Available online at www.sciencedirect.com
ScienceDirect
Preventive Medicine 45 (2007) 66–70
Preventive Medicine
www.elsevier.com/locate/ypmed

Associations of physical activity with smoking and alcohol consumption: A sport or occupation effect?

Wouter Poortinga *

Welsh School of Architecture, Cardiff University, Bute Building, King Edward VII Avenue, Cardiff, Wales, CF10 3NB, UK

Available online 10 May 2007

Abstract

Background. The aim of this study was to explore the associations of physical activity with smoking and alcohol consumption. It examined whether these associations are due to people participating in organized sports (the sport hypothesis), and/or reflect the concentration of drinking and smoking in manual occupational groups (the occupation hypothesis).

Methods. Data from the 2003 Health Survey for England (n=11,617) were analyzed from a multilevel perspective. Four models were specified to examine the variation of heavy drinking, smoking, sports activity, and occupational activity across different sociodemographic groups; and four sets of analyses further explored the associations of sports and occupational activity with heavy drinking and smoking.

Results. Some support was found for both the sport and occupation hypothesis. Sports activity and heavy drinking were more prevalent among sportsclub members, and occupational activity and heavy drinking were more prevalent among manual occupational groups. Sportsclub membership accounted for some of the association between sports activity and heavy drinking; and occupational position partly accounted for the association between occupational activity and heavy drinking. The occupation hypothesis is the more likely explanation for the association between physical activity and smoking.

Conclusions. This study shows that it is worthwhile to distinguish between different types of physical activity; and that multiple processes underlie the clustering of health behaviors.

Keywords: Clustering; Physical activity; Smoking; Alcohol consumption; Multilevel modeling

Introduction

The four main preventable causes of morbidity and mortality, smoking, excessive alcohol use, an unhealthy diet, and physical inactivity, are not randomly distributed across the population, but occur in combination with one another (Emmons et al., 1994; Ma et al., 2000; Laaksonen et al., 2001; Schuit et al., 2002; Fine et al., 2004; Pronk et al., 2004; Chiolero et al., 2006; Poortinga, 2006b). Most of the associations between lifestyle risk factors are positive, in particular between smoking and drinking (Castro et al., 1989; Bien and Burge, 1990; Revicki et al., 1991; Jensen et al., 2003; Chiolero et al., 2006). However, recent research suggests that physical inactivity is negatively associated with smoking and heavy drinking. Poortinga (2006b) found that people meeting the recommended levels of physical activity are more likely to smoke and to drink heavily.

At the moment it is not clear why the associations of physical activity with smoking and alcohol consumption are positive. One possible explanation is that the associations are due to people drinking and smoking in canteens after participating in organized sports (Schuit et al., 2002). In this interpretation the association of physical activity with smoking and drinking has to do with participation in organized sport and exercise, and can therefore be labeled *the sport hypothesis*. An alternative explanation is that the clustering of physical activity with smoking and alcohol consumption reflects the concentration of these risk factors in specific occupational groups (Poortinga, 2006b). It may be that people with a manual occupation are more likely to smoke and to drink heavily, in addition to being more physically active due to the nature of their work, as compared to people with a non-manual occupation. This can be termed the *occupation hypothesis*.

Some evidence has been found for the occupation hypothesis, in that smoking is more prevalent among manual than non-manual

* Fax: +44 29 2087 4623.
E-mail address: PoortingaW@Cardiff.ac.uk.

0091-7435/$ - see front matter © 2007 Elsevier Inc. All rights reserved.
doi:10.1016/j.ypmed.2007.04.013

occupational groups (Graham, 1994; Duncan et al., 1999). At the same time, people from lower socioeconomic backgrounds are more likely to meet the weekly recommendations of overall physical activity (Poortinga, 2006a), even if they are less likely to engage in more formal sports and leisure time activities (Niknian et al., 1991; Burton and Turrell, 2000; Macintyre and Mutrie, 2004; Poortinga, 2006a; Popham and Mitchell, 2006). Whether the occupation hypothesis also applies to alcohol consumption is less clear. Whereas some studies found that heavy drinking is more common among blue-collar workers than among white-collar workers (Lynch et al., 1997), others found no clear socioeconomic pattern in heavy alcohol consumption (Marmot, 1997; Poortinga, 2006a). Recent research suggests that there are distinctive gender differences, with women of higher education and men of lower education being more likely to drink heavily; and that these differences vary between countries (Bloomfield et al., 2006).

