

**CORRELATES OF AND PHYSICAL ACTIVITY COUNSELING EFFECT ON
ATTITUDE TOWARD PHYSICAL ACTIVITY AMONG OLDER PEOPLE**

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ABSTRACT

Among older adults, moderate regular physical activity, even if below the level to show fitness effect, leads to multiple health benefits. However, despite well-documented benefits of physical activity, the majority of adults in developed countries do not exercise. There is a need to investigate what influences attitude toward physical activity among older people to develop suitable health promotion scheme. The purpose of this study was to identify correlates of attitude toward physical activity and effect of physical activity counseling program on attitude change among older people. The data was drawn from the screening and counseling for physical activity and mobility (SCAMOB) project conducted by Finnish gerontology research center. It was a two-year, single blinded, randomized controlled trial on the effectiveness of individualized physical activity counseling provided by physiotherapist to sedentary older people. The participants were community-dwelling adults born between 1922 and 1928 who resided in Jyväskylä, Finland (N=632) in 2003. Results showed positive attitudes toward physical activity were associated with positive self-rated health, higher education, and male gender; negative attitudes toward physical activity were associated with negative self-rated health and older age. In conclusion, a physical activity counseling program for sedentary older people may not offer effective means of attitude change toward physical activity. However, the predominating positively perceived importance of physical activity (ceiling effect) limited the degree of attitude change possible, which is the main limitation of this study. Future studies should target those older people who have more negative attitude toward physical activity to avoid ceiling effect and investigate the mechanism of attitude change among older people.

Keywords: physical activity counseling, attitude, older people

ABBREVIATIONS

BMI – Body mass index

CI – Confidence interval

OR – Odds ratio

SCAMOB – Screening and counseling for physical activity and mobility

SD – Standard deviation

SPSS – Statistical package for social sciences

TPB – Theory of planned behavior

TRA – Theory of reasoned action

TTM – The transtheoretical model

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1 INTRODUCTION

Physical activity plays an important role in ‘healthy aging’. It can prevent many diseases in later life and can even contribute to delaying institutionalization for those with chronic conditions and disabilities (Healthy ageing – a challenge for Europe, 2006). Health benefits of regular physical activity have been confirmed, including primary and secondary prevention of several chronic diseases (e.g. cardiovascular disease, diabetes, cancer, hypertension, obesity, depression and osteoporosis) and premature death (Warburton et al., 2006; DiPietro, 2001).

However, past research has shown that despite well-documented benefits of physical activity, the majority of adults in developed countries do not exercise (Rhodes et al., 1999). This evident discrepancy between knowledge and behavior led to studies of factors associated with physical activity adherence. Among older people, perceived feelings of enjoyment and satisfaction were good predictors to physical activity adherence (Lehr, 1992; Hirvensalo, Lampinen, & Rantanen, 1998). Health education and promotion are often targeted on changing peoples’ attitude or beliefs toward a certain health-related issue, with the assumption that this will lead to successful behavior change of the individual. Although direct relation between attitude and behavior usually cannot be identified, several theories and models have been proposed to link attitude and behavior in physical activity research. For example, the “theory of reasoned action” (TRA) and the “theory of planned behavior” (TPB) have been used extensively, especially in the field of exercise psychology (Biddle & Mutrie, 2008). Therefore, it seems reasonable to assume that attitude toward physical activity influences motivation and adherence to physical activity.

Physical activity counseling is a health promotion scheme aimed at increasing physical activity level of an individual through educational intervention. Past research on motives and barriers of physical activity among the elderly has identified maintaining health as the most important motive and poor health and lack of interest as the most influential barriers. However, there is a lack of studies concerning the change of older people’s attitudes toward physical activity over time (Mäkilä et al., 2010).

The present study was conducted to obtain knowledge about factors contributing to attitude (perceived importance of physical activity) and attitude change toward physical activity among older people after physical activity counseling.

2 HEALTH PROMOTION AMONG OLDER PEOPLE

Health Promotion plays an important role in preventive medicine and public health due to its potential effect on improving the health status of the general public. According to the Ottawa Charter for Health Promotion (WHO, 1986:1) “Health promotion is the process of enabling people to increase control over and to improve their health”. It is the notion of advocating health related actions and notions among a target population.

The application of theoretical models into health promotion campaigns has become unavoidable due to the general consensus that health promotion campaigns are no longer accepted to be simply repeated “trial and error” in the nature of their design (Corcoran, 2007). Therefore, choosing the appropriate theoretical model for health promotion among older people is an important task. It involves careful considerations concerning purpose and function of the approach, relevance in health behavior change and their effectiveness in guiding subsequent clinical trials (Keller, 2000).

Currently, there are 759 million people aged 60 and above. By the year 2050, this number is predicted to rise to two billion (Administration on Aging, 2010). This unprecedented increase in number of older adults is due to multiple public health advances that have been introduced in developing countries, resulting in longer life expectancy (Aldwin, 2004). As people grow older, they will also be more prone to developing physiological problems and decline in functional abilities. A general recommendation is for government to invest more on preventive care and health promotion (DiPietro, 2001). Increasing physical activity has thus become a popular topic, while physical activity counseling is looked upon as a potentially effective method of increasing physical activity level among older people.

2.1 Physical activity among older people

Physical activity can be described as ‘any bodily movement produced by skeletal muscle that results in caloric expenditure’ (Caspersen, Powell, & Christenson, 1985:126). It is easy to confuse the term “physical activity” with “exercise”, which is defined as ‘physical activity that is planned, structured, repetitive and results in the improvement or maintenance of one or more facets of physical fitness’ (Caspersen, Powell, & Christenson, 1985:128). The benefits of physical activity among older people can be seen in physical, mental and societal aspects. Consequently, the main goal of ‘health promotion in old age’ is to encourage older people to

engage in adequate amount of physical activity.

A review article by Warburton et al. (2006) of 152 studies identified benefits of physical activity as primary and secondary prevention for premature death and several chronic diseases including: cardiovascular disease, diabetes, cancer, hypertension, obesity, depression and osteoporosis. There also appear to be linear relation between increased physical activity or fitness and health status (Warburton et al., 2006). Among older adults, moderate regular physical activity, even if below the level to show fitness effect, leads to health benefits through increasing accumulated daily energy expenditure and maintaining muscle strength (DiPietro, 2001).

The mental benefits of physical activity include increased quality of life, higher confidence and self-esteem and increased capacity to maintain independency, which is very important in maintaining feeling of worth among older people. Furthermore, engaging in physical activity gives older people opportunities to step outside and socialize, preventing depression and dementia (Abbatt, 1999). Overall, physical activity actively contributes to increasing quality of life and wellbeing for older people.

The societal benefits of physical activity include potential savings from health care system due to enhanced health condition and lowered prevalence of mental disorder among the older population. In addition, older people who are physically active are more likely to help in taking care of their own grandchildren and participate in volunteer work, making the society benefit from “senior production” (Healthy ageing – a challenge for Europe, 2006).

Benefits and recommended levels of physical activity for older adults (aged 65 and above) are mentioned within guidelines of notable health related organizations and research centers, such as WHO (World Health Organization), ACSM (American College of Sports Medicine) and AHA (American Heart Association). Specifically for older adults, “physical activity include leisure time physical activity (for example: walking, dancing, gardening, hiking, swimming), transportation (e.g. walking or cycling), occupational (if the individual is still engaged in work), household chores, play, games, sports or planned exercise, in the context of daily, family, and community activities.” (WHO, 2010). Recommended physical activity among all age groups should be carried out in a balanced fashion, including aerobic activity, muscle-strengthening activities, and flexibility activities. Special emphasis of physical activity for

older adults is put on balance activities due to high prevalence of falls among this age group. In addition, the importance of remaining as active as their physical condition allows is mentioned (WHO, 2010).

