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Barriers to Outdoor Physical Activity and Unmet Physical Activity Need in Older Adults

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ABSTRACT

OBJECTIVE: To profile participants based on reported outdoor physical activity barriers using a data-driven approach, describe the profiles and study their association with unmet physical activity need.

METHOD: Cross-sectional analyses of 848 community-dwelling men and women aged 75-90 living in Central Finland in 2012. Barriers to outdoor physical activity and unmet physical activity need were enquired with a questionnaire. The latent profiles were identified by profiling participants into latent groups using a mixture modeling technique on the multivariate set of indicators of outdoor physical activity barriers. A path model was used to study the associations of the profiles with unmet physical activity need.

RESULTS: Five barrier profiles were identified. Profile A was characterized with minor barriers, profile B with weather barriers, profile C with health and weather barriers, profile D with barriers concerning insecurity, health and weather; and profile E with mobility and health barriers. The participants in the profiles differed in the proportion of individual and environmental barriers. The risk for unmet physical activity need was highest among people whose severe mobility difficulties restricted their outdoor physical activity.

CONCLUSION: Outdoor physical activity barriers reflect the imbalance in person-environment fit among older people, manifested as unmet physical activity need.

Key words: aging, mobility, outdoor environment

INTRODUCTION

Unmet physical activity need is the feeling of the level of physical activity being inadequate, meaning that one would like to be more active than what he or she is capable of (Rantakokko et al., 2010a). It is unwanted and potentially impairs quality of life (Rantakokko et al., 2010b). It can also indicate a misfit between the capabilities of a person and the demands of the environment (Lawton and Nahemow, 1973; Rantakokko et al., 2010b). In a Finnish study, unmet physical activity need was reported by 14 percent of community-dwelling ambulatory older adults; however it is only recently identified and thus not widely recognized (Rantakokko et al., 2010a). In our previous studies we have found that individual risk factors, such as mobility limitations and low socioeconomic status (Eronen et al., 2012), and environmental barriers, such as hills, lack of resting places and dangerous crossroads were associated with unmet physical activity need in old age (Rantakokko et al., 2010a).

Outdoor physical activity, such as walking, is popular among older adults (Lim and Taylor, 2005) and beneficial for health and functioning (Simonsick et al., 2005). However, many older people face physical activity barriers in their everyday lives. Barriers can be either person-related, such as illnesses and mobility difficulties, or environmental, such as hilly terrains or lack of walking paths (Hovbrandt et al., 2007). Poor health is the most commonly reported barrier to physical activity (Newson and Kemps, 2007, Rasinaho et al., 2007, Schutzer and Graves, 2004, Cohen-Mansfield et al., 2003). Other frequently reported barriers are lack of company, lack of interest, lack of time and various environmental barriers (Dawson et al., 2007, Kowal and Fortier, 2007).

Age, gender and socioeconomic differences as well as obesity, depression, mobility limitations and chronic health conditions influence the nature of physical activity barriers that older people experience (Patel et al., 2012, Sallinen et al., 2009, Rosqvist et al., 2009, Rasinaho et al., 2007). We anticipated that a data-driven latent class model (Magidson and Vermunt, 2004) could reveal associations which are difficult to identify with a traditional risk analysis. The aim of the study was to identify latent profiles based on clustering of older people's perceived outdoor physical activity barriers, to characterize these groups in terms of their health, mobility and other personal resources, and further to see how the latent profiles relate to unmet physical activity need.

MATERIALS AND METHODS

Data for this cross-sectional study come from the baseline of the Life-Space Mobility in Old Age (LISPE) project, which is a 2-year prospective cohort study of individual and environmental factors underlying the life space of community-dwelling older people in Finland, described elsewhere (Rantanen et al., 2012). Briefly, the target population of the study comprised 75 to 90-year-old community-dwelling people who were able to communicate and willing to participate. A random sample of 2550 people was drawn from the national population register of whom 848 people participated and were interviewed in their homes between January and June 2012. The LISPE project was approved by the Ethical Committee of the University of Jyväskylä, Finland. All participants signed an informed consent.

