



Co-occurrence of protective health behaviours and perceived psychosocial job characteristics

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ABSTRACT

Little is known about the association between positive job characteristics of older workers and the co-occurrence of protective health behaviours. This study aims to investigate the association between perceived psychosocial job characteristics and the adoption of protective health behaviours. A population-based cross-sectional study was performed on a sample of 1025 males and females (age-range 50–69-years) attending a primary healthcare clinic. Perceived job characteristics (job demands: quantitative and cognitive demands; resources: possibility for development and influence at work) were determined using the Copenhagen Psychosocial Questionnaire. Each scale is presented in tertiles. Protective health behaviours were; consumption of five or more portions of fruit and vegetables a day, moderate alcohol, non/ex-smoker, and high and moderate physical activity. Each participant was scored 0–4 protective health behaviours. The majority of the sample had three protective health behaviours. Higher levels of influence at work and cognitive demands were associated with higher self-reported physical activity, but not with any number of protective health behaviours. Conversely, higher quantitative and higher cognitive demands were associated with reporting any number of protective health behaviours or above average number of protective health behaviours respectively. The findings on protective health behaviours were inconsistent in relation to the different measures of perceived psychosocial job characteristics and were largely confined to physical activity and diet.

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Introduction

The promotion of healthy behaviours has become a universal target with the aim to improve or reduce chronic disease from obesity, heart disease and diabetes. Protective health behaviours (PHBs) such as good diet, keeping physically active, being a non/ex-smoker and taking moderate alcohol can be influenced by both environmental (including the workplace) and societal factors. Previous work has shown that engaging in four as opposed to no PHB could result in a 14-year difference in chronological age (Khaw et al., 2008) with a notable trend of declining mortality risk with every added PHB. Furthermore, PHBs are also associated with better mental and self-rated health in a general population sample (Harrington et al., 2010).

A recent systematic review found employment to benefit health (van der Noordt et al., 2014) particularly mental health. For PHBs, most work-related studies focussed on associations between job characteristics and specific lifestyle factors predominantly taking a negative perspective – job strain (high job demands and low job control) resulting in poor lifestyle behaviours (Kouvonen et al., 2007; Lallukka

et al., 2004, 2008; Tsutsumi et al., 2003). Positive job characteristics such as high control at work and its association with protective health behaviours has rarely been studied. The Job Demands–Resources model provides a useful theoretical framework which proposes that the resources of the job are positively related to workers good health (Bakker et al., 2010). This conceptual framework allows the researcher to look at work in a positive manner with positive outcomes. This is complementary to the Copenhagen Psychosocial Questionnaire (COPSOQ) which promotes the investigation of distinct aspects of work, both stressors and resources, whilst covering a wide range of psychosocial factors (Kristensen et al., 2005). Resources, according to the COPSOQ, refer to the worker's ability to develop and influence the work they do.

Although many studies have investigated the associations between job demands and resources and specific negative lifestyle behaviours (Kouvonen et al., 2005a, 2005b; Block et al., 2009; Brunner et al., 2007; Ishizaki et al., 2004, 2008; Chau et al., 2012; John et al., 2006; Radi et al., 2007; Hiro et al., 2007), these associations are weak due to individual differences in behavioural responses (Kouvonen et al., 2007). These individualistic behavioural differences are not evenly dispersed throughout the population, but found to group for persons in lower socio-economic positions (Poortinga, 2007). Furthermore, studies published in the last number of years have shown varying results pertaining

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to job characteristics and lifestyle behaviours with researchers finding dissimilar associations between job characteristics and body mass index (BMI) (Kouvonen et al., 2005a; Block et al., 2009; Brunner et al., 2007; Ishizaki et al., 2004, 2008), leisure time physical activity (Lallukka et al., 2004, 2008; Tsutsumi et al., 2003; Chau et al., 2012), nicotine dependence (Tsutsumi et al., 2003; Lallukka et al., 2008; John et al., 2006; Radi et al., 2007) and alcohol intake (Kouvonen et al., 2005b; Hiro et al., 2007). These individual variations in responses can be reduced through investigating the co-occurrence of health behaviours where co-occurrence is understood as the bundling or clustering of health behaviours (Khaw et al., 2008). Such bundling may be explained by an underlying capacity suggested by the strength model of self-control (Hagger et al., 2010). This model postulates a capacity of self-regulation in staying with a healthy behaviour of any kind even when facing barriers. According to this model, the self-control resources can deplete when the individual faces high challenges without appropriate recovery time, a situation that may apply to the condition of excessive workload and excessive workload combined with low control ('high job strain').

