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Title Page

Full title: Nurses, age, job demands and physical activity at work and at leisure: A cross-sectional study

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Abstract

Background. The nursing workforce is ageing and increased age and demands at work, can impact on physical activity levels in the workplace and at leisure. Research has shown that work physical activity, without activity at leisure, is insufficient to prolong well-being. This study investigated the physical activity levels of a sample of nurses and aimed to determine if age and job demands are associated with engaging in recommended physical activity levels at work and at leisure.

Methods. A cross-sectional study was conducted with data collected during 2016. Two-hundred and ten nurses participated in the study. Two validated instruments were used: the Copenhagen Psychosocial Questionnaire (quantitative and cognitive demands) and the International Physical Activity Questionnaire.

Results. Older nurses (≥40-years) were significantly less likely to report engaging in recommended physical activity levels at work than younger nurses [OR 0.47, 95% CI (0.25-0.88) *p*=0.02]. Nurses with high quantitative demands were over twice as likely to engage in recommended levels of physical activity at work and at leisure. Engaging in recommended levels of physical activity at work was not associated with leisure-time physical activity reports.

Conclusion. Initiatives need to be put in place to ensure older nurses can fulfil their nursing role within their capabilities. These could include offering personal physical activity education to both on and off-duty nurses. Assessment of ability and patient acuity may be necessary.

Keywords:

Copenhagen Psychosocial Questionnaire (COPSOQ); Cross-sectional study; Age; International Physical Activity Questionnaire (IPAQ); Nurses; Recommended physical activity levels.

BACKGROUND

Studies have shown nurses to walk up to five miles in a 10-hour daytime shift with less physical activity recorded on night shifts and days off (Hendrich, Chow, Skierczynski, & Lu, 2008). However, despite this, nurses have been found to have less than adequate physical activity levels (Bakhshi, Fei, Murrells, & While, 2015). Further, physical activity at work, may not contribute the positive effect on health that activity at leisure can (Henwood, Tuckett, & Turner, 2012).

A body of work has emerged, over the last number of years, highlighting the difference between occupational physical activity and leisure-time physical activity and the beneficial effects these could bestow on health (Holtermann, Burr, et al., 2012; Holtermann, Hansen, Burr, Søgaard, & Sjøgaard, 2012). The research around occupational physical activity levels in relation to engaging in leisure-time physical activity varies. Low work physical activity was found to be associated with lower leisure-time activity by some scholars (Ekenga, Parks, Wilson, & Sandler, 2015). Others found high occupational physical activity to result in less leisure-time activity (Holtermann, Marott, et al., 2012). Further and conversely, Lallukka et al. (2004) found physically strenuous work to be associated with increased leisure-time physical activity for women. Clear associations have been found for male workers between high work physical activity and increased risk of all-cause mortality but the associations are not so clear for females (Holtermann, Burr, et al., 2012). Workers reporting high strain jobs (high job demands and low job control) have been found to be more physically inactive (Kouvonen et al., 2013) but this seems to be driven by the control these workers have in their job rather than their job demands. Nonetheless, for a nursing workforce, high job demands but not job control was found to be associated with regular aerobic physical activity (Chin, Nam, & Lee, 2016).

Adults are recommended to get at least 30 minutes physical (moderate) activity on 5 days a week (150 minutes a week) (Department of Health, 2016). Although self-reports of activity levels by means of validated instruments are fraught with bias (recall bias, social desirability bias) they remain an important method of assessing physical activity. Nevertheless, subjective physical activity data can

vary quite significantly from objective data (Prince et al., 2008; Yu et al., 2015). Previous work, using subjective measurements for physical activity levels in nurses, found higher average activity scores than that recommended (Kaewthummanukul, Brown, Weaver, & Thomas, 2006). However, other scholars found less, even insufficient physical activity levels for nurses (Albert, Butler, & Sorrell, 2014; Chin et al., 2016). These studies used different instruments for their measure of physical activity, perhaps resulting in different findings.

