somali to the respondents to verify the statements. A post meeting of the session was held by AJM and GEP after every focus group to discuss the outcome of the discussions and to identify new ideas that need to be exploited in the next focus group [19]. A brief summary in Swedish was also made at the end of the session by AJM.

The focus group discussions lasting between 75–90 minutes were recorded digitally and everything said in Swedish was transcribed verbatim by a native Swedish secretary. The Somali parts of the interviews were transcribed verbatim by a secretary. The secretary, who is a native Somali with nursing background and a broad experience in transcribing and translating interviews, translated the data into English. The translation was validated by AJM and later discussed with GEP in line with suggested steps of translation process to ensure quality [23]. Field notes of observations were completed by GEP following the focus groups to complement interview transcriptions in Swedish and English. The use of field notes provided additional information about the non-verbal exchange of information between the participants.

Analysis

Qualitative content analysis was used to analyse the material [24]. To familiarize with the data, GEP and AJM read and discussed the summaries, translations and field notes and when supplementary verification was needed, listened to the recordings. ELS, a behavioural scientist thoroughly familiar with focus groups, read through the Swedish and English transcriptions several times separately. Combining the interviews and observational notes provided depth and allowed the researchers to understand the experience and processes. The analysis followed an inductive approach and meaning units were identified by two researchers as a first step. Line by line coding was completed across all data collected and expressed by the participants.

The codes were grouped into general categories with shared content [24]. Categories and themes were developed on the basis of the codes. Several strategies were applied to ensure trustworthiness of the findings [24]. The text was analysed individually by the authors. Two of the authors (GEP and AJM), met several times and participated in all steps. ELS participated in developing sub-categories, categories and themes. EEH, a physiotherapist, read all the material, reflected, commented

and confirmed that they contained data supporting the findings. Triangulation was accomplished through multiple methods of data collection including field notes and interviews. Examples of the analysis are seen in Tables 2 and 3.

Ethical considerations

Ethical approval was granted by the regional ethics board in Lund, registration number 2011/517. The aim of the study and the focus group methodology were presented in Somali and in Swedish in the information letter and informed consent was obtained from the participants. The Somali women took part voluntarily in the study and were informed of their right to end their participation at any time. The material was de-identified and coded to guarantee confidentiality.

Results

Summary of results

Twenty-six women born in Somalia living in Sweden participated in four focus groups. The average time living in Sweden was 11.56 years, ranging from 1 to 23 years (Table 1). There was a wide age range of women in the focus groups but their views on health and physical activity did not differ. The overall analysis shows that the participants were aware that physical activity ought to be an important component of a healthy life but pointed out different obstacles. The results also showed that there were possibilities to become physically active if support and enthusiastic leaders were available. Four main themes and ten categories emerged from the analysed material: **Life in Somalia and Life in Sweden, Understanding and enhancing health and Facilitators and barriers to physical activity** (Tables 2 and 3).

Life in Somalia and life in Sweden

Migration to Sweden involves a number of stressors and strains that affect adaptation to the new environment. Living in a hot climate forces people to move with less intensity and the traditional lifestyle is considered to be sedentary. Living conditions in Somalia are totally different from life in Sweden. In both countries similar daily routines such as grocery shopping, cooking and cleaning exist, but the participants' views of what it is like to live in the two countries were not coherent. In Somalia chores are done together with other women and an extended family is always there to help, whereas in Sweden every woman alone takes care of her own household. Even though living in Sweden means having access to household machines such as vacuum cleaners and dishwashers, some participants thought that daily housework takes more time and energy when living in Sweden.

Living together with an extended family, sharing the daily housework with other women, was viewed by some participants as being simple and easy. Other participants felt that living as close together as one does in Somalia can sometimes put a strain on relationships. Life in Somalia can be easy as long as you get along with people you live with; otherwise it brings a lot of stress and difficulties. Being new to a country, without the support of your family, makes life stressful. The women expressed a loss of the extended family when moving to Sweden:

"You have family there [in Somalia] that can help you. But here [in Sweden] there is nobody helping you because the family is not here".

Life in Sweden is considered very stressful and filled with tasks to do from early morning to late at night, or as one participant put it:

"Lifestyle here is like herding goats: taking kids to school, going to work, bringing them back, and preparing a meal. Where does a mother get time to go to the gym?"

The women stated that taking care of the household without an extended family takes more time and energy than before. Some participants found life in Sweden difficult since they never had to do dishes or cook a meal before moving from Somalia. Household chores were done by a maid, someone else in the household, or the participants were just too young to be responsible for the daily activities before migrating.

Shopping for groceries and cooking is done on a daily basis in Somalia. People walk long distances in order to buy household goods. In Sweden supermarkets and refrigerators make it possible to do shopping once a week, a lifestyle adopted by the participants. This new lifestyle robbed the participants of valuable daily physical exercise, according to participants.

