Running head: BARRIERS TO PHYSICAL ACTIVITY

Perceived barriers to physical activity across adult age groups

Abstract

This study investigated type of and number of barriers to engagement in physical activity experienced by adult women and men in the same geographical area, the relationship between experienced barriers to engagement in physical activity and stages of change in relation to exercise behaviour, and identified barriers related to present physical activity level, and intention to be physically active. Data were obtained from a population study in two counties during 2000-2001. The sample consisted of 2709 females and 2212 men in the age groups 75, 60, 45, 40 and 30 years of age. Questionnaires measured barriers to engagement in physical activity, physical activity level, and readiness for engaging in physical activity (stages of change). Chi square and multivariate analyses of variance (MANOVA) demonstrated significant age and gender differences in the perceptions of barriers and the distribution on the various stages of change. Logistic regressions demonstrated that number of barriers, and higher age gave significantly lower odds ratios for both activity level and intentions to be active for both women and men, and attitude barriers gave significant lower odds ratios for intentions to exercise for women. The information from this study should be valuable for designing and tailoring both motivational strategies and interventions to fit targeted groups.

Perceived barriers to physical activity across adult age groups

Physical inactivity has been recognised as an independent health risk factor in the U.S. Surgeon general's Report, and Healthy people 2010 (USDHHS, 1996, 2000). As a consequence, increasing levels of physical activity has become "an imperative" for public health (Sparling et al, 2000). Recently, a growing body of research has focused on better understanding determinants of physical activity and explaining the variation in peoples' activity patterns. Such knowledge can, in addition to increasing our understanding, help identify meaningful strategies for interventions.

Obviously, any type of health behaviour is determined by a complex set of factors including social and cultural factors, socio-economic status, physical as well as social environment and individual psychological factors (Cummings et al. 1980, McAuley & Courneya, 1993). Psychological factors include knowledge, perceptions, motives and attitudes related to physical activity, such as self-efficacy, social norms and perceived barriers. It is important to understand how psychological factors operate across various social and cultural groups in order to develop effective behavioural change programs (Young & King, 1995, Conner & Norman, 1996).

Perceived barriers to physical activity may represent real environmental and practical hindrances, affective and emotional obstacles or simply excuses for avoiding physical activity. Barriers have been found to distinguish between physically active and inactive people (Slenker, Price & O'Connell, 1985), although some studies have found that it is not always the barriers perceived initially that predict drop out from exercise (Prochaska, Peters & Warren, 2000). The barrier concept figures in the major theories that have been applied to physical activity behaviour, including the theory of planned behaviour (Ajzen, 1988; Conner & Sparks, 1996) social cognitive learning theory (Bandura, 1986; McAuley, 1992) and

personal investment theory (Maehr & Braskamp, 1986). Also, exploratory studies have identified important barriers for engagement in physical activity (Allied Dunbar Fitness Survey,1992; Brawley, Martin & Gyurcik, 1998; Chada & Kolt, 2003; Dishman, 1989;).

Results from studies of barriers indicate that a few barriers seem to be universally reported (e. g., lack of time, European Commission, 1999), whereas other barriers (e.g., attitude towards exercise, lack of facilities) vary with cultures and different segments of the population (Chada & Kolt, 2003). There also seem to be consistent gender differences in the perception and reporting of barriers for physical activity (Auweele, Rezewnicki & Mele, 1997; Baranowski, Anderson & Carmack, 1998; Bjerke Karlsen & Ommundsen, 1997; Kendzierski & Johnson, 1993), but few studies have compared perceptions of barriers across ages within the same cultural and geographical area. Due to different life situations, young, middle-aged and elderly individuals may well experience different barriers for movement and exercise, and reports from some studies seem to support this belief (Canada Fitness Survey, 1983; Wold, 1986). Because of such variation, it is necessary to do pilot studies or otherwise obtain knowledge about the specific population studied, rather than rely on studies from other populations in other parts of the world. Such approaches have been attempted by Steinhardt and Dishman (1989) and Godin (1994) for American populations, and are recommended by Brawley, Martin and Gyurcsik (1998), who questioned whether a meaningful universal measure can be developed.

People cope differently with barriers, so that the extent to which a barrier actually keeps people from engaging in physical activity or exercise is not automatic. In some settings it may also be a matter of how often or how regularly the barrier is experienced. Therefore, Brawley, Martin and Gyurcsik (1998) have recommended including details about how limiting a barrier is perceived to be. It may also be argued that the number of barriers experienced is likely to be of importance, because it is easier to overcome one or only a few

barriers rather than many. The logical consequence would be that a higher number of barriers would be related to a lower participation level.