To sum up, the broad benefits of physical activity for older people are well documented. It is associated with improved length and quality of life, and also plays an important role in maintaining health and effective function in older people (Shephard, 2002). Moderate physical activity for 30-60 minutes, 3-5 times per week has been proven to be effective in reducing blood pressure (Fagard et al., 2001), as well as reducing risk factors for falls and hip fractures, such as muscle weakness, poor balance and decreased level of overall physical fitness (Latham et al., 2003). In order to engage in physical activity, a majority of older people are required to leave their normal home surroundings, adding to the potential positive effects on preventing social isolation among community-dwelling older people.

However, research-based evidence indicating cost-effective strategies and context deemed best to increase physical activity participation in old age is scarce (Eakin et al., 2001). Furthermore, adherence to physical activity program has been identified as the greatest challenge in getting individuals to experience the benefits of physical activity.

2.2 Physical activity counseling for older people

In some earlier studies, various approaches to physical activity promotion strategies have been carried out including verbal advice, written prescription, telephone support, community-based guided exercise by health professionals or mailed booklets. Moreover, research has shown that “initiating new physical activities in old age is strongly connected to encouragement to exercise by health care professionals” (Hirvensalo et al., 2003:231), especially with encouraging words (Hirvensalo et al., 2005). However, the long-term effects of these programs on behavior change, disability and other functional outcomes have not yet been proven (Leinonen et al., 2007), making physical activity counseling a potentially important area in health promotion among the older population. The focus of physical activity counseling is to guide individuals to live a healthy life in which body, mind, and spirit are integrated in order to experience fulfillment and happiness.

Research on an individualized physical activity counseling program has shown positive effect on mobility for the participants (Mänty et al. 2009). Although the result showed no effect of

physical activity counseling on older people with a wide range of IADL disability, positive outcomes were shown in preventing incident IADL disability. (von Bonsdorff et al. 2008). Another telephone-based exercise counseling program showed positive effects in frailty status, which resulted from improvement in functional limitations (Peterson et al. 2007).

The level of knowledge concerning benefits of physical activity does not necessarily lead to adopting regular physical activity in daily living (Schutzer & Graves, 2004; Mäkilä et al., 2010). Long-term health effect of moderate, regular physical activity is more beneficial for older people than fitness effects achieved through vigorous activity (DiPietro, 2001). The emphasis on health promotion schemes among older people should not be centered in the physical improvements and functional gains within or after a few months of intervention. In order to maximize the impact of health promotion, strategies should be shifted from efficacy trials to effectiveness trials (Prochaska, 2007). Researchers should look into the mechanisms of behavioral change and identify the factors that are most influential in altering elderly people's attitudes and enhancing elderly people's motivation toward physical activity.

3 ATTITUDE AND MOTIVATION TOWARD PHYSICAL ACTIVITY

Attitude has been defined as “a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor” (Eagly & Chaiken, 1993:1). Similar to other related psychological terms (e.g. beliefs, values and motivation), attitude cannot be subject to direct observation (Biddle & Mutrie, 2008). However, attitude can be further divided to three components: cognitive, affective, and behavioral (Rosenberg & Hovland, 1960). Using physical activity as example, the cognitive component relates to the net effect of an individual's knowledge concerning physical activity; the affective component relates to the net effect of an individual's preference of physical activity; and the behavioral component relates to an individual's approach or avoidance of physical activity (Corcoran, 2007). Several theories and models have been proposed to link attitude and behavior in physical activity research. For example, the “theory of reasoned action” (TRA) and the “theory of planned behavior” (TPB) have been used extensively, especially in the field of exercise psychology (Biddle & Mutrie, 2008).

Motivation is a comprehensive concept and has been an important research topic primarily in the field of psychology. “The study of motivation centers on the question of why people initiate, terminate, and persist in specific actions under particular circumstances.” (Filipp, 1996:218) Several methods have been used to categorize motivation. Generally, motivation can be divided into “intrinsic motivation” and “extrinsic motivation” (Deci, 1972). Intrinsic motivation derives from the sense of achievement and control one possesses when doing and often excelling in a certain task. Therefore, intrinsic motivation is often evident in situations where outcome correlates with factors the participants can control, and when the desired results are not determined by luck. Extrinsic motivation, on the other hand, comes from the outside environment. For example, money, fame, trophies, titles, social recognition and even the cheering crowd during sports games and competitions would fall in this category. Extrinsic motivation can also be negative when outcomes that are not desired motivate an individual to act in another way. Some examples of this would be punishment (for breaking rules or the law), intimidation and coercion.

One of the best-documented examples of motivation studies is within the study of achievement-related motivation. However, not so many hypotheses on age-related changes in achievement motivation have been proposed due to the fact that most studies had been conducted under school or work settings where elderly participants are scarce. Among the few, Entin and Raynor (1983) proposed that as people age, their motivation changes from more extrinsic to more intrinsic, meaning that as people get older, their desire of winning, focusing on one specific field of achievement gradually shifts towards preserving energy and spreading the focus on other aspects of life such as family, friends, hobbies and social connections (Filipp, 1996). This view can be supported by the self-determination theory (Deci & Ryan, 1985), which has also been applied in the field of psychological gerontology.

Identifying the factors that influence motivation in the elderly is important because the motivation level reflects an individual’s views, attitudes and beliefs on a specific topic, which is physical activity in the present research.

3.1 Correlates of attitude and motives toward physical activity

Attitude is composed of “cognitive”, “affective”, and “behavioral” components (Hovland & Rosenberg, 1960) and motives are influenced by “intrinsic” and “extrinsic” factors (Deci, 1972), all of which becomes different as people age. Therefore, it is reasonable to assume that

attitude and motives toward physical activity may differ throughout life course. Up to date, there have been no longitudinal studies about changes of attitude and motives toward physical activity from childhood to old age. However, findings from separate studies of attitude and motives toward physical activity targeting specific age groups support the hypothesis of age-related changes on attitude and motives toward physical activity.

In a study among college students, researchers divide physical activity into *sport* (defined by Lumpkin (1998) as “physical activity governed by formal or informal rules that involve competition against an opponent or oneself”) and *exercise* (defined by Neiman as “a form of physical activity involving exertion of sufficient intensity, duration, and frequency to achieve or maintain fitness or other athletic objectives”). Results showed that motives toward *sport* (eg, tennis, basketball, softball, soccer) were more intrinsic, such as enjoyment and challenge; whereas motives for *exercise* (eg, aerobics, cycling, rowing, weight training) were more extrinsic and focused on appearance and weight and stress management (Kilpatrick et al., 2005). Similar findings were seen among teenagers, whose exercise motives were positively associated with body mass index among males. Furthermore, perceived and ideal body size was a more important exercise motive for teenage females (Ingledeew & Sullivan, 2002). One cross-sectional study looked at exercise motives among 272 females aged between 18 and 60. Participants were divided into four age groups (under 31 years, 31-40 years, 41-50 years, and 51-60 years) to compare 11 exercise motives between groups. Results showed that younger groups focused more on weight control and gaining recognition from exercise than the oldest group (Gill & Overdorf, 1994).

Among older adults, maintaining health is a very important motivator to exercise. Social contacts and social support from an exercise group is especially important among women (Rasinaho et al., 2007), and advice to exercise from health care professionals is an important motivator for older adults who just began to exercise (Hirvensalo et al., 2003). Furthermore, subjective knowledge of one’s own health is an important indicator for public health and epidemiological studies. Self-rated health is a commonly used instrument for serving this purpose. Self-rated health constitutes an important component of quality of life among the older people and is increasingly studied in the field of gerontology (Leinonen, Heikkinen, & Jylhä, 1998). The reason this seemingly simple question and measuring instrument has been the center of discussion for so many years is due to its relevance with other objective health indicators, most importantly, with mortality. In addition, negative self-rated health has been

identified to be associated with negative attitude toward physical activity, exhibiting poor self-rated health as a major barrier to physical activity (Satariano, Haight, & Tager, 2000).