It has been widely acknowledged that inactivity increases with age (Hallal et al., 2012). A physically demanding job does not allow for a reduction in activity levels and older nurses feel challenged by the physical demands of their role (Clendon & Walker, 2013; Fragar & Depczynski, 2011). An association between physical workload and job strain has been shown previously, with nurses who work in accident and emergency and medical wards having higher levels of perceived stress from physical workload (McCarthy, Power, & Greiner, 2010). Other scholars found occupational factors to be significant contributors to physical inactivity and obesity for nurses (Chin et al., 2016). Therefore, the workplace of the nurse is important in relation to their perceived stress levels, physical inactivity and body mass index. Rotation to a less physically demanding area can positively impact on the older nurse's job satisfaction (Moseley, Jeffers, & Paterson, 2008), however this is not always possible.

Little is known about any difference in the age groups of nurses and their physical activity levels at work or leisure. This issue is gaining more importance with our population of ageing nurses. Figures in 2010 showed 20% of the nursing/midwifery workforce in Ireland were in the 50-59 year age bracket (Irish Nurses and Midwives Organisation, 2010). A national survey of nurses working in medical and surgical wards in acute hospitals reported 32% of respondents were less than 30 years of age, 44% were 30-39 and 25% were 40-59 with 1% over 60 years of age (Scott et al., 2013). Details from the Nursing and Midwifery Board of Ireland (2016) show only 38% of those on the Active Register (of nurses and midwives) are under 40 years of age with over half (53%) forty to fifty-nine years old.

This implies that our nursing workforce is older. Exploring the association between nurses' age and demands at work is particularly important if a healthy workforce is going to be maintained.

There is a need to examine the demands on the worker particularly in relation to the amount of work they need to complete and the decisions and skills required for this work. This needs to be examined in relation to both work and leisure-time physical activity levels because of recent evidence showing a clear difference between engaging in these and cardiovascular disease (Li, Loerbroks, & Angerer, 2013). The use of the Copenhagen Psychosocial Questionnaire (Kristensen, Hannerz, Hogh, & Borg, 2005) which reflects today's work environment will allow a clearer picture to be obtained by differentiating between quantitative demands (amount of work to be done) and cognitive demands. Physical activity levels do not always determine ability to conduct physical work. However, previous researchers have postulated that the discrepancy between the nurse's physical capability and their physical job demands grows with age and have found musculoskeletal disorders in middle-aged nurses (35-44 years) due to physical job demands (Heiden, Weigl, Angerer, & Müller, 2013). This could result in a premature degenerative process which may impact on the nurse's physical activity levels at work and leisure. Physical activity at work has been defined by some researchers as walking and heavy lifting and this classification of physical activity was found to be associated with risk of lower back pain (Heuch, Heuch, Hagen, & Zwart, 2017). For the purpose of this present study, physical activity levels included activities that take moderate or hard physical effort and make the nurse breathe somewhat or much harder than normal (IPAQ Research Committee, 2005).

Work physical activity alone is inadequate to prolong well-being; engagement with leisure-time physical activity is necessary (Henwood et al., 2012; Li et al., 2013). There is a paucity of research relating to older nurses and engagement with work and leisure-time physical activity separately. Additionally, research addressing how today's job demands (quantitative and cognitive demands) relate to activity levels at work and leisure is lacking and findings are inconsistent when available. Therefore, the purpose of the present paper is three-fold. Firstly; to investigate the physical activity

levels of a sample of nurses at work and at leisure; secondly to determine if age and/or perceived job demands are associated with physical activity levels at work and at leisure and thirdly; determine if engaging in recommended physical activity levels at work resulted in lower activity levels at leisure. Recommended physical activity levels at work are defined as 150 minutes a week and this was motivated by previous research on health professionals (Kovacheva & Tsen, 2018). Recommended leisure-time physical activity levels were defined similarly. The hypotheses of the study were:

Hypothesis 1: older nurses (≥40-years) engaged in less than recommended physical activity levels at work and at leisure than their younger counterparts.