Another question is whether some barriers are related not only to the actual behaviour, but also to the intention to be physically active. Intention is the key construct in the theory of planned behaviour, and several studies have demonstrated a strong relationship between the intention to be physically active and actual activity. Intention to increase level of physical activity has explained up to 30% of the variance in actual change (Dzewaltowski, 1989, Godin 1994). If perceived barriers are related only to the actual behaviour, and the intention remains the same, the impact of the barrier is not so severe and it is more likely that an intervention to change the barriers would be successful.

The transtheoretical model (Marcus & Simkin, 1994; Prochaska, Norcross & Di Clemente, 1994) offers a way to investigate the relationships among barriers, activity level and intentions. The stages of change model distinguishes between intention and actual physical activity level. The first stage (precontemplation) comprises neither intention to be physically active nor any activity, whereas all the other stages include an intention to be physically active. The contemplation stage is one of intentions but no physical activity. The preparation-, action- and maintenance stages all include physical activity of various regularity and duration (Marcus & Simkin, 1994). Barriers that are strongly related to the precontemplation stage can be assumed to also affect intentions whereas barriers related to the other stages primarily affect the activity level. In general, we would expect people to report more barriers, and experience the barriers to be more important at the lower end of the continuum of stages (precontemplation & contemplation). Further, we would expect different barriers to be prominent for different genders, age groups and at the different stages of change. For instance, it is likely that health barriers are more prominent for the older age

groups, and that practical barriers pose a larger problem for age groups with care for small children combined with work.

In research, one way of approaching the cultural differences in perception of barriers is to examine a large representative group of adults within one geographical area. In this study the population consisted of the inhabitants of two counties in Norway. All inhabitants in selected age groups of adults, ranging from young adults to elderly, were invited to a free physical health check and to answer questionnaires. The sample thus included a range of activity levels and intentions as well as reflecting the population diversity. The information and results on physical activity barriers provides information about physical activity behaviour, and also gives information that may be helpful in developing effective physical activity promotion programs with this target population.

The purposes of this study were: 1) To identify type of and number of barriers to engagement in physical activity experienced by 30-, 40-, 45-, 60- and 75 year old women and men in the same geographical area (2 counties) of Norway. 2) To investigate the relationship between experienced barriers to engagement in physical activity and stages of change in relation to exercise behaviour. 3) To identify barriers most strongly related to present physical activity level, and intention to be physically active (estimated by odds ratios). The resulting information should be valuable for designing and tailoring both motivational strategies and interventions to fit targeted groups.

<div align="center">Method</div>

Participants

Data were obtained from a population study by The Norwegian Institute of Public Health in two counties year 2000-2001 (Norwegian Institute of Public health, 2003). This type of health investigation has long traditions in the country, and has been part of the State's monitoring of health for many years. All inhabitants in the age groups 30, 40, 45, 60 and 75

years were invited to a free health examination. The age groups were selected to reflect a range of groups in the adult population. Two questionnaires (one main and one supplemental questionnaire specific to the current study) were sent out with the invitation, and were collected by the health personnel in conjunction with the physical examination. The questions about physical activity level were included in the main questionnaire; the questions about barriers and motivation for physical activity were part of the additional questionnaire. Invitations were sent to 11288 women and 10984 men, and 60.4% of women and 51.5 % of men participated, 56 % in all. The participants (N=12 504, females = 6 820, males = 5684) went through physical examinations and answered questionnaires. The sample for this study consisted of those individuals who answered the questions on the supplemental questionnaire about barriers to engagement in physical activity (N= 4921, 2709 females and 2212 men).

Measurements

Barriers to engagement in physical activity. To ensure that barriers in the questionnaire were relevant to this sample, we built upon former investigations in Norway where physically inactive, middle aged participants had identified barriers to their participation in physical activity (Pensgaard, 1991). We included all barriers identified in this study but added two barriers commonly known to be a problem for an elderly population, dizziness and need for peace and quiet.

The participants (N=4921) rated 15 possible barriers as very important (scored 3), quite important (scored 2), not important (scored 1) or not relevant (scored 0). The number and percentages of individuals who rated the barrier as very important or important are presented in table 1.

We performed an exploratory factor analysis of the barriers using principal component extraction with oblimin rotation as we expected some correlation between factors. The analysis yielded 4 factors with eigenvalues higher than one, and a scree plot supported this

solution. The criteria for accepting an item in a factor were loadings >.40 on that factor and no cross-loadings >.20 on other factors. We ran the analysis for all participants, and separately for both genders in each age group. The pattern was very similar for all groups, so details are only given for the solution for all in table 2. The ratings of the individual barriers within one factor were summed and divided by the number of items to give comparable mean scores for the scales. These mean scores for the different barrier scales are also included in table 2.

