Addressing inequalities in physical activity participation: Implications for public health policy and practice

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ARTICLE INFO

ABSTRACT

Objective. To investigate the characteristics of those doing no moderate-vigorous physical activity (MVPA) (0 days/week), some MVPA (1–4 days/week) and sufficient MVPA (≥5 days/week) to meet the guidelines in order to effectively develop and target PA interventions to address inequalities in participation.

Method. A population survey (2010/2011) of 4653 UK adults provided data on PA and socio-demographic characteristics. An ordered logit model investigated the covariates of 1) participating in no PA, 2) participating in some PA, and 3) meeting the PA guidelines. Model predictions were derived for stereotypical subgroups to highlight important policy and practice implications.

Results. Mean age of participants was 45 years old (95% CI 44.51, 45.58) and 42% were male. Probability forecasting showed that males older than 55 years of age (probability = 0.20; 95% CI 0.11, 0.28), and both males (probability = 0.31; 95% CI 0.17, 0.45) and females (probability = 0.38; 95% CI 0.27, 0.50) who report poor health are significantly more likely to do no PA.

Conclusions. Understanding the characteristics of those doing no MVPA and some MVPA could help develop population-level interventions targeting those most in need. Findings suggest that interventions are needed to target older adults, particularly males, and those who report poor health.

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Introduction

The inexorable slide to a more inactive lifestyle offers worrying projections of future prevalence of morbidity and mortality from non-communicable diseases (Branca et al., 2007; WHO, 2010; Lee et al., 2012). Given the ongoing rise of chronic diseases associated with physical inactivity, the associated economic burden (Allender et al., 2007), and modest short-term effects of previous interventions, a major re-think is required if we are to change the health of our population (DoH, 2010; Heath et al., 2012). Recent UK and US guidelines recommend that adults complete at least 150 min of moderate-vigorous physical activity (MVPA) per week (U.S. Department of Health and Human Services, 2010; DoH, 2011). Evidence demonstrates that meeting the recommended level of MVPA leads to a reduced risk of non-communicable disease (Stamatakis et al., 2009, Bryan and Katzmarzyk, 2011; Sun et al., 2014). However, it is imperative that these guidelines are followed up by innovative and sustainable action if we are to meet these recommendations.

Increasing the proportion of the population meeting the current physical activity (PA) guidelines represents a considerable societal challenge. Given the limited resources for public health promotion, we need to target these finite resources to those most in need. This requires an understanding of the characteristics of those who are not meeting the PA guidelines in order to more effectively develop and target evidence-based population-level PA interventions, on which there has been limited focus to date (Trost et al., 2002; Bauman et al., 2012; Anokye et al., 2013). However, translating such evidence into public health planning, policy and practice, and addressing inequalities in participation are challenging. Potentially, some socio-demographic and socio-economic characteristics could help us identify subgroups that need specific, targeted PA interventions, and also point to mediators

that could be targeted in behaviour change interventions (Bauman et al., 2012). Further, a population-level shift could be achieved through targeting those who do some PA (but not enough to meet the guidelines) and encouraging them to do a little more in order to achieve the current guidelines. While this would reflect the approach suggested by Rose (Rose, 1981), we must still recognise that the characteristics of those "in the tail" (i.e. those doing no MVPA) may be distinct from those more centrally located in the distribution (i.e. those doing some MVPA) and so require different approaches.

We therefore postulate that those who do no MVPA are distinct from those who do some MVPA (but not enough to meet the guidelines) and therefore require specific, targeted interventions. By deriving the probability of belonging to a group who either do no MVPA or some MVPA, we can identify specific subgroups that merit different tailoring of behaviour change interventions. Therefore the aim of this study was to investigate the characteristics of those doing no MVPA (0 days/week), some MVPA (1–4 days/week) and sufficient MVPA (≥5 days/week) to meet the guidelines, using an approach common in econometrics. A similar approach has been successfully used in a small number of other studies investigating the economic determinants of PA participation (Farrell and Shields, 2002; Downward, 2007; Humphreys and Ruseski, 2009; Eberth and Smith, 2010; Brown and Roberts, 2011; Anokye et al., 2013), and has been found valuable in other settings (Green et al., 2014).

Materials and methods

Survey

Data were collected with regard to PA and socio-demographic and socio-economic characteristics in the Sport and Physical Activity Survey (SAPAS) (n = 4653), commissioned by Sport Northern Ireland (Sport NI, 2010). Interviews were conducted face-to-face using Computer Assisted Personal Interviewing (CAPI) among a stratified random sample of adults aged 16 + years across Northern Ireland. The fieldwork was carried out continuously over a 12-month period (July 2009–August 2010) and addresses were randomly selected from the Royal Mail's Postal Address File (PAF). An individual aged 16 years and over within each selected household was randomly chosen to complete the survey by interviewing the resident with the most recent birthday.