Educational attainment has been used in many public health studies as one important variable. It can be assumed that higher educational level leads to higher socioeconomic status as well as to better access to health-related information and resources. However, association between educational attainment and equality in opportunities vary in different countries due to different education policy and social structure (Schütz, Ursprung, & Wößmann, 2008). According to a review article of “correlates of adults’ participation in physical activity”, educational attainment has been repeatedly documented to be positively associated with physical activity participation (Trost, et al., 2002). Similar findings were also seen in other studies where university educational level was found to be associated with increased self-efficacy and consequently higher motivational orientation toward physical activity (Ruchlin & Lachs, 1999; Netz & Raviv, 2004).

Gender differences in attitude toward physical activity has been studied mostly in children and adolescent groups, identifying males to have more positive attitude toward physical activity (Sallis, Prochaska, & Taylor, 2000). Past studies have identified male gender as a consistent stronger predictor of physical activity participation (Trost, 2004; Ruchlin & Lachs, 1999), whereas gender differences of attitude toward physical activity among older people have not been documented.

The body mass index (BMI) is a commonly used proxy for human body fat based on an individual's weight and height. Differences in attitude toward physical activity between normal (BMI = 19-25), overweight (BMI = 25-30), and obese (BMI > 30) people have been studied among adolescent, but not among older people. Results from adolescents’ study showed less positive attitude toward physical activity in over-weight and obese groups compared to normal weight group (Deforche, De Bourdeaudhuij, & Tanghe, 2006).

To conclude, attitude and motives toward physical activity change with increase in age, shifting mainly from extrinsic motives (e.g. body shape, opinions of others) to intrinsic motives (e.g. maintaining health); poor self-rated health, over-weight, and obese has been identified to be associated with negative attitude toward physical activity; higher educational attainment and male gender lead to higher motivational orientation toward physical activity.

4 UNDERSTANDING OF HEALTH BEHAVIOR CHANGE

Up to date, there exists a substantial amount of theoretical models for health promotion. Aldwin (2004) describes earlier models as the ones that are “relatively simple” and put more emphasis on behavioral or cognitive interventions. The most commonly used behavioral model is reward and punishment and one example of cognitive model is the health belief model, which focuses on impact of health behaviors and education (e.g. on adverse consequences of excessive alcohol) (Aldwin, 2004). More recent models are more complex, involving behavioral, cognitive, motivational and social components.

Keller (2000) categorizes theoretical models for health promotion into “Individual-level models” and “Community-based models”. While the prior is described to focus on individual strategies (mainly to cope with “barriers” and to increase “self-efficacy”), the latter argues that societal and environmental factors should also be included to address differences such as socioeconomic status, access to resources and family support (Keller, 2000).

The most common theoretical basis behind prior physical activity counseling and behavioral change studies have been the social cognitive theory (Bandura, 1989) and the transtheoretical model (Prochaska & DiClemente, 1983).

4.1 The social cognitive theory

The social cognitive theory (Bandura, 1989) is a learning theory that partly derives from behaviorism. People in the society observe each other and learn through understanding what kind of behavior leads to positive and negative reinforcement. Consequently, people imitate those who have achieved their own desired outcome. During his experiment, Bandura (1989) found out that people tend to imitate the behavior of those who may appear to have a higher socioeconomic status, even if the behavior is morally incorrect. For example, people followed a man in a nice suit and tie across the street during a red light but not when someone who was wearing ragged clothes did it first.

According to the social cognitive theory, behavior is closely related to self-efficacy (one’s perceived confidence in being able to perform a specific task) and the anticipated consequences of doing this task. If people are persuaded that they are competent for a specific task, they exert more effort and avoid focusing on their doubts when problems occur. In

addition, behavioral changes should be incremental and the goals set must not exceed the ability of the participant. The ideal process of behavioral change should include an increase in participant's self-efficacy followed by success in minor goals, which encourages the participant to challenge more difficult goals. In other words, the social cognitive theory explains relations between one's confidence, motivation and action. (Bandura, 1989)

During physical activity counseling, participants are given instructions and encouraged to participate in physical activity in daily life. Questions and doubts about physical, psychological, and environmental barriers are brought up and strategies to overcome them are given. This process increases the elderly person's confidence and self-efficacy, which can lead to higher possibility of engaging in physical activity.

4.2 The transtheoretical model

The transtheoretical model (TTM), (Prochaska & DiClemente, 1983), also often referred to as the "stages of change model" is another model that can be used to explain the process of health-related behavioral change. It is a cyclic model developed by Prochaska & Diclemente (1983) proposing the core concept of "stages of change". TTM suggests that adopting or change in behavior is a process that progresses through five stages: precontemplation, contemplation, preparation, action and maintenance.

"Precontemplation" refers to the stage where an individual does not have any intention for behavioral change. The reasons behind this might include not acknowledging harmfulness of current behavior or benefit of the new behavior, practical barriers or constraints they consider too difficult to overcome, past experience of failure in behavioral change, which makes them unmotivated. Therefore, participants within this stage could be sometimes described as "resistant" or "difficult", making them the target of most health promotion strategies. (Prochaska & DiClemente, 1983)

"Contemplation" refers to the stage where an individual intends to change during the next six months. They gain more knowledge of the pros and cons of a certain behavioral change, especially the harmfulness of not changing. While the process of contemplating and weighing the pros and cons can take a quite a long period of time, some researchers characterize this phenomenon as "chronic contemplation" or "behavioral procrastination" (Velicer et al., 1998).

“Preparation” refers to the stage where an individual intends to change in the immediate future, usually within the next month. This is usually not the result of a sudden decision. On the contrary, people reaching this stage have typically been doing some “preparation work” for the past year. For example: taking part in local sports club, attending regular physical activity counseling, building healthier habits with the support of books, group lectures and friends. People in the preparation stage are ideal participants for health promotion schemes and will often enroll voluntarily. On the other hand, when evaluating the outcome of a health promotion scheme, it is important for the researcher to bear in mind that the participants recruited through a voluntary course are highly possible to be already in this stage, so the researcher should be careful in generalizing the results to a larger population (Prochaska & DiClemente, 1983).

“Action” refers to the stage where an individual takes concrete action in modifying his/her old habit; in other words, a certain degree of behavioral change is evident. However, under the context of TTM, not all behavioral modifications can be counted as an “action”. Usually only those “actions” that have been identified by health professionals or researchers to be effective in reducing risks for diseases can be qualified. For example, in smoking, researchers used to count reduction in number of cigarettes smoked daily or choosing low tar, low nicotine cigarettes as an “action” but now the consensus is that only total abstinence can be counted as an “action” (Velicer et al., 1998).

“Maintenance” refers to the stage where an individual has achieved the desired behavioral change for more than six months and is working to prevent relapse from happening. They may continue to engage in intervention programs at the same or slightly reduced intensity. The main goal of the stage is to sustain the desired behavioral change. Longer “maintenance” stage aids in building an individual’s confidence and self-efficacy, which also prevents relapse (Prochaska & DiClemente, 1983).

Goldstein et al. (1999) reported on a physician-based physical activity counseling program targeting ambulatory people over 50 years old. The theoretical basis for the study is the transtheoretical model of change and social learning theory. The results at the six-week follow-up showed that “subjects in the intervention group were more likely to be in more advanced stages of motivational readiness for physical activity than subjects in the Control condition. This effect was not maintained at the 8 month follow-up” (Goldstein et al. 1999:40). More intensive, long-term interventions may be necessary to “promote the adoption

of physical activity among sedentary, middle-aged, and older adults in primary care medical practices” (Goldstein et al. 1999:40).

Although TTM was originally proposed to explain the process of smoking cessation behavior, its effectiveness in initiating physical activity has been confirmed (Adams & White, 2003). In addition, different attitude toward a certain behavior is evident during the first three stages: precontemplation (no intention in behavioral change), contemplation (intention to change within the next six months), and preparation (intention to change in the immediate future), making TTM an appropriate theoretical model to apply for the physical activity counseling program and the present study concerning attitude toward physical activity.