The Chronbach alpha values were satisfactory for the health barrier scale, the attitude barrier scale and the practical barrier scale. The internal consistency was somewhat lower for the scale with the fewest items, as could be expected, and the priority barrier scale needs therefore to be interpreted with care.

Physical activity level.

Physical activity level was assessed by a question about what kind of physical activity the participants had undertaken in their leisure time in the course of the last year. They were asked to estimate a weekly average of hours for the year, and to evaluate both light exercise (no sweat or feeling out of breath) and hard exercise (sweating and feeling out of breath). The answering alternatives were: none; less than 1; 1-2; 3 or more. The summed activity scores ranged from 2 to 8. Scores from 1 to 4 indicated no physical activity, and scores from 5 to 7 were counted as being active. This resulted in 37.5% being counted as inactive, and 62.5 % being counted as physically active.

Stages of change.

Stages of change in relation to physical activity were measured as recommended by Marcus and Simkin (1994). The question was formulated as: "Below there are some statements describing various levels of physical activity. Please indicate the level that best suits your situation (choose only one alternative). The answering alternatives were: 1) For the time being I am not physically active and have no plans to become physically active the next

six months, 2) for the time being I am not physically active but I have plans to become

physically active within the next six months, and 3) for the time being I am somewhat

physically active, but not regularly, and 4) for the time being I am physically active, but have

been so less than 6 months, and 5) for the time being I am physically active, and I have been

so for more than 6 months.

Analyses.

Data were analysed with SPSS.   For descriptives, we used frequencies and

crosstabulations with chi squares and contingency tables. For multivariate associations

between type of barriers and gender, age, and stages of change, we used multivariate analyses

of variance (MANOVA). Where significant main effects were demonstrated by the

MANOVA, we followed up with comparisons of differences across groups, using one-way

analyses of variance (ANOVA) with post hoc tests (Bonferroni), or t- tests where there were

only two groups (gender). In order to estimate odds ratios for being physically active or not,

and for intending to be physically active or not, we used logistic regressions.

<center>Results</center>

Descriptives

The distribution of men and women in different age groups, and mean scores for the

various measures are shown in table 3. T-tests demonstrated gender differences in the mean

scores of the barrier scales for health barriers (t = -3.46, df = 4667, p=.001), priority barriers (t

= -3.10, df = 4508, p=.002), practical barriers (t = -3.66, df = 4567, p=.001), and number of

barriers (t = -6.04, df = 4919, p=.001), but not for the attitude barriers (t = 1.11, df = 4351,

p=.265). Males scored in general lower than females, demonstrating that more women than

men reported health barriers, practical barriers and priority barriers to be of importance, and

the females experienced higher numbers of barriers.

A chi square analysis demonstrated gender differences in the distribution on the different stages of change (χ^2 = 21.376, df = 4, p = .001). There were relatively higher percentages of men than women both on the precontemplation stage, and the maintenance stage. There were relatively more men who were physically active (65.0% of the men and 60.6% of the women, (χ^2 = 9.258, df = 1, p = .002).

Age. Chi square analysis demonstrated significant age differences in the scores on health barriers (χ^2 = 365.62, df = 36, p < .001), priority barriers (χ^2 = 269.70, df = 24, p < .001), practical barriers (χ^2 = 140.87, df = 60, p < .001), attitude barriers (χ^2 = 230.31, df = 48, p < .001), and for number of barriers (χ^2 = 128.76, df = 56, p < .001). Scores on health barriers, attitude barriers and number of barriers increased with age for both genders. The difference as to health barriers and number of barriers was mainly between the younger (30, 40, 45 years) and the older age groups (60 and 75 years).

Chi square analyses demonstrated that the percentage of physically active women was significantly lower with higher age (χ^2 = 47.1, df = 4, p < .001), the difference was not significant for men (χ^2 = 2.82, df = 4, p = .589).