Data

Dependant variables: participation in physical activity

Data were collected with respect to frequency, duration and intensity of physical activities in the home, work, active travel, and recreation domains during the previous seven days, using the Global Physical Activity Questionnaire (GPAQ) (Bull et al., 2009). Based on the PA guidelines (extant at the time of the survey) of "at least 30 min per day, on at least 5 days per week" (Department of Health, Physical Activity, Health Improvement and Prevention, 2004; U.S. Department of Health and Human Services, 2008), PA was categorised as "none" (0 days/week doing ≥30 min of MVPA), "some" (1–4 days/week doing ≥30 min of MVPA) or "sufficient" (5 or more days/week doing ≥30 min of MVPA).

Independent variables: socio-demographic and socio-economic characteristics

Self-reported data were collected for gender, age, highest level of education, marital status, number of children, car ownership, disability, employment status, social class, area level socio-economic position (SEP) and self-rated health. Age was grouped into three categories, namely aged 16–34 years old, aged 35–54 years old, and aged 55 years and over. Highest level of education was grouped into no formal qualifications, GCSE or equivalent, A level or equivalent and degree or above. Employment status was categorised as economically active (working full time/part time) and economically inactive (including retired, student, unemployed). Disability was dichotomised as having a disability or not. Number of children was classified as none, one child, and two children or more. Marital status was categorised as single, married/co-habiting and divorced/widowed. Social class was dichotomised into ABC1 (managerial, administrative and professional) and C2DE (skilled, semi-skilled and unskilled manual workers, pensioners, casual and lowest grade workers). Area level SEP was based on the Northern Ireland Multiple Deprivation Measure (MDM) (Northern Ireland Statistics and Research Agency, 2005). Using respondents'

home postcode, individuals were allocated a MDM score which was categorised into tertiles ranging from the most to the least deprived area of residence. Self-rated health was answered on a 5-point scale; 1 = very good, 2 = good, 3 = average, 4 = poor, and 5 = very poor. Car ownership was classified as access to no cars, access to one car and access to two or more cars.

Statistical analyses

Descriptive statistics were calculated using frequencies for categorical variables. Bivariate correlations (Pearson's chi-squared tests of independence) were used to conservatively identify predictors for potential inclusion in the model. Socio-demographic and socio-economic variables that were associated with the dependent variable (membership of a particular PA category) at the $p \leq 0.10$ level were included. The nominal indicator of "sufficient MVPA" (i.e. met PA guidelines) was assigned as the reference category. A series of analyses that used ordered logit models were conducted (Brown and Roberts, 2011), adjusting for socio-demographic and socio-economic characteristics to estimate the coefficients of covariates related to participating in none, some or sufficient MVPA (see Appendix I for Econometric Specification). Analyses were undertaken separately for men and women as previous research has shown important differences in physical activity behaviour (Azevedo et al., 2007; Brown and Roberts, 2011; Anokye et al., 2013). Three behaviours were modelled: (1) not participating in any MVPA (0 days/week doing ≥30 min of MVPA); (2) participating in some MVPA (1–4 days/week doing ≥30 min of MVPA); and, (3) participating in sufficient MVPA to meet the guidelines (5 or more days/week doing ≥30 min of MVPA). As Odds Ratios (ORs) estimated from the ordered logit model are not directly interpretable, we used the model to forecast the probability of participation in MVPA. The model was applied to forecast the probability of doing none, some or sufficient MVPA, given certain individual socio-demographic and socio-economic characteristics.

In addition, we also constructed profiles of policy relevant population stereotypes using a combination of socio-demographic and socio-economic characteristics and forecast their probability of doing no MVPA, some MVPA or sufficient MVPA to meet the guidelines. The scenarios were purposely selected to reflect a diverse population and those identified as most in need in our society. All analyses were weighted to reflect Northern Ireland population demographic characteristics and non-response. Data were analysed using STATA 11 for Windows.

Results

Demographic characteristics

Table 1 shows the demographic characteristics of the sample (n = 4653). The mean age of the sample was 45 years old (95% CI 44.51, 45.58) and 42% were male. Further, 53% were economically inactive, 31% had no formal qualifications, 43% lived in the most deprived areas and two thirds of the sample (66%) did not report sufficient activity to meet the guidelines. Overall, 29% did no MVPA and 37% did some MVPA but not enough to meet the UK guidelines.

Table 2 presents the predicted probability of doing none, some or sufficient MVPA depending on a range of socio-demographic and socio-economic variables. Probabilities are computed using results from the ordered logit model, (whose details are in Appendix II). The 95% CI allows us to understand whether the probability (a number between 0 and 1 with values approaching 1 indicating greater probability) of doing none, some or sufficient MVPA is different between people with certain socio-demographic and socio-economic characteristics.

No physical activity

Males who are older (aged 55 years or older) (Prob. 0.20; 95% CI 0.11, 0.28) and those in poor health (Prob. 0.31; 95% CI 0.17, 0.45) are more likely to do no MVPA compared to younger males and those with very good health (Prob. 0.09; 95% CI 0.05, 0.12). A similar pattern was apparent for females, in that those who were older (Prob. 0.25; 95% CI 0.17, 0.34) and those in poor health (Prob. 0.38; 95% CI 0.27, 0.50) were more likely to do no MVPA compared to younger females in very good health (Prob. 0.21; 95% CI 0.14, 0.27).