Hypothesis 2: nurses who reported high quantitative demands engaged in recommended levels of physical activity at work but had less than recommended leisure-time physical activity.

Hypothesis 3: nurses who reported high cognitive demands had less than recommended levels of physical activity at work but engaged in recommended leisure-time physical activity levels.

Hypothesis 4: nurses with recommended work physical activity levels had less than recommended leisure-time physical activity levels.

Firstly, we established the age and job demands of our nurses and then how those factors were associated with work and leisure physical activity levels separately. This is an important consideration with our ageing nurses and for healthcare organisations who need to plan for the safe working conditions and maintenance of high quality practice.

METHODS

Design

A cross-sectional study was conducted with a sample of qualified nurses recruited from two hospitals in the Southern part of Ireland. The sample was representative of qualified nurses within the target population. Data were collected during 2016. A two-stage sampling approach was taken. The first stage involved the selection of different work areas within two teaching hospitals. The work areas included were; medical, surgical, medical/surgical, paediatrics, emergency departments, intensive care, coronary care, operating theatre, outpatient department and other (care of the elderly and orthopaedics). The second stage involved the random selection of a sample of nurses from each of these work areas.

Respondents

Nurses were randomly selected from the nursing off-duty (work roster) using a random generator application. The sample included staff nurses (registered nurses), junior nurse managers (Clinical Nurse Managers 1 (CNM1s)) and senior nurse managers (Clinical Nurse Managers 2 (CNM2s), Clinical Nurse Managers 3 (CNM3s)). All qualified nurses working part or full-time were eligible to be included in the sample. In total 300 nurses were invited to participate in the study. This sample size was seen to be representative of nurses working in the teaching hospitals although data on total numbers of nurses working in the sampled hospitals were not available. A response rate of 70% was obtained (*n*=210) however only *n*=203 of the returned questionnaires were completed properly and thus included in these analyses.

Data collection

A sealed envelope was left for potential respondents at their place of work. This envelope contained a study invitation letter detailing the study, in addition to contact details for the researcher, a questionnaire and a blank unlabelled envelope for the return of the completed questionnaire.

Completed questionnaires were placed in a specific sealed box left at each of the areas where the respondents were being recruited. This box was collected by the researcher.

Study Variables

Demographic details, job demands and physical activity levels were self-reported by respondents. Demographic data included age, gender, weight, height and area of work.

Job Demands

The Copenhagen Psychosocial Questionnaire (COPSOQ) (Kristensen et al., 2005) was used to measure the perceived job demands of the sample. Two job demands scales were used – quantitative demands and cognitive demands. Each of these scales were a combination of four items measured on a five-point Likert scale. The points of the individual four items for both quantitative and cognitive demands were added with each item having equal weight. The weights were 0, 25, 50, 75, and 100. The average was calculated and a theoretical range of 0-100 was produced. If at least half of the items were completed the score for each scale was calculated. A high score indicated high quantitative and high cognitive demands. Cronbach's alpha (α) for these data were; quantitative demands $\alpha=0.76$ and cognitive demands $\alpha=0.69$. Both the quantitative and cognitive demands scales were dichotomised at the median to examine high and low demands.

Physical Activity

Physical activity levels were measured using the International Physical Activity Questionnaire (IPAP-long version) (IPAQ Research Committee, 2005). The IPAQ is one of the most extensively used questionnaires to assess physical activity levels (van Poppel, Chinapaw, Mokkink, van Mechelen, & Terwee, 2010) and has been validated for use across 12 countries (Craig et al., 2003). The instrument demonstrated reliability and validity properties in many different settings and is considered to have reasonable measurement properties for physical activity levels of adults aged 18-65 years in different

settings (Craig et al., 2003). For the purpose of this paper, work and leisure-time physical activity levels were investigated using the IPAQ.