4.3 Role of attitude in behavioral change

The “theory of reasoned action” (TRA) and the “theory of planned behavior” (TPB) have been used extensively, especially in the field of exercise psychology, to explain the linkage between attitude and behavior in physical activity research (Biddle & Mutrie, 2008).

TRA was proposed by Ajzen and Fishbein (1980). It consists of three general components: behavioral intention, attitude, and subjective norm. Subjective norm in TRA is influenced by beliefs of others and motivation to comply with others in this specific task. Behavioral intention in TRA is the combined effect of attitude and subjective norm. In addition, behavioral intention is assumed to be an immediate determinant of behavior. Therefore, TRA explains the indirect link between attitude and behavior and also proposes the reason for potential limiting factors of attitudinal influence on behavior (Ajzen & Fishbein, 1980). Limitation of TRA in explaining behaviors with insufficient voluntary control inspired Ajzen to add in the “perceived behavioral control” component, which developed into the “theory of planned behavior” (TPB). According to Ajzen, perceived behavioral control is defined as “the perceived ease or difficulty of performing the behavior” (Ajzen 1988: 132). This is an important step that takes into account both personal and environmental effect on behavior (Biddle & Mutrie, 2008). Hausenblas et al. (1997) employed TRA and TPB in meta-analyses with over 10,000 participants and found large effect of intention on exercise behavior, as well as large effect of attitude on intention. Hagger et al. (2002) reported similar findings, with correlations of 0.60 between attitude and intention, 0.51 between intention and behavior, and 0.35 between attitude and behavior.

TRA and TPB explain the indirect link between attitude and behavior. Similar to the implication of TTM, attitude plays an important role in the early stages of behavioral change. Once the attitude is modified or when behavioral intention is evident, the subsequent transition from behavioral intention to behavioral change is then relatively easier. Therefore, even though earlier studies often show weak or no association between attitude and behavioral change, the role of attitude in behavioral change should not be underestimated.

5 AIM AND RESEARCH QUESTIONS

The aim of this study was to identify contributing factors to attitude toward physical activity and effect of physical activity counseling program on attitude change among older people.

Main research questions include:

- (1) How do age, gender, self-rated health, educational attainment, and BMI correlate to attitude toward physical activity among community-dwelling older people?
- (2) How does physical activity counseling program affect attitude toward physical activity among community-dwelling older people?

6 METHODS

6.1 Study design and participants

The data used in this study were drawn from screening and counseling for physical activity and mobility (SCAMOB), which was a population-based two-year, single-blinded, randomized controlled trial on the effectiveness of individualized physical activity counseling provided by a physiotherapist to sedentary older people.

Participants were recruited by mail through the city of Jyväskylä population registration database in 2003. Target group consisted of community-dwelling adults born between the year 1922 and 1928 (N=1,310). The study was designed to include older people who could move outdoors independently but were physically sedentary. In other words, those who could potentially benefit most from the physical activity counseling program. Therefore, the inclusion criteria were as follows: (1) the ability to walk at least 0.5 km without assistance, (2) moderately physically active or sedentary, (3) no memory impairment, (4) no medical contraindications for physical activity and (5) informed consent to participate in the program.

Baseline data collection process was completed by a four-phase screening procedure, which included a phone interview, an home-based face-to-face interview, self-report questionnaire on motives for and barriers to physical activity and functional tests in the study center. The baseline data used in current study were collected between April and August in 2003 (Leinonen et al., 2007; Mänty et al., 2009).

6.2 Intervention

After the baseline screening process, study population (n = 632) was randomly allocated into intervention group (n = 318) and control group (n = 314). The intervention group received a one-hour face-to-face physical activity counseling session by a physiotherapist. During the physical counseling session, the physiotherapist focused on participant's current level and interest in physical activity as well as perceived obstacles to physical activity and access to exercise facilities offered by the City of Jyväskylä. Furthermore, the physiotherapist identified potential strengths and limitations when the participant is trying to engage in physical activity and designed along with the participant an individualized physical activity plan. Compliance to physical activity plan was followed and assessed through telephone interviews every four months for two years. Afterwards, physical activity level and mobility limitation were followed every six months for another 1.5 year, thus the total follow-up time of SCAMOB was 3.5 years (Leinonen et al., 2007; Mänty et al., 2009).

6.3 Measures

Demographic data of SCAMOB were collected during the face-to-face interview while data of self-rated health and perceived importance of physical activity were collected by self-report questionnaires which were examined by nurses for completeness and further interviewed when necessary.

Self-rated health was assessed by asking the following question, "How is your health in general?" Participants were given four items to choose from: 1 = very good; 2 = good; 3 = not good and 4 = bad. When analyzing difference in attitude toward physical activity between groups with different self-rated health, data was grouped into two categories to improve the normality of the distribution of the variable: 0= negative self-rated health (not good and bad) and 1= positive self-rated health (very good and good).

The continuous variable measuring the *years of education* was grouped into two categories to improve the normality of the distribution of the variable: 0 = under 7 years; 1 = over 7 years. The cut point of 7 years was chosen because it is assumed in this cohort that the usual level of education means at least completing elementary school.

The continuous variable measuring body mass index (*BMI*) was grouped into three categories: normal weight = 19 to 25; overweight = 25 to 30 and obese = over 30. The cut point of 25 and 30 were chosen according to recommended range of BMI for normal, overweight, and obese (WHO, 2004). Body mass index was calculated by individual's body weight divided by the square of his/her height, unit of measure used was kg/m^2 . The weight and height were measured by professionals in the exercise laboratory.

Positive and negative attitude items derive from the list of motives for and barriers to exercise from the SCAMOB original data where the respondents were asked to circle from a list of statements all the items that they agreed with. The original list includes 26 motives for and 24 barriers to exercise. An expert panel discussion elicited 6 motives for and 7 barriers to exercise from the list, which represent positive and negative attitude items for the purpose of this study. Motives representing positive attitude included: exercise feels nice, exercise is fun, exercise is uplifting, physical effort is enjoyable, exercise relaxes me, and exercise is affordable. Barriers representing negative attitude includes: physical exercise feels uncomfortable, I feel insecure when exercising outdoors, I am too old to exercise, I have no time to exercise, I have no interest in exercising, I have enough other interests, and exercising is too expensive.

Level of positive attitude derived from number of positive attitude items for each individual. The variable was grouped into three categories to improve the normality of the distribution of the variable: 1 = having 0 to 1 positive attitude items (low level); 2 = having 2 to 4 positive attitude items (medium level) and 3 = having 5 to 7 positive attitude items (high level).

Level of negative attitude derived from number of negative attitude items for each individual. The variable was grouped into two categories to improve the normality of the distribution of the variable: 1 = having no negative attitude items; 2 = negative attitude present.

Perceived importance of physical activity was originally measured with an ordinal scale consisting of five items, describing exercise as follows: 1 = unnecessary, waste of time; 2 = not very important; 3 = I don't know; 4 = important and 5 = very important. When analyzing attitude toward physical activity at baseline and follow up, data was transferred into dichotomous variable to be included into positive and negative attitude items. Original answers 1-3 were combined into "exercise is not important" as one of the negative attitude items; original answers 4-5 were combined into "exercise is important" as one of the positive attitude items.

6.4 Statistical analysis

Chi-square test was used to examine difference in level of positive and negative attitude between groups of participants with different self-rated health as well as for between groups divided according to gender, years of education and BMI level.

Binary logistic regression analysis was applied to estimate possibility of possessing positive and negative attitude toward physical activity according to age, gender, BMI, years of education and self-rated health. Odds ratios (OR) and 95% confidence intervals (CI) were calculated.

Chi-square test was used to examine the difference between each positive and negative attitude items between intervention and control groups both before and after intervention. Chi-square test with Fisher's exact test was used in analyzing self-perceived importance toward physical activity at follow-up due to much skewed distribution of data, which contained 2 cells (50%) that have expected count less than 5. Independent samples t-test was used to examine difference between total number of positive and negative attitude items between intervention and control groups both before and after intervention.

