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Physical activity correlates in people with anxiety: data from 46 low- and middle-income countries

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Abstract

Objective: There is a lack of nationally-representative data on the correlates of physical activity (PA) among people with anxiety symptoms. Thus, we investigated PA correlates among community-dwelling adults with anxiety symptoms in 46 low- and middle-income countries (LMICs) using predominantly nationally-representative data.

Method: Cross-sectional data from the World Health Survey were analysed. PA was assessed by the International Physical Activity Questionnaire (IPAQ) and participants were dichotomised into those that do (≥150 minutes moderate-vigorous PA) and do not (<150 minutes) meet recommended PA weekly targets. Multivariable logistic regression was used to assess the correlates.

Results: The analysis included 24,850 people with anxiety symptoms (43.3±16.6 years; 39.7% males). The prevalence of low PA was 33.1% (95%CI=31.6%-34.6%). Older age [e.g., OR=4.57 for age ≥65 vs. 18-24 years], not married/cohabiting (vs. married/cohabiting OR=1.36), being in the richest quintile (vs. poorest OR=1.41), unemployed (vs. employed OR=2.18), inadequate vegetable consumption (vs. adequate OR=1.66), and poor sleep/energy, worse cognition, pain/discomfort and mobility difficulties were all significant correlates of low PA.

Conclusions: PA is associated with a range of factors among people with anxiety symptoms. Future interventions might target the identified correlates in order to facilitate people with anxiety to be more physically active.

Key words: anxiety, physical activity, mental health

Introduction

There is an abundance of evidence that complying with the international recommendation of 150 min of moderate to vigorous physical activity per week has important physical and mental health benefits (1-5). Understanding factors associated with the compliance of these physical activity recommendations is an important focus for public health (6). A study involving 38 countries worldwide and including almost 185,000 individuals showed that people with anxiety are less likely than those without anxiety to meet physical activity guidelines (7). Moreover, sedentary behaviour is associated with an increased risk of developing anxiety (8), and less sports participation is associated with greater symptom severity and increased odds of developing an anxiety disorder 2 years later (9). Physical activity can also improve symptoms for those with anxiety. Specifically a recent meta-analysis demonstrated that exercise, a structured form of physical activity, significantly reduces anxiety symptoms in people with anxiety disorder (standard mean difference=-0.55; 95% CI -0.13 to -0.97 adjusted for publication bias), which is in the medium effect size range (10).

Given these important health benefits of physical activity, there is a need for research to investigate what factors influence physical activity participation in people with symptoms of anxiety or anxiety disorders. In contrast with studies in people with schizophrenia (11), bipolar disorder (12), depression (13), alcohol use disorders (14), and dementia (15), there are much less data on correlates of physical activity participation in people with anxiety. A recent review of physical activity correlates involving 1,368 people with post-traumatic stress disorder (16) showed that the only correlate consistently associated with lower physical activity participation was the presence of hyperarousal. Next to this, a study in 102 Brazilian outpatients with a lifetime diagnosis of panic disorder demonstrated that somatic symptoms of anxiety were the only important predictors of low level of physical activity (odds ratio [OR] 2.81; 95% CI 1.00-7.90; p=.050) in a multivariate model (17). Exploring physical activity correlates in people with symptoms of anxiety in low- and middle-income countries (LMICs) is important given the suboptimal treatment of anxiety (18), differences in knowledge regarding the benefits of physical activity (19), and different environmental factors (e.g., occupational and social structures, safety, climate) (20) in LMICs. The lack of studies from LMICs also highlights the gap between where most correlation, research is done and where the largest public health impacts of physical inactivity are located (21). Information on physical activity correlates for people with anxiety, and in particular in LMICs, could guide the design and delivery of targeted interventions in these countries. Thus, given the

aforementioned gaps within the literature, we aimed to assess physical activity correlates among community-dwelling adults with symptoms of anxiety in 46 LMICs.