Stages of change and barriers. The mean scores for the various types of barriers among women and men in the different age groups and at different stages of change are shown in table 4 and 5. Contingency tables demonstrated differences in barrier scores at the different stages of change for health barriers (χ^2 = 161.99, df = 36, p < .0019, for priority barriers (χ^2 = 215.11, df = 24, p < .001), for practical barriers (χ^2 = 156.25, df = 60, p < .001), for attitude barriers (χ^2 = 172.08, df = 48, p < .001), and for number of barriers (χ^2 = 230.25, df = 56, p < .001). A consistent general pattern emerged, demonstrating decreasing barrier scores and number of barriers with increasing readiness for physical activity as defined by the continuum of stages of change. Those in the action stage demonstrated some deviant scores. The largest group for both genders and in all age groups were the preparers,

people who describe themselves as physically active but not regularly. There were age differences in distribution on stages of change (χ^2 = 136.95, df = 16, p < .001 for men, χ^2 = 166.18, df = 16, p < .001 for women). The percentage of precontemplators increased with age, but so did the percentage of people in the maintenance stage. There were relatively more contemplators among the younger groups of both men and women.

| A multivariate analysis of variance (MANOVA) was performed with the 4 barrier scores and number of barriers as dependent variables, and gender, age and stage of change as independent variables. The analysis demonstrated overall main effects on the barrier scores for both gender (Wilks λ = .98, F = 5.17, df = 5, 4098, p <.001), age (Wilks λ = .81, F = 13.30, df = 20, 4151, p <.001), and stage of change (Wilks λ = .95, F = 10.26, df =20, 4151, p <.001). The interaction effects were significant for gender by stages of change (Wilks λ = .992 , F = 1.594, df = 20, 4151, p <.05), and age by stages of change (Wilks λ = .961, F = 2.052, df = 80, 4151, p <.001). However, the interaction effects were not significant for age by gender, (Wilks λ = , F = 1.202, df = 20, 4151, p= .241), or for age by gender by stages of change (Wilks λ = , F = 1.137, df = 80, 4151, p =.190).

Interaction between stages of change and gender on types and number of barriers

As the interaction effect between stages of change and gender was significant, we further investigated the univariate tests to determine which variables contributed to the overall differences. The differences were significant only for the health barrier scale (F=3.95, df =4, p=.003), the practical barrier scale (F=3.07, df =4, p=.016),   and number of barriers (F=3.04, df =4, p=.016). It was demonstrated that the females in general scored higher on those barrier measures on all stages of change apart from the maintenance stage.

Interaction of stages of change and age on barriers

As the interaction effect between stages of change and age was significant (Wilks λ = .961, F = 2.052, df = 80, 4151, p <.001), we investigated the univariate tests also here. The

differences were significant for the health barrier scale (F = 1.87, df = 16, p =.019), the

priority barrier scale (F = 1.95, df = 16, p=.013), attitude barriers (F = 4.05, df = 16, p <.001,

and number of barriers (F= 2.52, df = 16, p = .001). The general pattern demonstrated that the

two older age groups (60 and 75 year old) scored higher than the three younger age groups on

the barrier measures at all stages of change, apart from the priority barriers, where the

younger age groups scored higher.

The relationship between barriers and activity level and intentions to exercise

In order to explore the relationship between barriers, actual physical activity level and

the intention to exercise, we performed logistic regression analyses with activity level (active

or not), and intention (precontemplation stage vs. the other stages of change) as the dependent

variables and barriers, age, and gender as the independent variables. The logistic regression

analysis estimates the probability of an event to occur (e.g., being active or not) from a set of

prediction variables. The cut-off point for dichotomisation into active or not active was

described in the method section. For examination of the differences between those who did or

did not intend to become physically active, we used the reported stages of change. The

precontemplation stage of change is the only stage where it is stated that the person has no

intention to become physically active. Therefore, we compared those at this stage (N = 526)

to those at the other stages. The scores on the barrier scales were divided into high and low

scores based on the median score. The results are given in odds ratios which are an

approximation of the likelihood to be active or intend to be active if the value of the predictor

variables is increased by one unit (here from low, which is the reference category, to high).

The results from the logistic regression are shown in table 6. The results demonstrated

that among the independent variables, number of barriers for women demonstrated a

significant relationship to activity level with an odds ratio of 0.6, indicating that reporting

more barriers reduced the odds ratios for being active. For women, also health barriers

demonstrated a small, but significant relationship with activity, and higher scores on health barriers actually gave slightly higher odds for being active (1.2, range from 1.0 – 1.5). This means that if the scores of the barrier went from low to high, the odds ratios for being active was slightly, but significantly increased. Age was significantly associated with activity level for women, with increasing odds ratios for being active with decreasing age, but they were not significant for men.

The odds ratios for intentions to be physically active demonstrated that attitude barriers were related to the intentions to be active for both genders. High scores on attitude barriers gave significantly lower odds ratios for intending to be physically active for (odds ratio = 0.8 for both genders, and odds ratios for number of barriers were 0.7 for women, and 0.6 for men). This means that high scores on attitude barriers and higher number of barriers were associated with not intending to be physically active.