There were 89 missing cases (out of 632) at follow-up for positive and negative attitude items respectively. Therefore, "last observation carried forward" was applied for estimation of missing data. The same estimation method was also used for missing cases in BMI and self-rated health at follow-up. Statistical analysis was performed using the SPSS program (SPSS 18.0 for Windows & Mac; IBM); $p \leq 0.05$ was considered statistically significant.

7 Results

Attitude toward physical activity varied between self-rated health groups (Table 1). Those with positive self-rated health were more likely to have a high level of positive attitude (35%) in comparison to those with negative self-rated health (17 %). Those with positive self-rated health were also more likely to have no negative attitude (86%) compared to those with negative self-rated health (71%). ($p < 0.001$ for level of positive attitude and $p < 0.001$ for level of negative attitude).

Table 1. Difference in attitude toward physical activity between self-rated health groups

	Self-rated Health (n=627)				p ¹
	Very good & good (n=275)		Not good & bad (n=352)		
Level of positive attitude	n	%	n	%	< 0.001
Low (0-1 positive attitude)	45	15	101	29	
Medium (2-4 positive attitude)	67	50	192	54	
High (5-7 positive attitude)	47	35	59	17	
Level of negative attitude					< 0.001
No negative attitude	236	86	251	71	

¹ P-values for Chi-square test

Men were more likely to have low (28% for men; 21% for women) and high (30% for men; 23% for women) level of positive attitude toward physical activity (Table 2), while more women (42% for men; 56% for women) held medium level of positive attitude toward physical activity ($p=0.011$). Men and women did not differ in negative attitude toward physical activity (82% for men; 76% for women, $p= 0.140$).

Table 2. Difference in attitude toward physical activity between gender (n=632)

	Men (n=159)		Women (n=473)		p ¹
	n	%	n	%	
Level of positive Attitude					0.011
Low (0-1 positive attitude)	45	28	99	21	
Medium (2-4 positive attitude)	67	42	264	56	
High (5-7 positive attitude)	47	30	110	23	
Level of negative Attitude					0.140
No negative attitude	130	82	360	76	

¹ P-values for Chi-square test

There were no difference between those who received over or under 7 years of education in high level of positive attitude (25% in both groups), shown in Table 3. However, those who received under 7 years of education were more likely to have a low level of positive attitude toward physical activity (28% for < 7 years; 19% for > 7 years) and less likely to have a medium level of positive attitude toward physical activity (47% for < 7 years; 56% for > 7 years), $p = 0.014$. Those who received under 7 years of education were also less likely to have no negative attitude toward physical activity (73% for < 7 years; 81% for > 7 years), $p = 0.043$.

Table 3. Difference in attitude toward physical activity between level of educational attainment groups

	Years of Education (n=629)				p ¹
	Under 7 years (n=270)		Over 7 years (n=359)		
Level of positive Attitude	n	%	n	%	0.014
Low (0-1 positive attitude)	76	28	68	19	
Medium (2-4 positive attitude)	126	47	203	56	
High (5-7 positive attitude)	68	25	88	25	
Level of negative Attitude					0.043
No negative attitude	199	73	289	81	

¹ P-values for Chi-square test

Those who were obese (BMI >30) were most likely to have a low level of positive attitude (19% for BMI 19-25; 23% for BMI 25-30; 25% for BMI >30), and less likely to have high level of positive attitude (32% for BMI 19-25; 23% for BMI 25-30; 23% for BMI >30), (Table 4). Those who were obese (BMI >30) were also least likely to have no negative attitude toward physical activity (83% for BMI 19-25; 78% for BMI 25-30; 73% for BMI >30). However, the results were not statistically significant ($p > 0.05$).

Table 4. Difference in attitude toward physical activity between BMI groups

	BMI (kg/m ²) n=628						p ¹
	19-25 (n=122)		26-30 (n=325)		Over 30 (n=181)		
Level of positive Attitude	n	%	n	%	n	%	0.299
Low (0-1 positive attitude)	23	19	75	23	45	25	
Medium (2-4 positive attitude)	60	49	176	54	94	52	
High (5-7 positive attitude)	39	32	74	23	42	23	
Level of negative Attitude							0.160
No negative attitude	101	83	253	78	133	73	

¹ P-values for Chi-square test

Binary logistic regression analysis, with baseline characteristics (Table 5), showed that older age had statistically significant effect in the presence of negative attitude toward physical activity (OR = 1.11, 95% CI (1.01-1.23), p=0.038) and marginally statistically significant association were found between older age and decrease in positive attitude toward physical activity (OR = 0.92, 95% CI (0.83-1.01), p=0.082). No statistically significant associations were observed between gender, BMI, and years of education with attitude toward physical activity (p>0.05). Those with positive (very good or good) self-rated health were 3 times more likely to have more positive attitude items (5-7 compared to <4) toward physical activity (OR = 2.73, 95% CI (1.86-4.00), p<0.001) and less likely to have at least 1 negative attitude toward physical activity (OR = 0.45, 95% CI (0.30-0.68), p<0.001).

Table 5. Estimated possibility of possessing positive and negative attitude toward physical activity

Characteristics	Attitude toward Physical Activity (n=632)					
	Positive Attitude ⁷			Netagive Attitude ⁸		
	OR	95% CI	p ¹	OR	95% CI	p ¹
Age (yrs)	0.92	0.83-1.01	0.082	1.11	1.01-1.23	0.038
Gender ²	1.35	0.89-2.05	0.161	0.79	0.49-1.28	0.342
BMI (kg/m ²)--overweight ³	0.67	0.42-1.08	0.101	1.22	0.71-2.12	0.472
BMI (kg/m ²)--obese ⁴	0.72	0.42-1.23	0.226	1.52	0.84-2.73	0.165
Education ⁵ (yrs)	0.85	0.58-1.25	0.415	0.76	0.52-1.12	0.169
Self-rated health ⁶	2.35	1.86-4.00	< 0.001	0.45	0.30-0.68	< 0.001

¹ P-values for Chi-square test

² man compared to woman

³ overweight compared to normal

⁴ obese compared to normal

⁵ over 7 years compared to under 7 years

⁶ positive(very good & good) compared to negative(not good & bad)

⁷ having 5-7 positive attitude items compared to 0-4 positive attitude items

⁸ having at least 1 negative attitude compared to no negative attitude

Baseline characteristics did not differ between the randomization groups. In the study population at baseline (table 6), average age was 77.6 ± 1.9 and 75% were female. The average years of education were 9.2 ± 4.2 . Mean BMI was 28.4 ± 4.5 . Majority of participants rated their health as good or not good (95%). In other words, majority of the participants avoided the two extreme choices (very good & bad).

Table 6. Baseline characteristics of the intervention and control group (n=632)

Baseline Characteristics	Intervention group (n=318)	Control group (n=314)
	Mean \pm SD	Mean \pm SD
Age (yrs)	77.6 \pm 1.9	77.6 \pm 1.9
Female (%)	75	75
Education (yrs)	9.1 \pm 4.0	9.3 \pm 4.4
Married (%)	37	44
Number of chronic conditions	3.0 \pm 2.0	3.0 \pm 2.0
BMI (kg/m ²)	28.3 \pm 4.5	28.4 \pm 4.5
MMSE score	27.1 \pm 2.0	27.0 \pm 2.2
Self-rated health (%)		
Very good	2	1
Good	47	37
Not good	48	57
Bad	3	3

There were no statistically significant differences between randomization groups at baseline and follow up for both positive attitude and negative attitude items (Table 7). The only statistically significant result was shown between intervention and control group at baseline in the negative attitude item “I have enough other interests” ($p=0.032$). However, this is interpreted more as by chance among the total of 34 comparisons than showing an actual meaning of significance. The three most chosen positive attitude items at baseline and follow up were “exercise is important” (99% and 99%), “exercise is uplifting” (57% and 57%) and “exercise feels nice” (48% and 42%). The three most chosen negative attitude items at baseline and follow up were “I feel insecure when exercising outdoors” (9% and 10%), “I have enough other interests” (5% and 5%) and “I am too old to exercise” (3% and 4%).