Methods

Settings and protocol

The World Health Survey (WHS) (2002-2004) is a cross-sectional study executed in 70 countries worldwide. Single-stage random sampling and stratified multi-stage random cluster sampling were conducted in 10 and 60 countries respectively. All individuals aged ≥18 years with a valid home address were eligible to participate. The use of Kish tables ensured that each member of the household had equal probability of being selected. The data were collected in all countries using the same set of questionnaires although some countries used a shorter version. The individual response rate ranged from 63% (Israel) to 99% (Philippines) (22). Ethical approval was obtained from ethical boards at each study centre. Sampling weights were generated to adjust for non-response and the population distribution reported by the United Nations Statistical Division. All participants provided informed consent.

Anxiety

The question 'Overall in the past 30 days, how much of a problem did you have with worry or anxiety' was used to assess anxiety. This question had the following answer options: 'none', 'mild', 'moderate', 'severe', and 'extreme'. In accordance with previous WHS publications, those who answered 'severe' and 'extreme' were considered to have anxiety (23-25).

Physical activity

Items from the International Physical Activity Questionnaire (26) were used to categorize physical activity. Specifically, participants were asked how many days over the past week on average they engaged in moderate physical activity and in vigorous physical activity. Secondly, participants were asked for how many minutes on average, they engage in physical activity at a moderate and vigorous level. The total amount of moderate to vigorous physical activity over the last week was calculated and those scoring ≥150 minutes were classified as meeting the World Health Organization guidelines (27)

(coded 0), and those scoring <150 minutes (low physical activity) were classified as not meeting the recommended guidelines (coded 1).

Sociodemographic variables

These included information on gender, age (18-24, 25-34, 35-44, 45-54, 55-64, ≥65 years), marital status [Married/cohabiting or other (never married/separated/divorced/widowed)], highest education attained (at least secondary completed or not), wealth quintiles, employment status (unemployed or not), and setting (rural or urban). Principal component analysis based on 15-20 assets was performed to establish country-wise wealth quintiles. Employment status was assessed with the question 'What is your current job?'. Those who answered 'not working for pay' were considered to be unemployed.

Health behaviours

Smoking

Current smoking was assessed with the question 'Do you currently smoke any tobacco products such as cigarettes, cigars, or pipes?' The answer options to this question were 'daily', 'yes, but not daily', or 'no, not at all'. Current smokers were defined as those who answered 'daily' or 'yes, but not daily'.

Diet

Two separate questions for fruits and vegetables were used to assess the amount of servings the participant eats on a typical day. The answer to these questions were dichotomized as <5 or ≥5 servings/day following WHO/FAO recommendations (28).

Alcohol consumption

The question 'Have you ever consumed a drink that contains alcohol (such as beer, wine, etc)?' with 'yes' and 'no' answer options was used to identify lifetime abstainers. Those who replied 'yes' were,then prompted to the next question on the amount of standard drinks of any alcoholic beverage the respondent had on each day of the past 7 days. The number of days in the past week in which 4 (female) or 5 (male) drinks were consumed was calculated (29), and a total of 1-2 and $\geq$3 days in the past 7 days were considered infrequent and frequent heavy drinking respectively. All other individuals, with the exception of lifetime abstainers, were considered to be non-heavy drinkers.

Mental health variables

Depression was based on the DSM-IV algorithm and used information on duration and persistence of depressive symptoms in the past 12 months (30, 31). Details for the variables on sleep/energy and cognition are provided below (section on health status).

Physical health variables

Having extreme difficulty in seeing and recognizing a person that the participant knows across the road (i.e., from a distance about 20 meters) (32) was used as the definition of visual impairment. A previous study showed that this condition likely corresponds to World Health Organization definitions of visual impairment (32). The presence of hearing problems was based on interviewer's observation of this condition at the conclusion of the survey. Arthritis, asthma, and diabetes were based on self-reported lifetime diagnosis. For angina, in addition to a self-reported diagnosis, a symptom-based diagnosis based on the Rose questionnaire was also used (33). Details on the variables on pain/discomfort and mobility difficulty are provided in the section below (health status).