Discussion

Consistent with previous research, women reported more barriers to physical activity than men (Artazcoz, Borrell & Benaen, 2001; Jaffe et al., 1999; Sternfeld et al., 1999). More women than men reported health barriers, practical barriers and priority barriers to be of importance, and the females experienced higher numbers of barriers. These results probably reflect differences in the life situations of women and men. It is documented that women still take the largest responsibility for family activities and housework (reference), which may explain why women experience more priority barriers and practical barriers. The fact that more men than women were rated as physically active in all age groups apart from the 30 year olds, supported this. The 30- year age group may still not have established such life situations. It is also consistent with other research that females report more health complaints than men (Grønningsæter, Christensen, Larsen & Ursin, 1991).

There were also significant age differences on health barriers scores, priority barriers, attitude barriers, and number of barriers, but, somewhat surprisingly, not for practical barriers. The age differences were mainly between younger and older age groups, with 60 and 75 year-olds reporting more health barriers and number of barriers than 30, 40 and 45-year olds. There were in general few differences between the 40 and 45 year olds. Elderly women (60 and 70 year olds) reported more practical barriers than their male counterparts. This may reflect that many women in these age groups never learnt to drive a car and often live longer than their men that used to take care of such things, have lower pensions, and may be more dependent on others to be active together with.

For attitude barriers, both genders scored higher with higher age, meaning that attitudes towards physical activity becomes more of a barrier over the years. As this barrier includes beliefs that they will not get anything out of being physically active, and do not see oneself as a physically active person, it may also have to do with what is considered proper behaviour for the elderly, women in particular. The young may not yet think that physical activity makes a difference for their health.

Stages of change: There were gender differences in the distribution on the different stages of change. There were relatively higher percentages of men than women both in the precontemplation stage, and the maintenance stage, meaning that more men are either active or not, whereas more women have intentions to be active without being able to establish a regular activity pattern. The interaction effect between stages of change and gender in the multivariate analysis showed that women at all stages of change, apart from the maintenance stage, reported more barriers, and felt more hindered by their health and practical situation than their male counterparts. This means that apart from those who have established physical activity as a part of their lifestyle, the type of health problems and the

practical life situation that females experience represent more hindrances for being physically active.

The interaction effect between age and stages of change, demonstrated a consistent general pattern of decreasing barrier scores with increasing readiness for physical activity as defined by the stages, but with some variations among the age groups. The differences were mainly between the 60 year olds and the 30 and 40 year olds for all types of barriers, apart from the priority barriers. This makes sense, in that the younger age groups may have both more pressure in their work life, as well as having younger children that demands more of them. In addition, it may also be related to new trends in leisure activities in our country, where the younger generation have developed more urban life styles and have replaced outdoor life with computer activities, film and café visits.

Those in the action stage demonstrated some deviant scores with higher scores on several of the barriers than the preparers and the contemplaters. However, there were few people in the action stage, so the individual scores are given more weight than at the other stages, this may account for the atypical scores. However, the fact that they have recently started to exercise, and have not yet made it a routine, may explain the experience of barriers as more important. This is in line with what has been demonstrated by earlier research that around half of those who try to start exercising drop out during the first 6 months (Dishman, 1986; Pate et al., 1995).

Logistic regressions did not demonstrate a strong relationship between the reported barriers and actual activity level or intentions to be physically active. However, number of barriers, and higher age gave significantly lower odds ratios for both activity level and intentions to be active for both women and men, and attitude barriers gave significant lower odds ratios for intentions to exercise for women. The trend is similar to what was found in a recent study of number of motives and reasons for quitting exercise among students

(Anderson, 2003), showing that what was reported as barriers initially did not correspond to the actual reasons for quitting exercise. The perceived barriers in this study may also not be the actual reasons for not exercising.

A primary issue to address in relation to actual activity for both genders, and in particular for the older age groups, seems to be the number of barriers. For women, and again, in particular for the elderly women, the attitude barriers reduced the intentions to be active. It is therefore important to offer activities that are perceived as suitable for this group, use role models they can identify with, and give information about the benefits to be gained by being physically active.

As expected, those who were at the maintenance stage of exercise behaviour, generally scored lower on the barrier scales and number of barriers. The younger precontemplaters scored higher on the priority barrier scales, and female contemplaters, apart from the 40 year olds, scored higher on the attitude barriers than the other groups, including the precontemplaters. Although there were some variations, data indicated a general picture with lower barrier scores associated with higher stages of change (precontemplation is scored 1 – maintenance 5), suggesting a link between readiness for involvement in physical activity and the perception of barriers.

