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Brief Original Report

Associations between active commuting and physical and mental wellbeing ☆

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ABSTRACT

Objective. To examine whether a relationship exists between active commuting and physical and mental wellbeing.

Method. In 2009, cross-sectional postal questionnaire data were collected from a sample of working adults (aged 16 and over) in the Commuting and Health in Cambridge study. Travel behaviour and physical activity were ascertained using the Recent Physical Activity Questionnaire (RPAQ) and a seven-day travel-to-work recall instrument from which weekly time spent in active commuting (walking and cycling) was derived. Physical and mental wellbeing were assessed using the Medical Outcomes Study Short Form survey (SF-8). Associations were tested using multivariable linear regression.

Results. An association was observed between physical wellbeing (PCS-8) score and time spent in active commuting after adjustment for other physical activity (adjusted regression coefficients 0.48, 0.79 and 1.21 for 30–149 min/week, 150–224 min/week and ≥225 min/week respectively versus <30 min/week, $p = 0.01$ for trend; $n = 989$). No such relationship was found for mental wellbeing (MCS-8) ($p = 0.52$).

Conclusion. Greater time spent actively commuting is associated with higher levels of physical wellbeing. Longitudinal studies should examine the contribution of changing levels of active commuting and other forms of physical activity to overall health and wellbeing.

Introduction

Regular physical activity can contribute to a broad range of health benefits (Biddle and Mutrie, 2008). Consistent associations have been found between physical activity and different aspects of physical and mental wellbeing, including depression and anxiety (Dunn et al., 2005), self-reported wellbeing (Anoyke et al., 2012; Bize et al., 2007; Hamer and Stamatakis, 2010), and emotion and mood (Stathopoulou et al., 2006). Some studies suggest a dose–response relationship (Dunn et al., 2005; Hamer et al., 2009).

This evidence is primarily drawn from studies examining associations with recreational physical activity, rather than more routine activities such as walking and cycling to work ('active commuting') (Mutrie and Faulkner, 2004). Qualitative research suggests that choice of travel mode may affect wellbeing (Guell and Ogilvie, 2013; Hiscock et al., 2002) and the nature and intensity of active commuting (AC) may differ from that of recreational physical activity. For example, AC is often solitary and may be experienced as less enjoyable and more stressful than leisure activities. This study uses a validated self-report measure of health-related quality of life (SF-8) to explore the relationship between AC and physical and mental wellbeing in a sample of working adults.

Methods

Study setting and data collection

This analysis uses cross-sectional data from the Commuting and Health in Cambridge study, which has previously been described in detail in Ogilvie et al. (2010). The study was set in the city of Cambridge, UK (approximate population: 108,000) and the surrounding area. Commuters aged 16 and over were recruited from multiple workplaces in the city. Between May and October 2009, participants completed postal questionnaires covering their travel behaviour, physical activity and wellbeing. The Hertfordshire Research Ethics Committee granted ethical approval and participants provided written informed consent.

Outcome measures

Physical and mental wellbeing summary variables were derived from responses to the Medical Outcomes Study Short Form (SF-8). This comprises eight ordinal response questions asking about participants' physical and mental health in the last 4 weeks (general health, physical functioning, role physical, bodily pain, vitality, social

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functioning, role emotional, and mental health). These were used to create physical (PCS) and mental (MCS) summary scores, which were then scaled to population norms using the methods described in Ware et al. (2001).

Exposure measure

Time spent actively commuting was derived using an instrument to record participants' self-reported travel to and from work over the previous seven days (Panter et al., 2011) based on a measure shown to have acceptable test-retest reliability (Shannon et al., 2006). Although the exposure was assessed over a different time period (seven days) than that for the outcome (four weeks), the typical weekly cyclical pattern of AC probably makes a seven-day measure more accurate and less susceptible to recall bias. The distribution of AC was heavily skewed: many participants reported little or no time spent actively commuting. We categorised AC a priori into a 4-level categorical variable; 0–29 min/week ('very low'); 30–149 min/week ('some AC, but below physical activity guidelines' (Cheif Medical Officers, 2011)); 150–224 min/week ('AC above guidelines'); and ≥225 min/week ('very high') (Yang et al., 2012).