Health status variables

Eight questions pertaining to four domains (i.e., sleep/energy, cognition, pain/discomfort, mobility) were used to assess health status. These domains are comparable to those often used in health-related quality of life outcome measures such as the Short Form-12 (SF-12) (34), the Health Utilities Index Mark-3 (HUI) (35), and the EUROQOL-5D (36). Each domain consists of two questions on past-30 day health status. The actual questions can be found in Supplementary Table 1 (Appendix). The answer option for each question was based on a five-point scale ranging from 'none' to 'extreme/cannot do'. For each separate domain, we used factor analysis with polychoric correlations to estimate a factor score which was later converted to scores ranging from 0-10 with higher values corresponding to worse health function (37, 38).

Statistical analyses

Data from 69 countries were publically available. Of these countries, 10 countries (Austria, Belgium, Denmark, Germany, Greece, Guatemala, Italy, Netherlands, Slovenia, UK) were omitted as sampling information was not available. Furthermore, 10 high-income countries (Finland, France, Ireland, Israel,

Luxembourg, Norway, Portugal, Sweden, Spain, United Arab Emirates) were also excluded as the focus of the study was on LMICs. Of the remaining LMICs, Morocco and Latvia were not included as information on physical activity was not collected, and so was Turkey owing to a lack of several variables used in the current analysis. Thus, a total of 46 countries, which were all LMICs according to the World Bank classification in 2003, constituted the final sample (Supplementary Table 2). The current analysis was restricted to those with anxiety as the aim of the study was to assess the correlates of physical activity in individuals with anxiety (n=24,850).

A total of 22 potential correlates of physical activity which could be selected from the available WHS database and corresponding to 4 domains (sociodemographics, health behaviour, mental health, physical health) were assessed. Descriptive analysis was done to characterize the sample with the use of weighted percentages and means (SDs). The differences in the sample characteristics by physical activity levels were tested by Chi-squared tests and Student's t-tests for categorical and continuous variables respectively. Multivariable logistic regression analysis was conducted to assess the correlates of low physical activity (outcome) by domains (39). Two models were constructed: Model 1 - adjusted for age, gender, and country; Model 2 - adjusted for all the variables in the respective domain in addition to age, gender, and country. In order to assess the influence of multicolinearity, we calculated the variance inflation factor (VIF) value for each independent variable used in Model 2 for all domains. The highest VIF was 2.18, which is much lower than the commonly used-cut off of 10 (40)., indicating that multicolinearity was unlikely to be a problem in our analyses.

In accordance with previous WHS publications, adjustment for country was done by including dummy variables for each country (23, 41). For all regression analyses, variables were included in the models as categorical variables with the exception of sleep/energy, cognition, pain/discomfort, and mobility (continuous variables). The sample weighting and the complex study design were taken into account in all analyses using the svy command in stata which uses the Taylor linearization method. Estimates for subpopulations were obtained with the use of the stata subpop option.

Results from the logistic regression models are presented as odds ratios (ORs) with 95% confidence intervals (CIs).

The level of statistical significance was set at $P<0.05$. The statistical analysis was performed with Stata 14.1 (Stata Corp LP, College station, Texas).

Results

The final sample included a total of 24,850 people (39.7% males) with anxiety symptoms who had a mean (SD) age of 43.3 (16.6) years. Overall, 33.1% (95%CI=31.6%-34.6%) engaged in low levels of physical activity. **Table 1** shows the sample characteristics (overall and by level of physical activity). These unadjusted estimates showed that among individuals with anxiety, low physical activity is significantly associated with the following characteristics: female gender, older age, not married/cohabiting, being unemployed, urban setting, less smoking, inadequate fruit and vegetable consumption, the presence of depression, having visual impairment, hearing problem, arthritis, angina, asthma, and diabetes, as well as scoring worse in the domains of sleep/energy, cognition, pain/discomfort, and mobility.