To assess the barriers to outdoor physical activity, we used the Barriers to Outdoor Physical Activity Questionnaire (BOPA), which was developed by an expert panel for our previous study (Rasinaho et al., 2007) and further modified for the present study (Rantanen et al., 2012). The participants were asked: "What are the reasons that hinder or prevent you from outdoor physical activity, such as walking for fitness or walking to a store? Select all that apply from the list". This was followed by a list of 17 items, with each item rated as present or absent: 1) Pain and illnesses are barriers for outdoor walking; 2) I'm too tired, poor mobility is a barrier for outdoor walking; 3) Poor vision is a barrier for outdoor walking; 4) Hearing problems are a barrier for outdoor walking; 5) I'm afraid of falling when I'm outdoors; 6) I'm afraid of falling victim to crime; 7) I feel insecure when I'm outdoors; 8) I'm afraid of getting hit by a car; 9) I have no one to go out with; 10) Poor weather is a barrier for outdoor walking; 11) Slippery roads are a barrier for outdoor walking; 12) Darkness is a barrier for outdoor walking; 13) The environment around my home is not suitable for outdoor walking; 14) I'm not interested in outdoor activities; 15) Health care personnel or relatives have told me not to go walking outdoors; 16) I'm too old for outdoor walking and 17) I'm not used to outdoor activities. For descriptive purposes, the items were summed to a scale ranging from 0 to 17, with 0 indicating no barriers and 17 barriers in all items. Internal consistency of the BOPA was found to be acceptable (Cronbach alpha =0.705). The physical activity barrier questionnaire has shown good reliability (κ 0.417-1.000) (Leinonen et al., 2007).

Unmet physical activity need was assessed with two questions: “Would you like to increase your level of outdoor physical activity” and “Do you feel that you would have the opportunity to increase your level of outdoor physical activity if someone recommended you to do so?” and response options were “yes” and “no”. Participants who felt that they had no opportunity to increase their physical activity level, even though they were willing to do so were defined as experiencing unmet physical activity need (Rantakokko et al., 2010a).

Background variables included age, gender, number of chronic diseases, length of education (years), perceived difficulties in walking 0.5 km (no difficulties/difficulties) and living alone or with someone. Level of physical activity was assessed using a seven point scale combining frequency and intensity of common physical activities (Grimby, 1986, Rantanen et al., 2012). Participants were categorized into physically inactive (at most light housework or gardening and short walks once or twice a week) and physically active (at least moderate physical activity ≥ 3 h a week). Cognitive status was assessed using the Mini-Mental State Examination (MMSE) (Folstein et al., 1975) and depressive symptoms with the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977). Information about the frequency of going outdoors was assessed using the University of Alabama at Birmingham Study of Aging Life-Space Assessment (LSA) (Baker et al., 2003). The time of the year when the interview was conducted was dichotomized into winter (from January 1 to March 31st) and spring/summer (from April 1st to June 30th).

Statistical analyses

The latent profile structure was identified from all 17 outdoor physical activity barrier (BOPA) variables by profiling participants into profile groups using latent class analysis. The latent class model is similar to a factor model with the exception that the latent variable is assumed to be categorical rather than continuous. An example of applying a similar latent class model is given in Magidson and Vermunt (2004, see example 10.2.1.1). We used the model shown in Figure 1 to estimate the parameters of the latent class model and, more importantly, to obtain the latent class membership of the subjects. The latter is similar to obtaining factor scores in factor analysis.

The number of latent profiles was based on model information criteria (Akaike information criterion, AIC, Bayesian information criterion, BIC, and sample size adjusted, aBIC) and salience of the configuration obtained. BIC indicated two subgroups, while aBIC indicated five subgroups (Table 1). Based on the average group membership probability and the interpretability of the barrier clustering in the groups, we decided to further examine the characteristics of five groups.

Subsequent to latent class model we constructed the conceptual path model shown in Figure 2 to assess the association between the barrier-based groupings and unmet physical activity need. In the actual path model the categorical membership variable was represented by four dummy variables with group A (minor barriers) as the reference category. Those with no unmet physical activity need formed the reference group. Each dummy variable was permitted to have a unique path coefficient in a logistic regression on the unmet physical activity need variable. The path model was adjusted by gender with men as the reference category and age, so that the adjusting variables had both direct and indirect effects on the unmet physical activity need variable.

The descriptive statistics on the impact of individual covariate measurements on the profiles was investigated separately for the background variables. Differences in the distribution of reported barriers between the profiles were compared with Kruskall-Wallis –tests for continuous variables and Chi square tests for categorized variables. Pairwise comparison p-values were corrected with the Dunn-Šidák correction. The analyses were performed with Mplus version 7.0 (Muthen & Muthen 1998-2009) and IBM SPSS Statistics version 20.0. (Armonk, NY: IBM Corp.).