The IPAQ-long version captured moderate and vigorous activities engaged in by nurses as part of their everyday lives, and self-reported for the last seven days. Respondents were requested to report on their exercise carried out in work and on their days off. Definitions for levels of physical activity were presented at the beginning of the questionnaire. Moderate physical activity was defined for the respondents as 'making them breathe somewhat harder than normal' where vigorous physical activity was defined as 'activities that take hard physical effort and make you breathe much harder than normal'.

The reported minutes of moderate and vigorous activity at work were computed and categorised as recommended (150 minutes a week or more) or low (less than 150 minutes a week) (Department of Health, 2016; Department of Health and Children Health Service Executive, 2009). Leisure-time physical activity reports were calculated in the same manner.

Age

Age was recorded by respondents as a continuous variable. To investigate the difference between physical activity levels for younger and older respondents, age was categorised into two categories, less than 40 and 40-years and over. This categorisation was motivated by a decline in strength and muscle mass loss from 40 years (Keller & Engelhardt, 2013).

Co-variates

Respondents self-reported their height and weight. Body mass index was calculated by the standard formula for BMI calculation (weight in kilograms divided by height in metres squared (kg/m^2)). Work areas were grouped based on similarities areas had to each other. Three groupings were made; Ward Areas, Acute Areas and Short Stay Areas. Ward Areas included nurses working in separate medical and surgical wards and combined medical/surgical wards, paediatrics and other (Care of the Elderly

and Orthopaedics). Acute Areas included nurses working in Intensive Care, Coronary Care and Emergency. Short Stay Areas included nurses working in Outpatients and Operating Theatre. The inclusion of BMI and place of work as covariates in the analyses was motivated by previous research findings (Chin et al., 2016; McCarthy et al., 2010).

Ethical considerations

Ethical approval was granted by the Clinical Research Ethics Committee of the Cork Teaching Hospitals, Cork, Ireland. Approval to conduct the study in the hospitals was sought from the Executive Management Board and the Director of Nursing in each hospital. Informed consent was obtained from all respondents in the study by virtue of completing and returning the questionnaire.

Data Analysis

Data were analysed using IBM SPSS Statistics Version 22 (IBM, Armonk, NY, USA). Descriptive statistics were conducted to describe socio-demographic factors relating to the respondents (Table 1). The independent variables were age, quantitative demands and cognitive demands. The dependent variables were work physical activity and leisure-time physical activity. To test hypotheses 1-4, univariate logistic regression analysis was conducted to investigate the association: (a) between the independent variables and the dependent variables, separately for work and leisure-time physical activity (model 1; Tables 2 and 3, hypotheses 1, 2 and 3) and (b) between work and leisure-time activity levels (Table 4, hypothesis 4). A number of separate multivariable logistic regression analysis models were built to further investigate the association between the independent variables and dependent variables while adjusting for potential confounders such as place of work and BMI (model 2; Tables 2, 3 and 4). Finally, model 3 included all variables entered simultaneously (age, quantitative and cognitive demands, place of work and BMI) (model 3; Tables 2 and 3) (and recommended work physical activity Table 4).

Results

Table 1 presents the demographic details of the sample. Almost all (96%) of the respondents were female with a mean age of 39.78 (SD 9.38) years (range: 22-61). Over three quarters of them were staff nurses (82%) with just over half of the sample working shifts. Respondents worked in a variety of areas with the majority in surgical wards (18%) or Operating Theatre (17%). Less than half of the nurses engaged in the recommended amount of physical activity at work with only 9% reporting meeting recommended leisure-time physical activity levels. Thirty-nine percent of nurses reported high quantitative demands and 45% high cognitive demands.

<<<Insert Table 1 here>>>

The associations between age, job demands and physical activity levels at work (separately and together) were investigated and results presented in Table 2. Univariate analysis is presented in model 1. Older nurses were less likely to report recommended physical activity levels at work univariately and this remained unchanged when the association was adjusted for place of work, BMI, age, quantitative and cognitive demands. Nurses with high quantitative demands were more likely to report engaging in recommended physical activity levels at work [OR 2.29, 95% CI (1.21-4.33) p=0.01] but the same was not true for high cognitive demands in the univariate analysis and fully adjusted models (adjusted for age, quantitative and cognitive demands, place of work and BMI).