Insert table 1 here

Table 2 illustrates the correlates of low physical activity in the sociodemographic domain estimated by multivariable logistic regression. In model 2 (i.e., adjusted for all covariates of the domain and country), the significant correlates for lower physical activity participation were older age [e.g., OR=4.57 for age ≥65 vs. 18-24 years], not married/cohabiting (vs. married/cohabiting OR=1.36), being in the richest wealth quintile (vs. lowest quintile OR=1.41), unemployed (vs. employed OR=2.18), while gender, education, and setting were not significant correlates. With respect to health behavior factors, in Model 2 (i.e., adjusted for all covariates in the domain in addition to age, sex, and country), inadequate vegetable consumption was the only factor significantly associated with low physical activity (OR=1.66; 95%CI=1.22-2.25) with no significant associations being observed for smoking, and fruit and alcohol consumption (see **Table 3**). In the mental health domain, poor sleep/energy and worse cognition were significantly associated with low physical activity but not depression (see **Table 4**). Finally, hearing problems (OR=1.56; 95%CI=1.20-2.02), pain/discomfort and mobility difficulty were the only significant correlates of low physical activity in the physical health domain (**Table 5**, Model 2).

Insert table 2 to 5 about here

Analyses with physical activity as a continuous outcome measure (minutes of physical activity per week) are presented as Supplementary Tables 3 to 5. In the fully adjusted model 2, there were three significant results that appear in the continuous model but not in the dichotomous one: (a) those in the "richer" wealth quintile were less physically active than those in the poorest category, (b) there was a significant

difference in urban vs rural setting with lower physical activity levels in an urban setting, and (c) smoking was significantly correlated with higher physical activity levels. Another discrepancy between the dichotomous and continuous models was that those aged 45-54 were significantly less likely to meet the guidelines than those aged 18-24 years in the dichotomous analysis, while lower physical activity levels did not differ between these age categories in the continuous analysis.

Discussion

To the best of our knowledge, the current multi-national study is the first to explore physical activity correlates in people with symptoms of anxiety. We found that in 24,850 people with anxiety symptoms [Mean (SD) age 43.3±16.6 years; 39.7% males] from 46 LMICs, older age, not married/cohabiting, being in the richest wealth quintile, unemployment, inadequate vegetable consumption, poor sleep/energy, worse cognition, hearing problems, pain/discomfort and mobility difficulties were all significant correlates of low physical activity. The most important differences between analyses of physical activity as a dichotomous variable (meeting the physical activity guidelines or not) versus a continuous variable was that in the continuous model, urban setting and smoking were also correlates of respectively low and high levels of physical activity. These discrepant findings are however not surprising as it is well known that continuous analyses generally have more power to reject the null hypothesis (42).

Consistent with data from the general population (42, 43), we found that older age and the presence of physical health problems such as pain and mobility difficulties were associated with less physical activity. Our data also confirm previous findings (7) that poor sleep/energy, mobility limitations, pain/discomfort and cognitive problems, which are more prevalent in older patients and in those with problems with physical health, are associated with lower physical activity levels in those with symptoms of anxiety. It is known that people with anxiety may be more likely to have chronic pain (44), which might impact upon mobility. Thus, collaborative interventions that seek to reduce pain and improve mobility among those with symptoms of anxiety might be an important strategy to increase physical activity and reduce anxiety levels in this population.

Our data suggest that the socioeconomic status of individuals with symptoms of anxiety should also be taken into consideration in future research or when planning interventions. For instance, and in contrast with data from the general population (21), in our study not being married/cohabiting was a significant correlate of low physical activity. While the exact mechanism linking marital status and low physical activity is not clear, it may be that those who are not married or not cohabiting tend to feel lonelier, and this may in turn lead to less physical activity. Indeed, loneliness has been linked with lower physical activity in the general population (45) and might be related to social anxiety (46). Next, not being employed was found to be a strong correlate of low physical activity. Although speculative, it may be that employment enhances social connectedness and functioning in individuals with anxiety, which

may result in a more physically active lifestyle. Thus, future research that explores the extent to which social support can increase physical activity in this population is warranted. In particular, the amount and type of social support necessary to initiate or maintain a physically active lifestyle should be investigated, especially in settings with limited resources.