A large group were at the preparation stage (active, but not regularly, N=2015). Many of the preparers were defined as physically active by the more detailed activity description (70,7% in total, 73,5% of the men and 68,0% of the women). The difference between this stage and the maintenance stage may therefore be a question of how people define regular physical activity: having an active lifestyle versus exercising according to a fixed schedule.

Although few people were at the action stage, the higher barrier scores for this group indicate that work to reduce the barriers may be especially important for people who have recently started to exercise in order to prevent drop out.

This study has some limitations that should be considered. Some of the barrier scales (the priority scale in particular) need improvement and further validation. However the results in this study demonstrated reasonable face validity (e.g. younger people report more priority barriers, and this decreases with higher age). Another problem usual in this type of research, are the criteria for defining physically active versus non-active, with the limited information given in the population study.

However, the current results provide information on perceived barriers and activity patterns of Norwegian adults across age groups in the same geographical area where the cultural differences are minimised. The results demonstrated both gender and age differences in perception of barriers that are important to address in order to help increase the activity level in the population. The population of middle-aged adults is neglected in the physical activity research, and the current results provide some insights into changing perceptions and activity across the middle age adult years. The gender differences demonstrate the need to examine the situation of men and women separately.

The results also clearly linked the perception of barriers to the readiness to be physically active (the stages of change), and demonstrated that women in particular seem to have intentions to be physically active without being able to establish a regular physical activity pattern. Finding practical ways to overcome barriers for these women may be a fruitful way of increasing the activity level.

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Table 1. Reported Barriers

Barrier	Total N	N reporting	%
It is too expensive for me	4713	258	5.2
I do not think it is of importance for my health	4607	1789	36.4
I do not like to be physically active	4597	1306	26.5
I do not have time and energy	4630	2370	48.8
I do not think I will get anything out of it	4601	1007	20.5
I do not see myself as a physically active person	4620	1479	30.1
Health-problems hinder me	4921	2022	41.4
I need more peace and quiet	4837	2128	43.2
I am bothered by dizziness	4788	708	14.4
I feel more like doing other things	4760	2072	42.1
I lack an organised possibility	4739	687	14.0
I have nobody to do it with	4728	941	19.1
I do not dare	4693	374	7.6
I lack transport	4719	258	5.2

Table 2 :Results from the factor analysis. Principal component, Oblimin rotation

Variables	Factors			
	Factor1	Factor 2	Factor 3	Factor 4
Health-problems hinder me	.220	-.180	**.803**	-,171
I need more peace and quiet	.221	-.220	**.768**	.294
I am bothered by dizziness	.348	-.198	**.712**	.008
I lack an organised possibility	**.796**	-.308	.159	.239
I have nobody to do it with	**.787**	-.328	.101	.293
I do not dare	**.733**	-.342	.404	.148
I lack transport	**.743**	-.291	.378	.038
It is too expensive for me	**.736**	-.268	.227	.246
I feel more like doing other things	.294	-.185	.050	**.802**
I do not have time and energy	.238	-.345	.061	**.760**
I do not think I will get anything out of it	.388	**-.802**	.199	.260
I do not think it is of importance for my health	.241	**-.762**	.186	.030
I do not like to be physically active	.305	**-.809**	.139	.250
I do not see myself as a physically active person	.315	**-.778**	.170	.312

Internal consistency:	**Chronbach's alpha**	**Mean score**	**(SD)**
Factor 1: Practical barriers:	Alpha = .91	1.00	.76
Factor 2: Attitude barriers:	Alpha = .86	1.33	.83
Factor 3: Health barriers:	Alpha = .73	0.68	.60
Factor 4: Priority barriers:	Alpha = .57	1.03	.78