<<<Insert Table 2 here>>>

Table 3 shows the univariate and multivariable logistic regression results for age, job demands and physical activity levels at leisure. No significant association was found for both age and high cognitive demands and physical activity levels at leisure. However, nurses who reported high quantitative demands were almost three times as likely [OR 2.85, 95% CI (1.02-7.94) p=0.04] as those with low quantitative demands to engage in recommended leisure-time physical activity regardless of age, place of work, BMI and cognitive demands.

<<<Insert Table 3 here>>>

Table 4 shows the association between engaging in recommended physical activity levels at work and at leisure. No significant association was found in the univariate or multivariable analyses.

<<<Insert Table 4 here>>>

Discussion

The aim of this study was to investigate the physical activity levels of a sample of nurses at work and at leisure and to determine if age and/or perceived job demands were associated with physical activity levels at work and at leisure. Just under half of our nurses engaged in recommended physical activity levels at work, similar to previous findings (Albert et al., 2014; Chin et al., 2016). However, a lower proportion of our respondents engaged in recommended physical activity at leisure than previously found (Albert et al., 2014; Bakhshi et al., 2015) and this proportion was also substantially lower than figures for the general population in Ireland (reported as 31%) (Department of Health, 2016). This is a worrying finding particularly in view of longitudinal evidence demonstrating the necessity of leisure-time physical activity (beyond work physical activity) for maintenance of good health (Henwood et al., 2012). Additionally, workplaces are required to promote the health of their workers (Department of Health, 2013). Introducing initiatives in the workplace such as short high-intensity exercise classes, may help towards improving both work and leisure-time physical activity levels.

We found some evidence to support hypothesis 1 with our older nurses being less likely to engage in recommended physical activity levels at work however we found no evidence to support this at leisure. Previous scholars found that nurses, as they age, find it more difficult to meet the physical demands of their role (Fragar & Depczynski, 2011) and that rotation though areas where work demands are lighter, could improve the experience and increase job satisfaction (Moseley et al., 2008). However, we did not investigate job rotation nor measure job satisfaction in this present study, so we are unable to determine this.

Again, only some evidence was found to support hypothesis 2 in relation to job demands and physical activity levels. We found high quantitative demands were associated with reporting of recommended physical activity levels at work. However, contrary to hypothesis 2, high quantitative demands were also associated with engaging in recommended leisure-time physical activity levels. This is consistent with previous findings (Chin et al., 2016; Lallukka et al., 2004) but the instrument

used to measure job demands in Chin's work did not differentiate between quantitative and cognitive demands. The COPSOQ caters for today's human service workers by including a scale focused on cognitive demands which asks questions such as 'Do you have to keep your eye on lots of things while you work?', 'Does your work require you to make difficult decisions?' These questions reflect the autonomous role of today's nurse who is accountable for the care s/he delivers.

The null hypothesis was accepted for hypothesis 3 as no association was found for cognitive demands and work or leisure-time physical activity levels. Previous scholars have found nurses, in a management role (implying high cognitive demands) to have higher levels of obesity and lower engagement with physical activity (Chin et al., 2016) however for a general sample, no association was found (Kouvonen et al., 2013). The demands of a physical job may have resulted in only 21% of the older nurses in our sample working full-time compared to 56% of younger nurses (data not shown). Risk of injury or physical ailments increase significantly with age, particularly if the nurse is working in a physically demanding environment (Clendon & Walker, 2013; Heiden et al., 2013) thus potentially prompting reduced hours. However, we are unable to establish if this in the case in our sample of nurses.