In contrast to high-income countries, where those of a higher socioeconomic position are generally known to be more physically active during leisure-time (47), our data in LMICs show that those in the richest wealth quintile are less physically active. Potential explanations for this include more motorized transport, sedentary screen-based leisure and less labour-demanding jobs among the richest in LMICs. Next to this, it might be hypothesized that those with (social) anxiety in a higher socioeconomic position do not necessarily need to leave their homes or engage in outdoor activities for subsistence. Finally, low physical activity and less consumption of vegetables may be reflecting a clustering of unhealthy lifestyles and behaviour which is increasing in LMICs (48).

Practical implications, limitations and future research

The current findings suggest a need to tailor physical activity interventions to different age groups and to consider poor sleep/energy, pain/discomfort, mobility problems and cognitive problems. However, since the study is cross-sectional, cause and effect cannot be deduced. For example, anxiety may be a common risk factor for both low physical activity and not being married. In cases where anxiety is a shared underlying factor for both the exposure and the outcome, it is possible that addressing the physical activity correlate assessed in our study would not lead to increases in physical activity. Thus, future prospective research is required to disentangle the directionality of the relationships we observed. A second limitation is that the anxiety variable used was based on a single question. This question has been used in previous WHS publications to define anxiety (23, 24) and specificity may have been enhanced by our use of extreme categories. However, the specificity and sensitivity of this question against the gold standard diagnosis of anxiety disorders is not established. Therefore, future studies should include a more complete anxiety assessment and ideally use a clinical diagnosis. Third, since the assessment of anxiety was based on self-report, the perception of this condition may have differed by culture and region. Fourth, physical activity was captured with a self-report measure which has been prone to recall bias (49, 50). Fourth, the current study only included non-institutionalized people and therefore, the current data cannot be generalized to the institutionalized who are more likely to be

inactive. Finally, future studies in LMICs may wish to assess how macro-level environmental factors (e.g., food insecurity, civil conflicts, extreme weather conditions) are linked to physical inactivity in this population.

In conclusion, our data illustrate that a number of socioeconomic and health and lifestyle factors are associated with physical activity levels among people with symptoms of anxiety from 46 LMICs. These findings provide guidance for future population level interventions across LMICs to help people with anxiety to become more active.

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Conflicts of interest

None

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Table 1 Sample characteristics (overall and by low physical activity)

Characteristic	Category	Total	Low physical activity		P-value[a]
			No	Yes	
Sociodemographic domain					
Gender	Male	39.7	41.6	35.7	<0.001
Age (years)	18-24	13.9	14.8	12.1	<0.001
	25-34	22.2	25.3	15.9	
	35-44	21.0	23.4	16.2	
	45-54	18.1	18.6	17.3	
	55-64	11.3	10.1	13.8	
	≥65	13.4	7.9	24.8	
Marital status	Married/cohabiting	65.3	68.9	58.0	<0.001
Education	Secondary or higher	39.1	39.9	37.6	0.150
Wealth	Poorest	23.8	24.7	22.0	0.068
	Poorer	21.9	21.7	22.4	
	Middle	19.3	19.6	18.8	
	Richer	18.8	18.7	18.9	
	Richest	16.2	15.3	17.9	
Unemployed	Yes	53.9	46.3	69.3	<0.001
Setting	Urban	45.3	42.0	52.2	<0.001
Health behavior domain					
Current smoking	Yes	31.6	32.6	29.5	0.025
Fruit consumption[b]	<5 servings/day	94.7	94.0	96.2	0.002
Vegetable consumption[b]	<5 servings/day	91.1	89.6	94.3	<0.001
Alcohol consumption	Lifetime abstainer	60.2	59.9	60.9	0.602
	Non-heavy	34.4	34.7	33.7	
	Infrequent heavy	4.1	4.2	3.8	
	Frequent heavy	1.3	1.2	1.6	
Mental health domain					
Depression	Yes	24.9	23.0	28.9	<0.001
Sleep/energy[c]	Mean (SD)	4.5 (3.1)	4.1 (3.0)	5.1 (3.1)	<0.001
Cognition[c]	Mean (SD)	3.8 (3.1)	3.4 (3.0)	4.3 (3.3)	<0.001
Physical health domain					
Visual impairment	Yes	4.9	3.2	8.4	<0.001
Hearing problem	Yes	6.0	3.5	11.0	<0.001
Arthritis	Yes	20.3	18.7	23.6	<0.001
Angina	Yes	26.6	25.2	29.4	<0.001
Asthma	Yes	9.4	8.2	11.8	<0.001
Diabetes	Yes	6.2	4.7	9.4	<0.001
Pain/discomfort[c]	Mean (SD)	4.7 (3.0)	4.3 (2.9)	5.4 (3.0)	<0.001
Mobility[c]	Mean (SD)	4.3 (3.2)	3.8 (3.0)	5.1 (3.4)	<0.001