RESULTS

Mean age of all participants (n=848) was 80.1 (SD 4.3) years, 62 percent were women and 53.3% lived alone, see Table 2. Participants had completed on average 9.6 years of education, their mean MMSE score was 26.2 (SD 2.8), mean CES-D score 9.6 (SD 6.8) and mean number of diseases 4.4 (SD 2.4). 36.1 % of all participants were categorized as physically inactive and 25.6% reported difficulties in walking 0.5 km. The majority of the participants (84.6%) went out of their homes every day. Unmet physical activity need was reported by 13.6% of all participants.

Barrier profiles

Table 3 describes the five identified profiles of outdoor barriers. Almost half of the participants (46.5%) reported practically no barriers for outdoor physical activity (mean number of barriers 0.5 (SD 0.6) and their profile was named *Minor barriers*. Every fourth participant (26.5%) belonged to the barrier profile named *Ambient conditions*. These people reported on average 2.4 (SD 0.9) barriers, concerning mostly poor weather (68.9%) and slippery roads (82.2%). Barrier profile *Poor health* included 15.9% of the participants, who predominantly reported pain and illnesses (95.6%), slippery roads (97.0%), poor weather (75.6%) and fear of falling (54.8%) as barriers for outdoor physical activity. Their average number of barriers was 4.7 (SD 1.1). The highest number of barriers (mean 7.4, SD 1.6) including darkness (89.7%), fear of falling (87.2%), slippery roads (87.2%), poor weather (76.9%), pain and illnesses (69.2%), poor mobility (64.1%) fear of crime (59.0%) feelings of insecurity (56.4%), were reported by the participants whose barrier profile was named *Insecurity*. The fifth profile, covering 6.5% of the participants, was called *Mobility limitations*. The participants belonging to this profile reported on average 3.4 barriers (SD 1.2), which included mainly pain and illnesses (89.1%), poor mobility (78.2%) and fear of falling (43.6%). Participants who were profiled under *Minor Barriers* –profile were active outdoors and had good mobility (Table 2). People in *Ambient conditions* –profile were also active and most of them did not have mobility difficulties, but they had some concern for poor weather. In the remaining three profiles the participants were characterized by walking difficulties and inactivity. Most of the people in *Insecurity* and *Poor health* –profiles were inactive and had reduced mobility. The number of outdoor physical activity barriers differed statistically significantly between all profiles, being the lowest among people in *Minor*

Barriers –profile and highest among people in *Insecurity*-profile. Compared with *Ambient conditions*, *Poor Health* and *Insecurity* -profiles, the smaller frequency of environmental barriers among people in *Mobility limitations* –profile was evident.

Unmet physical activity need

The results of the age- and sex-adjusted path model showed the differences in the odds of reporting unmet physical activity need between the five profiles of outdoor physical activity barriers (Table 4). When compared to the *Minor barriers* profile, people in the *Ambient conditions* profile were almost two times more likely to report unmet physical activity need. For the *Poor health*- and *Insecurity*-profiles the risk was over 5-fold. The risk was highest among people in the *Mobility limitations* profile, odds ratio 11.12, 95% confidence interval 5.46-22-64. Sensitivity analysis showed that the time of the year when the interview was carried out did not influence the results (Wald test for interaction p=0.844).

DISCUSSION

We identified five different profiles of outdoor activity barriers, which reflected the functional status of older community-dwelling people. The risk of unmet physical activity need – an indicator of imbalance in the person-environment fit in the area of mobility (Rantakokko et al., 2010a) - increased with increasing number of individual mobility problems and environmental mobility barriers. However, the imbalance in person-environment fit was largest among people with most severe mobility limitations who rarely reported environmental barriers. It is likely that their individual capabilities do not meet the requirement for physical capacity that their physical environment would require. They probably mostly stay indoors and remain unaware of the barriers present in the outdoor environment. This suggests that individual difficulties alone can be a sign of problems in person-environment fit (Benzinger et al., 2014).