Table 7. Positive and negative attitude at baseline and follow up (n=632)

	Baseline			p ¹	Follow up		
	Intervention group (n=318), n (%)	Control group (n=314), n (%)			Intervention group (n=318), n (%)	Control group (n=314), n (%)	p ¹
Positive Attitude Items							
Exercise feels nice	151 (47)	152 (49)	0.728	141 (44)	124 (39)	0.229	
Exercise is fun	85 (27)	89 (29)	0.597	91 (29)	87 (28)	0.838	
Exercise is uplifting	183 (56)	174 (56)	0.686	182 (57)	169 (54)	0.388	
Physical effort is enjoyable	46 (14)	50 (16)	0.575	47 (15)	48 (15)	0.845	
Exercise relaxes me	126 (40)	133 (43)	0.424	119 (37)	123 (39)	0.628	
Exercise is affordable	81 (25)	76 (24)	0.765	80 (25)	71 (23)	0.467	
Exercise is important	315 (99)	306 (98)	0.300	317 (99)	310 (99)	0.061 ³	
Number of items (mean ± SD)	3.1 ± 1.88	3.12 ± 1.92	0.909 ²	3.07 ± 1.89	3.00 ± 1.86	0.485 ²	
Negative Attitude Items							
Physical exercise feels uncomfortable	10 (3)	9 (3)	0.849	10 (3)	14 (4)	0.388	
I feel insecure when exercising outdoors	26 (8)	33 (11)	0.302	29 (9)	33 (11)	0.558	
I am too old to exercise	10 (3)	10 (3)	0.966	14 (4)	14 (4)	0.973	
I have no time to exercise	6 (2)	9 (3)	0.412	3 (1)	7 (3)	0.196	
I have no interest in exercising	7 (2)	8 (3)	0.766	7 (2)	5 (2)	0.576	
I have enough other interests	9 (3)	20 (6)	0.032	13 (5)	16 (6)	0.546	
Exercising is too expensive	8 (3)	3 (1)	0.137	11 (4)	8 (3)	0.503	
Exercise is not important	3 (1)	6 (2)	0.300	0 (0)	4 (1)	0.061 ³	
Number of items (mean ± SD)	0.24 ± 0.51	0.31 ± 0.61	0.138 ²	0.27 ± 0.57	0.32 ± 0.64	0.319 ²	

¹ P-values for Chi-square test

² P-values for independent t test

³ P-values for Chi-square test with Fisher's Exact Test

8 DISCUSSION

This study presented data on contributing factors and the effect of physical activity counseling program on attitude toward physical activity among older people, which included both cross-sectional and experimental study design. Main findings of this study suggest that among community-dwelling sedentary older people, there is (1) statistically significant association between positive self-rated health and positive attitude toward physical activity; statistically significant association between negative self-rated health and negative attitude toward physical activity. (2) Statistically significant association between older age with having negative attitude toward physical activity. (3) More positive attitude and lesser negative attitude toward physical activity among those who received over 7 years of education. (4) Higher proportion of high level of positive attitude in males. (5) No statistically significant effect of physical activity counseling on attitude toward physical activity, BMI, and self-rated health.

Association between negative self-rated health and negative attitude toward physical activity is in accordance with earlier studies, exhibiting poor self-rated health as major barrier to physical activity (Satariano, Haight, & Tager, 2000). Although there was no direct evidence supporting positive self-rated health with positive attitude toward physical activity among older people, positive attitude toward physical activity and expectations of positive outcome related to physical activity are important motivators for engaging in physical activity (Rasinaho, 2007; Leveille, Cohen-Mansfield, & Guralnik, 2003). According to a review study of correlates of adults' participation in physical activity, perceived health or fitness has been repeatedly documented to be positively associated with physical activity (Troost, et al., 2002). Distribution of self-rated health is in accordance with earlier studies among older people in the Nordic countries, where majority of people chose mid-range answers (good & not good), avoiding the two extreme choices (very good & bad) and about 40% selected positive self-rated health (Heistaro et al., 2001). When applying results of self-rated health, it is important to note that it is not directly comparable between cultures. Main reasons include difference in frameworks for health evaluation, difference in baseline morbidity, norm of expressing opinions (e.g. in some Asian cultures, people hardly select extreme alternatives) and linguistically different interpretation between self-rated health choices (Jylhä, 2009).

Although physical activity participation is consistently inversely associated with age (Troost, et al., 2002), past research has shown generally positive attitude toward physical activity among older people, both in community (353/407, 87%) and hospital (32/44, 78%) settings (Buttery, 2009; Crombie et al., 2004). In the current study, 99% of participants acknowledged physical activity as important, which is in line with previous findings. However, results from current study also showed statistically significant association between increasing in age and having negative attitude toward physical activity, which contradicts with previous findings. One possible explanation may be due to skewed data distribution, with much lesser negative attitude (0.28/8 items) chosen than positive attitude (3/7 items), therefore making it difficult to generalize the association between age and negative attitude despite its statistical significance.

In the present study, having higher educational attainment was associated with more positive attitude and lesser negative attitude toward physical activity. This result is supported by previous study in which university educational level is associated with increased self-efficacy and consequently higher motivational orientation toward physical activity (Netz & Raviv, 2004). Although the cut point of 7 years of education differs from university level education, it can be assumed that higher educational level leads to higher socioeconomic status as well as to better access to health-related information and resources. However, average expected level of socioeconomic status with certain level of education differs between countries. In the Nordic countries, difference between socioeconomic statuses is relatively small in spite of difference in educational level (Schütz, Ursprung, & Wößmann, 2008). This may be the reason why education level was significantly associated with prevalence of positive and negative attitude items but showed weak association in the regression model.

Gender difference in terms of more positive attitude toward physical activity was observed in males in “high level” of positive attitude but not in the regression model. Possible explanation could be that the main difference observed between genders was in “high level” of positive attitude (having 5-7 positive attitude items) compared to “medium level” (having 2-4 positive attitude items) and “low level” (having 0-1 positive attitude items); whereas in the regression model, medium and low level were combined, then compared to high level. However, this shows that the difference in attitude between genders is not very strong, as the results differ merely because of the application of different grouping methods. Past studies have identified male gender as a consistent stronger predictor of physical activity participation among older

people (Trost, 2004; Ruchlin & Lachs, 1999), whereas gender differences of attitude toward physical activity among older people have not been documented.

Differences in attitude toward physical activity between normal, overweight, and obese people have been studied among adolescent, but not among older people. Results from adolescents study showed less positive attitude toward physical activity in over-weight and obese groups compared to normal weight group (Deforche, De Bourdeaudhuij, & Tanghe, 2006). In the current study, less positive attitude and more negative attitude toward physical activity were observed in overweight and obese group. However, the results were not statistically significant. One explanation can be the overall domination of positive attitude toward physical activity in the study group, limiting the range of observed difference. In addition, this tells that people who are over-weight or obese do acknowledge the importance of physical activity. However, this knowledge alone does not prevent them from being overweight or obese, because the cause of obesity is in most cases multifactorial.

One main finding of this study revealed that physical activity counseling program had no effect on attitude toward physical activity among older people. No previous study was found to correlate with the same study question. The main reason for this result (also one of the limitations of this study) is the study population exhibit highly positive attitude in perceived importance of physical activity (99%) at baseline, representing generally positive attitude toward physical activity, which limited the extent of possible attitude change. In addition, the counseling program was designed mainly for addressing solution to possible barriers toward physical activity participation, which may have no direct or limited effect on influencing attitude toward physical activity. Finally, studies have shown that older people were usually warned about negative effect of physical activity (musculoskeletal problems, risk of falling) until recently (Grant, 2001; Trost et al., 2004). Previous mixed information about positive and negative effects of physical activity may reduce the possible influence of physical activity counseling, which may be viewed by older people as “yet another new piece of advice” on the same topic.