Food and beverages were identified as a potential barrier to a healthy lifestyle. Traditional Somali food contains a lot of sugar and the participants know it is bad for health. Participants continue with their traditional consumption of the "typical" Somali staple food and beverages such as sweet tea, cookies, rice and meat, while the consumption of vegetables and other greens has been reduced. According to the participants, grocery shopping in Sweden is difficult since it is hard to recognize the packaging of the product needed for cooking. In big supermarkets fruit and vegetables lack the typical scent, and spinach, for instance, looks different from the spinach found in Somalia. They are also aware that the level of physical activity and the intake of food must be changed, but traditions are a part of one's identity and become more important when moving to a foreign country.

Table 2 Life themes with meaning units, codes and categories derived from the analysis

Meaning units	Code	Category	Theme
"Women cooked together, they spent time together and got along. Life was simple." P13*	Household chores were done together	Extended family essential for everyday life	Life in Somalia
"Migration has changed everything, stress, children and large family to care for." L15*	Alone with a large family		
"When you come to a new country and you don't have support or someone helping you, it's easy to be affected by stress." K7*	Stressful life without support		
"If you are sick here in Sweden, you still have to do everything yourself, whereas in Somalia you get help." P15.	No help when needed		
"My situation is different because I wasn't married off. I chose the person I wanted to get married to. So I didn't have the support from my family." P16	Go against the will of the family	Traditional way of living	
"The house work takes most of the time and energy. You have to go to the store and buy fresh things and then go home and cook the same thing every day, walk back and forth, buy the things and come back." P12	Household chores occupy the whole day		
"I'm tired and afraid. Life in Sweden is stressful! There is always something emerging." P18–19	Always having something to do is stressful	Life filled with chores and no spare time	Life in Sweden
"And all this stress, the sugar levels start because we have not adapted to this country. As a result you get health issues." K3	Hard to adapt to a new life		
"The house work takes most of the time and energy." P12	Household chores takes all energy		
"It is difficult for a single mother and if maybe the kids' father lives with her she might get some help." L15	Maybe help if the spouses are living together		
"I went to school this morning, and when I finish I will pick up the children from school. When my husband comes home I will leave again for an appointment at the school with the teacher, even though I have other things needing to be done." K3	A structured life with many appointments		
"The little time we have to ourselves we go for tea to somebody's house and we take tea with a lot of sugar." K7	Spare time is spent drinking tea	Traditional culture prevails	
"We cannot leave our cultural background with regard to food." L7	Traditional food is consumed		
"The household chores and the kids, where would I get time for physical activity? The walks and movements that I do are enough." K8	Physical activity doing household chores	No further need to move	
"As a mother with full-time activity there is no spare time, my schedule is packed. I am very tired cooking, washing etc. I do not need any physical activity." K7	Full-time activity taking care of the house		

*K: focus group 3, small city; L: focus group 4, small city; P: focus group 1 and 2, large city.

Table 3 Health and Physical activity themes with meaning units, codes and categories derived from the analysis

Meaning units	Code	Category	Theme
"We believe in God, he is the one who grants health." K4*	Health is a gift from God	Faith in God	Health
"We have thick skin; the sun can penetrate through our skin." L12*	The sun can penetrate our skin	Misconceptions	
"My mother used to drink juice with plenty of sugar and tea with a lot of sugar. In Somalia you burnt the calories so my mother had good health." L14	Good health despite high intake of sugar		
"If I take a walk outside or go to some activity and jump and sweat, my blood circulation and everything works and health also comes." L4	Jump and sweat is healthy	Enhancing health	
"If I do not work out for a long time I cannot even sleep." L8	Bad sleep due to no movement		
"If gyms are mixed men and women we cannot go, but if the gym is for women only, we could go." L8	Gym for women only is a must	Facilitators	Physical activity
"If somebody 'holds your hand' supports you and motivates you, you walk!" K16	Support is motivational for walking		
"I love swimming but my religion does not allow men to mix with men." K12	Religion does not allow mixing with men	Factors affecting physical activity	
"It is winter and it's too cold to walk, and it's dark." P10*	Restrained from walking due to a cold and dark environment		
"To get dressed and walk alone I see as the most boring thing ever!" K15	Walking is boring		
"I have the chance to work out, but we Somalis would choose to go to a friend's house and drink tea with a lot of sugar and chat. There are health benefits in chatting too." L16	Chatting takes priority over a workout		

*K: focus group 3, small city; L: focus group 4, small city; P: focus group 1 and 2, large city.

Understanding and enhancing health

Health means different things to different people, depending on the situation. In general it is the condition of a person's mind and body, usually meaning being free from illness. Health was described as being able to do everything a person desires to do and it was considered a gift from God to achieve and to nurture. Each person is responsible for his or her own health, and everyone could make choices in life to enhance or to spoil health, causing mental and physical illness. Socialization among friends gives peace of mind and may not increase physical health but contributes to enhancing mental health:

"I think the mind needs conversation, a cup of tea, dates and Somali sweets."