Additionally we found no association between work physical activity and leisure-time physical activity (hypothesis 4) where associations, although inconsistent, have been found previously (Ekenga et al., 2015; Holtermann, Marott, et al., 2012; Lallukka et al., 2004). The wide confidence interval may be indicative of the small sample size and although insignificant, the direction of the association is consistent with Lallukka et al.'s (2004) findings.

The Irish health service is under strain (Thomas, Burke, & Barry, 2014), with an ageing population, and indeed an ageing nursing workforce. The combination of these factors can potentially threaten the provision of safe, quality care going forward. Our study found older nurses were less likely to engage in recommended physical activity levels at work regardless of job demands, place of work and BMI. We were unable to determine if this was due to their physical capability, or if other

factors were involved, such as, self-reported nature of the data, or even increased experience allowing nurses to accurately assess and plan their work. An observational study design, with the use of an objective measure of physical activity such as an accelerometer, would aid with determining why older nurses do not meet recommended physical activity levels at work. Nevertheless, job rotation and workplace wellness activities to promote and assess physical activity levels at work are necessary for our ageing nurses to continue to be an active part of the frontline workforce. This will enable organisations to retain these experienced staff and result in good physical activity habits to continue into the home environment. Ensuring frequent rest breaks are included in the working day for all nurses is important to allow them to meet the physical activity levels their work entails.

Limitations

This was a cross-sectional study and therefore we cannot determine a causal relationship between age, job demands and physical activity levels. This study relied on self-reported data. Job demands, physical activity levels and height may have been overestimated with an underestimation of weight. This reporting bias could have resulted in an under or over estimation of associations however, we are confident that this bias did not affect our associations to a large extent. Nevertheless, although the IPAQ is one of the most extensively used questionnaires to assess physical activity levels (van Poppel et al., 2010), issues such as the length of the instrument and the tendency of respondents to over report their activity levels when completing it, have been highlighted in the literature (Hartley et al., 2015; Kaewthummanukul et al., 2006; Lee, Macfarlane, Lam, & Stewart, 2011; van Poppel et al., 2010). The use of an objective measure for physical activity levels such as an accelerometer would have added to the study resulting in a more accurate measure of physical activity levels.

Data on potential confounders, such as injury history, were not collected. Objective occupational health data would have enhanced this work and should be included in future research in this area. This type of data, in addition to objective physical activity data, could aid with workload management. Workload management for nurses is an important endeavour that aims to match the

patients' needs with the number of nursing staff and their expertise. This is becoming an increasingly popular way of delivering a high quality service to patients while managing operational factors (van den Oetelaar, van Stel, van Rhenen, Stellato, & Grolman, 2016) and it may facilitate the role of older nurses in more physically demanding work areas.

Whilst the response rate of the study was good at 70% the research did take place within an environment where workers were previously found to be under stress (McCarthy et al., 2010). A higher response rate may have been obtained if nurses did not view their participation and completion of the study questionnaire as extra paperwork. The sample was drawn from two teaching hospitals which were both located in the same city. This may limit the generalisability of the study findings.

Conclusion

Nursing, as a profession, demands a level of physical activity to meet the needs of patients. The delivery of safe, quality care is a fundamental part of the nurse's role however if the nurse is unable to engage with their work, at the level demanded by their work area, they may opt to leave the profession, with a resultant loss of valuable experience. The physical activity levels required of nurses in different work areas needs to be assessed and work matched to ability to retain our experienced nursing workforce. This is particularly important for older nurses who, as found in this study, are less likely to engage in recommended physical activity levels at work. The reasoning behind this needs to be determined by nurses as individuals, their managers and employers. Knowing that older nurses are potentially unable to engage with more physically demanding work is valuable knowledge for employers. This finding could guide decisions made around work practices and job rotation ultimately benefiting older nurses and the health service through preserving nurses' physical health.