Research findings suggest that a mismatch between job demands and resources is associated with a greater probability of co-occurring poor lifestyle behaviours (Kouvonen et al., 2006). A recent meta-analysis found workers who reported job strain were more likely to have unhealthy lifestyles in cross-sectional analysis and further in longitudinal analyses, workers with high job strain at baseline were less likely to have assumed a healthy lifestyle at follow-up (Heikkilä et al., 2013). Cardiovascular outcomes have been investigated for older workers (Mc Carthy et al., 2012), however antecedents (alcohol intake, smoking, inactivity, poor diet) of this chronic disease are important to consider in this age group. Previous work has focussed either on lifestyle factors in a general population sample (Harrington et al., 2010) or on lifestyle factors in a work sample (Siegrist and Rodel, 2006), but to the best of our knowledge not specifically on older heterogeneous workers investigating the positive aspects of work for protective health behaviours.

This study aims to investigate the association between perceived psychosocial job characteristics and the adoption of protective health behaviours. We hypothesised that those workers reporting a positive work experience will report more protective behaviours than those with a less positive work experience.

Methods

Participants

The Mitchelstown study is a cross-sectional primary care-based study on Irish men and women (50–69 years) sampled from a large primary health care clinic (Livinghealth Clinic) in North Cork, Ireland (Kearney et al., 2012). Participants were randomly selected from a list of currently registered patients. In total, 2047 participants were recruited to the study with a 67% response rate. No monetary compensation was given to the participants. Just over half of the sample were current workers (52% $n = 1025$), 30% ($n = 605$) were retired, 12% ($n = 234$) were household labourers and 6% ($n = 111$) were unemployed. For the purpose of this paper only current workers were included in these analyses.

Ethical approval for the study was granted by the Clinical Research Ethics Committee of the Cork Teaching Hospital, Cork, Ireland. Written informed consent was obtained from all individual participants included in the study.

Study variables

Work status was self-reported by participants following which they were classified as workers if they were in paid employment (employee, self-employed, farmer). Current employment data were missing for 4% of the participants.

Independent variables

Perceived job characteristics as determined by employees were ascertained using the Copenhagen Psychosocial Questionnaire (COPSOQ) (Kristensen et al., 2005). Four scales from the COPSOQ were used with resources measured by influence at work and possibility for development, and demands classified as cognitive and quantitative demands. Each scale was a composite of four items and had a theoretical range of 0–100. The average score for each scale was calculated if at least half of the items were complete. A high score was indicative of high demands, high influence at work, and high possibility for development. Cronbach's alpha (α) for the individual scales were; quantitative demands $\alpha = 0.72$ (males $\alpha = 0.71$, females $\alpha = 0.72$), cognitive demands $\alpha = 0.78$ (males $\alpha = 0.78$, females $\alpha = 0.78$), possibility for development $\alpha = 0.82$ (males $\alpha = 0.80$, females $\alpha = 0.83$) and influence at work $\alpha = 0.81$ (males $\alpha = 0.82$, females $\alpha = 0.79$). Each scale was then divided into tertiles with the highest tertile indicating a high score in that dimension. The lowest tertile was used as a reference for all four scales with those in the intermediate and highest tertile compared to this. Demands and resources scales were also dichotomised. This was for the purpose of creating a job strain variable (here expressed as a combination of high quantitative and cognitive demands and low influence at work and possibility for development).

Dependent variables

Smoking history was established by asking – 'Do you now smoke', or 'have you smoked at least 100 cigarettes in your life?' Smokers were categorised into current smokers and non-smokers/ex-smokers.

Moderate alcohol intake was determined by asking 'How often do you have a drink containing alcohol' and 'During the past 7 days how many standard drinks of any alcoholic beverage did you have each day?' A standard drink was defined as a pub measure of spirits, small glass of wine, half pint of beer or an alcopop (about 10 g of pure alcohol (Health and Safety Executive, 2015)). Never drinkers were established from the first question. Moderate drinkers (1–14 units/week) and heavy drinkers (>14 units/week) were defined from the second question (Khaw et al., 2008). Abstainers and heavy drinkers were combined due to the U-shape properties of alcohol consumption in relation to cardiovascular disease risk (Hammar et al., 1997).