Several times during the discussions, explanations were sought to understand symptoms and conditions where prior health care visits had failed to give clarifying answers, and this led to unfounded anxiety. Somali traditions and views of health differ from the way Swedes perceive factors affecting health, and the understanding of health is based on experience, tradition and misconceptions. A question came up why high blood pressure in Somalia was present even though the country has an abundance of sunlight, and one participant argued for her belief:

"The sauna is a hot place and if you sit there for a long time you sweat a lot, and sugar and fat and toxins come out of your body."

Several women argued that reliance on health professionals is the greatest when medication is given:

"The Somalis love tablets, even if the doctor says the best medicine for blood pressure is walking, and making the body sweat, and eating a lot of vegetables, we just love medication, it does not matter what part of the body is aching".

Facilitators and barriers to physical activity

Physical activity was considered important to health and well-being, and the discussion identified both facilitators and barriers to being physically active. In Somalia physical activity is incorporated into activities of daily living. Walking for health or just for the sake of it never existed. One participant talked about how Somalis think about walking:

"Unless we force ourselves it is not in our mind to walk."

Adults never engage in leisure-time activity, it is for children only. Leisure-time activity for a Swede often involves physical activity, something totally unfamiliar to

a person from Somalia who uses spare time to sit at home, or as one participant explains:

"We make very sweet cakes or cookies, sit facing each other and that is what the majority of us do."

Participation in leisure-time physical activity had occurred since they moved to Sweden. The activity became a positive experience when it was organized in such a way that the requirements of Somali customs were met and when a fellow Somali woman became an informal leader. One of the participants expressed a sense of well-being following the activity along with nights of sleeping well. The successful activity was run by an enthusiastic Somali woman who mobilized a whole group for jogging activity on a weekly basis, and with her energy was she able to mobilize a whole group. Dressed in traditional clothing, the group had a fixed day to meet at a nearby schoolyard. The importance of creating a comfortable and safe environment was emphasized in order for the participants to move freely. Physical activity is preferably performed separately from men, but a minority could consider going to a gym with men and women mixed. Being physically active is for many women equivalent to spending time at a gym. The possibility for other people to watch while they are exercising can create an uncomfortable feeling and exercise is therefore avoided. Depending on where you live you might have access to a gym for women only, giving the opportunity to join the health club and work out a couple of hours once a week together with friends and other women.

Choosing a familiar place for the exercise is important, and if a public place is chosen it should be well lit and equipped with cameras for surveillance in order to create a sense of security. The companionship of other women was a major facilitator to maintaining the habit of being physically active. The need for support from someone who can motivate and keep up the spirit of exercising was identified, or as one woman described her situation:

"I would personally need somebody helping with the chores or go to a health camp Somali Biggest Losers." [Like the Swedish television show, Biggest Loser]

One important view expressed by many women was that life in Sweden gives no incentive to go outdoors or even to get dressed sometimes, unless there are children in the household attending school, or if you have work to go to or as one woman explained:

"Nowadays, I usually think why should I get dressed and go outside if I do not need to go and buy milk like I did in Somalia every day."

When you need to go outside, the choice of walking or using public transportation is easy, since the bus is always available, taking you wherever you need to go.

Single mothers, as well as participants living in a relationship, mentioned a busy schedule, with no time or energy to be physically active more than everyday chores require. The cold climate in winter is a major barrier to going outside, and thus leaving the home is easier in the summertime. The custom in Somalia is to stay indoors and sleep on rainy days. Along with the cold climate, the darkness is a hindrance to walking outside. Fear of walking alone, in the dark, as well as feeling unsafe in the neighbourhood are reasons for spending a lot of time indoors.

Religious and cultural factors also affect a physically active lifestyle. Traditional Somali clothing for women, a full-length dress and a hijab, is less suitable when you need to move freely. According to Somali customs, wearing swimwear and mainstream European clothing when males are present is forbidden, "haram". Besides taking too much effort to get dressed, walking is the most boring activity you can do, especially when you are alone. It is also considered "haram" by some women to move to music.

Discussion

Summary of results

Life in Sweden was regarded by Somali women as a mixture of traditions and adapting to a new environment and situation. The participants considered health a gift from God and found it to be the individual's responsibility to make health-enhancing choices. Physical inactivity is increasing among the world's population and Somali women are no exception. Factors participants identified as enhancing an increased physical activity were safe surroundings, support from people and the company of fellow Somali women. The importance of having enthusiastic leaders and role models to set a good example for a healthy life was also stressed. Barriers such as motivation, lack of time and climate are universal to mankind. Other identified barriers exist for not being physically active, of which tradition and religion are factors distinctive for the group.

Discussion of method

The aim of the study was to explore and understand the perception of physical activity among Somali women. We conducted four focus groups to collect data, a number recommended in published studies [25,26]. Language and cultural barriers must be acknowledged as limitations in this study. The fact that the study is bilingual and represents a cultural diversity is a source to misinterpretation of data [23]. The topic and the main themes were presented to the participants in both Somali and Swedish.