Table 3.
Descriptives

		30 yrs		40 yrs		45 yrs		60 yrs		75yrs		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
	Women	554	(20.5)	613	(22.6)	590	(21.8)	613	(22.6)	339	(12.5)	2709	(100)
	Men	297	(13.4)	488	(22.1)	529	(23.9)	547	(24.7)	351	(12.5)	2212	(100)
Physically active	N=4499												
	Women	350	(67.3)	353	(61.9)	340	(62.5)	318	(60.0)	131	(43.7)	1492	(59.8)
	Men	182	(63.9)	298	(63.8)	317	(65.1)	326	(67.9)	199	(63.0)	1322	(67.7)
Stages of change	N=4821												
Precontemplators	Women	41	(7.4)	48	(7.9)	47	(8.1)	83	(13.9)	79	(25.5)	298	
	Men	32	(10.3)	52	(10.8)	47	(9.0)	62	(11.6)	60	(23.7)	273	
Contemplators	Women	182	(33.0)	187	(30.7)	170	(29.3)	105	(17.5)	54	(17.4)	698	
	Men	90	(30.7)	158	(32.7)	132	(25.1)	103	(19.3)	35	(10.4)	518	
Preparers	Women	224	(40.7)	258	(42.3)	240	(41.4)	280	(46.7)	110	(35.5)		
	Men	115	(39.2)	191	(39.5)	248	(47.2)	233	(43.7)	116	(34.4)	903	
Action	Women	36	(6.5)	29	(4.8)	23	(4.0)	13	(2.2)	2	(0.6)		
	Men	4	(1.4)	13	(2.7)	12	(2.3)	15	(2.8)	5	(1.5)	49	
Maintenance	Women	68	(12.3)	88	(14.4)	100	(17.2)	118	(19.7)	65	(21.0)	439	
	Men	52	(17.7)	69	(14.3)	86	(16.4)	120	(22.5)	101	(30.0)	428	
Mean barrier scores		Mean	St.dev	Mean	St.dev	Mean	St.dev	Mean	St.dev	Mean	St.dev	F. df. p	
Health	Women	.80	(.75)	.90	(.77)	.98	(.74)	1.23	(.75)	1.45	(.77)	49.58. 4. ***	
	Men	.72	(.66)	.81	(.67)	.89	(.69)	1.07	(.75)	1.30	(.77	35.50. 4.***	
Priority	Women	1.56	(.81)	1.44	(.79)	1.40	(.84)	1.22	(.83)	1.03	(79)	24.59. 4.***	
	Men	1.59	(79)	1.48	(.80)	1.34	(.80)	1.12	(.82)	.88	(.80)	40.41. 4.***	
Practical	Women	.72	(.60)	.65	(.59)	.66	(.61)	.74	(.66)	.87	(.72)	6.50. 4.***	
	Men	.72	(.56)	.67	(.56)	.66	(.53)	.59	(.55)	.59	(.66)	3.24. 4.*	
Attitude	Women	.80	(.68)	.93	(.75)	1.02	(.78)	1.24	(.85)	1.24	(.81)	27.98. 4.***	
	Men	.91	(.68)	.94	(.73)	1.02	(.75)	1.16	(.80)	1.21	(.84)	10.47. 4.***	
Barrier number	Women	3.52	(2.45)	3.55	(2.55)	3.87	(2.63)	4.31	(3.16)	4.28	(3.37)	9.88. 4.***	
	Men	3.33	(2.37)	3.23	(2.56)	3.24	(2.51)	3.57	(2.82)	3.68	(3.03	2.50. 4. *	

Table 4   Mean scores for types of barriers at the stages of change - women

Variable		30 yrs	Women	N=888				
	Precontempl	Contemplaters	Preparers	Action	Maintenance	F value	df	p
Barrier	N=41	N=181	N=223	N=34	N=68			
Health	0.71	0.96	0.70	0.93	0.71	3.78	4	.005**
Priority	1.84	1.63	1.61	1.49	1.14	6.76	4	.000***
Practical	0.76	0.76	0.75	0.66	0.49	3.02	4	.018*
Attitude	0.79	0.92	0.77	0.85	0.50	4.87	4	.001**
Number	4.12	3.98	3.41	3.28	2.38	6.36	4	.000***
		40/45 yrs	**Women**	N=1165				
Barrier	N=95	N=351	N=490	N=49	N=180			
Health	1.11	0.98	0.88	102	0.88	2.61	4	.034*
Priority	1.61	1.54	1.48	1.07	1.04	15.98	4	.000***
Practical	0.85	0.74	0.62	0.59	0.50	7.72	4	.000***
Attitude	1.41	1.08	0.94	0.76	0.68	17.42	4	.000***
Number	5.03	4.21	3.56	3.33	2.52	21.39	4	.000***
		60 yrs	**Women**	N=555				
Barrier	N=73	N=94	N=260	N=12	N=116			
Health	1.40	1.42	1.20	1.33	1.01	5.16	4	.000***
Priority	1.14	1.25	1.32	1.50	0.95	4.10	4	.003**
Practical	0.83	0.87	0.75	1.07	0.51	5.29	4	.000***
Attitude	1.07	1.43	1.35	1.40	0.89	7.15	4	.000***
Number	4.10	5.12	4.62	4.77	2.92	8.77	4	.000***
		75yrs	**Women**	N=263				
Barrier	N=62	N=45	N=96	N=2	N=68			
Health	1.72	1.61	1.43	1.33	1.12	5.45	4	.000***
Priority	1.07	0.98	1.11	1.75	0.85	1.48	4	.231
Practical	0.86	0.86	0.94	1.50	0.70	1.23	4	.229
Attitude	1.11	1.20	1.37	2.00	1.13	1.53	4	.193
Number	3.95	4.31	4.93	9.00	3.75	2.77	4	.027*