Person-environment fit demonstrates the balance between the capacities of the individual and the demands of the environment (Lawton and Nahemow, 1973). Longitudinal studies have shown that increase in person-environment fit problems is due to functional decline (Werngren-Elgstrom et al., 2008, Iwarsson, 2005). Individual problems such as chronic conditions and pain have been identified as the most frequently reported barriers to physical activity among older people (Moschny et al., 2011, Newson and Kemps, 2007, Cohen-Mansfield et al., 2003). People with chronic conditions have also reported more barriers than healthy people (Schutzer and Graves, 2004). Poor health was a frequently reported barrier also in this study; however, the combinations of barriers derived with the data-driven approach showed that in many older people, the outdoor physical activity barriers comprise of multiple factors in addition to poor health. Instead of investigating only the frequency of single barriers, latent grouping of barriers demonstrated which barriers are likely to be linked together and what kind of functional status they express.

Community-dwelling older people form a heterogeneous group in what it comes to perceiving outdoor physical activity barriers. Accordingly, the strategies to improve the opportunities for outdoor physical activity among this population need to be tailored to meet the different needs. Good sidewalks and proper street maintenance benefit most people, and for older people with mobility disabilities these may serve as facilitators for physical activity (Rosenberg et al., 2012). Insecurity due to fear of falling can be reduced with supervised

exercise (Freiberger et al., 2013), but frail older people might also be in need of a friend, relative or a lay volunteer to assist in outdoor activities.

Strengths and limitations

The strength of this study is that a large group of older adults were interviewed face-to-face in their homes by trained interviewers. The participants of the current study represent the healthier proportion of their age-group; however, the sample also included people with health problems (Rantanen et al., 2012). Consequently, the associations observed probably reflect those present in a general population of similar age. The BOPA questionnaire is a result of many years of research experience and development, and it has been found to be sensitive among older people to obesity (Sallinen et al., 2009), depressive mood (Rosqvist et al., 2009) and mobility limitations (Rasinaho et al., 2007). Strength of our approach was that we performed the profiling separate from the analysis of the risk factors related to the profiles, thus the profiles were purely barrier-based and not dependent on the functional or health status. Unmet physical activity need is a novel viewpoint to research on physical activity of older people and it has not been widely studied earlier (Rantakokko et al., 2010a).

The cross-sectional design can be considered as a limitation, since it does not allow us to study the temporal dimension of outdoor physical activity barriers and their association with unmet physical activity need. Prospective studies are needed to understand future changes in unmet physical activity need and other outcomes among people with different outdoor physical activity barrier profiles. Considering that this study was conducted in Finland, it may not be a surprise that ambient conditions were the most frequently reported barriers. “Poor weather” in a Nordic country can include any poor weather during the entire year, such as rain, hot temperatures, very cold temperatures or icy conditions (Tu et al., 2004). However, we did not find a correlation between time of the year when the interview was conducted and unmet physical activity need.

CONCLUSIONS

Individual and environmental outdoor physical activity barriers reflect the functional status of older community-dwelling people. Generally, increase in the number of reported barriers was parallel to the risk of unmet physical activity need with the mobility limitations group being the only exception with its lower average number of barriers. The number of outdoor physical activity barriers was the highest among people who had mobility difficulties and concerns and insecurity regarding the outdoor environment, but the risk of unmet physical activity need was highest among people who – due to severe mobility difficulties - did not perceive barriers in the environment.

Conflict of interest

The authors declare that there are no conflicts of interest.

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Table 1. Information Criteria (AIC, BIC and aBIC [a]), Entropy, Group Sizes and Percentage of Individuals Estimated in Groups Based on Average Group Membership Probability (%) for up to Six Profile Groups in Mixture Models of the Outdoor Physical Activity Barrier Variables (Jyväskylä and Muurame, Finland, 2012).

Number of profile groups	AIC	BIC	aBIC	Entropy	n_1 (%)	n_2 (%)	n_3 (%)	n_4 (%)	n_5 (%)	n_6 (%)
1	8414	8495	8441	1	848 (100)					
2	7584	**7750**	7639	0.769	303 (90.0)	545 (95.4)				
3	7513	7765	7596	0.834	248 (89.9)	544 (95.7)	56 (86.2)			
4	7459	7796	7571	0.773	64 (86.4)	462 (92.8)	120 (82.4)	202 (81.9)		
5	7417	7840	**7556**	0.753	135 (85.1)	39 (92.8)	220 (77.6)	55 (86.4)	399 (88.0)	
6	**7400**	7908	7568	0.841	136 (84.4)	21 (96.4)	38 (88.4)	53 (89.0)	174 (87.8)	426 (93.6)

[a] AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion, aBIC = Sample-size adjusted BIC. Bold typeface indicates best fitting model.