The participants could choose to give their views in the language they preferred, resulting in a mixed discussion and a limitation to the non-Somali-speaking researcher co-conducting the focus groups. Another limitation is the procedure of translation [23]. One translator was used instead of a team of bilingual translator thus to compensate the limit we used comparison of translations by researcher and translator cognizant of the customs, values, beliefs and language of the respondents [23]. The moderator and translator were nurses that may have class and educational biases of their shared ethnic culture and social positions that they perceive as superior to the participants. On the other hand clinicians can increase the likelihood of gathering and translating accurate data [27].

The selection was confined to southern Sweden and the participants were invited by snowball recruitment through a contact person in the local Somali community; no specific selection was made. Other Somali women might have different views from the women taking part in this study.

Discussion of the results

Somali women experienced major changes in lifestyle since immigration and we found that life in Sweden gives no incentive to be physically active and the level of activity in everyday life has decreased.

Findings show that most people tend to stick to their cultural habits and values even more firmly, to retain their original identity in a strange and new environment [28]. The identity issue faced by Somali immigrants depends on age, gender and how much time the person has spent in the host country. The elderly Somalis prefer to remain within their community whereas the younger generation juggles with multiple identities [10]. Social norms, attitudes, customs and gender roles derive from Islamic tradition and religion becomes a way to preserve identity and a sense of community and may work as a moral and practical guide to everyday life [29-31]. Studies have shown that especially women become more religious away from Somalia [10,29]. Besides religion, the clan system still prevails and influences life by being a source of comfort and at the same time exerting social control [10]. Together with the ability to speak Swedish, it was noticeable that the younger women appeared more outgoing, interested in knowing more about health, physical activity and Swedish manners, yet keeping to Somali traditions and norms always was important. The participants talked about the absence of the extended family to give support and help in everyday life. With this knowledge in mind it is understandable that life in Sweden appears different and stressful.

To treat illnesses, Somalis may use extensive herbal medicine traditions and commonly expect to receive medication for every illness when utilizing Swedish

health care systems [31]. Physical activity on prescription (PAP) is used in Swedish health care to promote physical activity, and Swedes show 65 percent compliance with the method although GPs regard PAP with mistrust and use the method sparsely [32,33]. Women in the study pointed to a great trust in medication, indicating that adherence to a non-pharmaceutical method might be low. Ethnographic guidelines suggest that Somali patients may be disappointed when no pharmaceuticals are prescribed [31].

The conception of health and the factors that facilitate good health are different in Sweden and in Somalia. Depending on whether a person comes from a rural or urban area in Somalia, views of health and how to use medical systems vary [31]. Similar findings were seen among the participants together with a gap of knowledge due to varying levels of education and prior experience.

Regardless of origin, daily physical activity is genetically and biologically regulated and humans always avoid moving more than necessary in order to preserve energy for times when it is better needed [34,35]. The women showed different levels of motivation for physical activity, just like any person in the process of a change to an increased level of activity. Behavioural changes to a higher level of physical activity are challenging both to the person needing a change and to the supporting health professionals [36,37]. Participants pointed to enablers crucial for lifestyle changes, such as creating a feeling of comfort, support and companionship with other women, factors universal to everybody trying to increase the level of physical activity. Other populations' points to similar factors [5,8] but Somali women appear to have special needs to feel secure and comfortable when being physically active, which requires the activity to coincide with Somali traditions and lifestyle. The great need for comfort might be an indication of a lack of belonging to society. According to unpublished data, the sense of belonging derives from the individual's willingness to be a part of society but it is also society's acceptance of the individual that matters [28].

Barriers to being active were elucidated, identical to those seen in previous studies, including climate, religious, cultural and safety concerns [5,38]. Furthermore the participants talked about traditional Somali food being a risk factor for health, and difficulties in changing diet from traditional Somali food to a healthier alternative are not considered [39].

Life in Somalia and Sweden is as different as can be expected, although similarities exist. Whether women are living in Sweden or Somalia, finding time for the home, family and for the woman herself will always be an issue. Awareness of the importance of physical activity exists, but tools to enhance activity on an individual basis are missing. Identified barriers, such as motivation and

lack of time to become more physically active, are universal for every human being. Barriers such as language, religion, values and tradition need to be taken into consideration when planning interventions for Somali women. The decrease of physical activity in everyday life is a global issue, and international recommendations for physical activity address the link between the frequency, duration, intensity, type and total amount of physical activity needed for the prevention of NCDs [2]. It is necessary to focus on changing the sedentary life trend for Somali women as well.