Less support is available for the sport hypothesis. People who regularly join in activities of a range of clubs and organizations (including sports club, gym, and exercise or dance groups) are more likely to drink moderate levels of alcohol than people who never join in activities of these organizations, but are less likely to smoke (Poortinga, 2006a). This suggests that the sport hypothesis may help to explain the clustering of physical activity with alcohol consumption, but not with smoking. However, at the moment no further supporting evidence has been found for the sport hypothesis of clustering.

The aim of the current paper is to further explore the associations of physical activity with smoking and alcohol consumption. This will be done by distinguishing between two types of physical activity, i.e., sports activity and occupational activity. It is important to make a distinction between the two types, as the sport and occupation hypotheses specifically apply to sports and occupational physical activity, respectively. There are some indications that this may help to explain some of the differences in the associations of physical activity with smoking and drinking. Whereas some studies found a negative association between physical activity and smoking (Kvaavik et al., 2004; Chiolero et al., 2006), others found a positive association (Poortinga, 2006b). Most likely that is because the former studies focused on leisure time physical activity, and the latter on overall physical activity, including occupational activity. The two hypotheses are compared by (1) examining the socio-demographic variation in drinking, smoking, sports activity and occupational activity, and (2) exploring the associations of the two types of physical activity with drinking and smoking. If the associations between physical activity and smoking/drinking are due to participation in organized sport and exercise (the sport hypothesis), smoking and alcohol consumption should be more prevalent among sportsclub members than among non-sportsclub members, as should sport-related physical activity. If the clustering is due to people with a manual occupation being more likely to smoke and to drink heavily (the occupation hypothesis), occupational physical activity, smoking, and alcohol consumption should all be more prevalent among manual occupational groups than among non-manual groups. Furthermore, the associations of occupational activity with smoking and alcohol consumption should be attenuated when controlling for differences in occupational position.

Data set

In this study data from the 2003 Health Survey for England (HSE) were used. The HSE 2003 data set, which was collected between June 2003 and March 2004, consisted of 14,836 respondents living at 8867 household addresses that were selected from 720 postcode sectors.[1] As most of the participants aged 65 years and over ($n=3219$) were retired with no information on occupational activity, they were excluded from the analyses. The resulting data set comprised 11,617 individuals living at 6848 household addresses selected from 720 postcode sectors.

Measures

The main variables in this study are heavy drinking, smoking, sports activity, and occupational activity. People's current *smoking status* was assessed with the question "Do you smoke cigarettes at all nowadays". People answering "yes" were considered smokers, and those who answered "no" non-smokers. *Heavy drinking* was defined as drinking eight or more units for men and six or more units for women on at least one day in the week (Office for National Statistics, 2002). After establishing how often the respondents typically drink, questions focused on their alcohol consumption during the previous seven days. When drinking on more than one occasion, respondents were asked about their consumption on the heaviest day. The *sports and exercise activity* variable was based on people's involvement in a range of sport and exercise activities, including swimming, cycling, workout at gym, aerobics, dancing, running/jogging, football, rugby, badminton, tennis, squash, exercises, and 'other' sport or exercise. This study compared people who on average engaged in at least one moderate or vigorous sport or exercise activity per week that lasted for more than 30 min with those who engaged less often in such activity. The level of *occupational activity* was based on the Standard Occupational Classification code of people's current job in combination with the answer to a question about how physically active people feel they are in their job (very, fairly, not very, or not at all). People were classified as having a high level of occupational activity if they considered themselves as very physically active and/or were in a small number of occupations defined as involving heavy work; and if people considered themselves as fairly physically active and were in a small number of occupations involving heavy or moderate work.

The following sociodemographic variables were included in the analyses: gender, age, social class, economic activity, and sportsclub membership. People were categorized into five 10-year age bands (16–24, 25–34, 35–44, 45–54, and 55–64). Two occupational variables were included in this study: household social class and economic status. Household Social Class was based on the Registrar General's occupation-based

[1] National Centre for Social Research and University College London. Department of Epidemiology and Public Health. *Health Survey for England 2003*. Colchester, Essex: UK Data Archive [distributor], March 2005. Reference No.: SN 5098. Available from: http://www.data-archive.ac.uk/.