Table 2. Characteristics of Participants in the Five Profiles for Outdoor Physical Activity Barriers (Jyväskylä and Muurame, Finland, 2012).

	All	A. Minor barriers (n=399, 47%)	B. Ambient conditions (n=220, 25.9%)	C. Poor health (n=135, 15.9%)	D. Insecurity (n=39, 4.5%)	E. Mobility limitations (n=55, 6.2%)	p-value [a]
Variable			**Mean ± SD[b]**				
Age	80.1 ± 4.3	79.1 ± 4.0^{C,D,E} [c]	80.2 ± 4.3	81.7 ± 4.3^{A}	81.9 ± 4.3^{A}	81.8 ± 3.9^{A}	<0.001
MMSE [d]	26.2 ± 2.8	26.4 ± 2.6	26.2 ± 2.7	25.6 ± 3.2	25.4 ± 3.0	26.1 ± 2.7	0.095
CES-D [e]	9.6 ± 6.8	7.8 ± 6.0^{C,D,E}	9.6 ± 6.3^{C,D}	12.2 ± 6.9^{A,B,D}	16.9 ± 8.8^{A,B,C}	12.0 ± 5.9^{A}	<0.001
Number of diseases [f]	4.4 ± 2.4	3.7 ± 2.2^{C,D,E}	4.3 ± 2.4^{C}	5.7 ± 2.5^{A,B}	5.5 ± 2.5^{A}	5.5 ± 2.4^{A}	<0.001
Number of barriers	2.2 ± 2.1	0.5 ± 0.6^{B,C,D,E}	2.4 ± 0.9^{A,C,D,E}	4.7 ± 1.1^{A,B,D,E}	7.4 ± 1.6^{A,B,C,E}	3.4 ±1.2 ^{A,B,C,D}	<0.001
Education in years	9.6 ± 4.1	9.9 ± 4.2	9.7 ± 4.2	8.9 ± 4.1	9.0 ± 3.4	9.3 ± 3.9	0.134
			%				
Women	62.0	52.4^{B,C,D}	64.5^{A,D}	77.0^{A}	92.3^{A,B,E}	63.6^{D}	<0.001
Lives alone	53.3	44.6^{B,C,D}	57.3^{A,D}	62.2^{A}	84.6^{A,B,E}	56.4^{D}	<0.001
Difficulties in 0.5 km	25.6	9.8^{B,C,D,E}	17.8^{A,C,D,E}	59.3^{A,B}	56.4^{A,B}	67.3^{A,B}	<0.001
Inactive	36.1	17.8^{B,C,D,E}	29.5^{A,C,D,E}	71.1^{A,B}	71.8^{A,B}	83.6^{A,B}	<0.001
Goes outdoors daily	84.6	93.0^{C,D,E}	90.0^{C,D,E}	72.6^{A,B,E}	60.5^{A,B}	49.1^{A,B,C}	<0.001
Unmet physical activity need	13.6	5.3 ^{C,D,E}	10.0 ^{C,D,E}	28.1 ^{A,B}	28.2 ^{A,B}	41.8^{A,B}	<0.001

[a] p-value for between-groups (A-E) comparisons. Comparisons made with Kruskall-Wallis –test for continuous variables and Chi square test for categorized variables.

[b] SD= Standard deviation

[c] Superscripts $^{A, B, C, D, E}$ indicate statistically significant differences (*p*-value <0.05) between barrier profiles.

[d] MMSE= Mini-Mental State Examination.

[e] CES-D= Center for Epidemiologic Studies Depression Scale.

[f] Diseases included pulmonary, cardiac, circulatory, locomotor, rheumatic, eye, neurological, endocrinological, gastroenteric and dermatological diseases; hearing disorders, cancers and psychological disorders.

Table 3. Profile Names and the Percentages of Persons Reporting Different Outdoor Physical Activity Barriers in the Profiles (Jyväskylä and Muurame, Finland, 2012).