The same physical activity counseling program was found to be effective in increasing physical activity level and preventing mobility limitations among older people (Mänty, 2009). While the detailed mechanism of how physical activity counseling increase physical activity participation is yet to be understood, according to the result of the current study, we can

assume that it was not because of attitude change toward physical activity. This correlates with the result from previous review study, in which attitude toward physical activity was found to have weak or no association with physical activity participation among older people (Mobily et al., 1987; Trost et al., 2004). The transtheoretical theory can be applied to explaining why positive attitude toward physical activity cannot effectively predict actual physical activity participation. Those who possess positive attitude toward physical activity could be only in the “contemplation” or “preparation” stage, which can take quite a long period of time before they move to the “action” stage.

Although positive attitudes toward physical activity alone were insufficient for increasing physical activity participation among older people (Mobily et al., 1987), it can increase intention for initiating physical activity, which is more strongly correlated with physical activity participation. According to the “Lifelong openness model” of attitude change, older people possess as much potential for attitude change as younger people (Tyler & Schuller, 1991). Future implication of this study is to target physical activity counseling program on older people with more negative attitude toward physical activity to observe potentially higher degree of attitude change.

The strength of the current study include large and representative sample of older people, successful randomization process (baseline characteristics of the intervention and control groups were comparable), considerably longer intervention and follow-up time compared with previous physical activity counseling programs targeting older people, and standardized questionnaire used for assessing primary outcome of this study (attitudes toward physical activity).

However, results of the current study must be interpreted with caution due to a few limitations. The predominating positively perceived importance of physical activity (ceiling effect) poses a potential risk of overestimating difference in negative attitude toward physical activity though statistically significant. In addition, the questionnaire in SCAMOB was not originally designed for assessing attitudes toward physical activity but rather motives for and barriers to physical activity. Representative questions of attitudes toward physical activity were elicited from the original questionnaire by an expert panel discussion, but it is not directly comparable to other standardized instruments for measuring attitude toward physical activity.

9 CONCLUSIONS

Main findings of the present study include (1) Positive attitudes toward physical activity were found to be associated with positive self-rated health, higher education, and male gender; negative attitudes toward physical activity were found to be associated with negative self-rated health and older age. (2) Physical activity counseling program had no effect on attitude toward physical activity among older people.

In conclusion, the results of the present study indicate that self-rated health is a stronger predictor of both positive and negative attitudes toward physical activity among older people, while age, gender, and education appeared to be contributing factors. In addition, the results suggest that physical activity counseling for sedentary older people may not offer effective means of attitude change toward physical activity.

Future implication of this study is to target physical activity counseling program on those older people who have more negative attitude toward physical activity to observe potentially higher degree of attitude change while more studies are needed to investigate the mechanism of attitude change among older people.

Reference List

- Abbatt, J. (1999). *Active for life: Promoting physical activity with older people (guidelines)*. Retrieved 11/17, 2009, from http://www.nice.org.uk/aboutnice/whoware/aboutthehda/hdapublications/active_for_life_promoting_physical_activity_with_older_people_guidelines.jsp
- Adams, J., & White, M. (2003). Are activity promotion interventions based on the transtheoretical model effective. *A Critical Review. British Journal of Sports Medicine*, 37(2), 106-114.
- Administration on Aging. (2010). Message from kathy greenlee, assistant secretary for aging: presented at the international day of older persons 2010.
- Ajzen, I. (1988). *Attitudes, personality and behavior*. Chicago: Dorsey Press.
- Ajzen, I., Fishbein, M., & Heilbroner, R. L. (1980). *Understanding attitudes and predicting social behavior* Prentice-Hall Englewood Cliffs, NJ.
- Aldwin, C. M., & Gilmer, D. F. (2004). *Health, illness and optimal aging. biological and psychosocial perspectives* Thousand Oaks: Sage Publications.
- Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist*, 44(9), 1175-1184.
- Biddle, S. J. H., & Mutrie, N. (2008). *Psychology of physical activity: Determinants, well-being and interventions* (2nd ed.). New York: Routledge.
- Buttery, A. K., & Martin, F. C. (2009). Knowledge, attitudes and intentions about participation in physical activity of older post-acute hospital inpatients. *Physiotherapy*, 95(3), 192-198.
- Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: Definitions and distinctions for health-related research. *Public Health Reports*, 100(2), 126-131.
- Corcoran, N. (2007). *Communicating health : Strategies for health promotion*. Los Angeles: Sage Publications.
- Crombie, I. K., Irvine, L., Williams, B., McGinnis, A. R., Slane, P. W., Alder, E. M., et al. (2004). Why older people do not participate in leisure time physical activity: A survey of activity levels, beliefs and deterrents. *Age and Ageing*, 33(3), 287-292.
- Deci, E. L. (1972). Intrinsic motivation, extrinsic reinforcement, and inequity. *Journal of Personality and Social Psychology*, 22(1), 113-120.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

- Deforche, B. I., De Bourdeaudhuij, I. M., & Tanghe, A. P. (2006). Attitude toward physical activity in normal-weight, overweight and obese adolescents. *Journal of Adolescent Health, 38*(5), 560-568.
- DiPietro, L. (2001). Physical activity in aging: Changes in patterns and their relationship to health and function. *The Journals of Gerontology: Series A, 56*(suppl 2), 13-22.
- Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Harcourt Brace Jovanovich College Publishers.
- Eakin, E. (2001). Promoting physical activity among middle-aged and older adults in health care settings. *Journal of Aging and Physical Activity, 9*(Supplement), S29-S37.
- Entin, E., & Raynor, J. (1983). The function of future orientation as a determinate of human behavior in a step-path theory of action. *International Journal of Psychology, 18*, 463-487.
- Fagard, R. H. (2001). Exercise characteristics and the blood pressure response to dynamic physical training. *Medicine & Science in Sports & Exercise, 33*(6), S484-S492.
- Filipp, S. H. (1996). *Handbook of the psychology of aging* (4th ed.) Academic Press, Inc.
- Gill, K., & Overdorf, V. (1994). Incentives for exercise in younger and older women. *Journal of Sport Behavior, 17*(2).
- Goldstein, M. G., Pinto, B. M., Marcus, B. H., Lynn, H., Jette, A. M., Rakowski, W., et al. (1999). Physician-based physical activity counseling for middle-aged and older adults: A randomized trial. *Annals of Behavioral Medicine, 21*(1), 40-47.
- Grant, B. C. (2001). 'You're never too old': Beliefs about physical activity and playing sport in later life. *Ageing & Society, 21*(06), 777-798.
- Hagger, M. S., Chatzisarantis, N. L. D., & Biddle, S. J. H. (2002). A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport & Exercise Psychology, 24*(1), 3-32.
- Hausenblas, H. A., Carron, A. V., & Mack, D. E. (1997). Application of the theories of reasoned action and planned behavior to exercise behavior: A meta-analysis. *Journal of Sport & Exercise Psychology (JSEP), 19*(1), 36-51.
- The healthy ageing - a challenge for europe.*(2006). Edita Publishing.
- Heistaro, S., Jousilahti, P., Lahelma, E., Vartiainen, E., & Puska, P. (2001). Self rated health and mortality: A long term prospective study in eastern finland. *Journal of Epidemiology and Community Health, 55*(4), 227-232.