Covariates

We adjusted our analysis for covariates known to be related to the prevalence of AC (Trost et al., 2002). Participants provided information on their gender, age (grouped as 16–29, 30–39, 40–49, 50–59, ≥60 years) and highest educational attainment (dichotomised into 'less than bachelor's degree' and 'bachelor's degree or higher') and the distance between their home and workplace (kilometres). We calculated body mass index from self-reported weight and height (kg/m^2) and used standard cutpoints to categorise it into 'normal or underweight', 'overweight', and 'obese' (World Health Organisation, 2000). To control for time spent in other forms of physical activity, we used responses to the validated Recent Physical Activity Questionnaire (RPAQ) (Besson et al., 2010), to compute total time spent in 'recreational' and 'workplace' physical activity (h/week).

Analysis

Univariable linear regression was used to explore associations between AC and physical and mental wellbeing. We then adjusted for covariates in multivariable models. The final specification of these models was determined using Akaike's Information Criterion (AIC) to identify the models that best fit the data. Recognising the potential for weight status to act as a confounder or a mediator of the relationship between active commuting and wellbeing, we present models before and after its inclusion. All analyses were conducted in 2012 using R version 2.13.

Results

Of the 1164 participants who completed the questionnaire, 128 were excluded from analysis due to physical disabilities or illnesses that may have prevented them from walking. A further 47 were excluded due to missing data in either outcome, exposure, or covariate measures. This resulted in a sample of 989 participants for analysis, of whom most were female (68%), educated to bachelor's degree level (73.1%) and neither overweight nor obese (65.1%) (Table 1). Median scores on SF-8 summary variables were higher than the population averages (50) for both physical (median = 56.0, IQR = 52.8–58.0) and mental (median = 52.5, IQR = 48.2–57.5) wellbeing.

Table 1
Sample characteristics according to time spent in active commuting, Cambridge, UK (2009).

	Weekly time spent in active commuting			
	0–29 min	30–149 min	150–224 min	≥225 min
	n (%)	n (%)	n (%)	n (%)
Gender (n = 989)				
Male (n = 316)	64 (20.3)	101 (32.0)	84 (26.6)	67 (21.2)
Female (n = 673)	208 (30.9)	199 (29.6)	156 (23.2)	110 (16.3)
Age (n = 989)				
16–29 (n = 172)	36 (20.9)	53 (30.8)	56 (32.6)	27 (15.7)
30–39 (n = 291)	74 (25.4)	88 (30.2)	82 (28.2)	47 (16.2)
40–49 (n = 258)	76 (29.5)	81 (31.4)	52 (20.2)	49 (19.0)
50–59 (n = 201)	65 (32.3)	58 (28.9)	33 (16.4)	45 (22.4)
≥60 (n = 67)	21 (31.3)	20 (29.9)	17 (25.4)	9 (13.4)
Highest educational qualification				
Less than degree (n = 266)	99 (37.2)	80 (30.1)	52 (19.5)	35 (13.2)
Degree or higher (n = 723)	173 (23.9)	220 (30.4)	188 (26.0)	142 (19.6)
Weight status				
Normal or underweight (n = 644)	154 (23.9)	197 (30.6)	166 (25.8)	127 (19.7)
Overweight (n = 264)	78 (29.5)	86 (32.6)	58 (22.0)	42 (15.9)
Obese (n = 81)	40 (49.4)	17 (21.0)	16 (19.8)	8 (9.9)
Physical component score (PCS-8)				
Median (IQR)	55.3 (51.5–57.6)	56.0 (53.0–58.0)	56.2 (53.7–58.1)	56.3 (54.0–58.3)
Mental component score (MCS-8)				
Median (IQR)	52.3 (46.9–57.5)	52.5 (48.7–57.4)	52.5 (47.5–57.5)	52.7 (48.8–57.5)
Recreational physical activity (h/week)				
Median (IQR)	2.5 (0.0–5.0)	2.5 (0.0–5.0)	2.5 (0.0–5.0)	2.5 (0.0–5.0)
Work-based physical activity (h/week)				
Median (IQR)	5.1 (4.1–5.5)	5.3 (4.2–5.7)	5.3 (4.5–5.7)	5.3 (5.0–5.8)
Distance from work (km)				
Median (IQR)	20.9 (10.9–28.9)	4.8 (3.0–16.0)	4.8 (3.2–8.0)	8.0 (4.8–12.9)

Sample characteristics are presented as number of participants (n) with percentage of participants in parentheses (%). Descriptive statistics for PCS, MCS, physical activity and distance from work are presented as median and inter-quartile range (IQR) due to skewed distributions.