Abbreviation: SD Standard Deviation
Data are column % unless otherwise stated.
All estimates are based on weighted sample.
The total amount of moderate to vigorous physical activity over the last week was calculated and those scoring <150 minutes were considered to have low physical activity.

[a] Differences in sample characteristics by low physical activity was tested by Chi-squared tests and Student's *t*-tests for categorical and continuous variables respectively.
[b] Mexico is not included as data on fruit and vegetable consumption were not collected.
[c] These variables had scores ranging from 0 to 10 (higher scores indicating worse conditions).

Table 2 Association between sociodemographic factors and low physical activity estimated by multivariable logistic regression

		Model 1		Model 2	
Characteristic	Category	OR	95%CI	OR	95%CI
Gender	Female	1.00		1.00	
	Male	0.85*	[0.75,0.97]	1.10	[0.95,1.27]
Age (years)	18-24	1.00		1.00	
	25-34	0.74**	[0.60,0.92]	0.97	[0.76,1.25]
	35-44	0.83	[0.67,1.02]	1.18	[0.92,1.52]
	45-54	1.11	[0.89,1.38]	1.47**	[1.13,1.93]
	55-64	1.73***	[1.37,2.19]	2.11***	[1.61,2.77]
	≥65	4.53***	[3.60,5.70]	4.57***	[3.49,5.98]
Marital status	Married/cohabiting	1.00		1.00	
	Other	1.30***	[1.13,1.49]	1.36***	[1.18,1.58]
Education	<Secondary	1.00		1.00	
	≥Secondary completed	1.12	[0.94,1.32]	1.08	[0.88,1.33]
Wealth	Poorest	1.00		1.00	
	Poorer	1.15	[0.98,1.37]	1.14	[0.95,1.35]
	Middle	1.12	[0.92,1.36]	1.10	[0.90,1.36]
	Richer	1.21	[0.99,1.47]	1.18	[0.96,1.46]
	Richest	1.44***	[1.18,1.76]	1.41**	[1.12,1.77]
Unemployed	No	1.00		1.00	
	Yes	2.10***	[1.81,2.42]	2.18***	[1.87,2.53]
Setting	Rural	1.00		1.00	
	Urban	1.31**	[1.11,1.55]	1.18	[0.98,1.43]

Abbreviation: OR Odds Ratio; CI Confidence Interval
The total amount of moderate to vigorous physical activity over the last week was calculated and those scoring <150 minutes were considered to have low physical activity.
Model 1: Adjusted for gender, age and country. Estimate for age was only adjusted for gender and country, and that of gender was only adjusted for age and country.
Model 2: Adjusted for all covariates in the Table and country.
* p<0.05, ** p<0.01, *** p<0.001