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Table 1: Descriptive statistics, number (n), Mean (M), Standard Deviation (SD) for demographic details and job demands (*n*=203)

	N (%)	Range	M(SD)
Age		22-61	39.78(9.38)
Females	192(96%)		
Marital Status			
Single	60(30%)		
Married/Cohabiting	133(67%)		
Separated/Divorced	7(3%)		
Missing	3		
BMI		17-41	24.7(3.44)
Education			
Certified trained	52(26%)		
Diploma	23(11%)		
Post Graduate diploma	42(21%)		
Degree	77(39%)		
MSc/MA	4(2%)		
Other (unreported)	2(1%)		
Missing	3		
Position			
Staff Nurse	163(82%)		
CNM 1	11(5%)		
CNM 2	22(11%)		
CNM 3	4(2%)		
Missing	3		
Type of Work			
Shift Work	106(53%)		
Days only	74(37%)		
Nights only	14(7%)		
Other (unreported)	6(3%)		
Missing	3		
Place of work			
Medical/Surgical	19(10%)		
Medical	8(4%)		
Surgical	35(18%)		
Intensive Care Unit	11(5%)		
Coronary Care Unit	4(2%)		
Paediatrics	22(11%)		
Emergency Department	25(12%)		
Outpatients Department	14(7%)		
Operating Theatre	34(17%)		
Other	28(14%)		
Missing	3		

Work Physical Activity Recommended	80(41%)		
Leisure Physical Activity Recommended	19(9%)		
Quantitative Demands High	78(39%)	0-87.5	46.6(17.9)
Cognitive Demands High	91(45%)	18.75-100	75.2(15.9)

Table 2: Univariate and multivariable logistic regression analysis showing the association between age and job demands and physical activity levels at work (*n*=203)

	Model 1		Model 2		Model 3	
	OR(95% CI)	*p*-value	OR(95% CI)	*p*-value	OR(95% CI)	*p*-value
Age (40 years and over)	0.41(0.23-0.74)	<0.01	0.44(0.24-0.81)	0.01	0.47(0.25-0.88)	0.02
High Quantitative Demands	2.41(1.33-4.36)	<0.01	2.49(1.34-4.65)	<0.01	2.29(1.21-4.33)	0.01
High Cognitive Demands	1.72(0.96-3.07)	0.07	1.62(0.89-2.96)	0.12	1.47(0.79-2.76)	0.23

Model 1 – Univariate analysis
Model 2 – Adjusted for place of work and BMI
Model 3 – All variables (age, quantitative demands, cognitive demands, place of work and BMI included)

Table 3: Univariate and multivariable logistic regression analysis showing the association between age and job demands and physical activity levels at leisure (*n*=203)

	Model 1		Model 2		Model 3	
	OR(95% CI)	*p*-value	OR(95% CI)	*p*-value	OR(95% CI)	*p*-value
Age (40 years and over)	0.62(0.24-1.60)	0.32	0.69(0.25-1.88)	0.47	0.77(0.28-2.11)	0.60
High Quantitative Demands	2.91(1.09-7.76)	0.03	2.84(1.03-7.88)	0.04	2.85(1.02-7.94)	0.04
High Cognitive Demands	1.05(0.41-2.72)	0.91	0.89(0.33-2.41)	0.82	0.79(0.29-2.19)	0.66

Model 1 – Univariate analysis
Model 2 – Adjusted for place of work and BMI
Model 3 – All variables (age, quantitative demands, cognitive demands, place of work and BMI included)

Table 4: Univariate and multivariable logistic regression analysis showing the association between work physical activity and leisure-time physical activity (recommended level) (*n*=203)

	Model 1		Model 2		Model 3	
	OR(95% CI)	*p*-value	OR(95% CI)	*p*-value	OR(95% CI)	*p*-value
Recommended work physical activity	2.09(0.80-5.47)	0.13	2.35(0.85-6.49)	0.10	1.94(0.67-5.66)	0.22

Model 1 – Univariate analysis
Model 2 – Adjusted for place of work and BMI
Model 3 – All variables (age, quantitative demands, cognitive demand, place of work and BMI included)