Major life events have a strong effect on leisure PA behaviour [32]. Consequently, Somali women who have experienced substantial life events by migrating are an important target group for physical activity promotion. This study sheds light on Somali women's views and experiences of physical activity, and there is a need for more information concerning the actual level of physical activity in order to offer adequate support to the group. Healthcare providers must be aware of individual variations but also be wary of generalization that may lead to stereotyping [40]. Other studies have shown, just like this study, that regardless of country of origin that support on different levels is crucial to establish an increased level of physical activity in both short and long term [5,41,42]. This study found that Somali women settled in Sweden are not a homogeneous group needing exactly the same type of intervention to adopt a less sedentary lifestyle. Interventions focusing on enhancing physical activity in everyday life could therefore be successful.

Conclusions

Immigrant Somali women constitute a heterogeneous group with individual needs depending on age, education and background. Several reasons emerged for adopting a sedentary behaviour and facilitators as well as barriers for Somali women living in Sweden were identified to increase and stimulate physical activity. This study is consistent with what is known about general barriers to becoming physically active, but demonstrates the group's specific needs when addressing interventions to reduce a sedentary lifestyle. The daily physical activity performed in the home country has been lost and replaced with chores filled with convenience, leaving no incentive for daily physical activity. Interventions to increase daily physical activity levels and minimize a sedentary time are important. Primarily, there is a need to raise the awareness of the harmful effect that a sedentary lifestyle pose on health. If the need for a change is recognized the individual is more likely take part in suggested interventions and become ready to change behavior.

Since traditional Somali life never involves leisure-time physical activity, one cannot expect these women to

compensate for the low daily activity level with leisure-time activity in the Swedish way. Health programs to facilitate physical activity must consider a safe supportive environment where Somali women can feel secure. The women's views and experiences will provide ideas for culturally relevant interventions to stimulate physical activity on a daily basis to avoid NCDs. Tailored interventions with respect to Somali traditions are necessary to achieve an actual increase of physical activity among women who have emigrated from Somalia.

Abbreviations

NCD: Non-communicable disease; PAP: Physical activity on prescription; WHO: World Health Organization.

Competing interests

The authors declared that they have no competing interests.

Authors' contributions

The planning of the study was performed by GEP, AJM, ELS and EEH. GEP and AJM carried out the data collection. Data were analysed and the manuscript was drafted by GEP, AJM and ELS. A corroborative analysis was performed by EEH who also contributed to the development of the manuscript. The final manuscript was read and approved by all authors.

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Paper IV

Immigrant Somali women´s level of physical activity assessed by accelerometry

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Abstract

Background

Physical inactivity is a major contributor to death and disability from non-communicable diseases (NCD). One third of the adult population is physically inactive and immigrant women are identified as a vulnerable population with an increased prevalence of unhealthy behaviours, with decreased levels of physical activity and a risk of poor health status. Somali immigrant women have increased rates of overweight and obesity, low fitness levels and low levels of cardiorespiratory fitness compared to non-immigrant women. These findings suggest that Somali women are at increased risk of developing lifestyle-related diseases. Few studies assess levels of physical activity among Somali women. In order to eliminate physical inactivity as a risk factor for developing NCD among Somali women, it seems important to find out if the accumulating level of physical activity according to international guidelines. The aim of this study was to objectively assess levels of health enhancing physical activity as well as inactivity, assessed with accelerometry.

Methods

Seventy Somali women (18-63 yr. of age) in southern Sweden were included. Participants were asked to wear an accelerometer during the waking hour for a 7 day period. Along with introduction of the monitor, subject characteristics and waist circumference (WC) were collected. After a week of monitoring the accelerometer was returned and data uploaded.

Results

Twenty-five participants (group A) showed sufficient monitor wear time and forty four participants (group B-D) were excluded due to insufficient wear time (n=35), refused to wear monitor (n=8) and monitor lost when used (n=1). Group A registered a median of 11 hours and 35 minutes of sedentary time per day. A median of 29 minutes of moderate to vigorous intensity physical activity was performed, with no time spent in vigorous intensity. Eighteen

(72%) of the women performed 150 minutes of MVPA/ week and eight (32%) performed 30 minutes of MVPA/day. Four participants performed continuous physical activity for 30 minutes whereas nine participants accumulated the activity in bouts of ≥ 4 . The prevalence of WC ≥ 88 cm was in group A 72% and group B 42% (<0.0349).

Conclusions

The Somali women in this study showed a high prevalence of sedentary behavior and few individual met the global guidelines of physical activity, hence the risk of developing lifestyle-related diseases due to low levels of physical activity is increased.

Key words

Migration, accelerometer, physical activity, waist circumference, Somalia, women

Background

Physical inactivity is a major contributor to death and disability from non-communicable diseases (NCD) [1]. One third of the adult population are physically inactive when including leisure time, occupation, transportation and housework activity with a global variation ranging from 17% in Southeast Asia to 43 % in eastern Mediterranean [2].

Physical activity is a combination of intensity, duration and frequency and relates to the outcome of health and diseases such as diabetes, hypertension and obesity in a dose-response relationship [3]. The definition of physical inactivity is when none of the three criteria are met: 1) 30 minutes of moderate-intensity physical activity on at least 5 days every week; 2) 20 minutes of vigorous-intensity physical activity on at least 3 days every week or 3) an equivalent combination achieving 600 metabolic equivalent (MET)-minutes per week [4]. Moderate-intensity activity has well documented health benefits and seems to be sufficient for prevention and treatment of many chronic diseases [5].