Barrier	A. Minor barriers (n=399, 47%)	B. Ambient conditions (n=220, 25.9%)	C. Poor health (n=135, 15.9%)	D. Insecurity (n=39, 4.5%)	E. Mobility limitations (n=55, 6.2%)	*p-value* [a]
BOPA [b] 1. Pain and illnesses are barriers for outdoor mobility.	10.8[C,D,E c]	14.5[C,D,E]	95.6[A,B,D]	69.2[A,B,C]	89.[A,B]	<0.001
BOPA 2. I'm too tired, poor mobility is a barrier for outdoor mobility.	1.8[C,D,E]	3.2[C,D,E]	43.7[A,B,E]	64.1[A,B]	78.2[A,B,C]	<0.001
BOPA 3. Poor vision is a barrier for outdoor mobility.	1.0[C,D]	0[C,D,E]	17.8[A,B]	10.3[A,B]	3.6[B]	<0.001
BOPA 4. Hearing problems are a barrier for outdoor mobility.	0[C,D,E]	0[C,D,E]	4.4[A,B]	7.7[A,B]	5.5[A,B]	<0.001
BOPA 5. I'm afraid of falling when I'm outdoors.	1.5[B,C,D,E]	15.9[A,C,D,E]	54.8[A,B,D]	87.2[A,B,C,E]	38.2[A,B,D]	<0.001
BOPA 6. I'm afraid of falling victim to crime.	1.0[B,D]	10.0[A,C,D]	0[B,D]	59.0[A,B,C,E]	1.8[D]	<0.001
BOPA 7. I feel insecure when I'm outdoors.	0.5[C,D,E]	3.2[D]	5.2[A,D]	56.4[A,B,D,E]	10.9[A,D]	<0.001
BOPA 8. I'm afraid of getting hit by a car.	0[D]	1.4[D]	0[D]	25.6[A,B,C,E]	0[D]	<0.001
BOPA 9. I have no one to go out with.	1.0[B,C,D,E]	4.5[A,D,E]	10.4[A,D]	30.8[A,B,C]	23.6[A,B]	<0.001
BOPA 10. Poor weather is a barrier for outdoor mobility.	24.1[B,C,D,E]	68.6[A,E]	75.6[A,E]	76.9[A,E]	43.6[A,B,C,D]	<0.001
BOPA 11. Slippery roads are a barrier for outdoor mobility.	0[B,C,D]	84.1[A,C,E]	97.0[A,B,E]	87.2[A,E]	0[B,C,D]	<0.001
BOPA 12. Darkness is a barrier for outdoor mobility.	3.8[B,C,D]	31.4[A,C,D,E]	60.7[A,B,D,E]	89.7[A,B,C,E]	3.6[B,C,D]	<0.001
BOPA 13. The environment around	0.5[D,E]	0[D,E]	2.2[D]	23.1[A,B,C]	5.5[A,B]	<0.001

my home is not suitable for outdoor walking.						
BOPA 14. I'm not interested in outdoor activities.	1.8^{D,E}	1.4^{D,E}	2.2 ^{D,E}	15.4 ^{A,B,C}	12.7^{A,B,C}	<0.001
BOPA 15. Health care personnel or relatives have told me not to go walking outdoors.	0^{D,E}	0.5^{D,E}	0.7^{D,E}	12.8^{A,B,C}	9.1^{A,B,C}	<0.001
BOPA 16. I'm too old for outdoor walking.	0.8^{D,E}	0.0^{D,E}	2.2^{D}	12.8^{A,B,C}	7.3^{A,B}	<0.001
BOPA 17. I'm not used to doing outdoor activities.	0^{D,E}	0.5^{D}	0.7	7.7^{A,B}	5.5^{A}	<0.001

[a] *p for* between-groups (A-E) comparisons. Comparisons made with Chi square tests.
[b] BOPA = Barriers to Outdoor Physical Activity Questionnaire.
[c] Superscripts $^{A, B, C, D, E}$ indicate statistically significant differences (*p*-value <0.05) between barrier profiles.

Table 4. Age- and Sex-Adjusted Odds Ratios (OR) and 95% Confidence Intervals (CI) for Unmet Physical Activity Need in the Five Outdoor Physical Activity Barrier Profiles (Jyväskylä and Muurame, Finland, 2012).

	The risk of unmet physical activity need	
Profile	**OR**	**95% CI**
A. Minor barriers (n=399)	1	
B. Ambient conditions (n=220)	1.87	0.99-3.51
C. Poor health (n=135)	5.64	3.08-10.33
D. Insecurity (n=39)	5.21	2.21-12.28
E. Mobility limitations (n=55)	11.12	5.46-22.64

Figure captions

Figure 1. Conceptual latent class model for the estimation of group membership based on 17 outdoor barrier variables (Jyväskylä and Muurame, Finland, 2012).

Figure 2. Conceptual path model assessing the association between barrier variable-based latent classes and unmet physical activity (Jyväskylä and Muurame, Finland, 2012).