- Hirvensalo, M., Heikkinen, E., Lintunen, T., & Rantanen, T. (2003). The effect of advice by health care professionals on increasing physical activity of older people. *Scandinavian Journal of Medicine & Science in Sports*, 13(4), 231-236.
- Hirvensalo, M., Heikkinen, E., Lintunen, T., & Rantanen, T. (2005). Recommendations for and warnings against physical activity given to older people by health care professionals. *Preventive Medicine*, 41(1), 342-347.
- Hirvensalo, M., Lampinen, P., & Rantanen, T. (1998). Physical exercise in old age: An eight-year follow-up study on involvement, motives, and obstacles among persons age 65-84. *Journal of Aging and Physical Activity*, 6, 157-168.
- Ingledeu, D. K., & Sullivan, G. (2002). Effects of body mass and body image on exercise motives in adolescence. *Psychology of Sport and Exercise*, 3(4), 323-338.
- Jylhä, M. (2009). What is self-rated health and why does it predict mortality? towards a unified conceptual model. *Social Science & Medicine*, 69(3), 307-316.
- Keller, C., & Fleury, J. (2000). Health promotion for the elderly. Thousand Oaks (Calif.) : Sage.
- Kilpatrick, M., Hebert, E., & Bartholomew, J. (2005). College students' motivation for physical activity: Differentiating men's and women's motives for sport participation and exercise. *Journal of American College Health*, 54(2), 87-94.
- Latham, N. K., Anderson, C. S., & Reid, I. R. (2003). Effects of vitamin D supplementation on strength, physical performance, and falls in older persons: A systematic review. *Journal of the American Geriatrics Society*, 51(9), 1219-1226.
- Lehr, U. M. (1992). Physical activities in old age: Motivation and barriers. *HarrisS, HarrisR, HarrisWS, Eds. Physical Activity, Aging and Sports*, 2, 51-62.
- Leinonen, R., Heikkinen, E., Hirvensalo, M., Lintunen, T., Rasinaho, M., Sakari - Rantala, R., et al. (2007). Customer - oriented counseling for physical activity in older people: Study protocol and selected baseline results of a randomized - controlled trial (ISRCTN 07330512). *Scandinavian Journal of Medicine & Science in Sports*, 17(2), 156-164.
- Leinonen, R., Heikkinen, E., & Jylhä, M. (1998). Self-rated health and self-assessed change in health in elderly men and women--a five-year longitudinal study. *Social Science & Medicine*, 46(4-5), 591-597.
- Leveille, S. G., Cohen-Mansfield, J., & Guralnik, J. M. (2003). The impact of chronic musculoskeletal pain on exercise attitudes, self-efficacy, and physical activity. *Journal of Aging and Physical Activity*, 11(2), 275-283.
- Lumpkin, A. (1998). *Physical education and sport: A contemporary introduction*. (4th edition. ed.). Boston, Mass: McGraw-Hill.
- Mäkila P., Hirvensalo M., Parkatti T. (2010). Changes in physical activity involvement and attitude to physical activity in a 16-year follow-up study among the elderly. *Journal of*

Aging Research, Article ID 174290 (published online). Retrieved 16/05, 2011 from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2989865/pdf/JAR2010-174290.pdf>

- Mänty, M., Heinonen, A., Leinonen, R., Törmäkangas, T., Hirvensalo, M., Kallinen, M., et al. (2009). Long-term effect of physical activity counseling on mobility limitation among older people: A randomized controlled study. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, 64(1), 83-89.
- Mobily, K. E., Lemke, J. H., Drube, G. A., Wallace, R. B., Leslie, D. K., & Weissinger, E. (1987). Relationship between exercise attitudes and participation among the rural elderly. *Adapted Physical Activity Quarterly*, 4(1), 38-50.
- Neiman, D. (2003). *Exercise testing and prescription: A health-related approach*. (5th edition. ed.). New York, NY.: McGraw Hill.
- Netz, Y., & Raviv, S. (2004). Age differences in motivational orientation toward physical activity: An application of Social—Cognitive theory. *The Journal of Psychology: Interdisciplinary and Applied*, 138(1), 35-48.
- Peterson, M. J., Sloane, R., Cohen, H. J., Crowley, G. M., Pieper, C. F., & Morey, M. C. (2007). Effect of telephone exercise counseling on frailty in older veterans: Project LIFE. *American Journal of Men's Health*, 1(4), 326-334.
- Prochaska, J. O., & DiClemente, C. C. (1983). Transtheoretical therapy: Toward a more integrative model of change. *Psychotherapy: Theory, Research and Practice*, 19(3), 276-287.
- Prochaska, J. O., Evers, K. E., Prochaska, J. M., Van Marter, D., & Johnson, J. L. (2007). Efficacy and effectiveness trials. *Journal of Health Psychology*, 12(1), 170-178.
- Rasinaho, M., Hirvensalo, M., Leinonen, R., Lintunen, T., & Rantanen, T. (2007). Motives for and barriers to physical activity among older adults with mobility limitations. *Journal of Aging and Physical Activity*, 15(1), 90-102.
- Rhodes, R. E., Martin, A. D., Taunton, J. E., Rhodes, E. C., Donnelly, M., & Elliot, J. (1999). Factors associated with exercise adherence among older adults: An individual perspective. *Sports Medicine*, 28(6), 397-411.
- Rosenberg, M. J., & Hovland, C. I. (1960). Cognitive, affective, and behavioral components of attitudes. *Attitude Organization and Change: An Analysis of Consistency among Attitude Components*, 1-14.
- Ruchlin, H. S., & Lachs, M. S. (1999). Prevalence and correlates of exercise among older adults. *Journal of Applied Gerontology*, 18(3), 341-357.
- Sallis, J. F., Prochaska, J. J., & Taylor, W. C. (2000). A review of correlates of physical activity of children and adolescents. *Medicine & Science in Sports & Exercise*, 32(5), 963-975.

- Satariano, W. A., Haight, T. J., & Tager, I. B. (2000). Reasons given by older people for limitation or avoidance of leisure time physical activity. *Journal of the American Geriatrics Society*, 48(5), 505-512.
- Schutzer, K. A., & Graves, B. S. (2004). Barriers and motivations to exercise in older adults. *Preventive Medicine*, 39(5), 1056-1061.
- Schütz, G., Ursprung, H. W., & Wößmann, L. (2008). Education policy and equality of opportunity. *Kyklos*, 61(2), 279-308.
- Shephard, R. J. (2002). *Gender, physical activity, and aging*. London.: CRC Press.
- Trost, S. G., Owen, N., Bauman, A. E., Sallis, J. F., & Brown, W. (2002). Correlates of adults' participation in physical activity: Review and update. *Medicine & Science in Sports & Exercise*, 34(12), 1996-2001.
- Tyler, T. R., & Schuller, R. A. (1991). Aging and attitude change. *Journal of Personality and Social Psychology*, 61(5), 689-697.
- Velicer, W. F., Prochaska, J. O., Fava, J. L., Norman, G. J., & Redding, C. A. (1998). Smoking cessation and stress management: Applications of the transtheoretical model of behavior change. *Homeostasis*, 38(5-6), 216-233.
- von Bonsdorff, M. B., Leinonen, R., Kujala, U. M., Heikkinen, E., Törmäkangas, T., Hirvensalo, M., et al. (2008). Effect of physical activity counseling on disability in older people: A 2-year randomized controlled trial. *Journal of the American Geriatrics Society*, 56(12), 2188-2194.
- Warburton, D. E. R., Nicol, C. W., & Bredin, S. S. D. (2006). Health benefits of physical activity: The evidence. *Canadian Medical Association Journal*, 174(6), 801-809.
- World Health Organization. (1986). *Ottawa charter for health promotion*. Geneva. Retrieved 12/05, 2011 from: http://www.who.int/hpr/NPH/docs/ottawa_charter_hp.pdf
- World Health Organization. (2004). *Obesity: preventing and managing the global epidemic*. Geneva. Retrieved 12/05, 2011 from: http://www.who.int/nutrition/publications/obesity/WHO_TRS_894/en/index.html
- World Health Organization. (2010). *Global recommendations on physical activity for health*. Geneva. Retrieved 12/05, 2011 from: http://www.who.int/dietphysicalactivity/factsheet_recommendations/en/index.html