Table 3 Association between health behaviors and low physical activity estimated by multivariable logistic regression

		Model 1		Model 2	
Characteristic	Category	OR	95%CI	OR	95%CI
Current smoking	No	1.00		1.00	
	Yes	0.91	[0.79,1.05]	0.88	[0.74,1.05]
Fruit consumption[a]	≥5	1.00		1.00	
(servings/day)	<5	1.45*	[1.05,2.00]	1.20	[0.86,1.69]
Vegetable consumption[a]	≥5	1.00		1.00	
(servings/day)	<5	1.59**	[1.20,2.13]	1.66**	[1.22,2.25]
Alcohol consumption	Lifetime abstainer	1.00		1.00	
	Non-heavy	0.88	[0.74,1.05]	0.91	[0.72,1.15]
	Infrequent heavy	0.92	[0.67,1.28]	0.87	[0.59,1.27]
	Frequent heavy	1.38	[0.81,2.36]	0.72	[0.40,1.29]

Abbreviation: OR Odds Ratio; CI Confidence Interval
The total amount of moderate to vigorous physical activity over the last week was calculated and those scoring <150 minutes were considered to have low physical activity.
Model 1: Adjusted for gender, age and country.
Model 2: Adjusted for all covariates in the Table and country.
[a] Mexico is not included as data on fruit and vegetable consumption were not collected.
* p<0.05, ** p<0.01

Table 4 Association between mental health factors and low physical activity estimated by multivariable logistic regression

		Model 1		Model 2	
Characteristic	Category	OR	95%CI	OR	95%CI
Depression	No	1.00		1.00	
	Yes	1.16	[1.00,1.35]	1.08	[0.93,1.27]
Sleep/energy[a]	per unit increase	1.05***	[1.03,1.08]	1.03*	[1.01,1.06]
Cognition[a]	per unit increase	1.06***	[1.03,1.08]	1.04**	[1.01,1.07]

Abbreviation: OR Odds Ratio; CI Confidence Interval
The total amount of moderate to vigorous physical activity over the last week was calculated and those scoring <150 minutes were considered to have low physical activity.
Model 1: Adjusted for gender, age and country.
Model 2: Adjusted for all covariates in the Table and country.
[a] These variables had scores ranging from 0 to 10 (higher scores indicating worse conditions) and were included in the models as continuous variables
** p<0.01

Table 5 Association between physical health factors and low physical activity estimated by multivariable logistic regression

		Model 1		Model 2	
Characteristic	Category	OR	95%CI	OR	95%CI
Visual impairment	No	1.00		1.00	
	Yes	1.71**	[1.20,2.43]	1.39	[0.96,2.03]
Hearing problem	No	1.00		1.00	
	Yes	1.72***	[1.35,2.18]	1.56***	[1.20,2.02]
Arthritis	No	1.00		1.00	
	Yes	1.04	[0.89,1.22]	0.91	[0.76,1.09]
Angina	No	1.00		1.00	
	Yes	1.07	[0.94,1.22]	0.90	[0.77,1.04]
Asthma	No	1.00		1.00	
	Yes	1.19	[0.95,1.49]	1.19	[0.92,1.55]
Diabetes	No	1.00		1.00	
	Yes	1.30	[0.99,1.70]	1.15	[0.86,1.55]
Pain/discomfort[a]	per unit increase	1.10***	[1.07,1.12]	1.05***	[1.02,1.09]
Mobility[a]	per unit increase	1.10***	[1.07,1.13]	1.07***	[1.04,1.11]

Abbreviation: OR Odds Ratio; CI Confidence Interval
The total amount of moderate to vigorous physical activity over the last week was calculated and those scoring <150 minutes were considered to have low physical activity.
Model 1: Adjusted for gender, age and country.
Model 2: Adjusted for all covariates in the Table and country.
[a] These variables had scores ranging from 0 to 10 (higher scores indicating worse conditions) and were included in the models as continuous variables
** p<0.01, *** p<0.001