Studies indicate that immigrant women show an increased prevalence of unhealthy behaviors, with decreased levels of physical activity and a risk of poor health status [1, 6, 7]. Somali immigrant women globally have increased rates of overweight and obesity, low fitness levels and low levels of cardiorespiratory fitness compared to non-immigrant women, suggesting a high risk of developing obesity, cardiovascular diseases, diabetes and even mental health problems. [8]. Furthermore, women who migrated from their native countries tend to have a more sedentary lifestyle compared to when they were living in their native land [8]. From our research group, a study indicates that the daily physical activities have been changed when migrating and replaced with a more sedentary lifestyle with access to household appliances, leaving no incentive for daily physical activity [9]. Moreover, Somali

women associate physical activity with leisure time activity, which never is included in traditional Somali life and therefore rarely practiced. In order to eliminate physical inactivity as a risk factor for developing NCD among Somali women and to be able to design effective intervention programs it seems important to find out if the accumulating level of physical activity according to international guidelines.

Earlier studies focusing on Somali women's physical capacity are based on physical function of the hand and upper leg muscles or on self-reported data of physical activity or on strength [10-12]. The most common method to collect data of physical activity levels is through self-report, surveys or questionnaires [6], such as the international physical activity questionnaire (IPAQ) and the global international physical activity questionnaire (GPAQ) [13, 14]. Global strategy suggests more focus on national monitoring of physical activity to identify groups in special need of more efficient promotion of a physically active lifestyle [15]. Self-reported physical activity implicate significant reporting bias attributable to a combination of social desirability bias and the cognitive challenge associated with estimating frequency and duration of physical activity [16]. Objective measurement devices such as accelerometers assess movement-intensity, frequency and duration offering a potential solution to problems associated with self-reported data [17]. To the best of our knowledge no study has objectively assessed the levels of physical activity among Somali women living in Sweden.

The aim of this study was to objectively assess levels of physical activity as well as inactivity, using accelerometry, and the relationships between physical activity/inactivity and age, WC measurements and social background among Somali women living in Sweden.

Methods

Subjects

The study population included 70 women between 18 and 63 years of age, with Somali descent living in one large city (338 000 inhabitants) and three smaller cities (60-114 000 inhabitants) in southern Sweden. The women were recruited through the local Somali women's association with the help of Somali speaking instructors working at Somali centers. Participants were informed and invited to participate in the study by snowball recruitment during 2013 and 2014. The purpose and objectives were carefully explained verbally and in writing in Swedish and in Somali to each participant. In total 61 women accepted to participate in the study, nine declined to wear a monitor and one device was lost while in use (Fig 1).

Measurement of physical activity

All participants wore the Actigraph GT3X accelerometer with the epoch duration set at 15 s. Accelerometers assesses human motion (frequency and intensity) over a user-specified time epoch duration. The acceleration signal is digitized, and the magnitude is summed over the "epoch". At the end of the epoch duration the summed value or activity "count" is stored in the memory, and the integrator is reset. Technical specifications and performance properties of this instrument have been describes elsewhere [18]. The accelerometer was distributed and collected after use by GEP and AJM.

The participants wore the accelerometers in an elastic belt with an adjustable buckle, around the waist during the waking hours, except while showering, bathing, or swimming, for a 7-day period, acceptable to provide reliable estimates for physical activity monitoring [19]. Waking hours was defined as the moment upon getting out of bed in the morning through the

moment of getting into bed in the evening. Data from the monitor was uploaded to a computer using the program ActiLife v5.8.3. Accelerometer recordings for four days with a minimum of 10 hours per day wear time, with one weekend day included, was considered as valid as earlier suggested by Trost et al [19]. The study population was divided into four groups (A, B, C and D). Group A had sufficient monitor wear time (4 days ≥ 600 minutes) whereas group B-D (B, 4 days < 600 minutes; C, 3 days ≥ 600 minutes; and D, 3 days < 600 minutes) showed non-compliance to wear-time criteria. This resulted in 25 participants, group A, who met the wear time criteria and 35 participants, group B-D, with less than four days and 10 hours per day wear time. Wear time data for the 25 participants with four or more valid days are analyzed in this paper. Subject's characteristics for all subjects, including the 35 other participants with three or more valid days are presented in Table 1. The following assessments were obtained: time being sedentary, total time in all health enhancing physical activity, such as moderate and vigorous-intensity physical activity (MVPA) combined. Sedentary was set below a level of 100 counts per minute [20, 21]. The cutoff points for moderate and vigorous physical activity were set to 1952-5724 and ≥ 5725 counts per minute, respectively where 1952 counts per minute corresponding to walking at 4km/h [18]. Adherence to physical activity recommendations was examined by estimating the proportions of the population that met the published physical activity guidelines to accumulate 150 minutes of MVPA/week or 75 minutes vigorous physical activity/week.