*sign diff between the stages, p<.05   *** sign diff between stages, p<.001

Table 5. Mean scores for types of barriers at the stages of change - men

Variable		**30 yrs**	**Men**	N=290				
	Precontempl	Contemplaters	Preparers	Action	Maintenance	F value	df	p
Barrier	N=31	N=90	N=114	N=4	N=51			
Health	0.87	0.70	0.73	0.33	0.67	0.85	4	.494
Priority	1.71	1.62	1.67	1.13	1.28	2.77	4	.028*
Practical	0.78	0.79	0.70	0.35	0.67	0.97	4	.381
Attitude	1.17	0.97	0.87	0.31	0.77	1.26	4	.003**
Number	4.44	3.46	3.32	2.50	2.42	4.02	4	.003**
		40/45yrs	**Men**	N=985				
Barrier	N=98	N=282	N=430	N=	N=151			
Health	0.86	0.84	0.85	0.79	0.92	0.47	4	.755
Priority	1.67	1.48	1.43	1.29	1.06	10.64	4	.000***
Practical	0.76	0.69	0.66	0.71	0.57	1.92	4	.104
Attitude	1.34	1.04	0.95	0.84	0.74	10.93	4	.000***
Number	4.41	3.45	3.17	2.92	2.34	11.39	4	.000***
		60 yrs	**Men**	N=509				
Barrier	N=54	N=96	N=222	N=15	N=112			
Health	1.36	1.18	1.01	0.93	0.95	3.97	4	.003**
Priority	1.14	1.25	1.20	1.03	0.83	4.86	4	.001**
Practical	0.68	0.64	0.61	0.51	0.49	1.95	4	.099
Attitude	1.12	1.34	1.17	1.10	0.92	3.16	4	.019*
Number	3.69	4.29	3.72	3.33	2.60	5.66	4	.000***
		75 yrs	**Men**					
Barrier	N=65	N=23	N=103	N=4	N=93			
Health	1.72	1.23	1.17	1.58	1.19	4.27	4	.002**
Priority	1.08	0.82	0.73	0.83	0.89	1.80	4	.111
Practical	0.91	0.48	0.46	0.87	0.51	5.21	4	.000***
Attitude	1.21	1.55	1.18	1.00	1.18	0.91	4	.946
Number	4.19	3.46	3.33	4.60	3.52	1.14	4	.337

*sign diff between the stages, p<.05   *** sign diff between stages, p<.001

Table 6. Odds ratios for present activity level and intentions by type of barriers for women and men (logistic regression) Low barrier scores are reference categories for all the barrier measures, and the confidence interval for the ratios (CI) are given in brackets..

Type of barrier scores	Women N=2090 Odds ratio of being active (95% CI)	Men N=1791 Odds ratio of being active (95% CI)	Women N=2267 Odds ratio of intention to be active (95% CI)	Men N=1941 Odds ratio of intention to be active (95% CI)
High health barrier scores	$1.2 (1.0\text{-}1.5)^{*}$	$1.2 (0.9\text{-}1.5)^{NS}$	$0.9 (0.8\text{-}1.0)^{NS}$	$0.9 (0.8\text{-}1.0)^{NS}$
High priority barrier scores	$1.0 (0.8\text{-}1.3)^{NS}$	$1.0 (0.8\text{-}1.2)^{NS}$	$1.0 (0.9\text{-}1.2)^{NS}$	$0.9 (0.8\text{-}1.0)^{NS}$
High practical barrier scores	$0.9 (0.7\text{-}1.1)^{NS}$	$1.0 (0.8\text{-}1.2)^{NS}$	$0.9 (0.8\text{-}1.0)^{NS}$	$1.0 (0.9\text{-}1.2)^{NS}$
High attitude barrier scores	$1.0 (0.8\text{-}1.2)^{NS}$	$0.9 (0.7\text{-}1.2)^{NS}$	0.9 (0.7-1.0)*	0.8 (0.7-0.9)**
High number of barriers	0.6 (0.5 –0.8)***	$0.6 (0.5\text{-}0.7)^{NS}$	$1.1 (0.7 \text{–}1.6)^{NS}$	$0.8 (0.5\text{-}1.2)^{NS}$
Age. High (75 & 60) Low (30, 40,45)	$1.0 (0.98\text{–} 0.99)^{NS}$ Reference group	$1.0 (1.0\text{-}1.0)^{NS}$ Reference group	0.6 (0.4-0.8)*** Reference group	0.7 (0.5-0.9)* Reference group