Other variables measured

WC was measured with a tape measure at the level of the belly button and midway between the pelvic bone and the end of the ribcage. All women wore a thin layer of clothes at the time of measure. Information about age and social background were obtained when the monitor was introduced (Table 1).

Statistical Analysis

The data was checked for normality using Skewness/Kurtosis All test. Descriptive data are presented as means, standard deviations (SD), when normally distributed, or median and 25th-75th percentile when skewed. Analysis of statistical differences between groups was performed using a Mann-Whitney U-test approach. Logistic regression analysis was used to analyze relations between subject characteristics and the level of physical activity. Fisher's exact test was used to compare the group with eligible data with the participants with non-sufficient monitor wear time. All analyses were set at $P < 0.05$ level of significance. The STATA 13.0 software program (Stata Corp, College Station, TX) was used to all statistical analysis.

Ethical considerations

Ethical approval was granted by the regional ethical review board in Lund, registration number 2013/211. The aim of the study and the use of the physical activity monitor were presented in an information letter in Swedish and in Somali to accommodate the participant's choice of language. Verbal information in Swedish and Somali was given along with the written information. An informed consent was obtained prior to inclusion. Participation in the study was strictly voluntary and all participants were informed of their right to end their participation at any time. The material was de-identified and coded to guarantee confidentiality.

Results

Physical and subject characteristics of the participants are presented in Table 1. The age distribution of group A-D was 18-24($n=17$), 25-44 ($n=36$) and $45 \geq$ ($n=7$). The age group 18-27 were overrepresented in the sample.

A total of 44 subjects were excluded due to insufficient wear time (n=35), refused to wear monitor (n=9) and monitor lost when in use (n=1). The final sample group A, with sufficient monitor wear time consisted of 25 participants, age 18-24 (n=6), 25-44 (n=14) and ≥ 45 (n=5), (Fig.1). Eight women in group A had no children and five women had ≥ 4 children. In group B-D sixteen women had no children and four women had ≥ 4 children. Group A had lived for a longer duration in Sweden, ($p < 0.0019$), and had a greater WC ($p < 0.0349$) than group B-D. The prevalence of a WC ≥ 88 cm was 72% in group A and 42% in group B-D ($p < 0.0349$). No other significant differences were seen between group A and group B-D (Table 1).

Physical activity levels are presented in Table 2. The participants registered a median of 1 hour and 35 minutes of sedentary time per day. As a group the participants performed in median 29 minutes of MVPA per day, with no time spent in vigorous intensity. Eighteen (72%) of the women performed 150 minutes of MVPA/ week and eight (32%) performed 30 minutes of MVPA/day. Four participants performed continuous physical activity for 30 minutes whereas nine participants accumulated the activity in bouts of 4 or more. To be a student (OR = 1.64) or to be working (OR = 1.42) increased the odds of achieving 150 minutes of MVPA/ week. No statistical relations were seen between age, WC and the level of physical activity (Table 3).

Discussion

Summary of the results

A few individuals accumulated levels of physical activity according to WHO's recommendations necessary for health benefits [4]. Analyses of the study population's physical activity showed that the women spend over 11 hours of the day's waking hours in

a sedentary mode. Health enhancing MVPA was performed at a median of 29 minutes/day. Nine (36%) participants performed the MVPA in bouts less than 10 minutes at the time. No physical activity of vigorous intensity was performed. Eighteen out of the 25 participants showed a WC greater than 88cm.

Discussion of the result

The participants showed a high level of sedentary behavior which in itself is a risk factor related to premature death [22, 23]. The time spent in sedentary was more than eleven hours per day whereas adults in other studies show between 7-8 hours of sedentary behavior /day [20, 24, 25]. Global recommendations for physical activity was revised in 2010 to include 150 minutes of MVPA or at least 75 minutes of vigorous- intensity throughout the week [4] In addition to the revised guidelines, results showing MVPA on a daily basis are reported, since 30 minutes daily physical activity is a widely used concept [26]. Eighteen out of 25 participants met the health enhancing recommended levels of physical activity (150 minutes of MVPA/week), although the activity was performed in bouts less than 10 minutes at time which does not meet the recommended duration of physical activity [4]. Seventy two percent of the participant showed a WC \geq 88cm indicating obesity, although research indicate a need for defining different WC cut off points in different populations[27].

To our knowledge this is the first study where accelerometry is used in this population and the result indicates a lower level of physical activity than other accelerometer based studies have reported [20, 24, 25]. Self-reported questionnaires are often used when assessing physical activity, but individuals have a tendency to overestimate the actual level and time of physical activity giving an estimate that do not correspond with the actual amount of physical activity [28, 29]. Therefor the use of objective measures such as accelerometry is

to prefer. Sedentary behavior among all populations is considered a health risk but it is essential to decrease the risk particularly to an already vulnerable group such as immigrated women.

The age distribution of the population in this study was similar to the Somali community living in Sweden. The majority of the Somalis have no children reflecting the age profile of the population, 50 percent are between 16 to 30 years of age [30] When showing such a young age profile one can assume that interventions to enhance physical activity will benefit the women and their families for many years to come and will go hand in hand with the framework of the European health policy, "Health 2020" [31]. Interventions will not only benefit women on an individual basis but it will also decrease the burden of disease and the load of socioeconomics according to the aim of the policy to address health inequalities, and ensure the health of future generations.

Discussion of the method

The triaxial Actigraph measures and records vertical acceleration as "counts," providing an indication of the intensity of physical activity associated with locomotion [32].

Earlier studies have showed low compliance to use an accelerometer, something this study also report with its participation rate of 42% [20]. On the other hand there is no method which is faultless but by using objective measures one can avoid overestimation of physical activity that may occur when using self-reported questionnaires [28, 33].

In this study we chose to use WC as a measure to assess the participant's health risk since several studies argue that WC might be a better measure than BMI given its relationship with harmful visceral adiposity [34, 35].

Limitations

Although results of the study provide important information about the physical activity level of Somali women living in Sweden there are limitations to consider. The sample size is small yet it may give a view of the present physical activity levels among Somali women living in Sweden. Due to financial and practical constraints the number of accelerometers used in the study was limited. Another possible limitation is the time period used to monitor activity. 7-days monitoring periods have been routinely used in physical activity monitor studies because they provide a sufficiently large number of days to achieve intra class correlations of more than 80% in most populations, while also providing the opportunity to sample behavior on both week and weekend days [33]. Future research on larger populations is needed in order to draw significant conclusions.

Conclusion

Although the population was small the study can give an indication of the true level of activity and inactivity. The Somali women in this study showed a high prevalence of sedentary behavior and few individual met the global guidelines of physical activity. The result indicates that women emigrated from Somalia to Sweden show a high risk of developing lifestyle- related diseases due to low levels of physical activity. Therefor there is every reason to emphasize the importance of regular moderate to vigorous physical activity and to encourage the women to create opportunities to limit sitting time whilst at home, at work, and during transportation.

Abbreviations

IPAC: international physical activity questionnaire; GPAQ: global international physical activity questionnaire; MET: Metabolic equivalent; MVPA: Moderate to Vigorous- intensity Physical Activity; NCD: Non-communicable disease; WC: waist circumference

Competing interests

The authors declared that they have no competing interest.

Authors' contributions

The planning of the study was performed by GEP, ELS and EEH. GEP and AJM carried out data collection. Data was analyzed and the manuscript was drafted by GEP, ÅBT and EEH.

The final manuscript was read and approved by all authors.

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Table 1. Physical characteristics of the participants

N=60					
	Group A	Group B	Group C	Group D	p-value
	4days \geq 600min N=25	4days<600min N=12	3days \geq 600min N=11	3days<600min N=12	
Age	33 [21-45]	28 [22-34]	31 [26-33]	30 [25-33]	<0.0898
Waist circumference (cm)	96 [80-109]	84 [81-91]	85 [80-92]	88 [81-91]	<0.0349
Time in Sweden(yr)	10 [2-22]	3 [2-4]	2 [2-3]	4 [1-5]	<0.0019
Children (number)	2 [0-4]	0 [0-2]	1 [0-2]	1 [1-2]	<0.1916
single	13	10	5	5	<0.6955
employed	10	3	5	3	<0.3491
student	8	7	3	6	<0.3980

Median [25th-75th] percentile for skewed data

Table 2. Physical activity and sedentary time of participants with sufficient monitor time

Data available 4days \geq 600min	N=25
Number of days monitored	6.2 (3)
Registered time (min \cdot d ⁻¹)	760 (71)
Sedentary (min \cdot d ⁻¹)	681 [545-901]
MVPA \geq 3METs (min \cdot d ⁻¹)	29 [16-50]
Moderate intensity, 3-6METs	29 [16-50]
Vigorous intensity, >6METs	0 [0-4]
150 min of MVPA/week	18
75min vigorous physical activity/week	0
30 min of MVPA/day	8

Mean (SD) or median [25th-75th] percentile for skewed data

Table 3. Accumulated physical activity according to recommendations, by age groups and waist circumference

	MVPA 30 min/day (n=25)		p-value	MVPA 150min/week (n=25)		p-value
	<i>Active</i>	<i>Non active</i>		<i>Active</i>	<i>Non active</i>	
<i>Age</i>						
18-24(yr.)	1	5		3	3	
5-44(yr.)	5	9		11	3	
45- (yr.)	2	3		4	1	
			<0.722			<0.480
<i>Waist circumference</i>						
≤88 (cm)	5	5		6	4	
>88 (cm)	3	12		12	3	
			<0.128			<0.261

N tested by Fisher’s exact test

Figure 1. Sampling procedure of the project