Physical activity was measured using the IPAQ-short form (International Physical Activity Questionnaire) (IPAQ Research Committee, 2005). A combined physical activity score METS-min/week was computed by summing walking, moderate and vigorous MET-min/week scores (Craig et al., 2003). Participants were categorised as having low, moderate or high physical activity. Moderate activity was defined as being equivalent to thirty minutes at least of moderate-intensity physical activity on most days. Low activity, less than this and high activity, defined as at least sixty minutes moderate-intensity activity beyond that of the moderate activity category.

Fruit and vegetable intake was assessed from completed Food Frequency Questionnaires (FFQ) which were previously validated in an Irish population (Harrington, 1997). A binary variable was created based on national policy recommendations of five or more portions per day; those who ate less than five portions a day and those who ate five or more portions a day.

In sum, protective health behaviours were; consumption of five or more portions of fruit and vegetables a day, non/ex-smoker, high and moderate physical activity and moderate alcohol. Components of PHBs were treated as dichotomous variables. Scale of number of PHBs was constructed by adding the number of PHBs per person giving a theoretical range of 0–4.

Covariates

Other variables used in these analyses included sex, age, education, type of work (manual/non-manual) and marital status. Age was used as a continuous variable in regression analysis. Educational level was established based on highest level of schooling achieved (primary,

secondary, tertiary). For the regression models, education was categorised into two groups, primary versus secondary and tertiary. Age, sex and education were included in the regression analysis due to their significant association with the number of PHBs. An interaction term between job strain (high demands and low control) and education was created for inclusion in the analysis of job strain and PHBs to further clarify any associations found.

Data analysis

Data were analysed using Predictive Analytics Software – PASW™ 18 (IMB, Armonk, NY, USA). Descriptive statistics were conducted to describe socio-demographic characteristics of the sample (Table 1). Mann–Whitney U tests were performed to investigate the particular pattern of co-occurrence of PHBs by socio-demographic factors (age, sex, education, type of work and marital status) (Table 2). To determine associations of specific work factors with one of the four specific PHBs

and with the number of PHBs, a series of logistic regression analyses were completed. Separate models were built. The independent variables for the separate models were influence at work, possibility for development, quantitative demands and cognitive demands with *p* for trend presented across the tertiles of perceived job characteristics. Sex, education and age were included in all models as potential confounders. The dependent variables were each of the specific 4 PHBs (Table 3), none versus any PHB and high number of co-occurring PHBs (3–4 PHBs) versus low number of PHBs (1–2 PHBs) (Table 4). Finally, the association between high strain (high demands and low control) and PHBs was analysed. This was motivated by the Job Demand–Control Model postulating that poor health outcomes occur when the worker experiences high job demands and low job control (Karasek, 1979). There was a strong association between education and type of work so only education was included in the regression analysis as an indicator for social status.

Table 1
Descriptive statistics, number (*n*), Mean (*M*), Standard deviation (*SD*) for demographic details, work characteristics and number of protective health behaviours of the working sample.

	<i>n</i> = 1025			
	Range	<i>M</i> (<i>SD</i>)	<i>N</i> (%)	Missing data <i>n</i>
Age	50–69	57.8 (4.9)		
Males			542 (53%)	
Education				58
Primary			170 (18%)	
Secondary			507 (52%)	
Tertiary			290 (30%)	
Marital status				3
Married/cohabiting			837 (82%)	
Single/separated/divorced/widowed			185 (18%)	
Manual work				152
Yes			532 (61%)	
No			341 (39%)	
Smoking				16
Current smokers			126 (12%)	
Non-smokers/Ex-smokers			883 (88%)	
^a Alcohol intake typical day	1–5	4.2 (4.9)		306
Abstainer			129 (18%)	
Moderate alcohol			489 (68%)	
Heavy alcohol			101 (14%)	
Physical activity (IPAQ score)	0–19278	^b 792 (144.4–2772)		55
Low			460 (47%)	
Moderate			271 (28%)	
High			239 (25%)	
Daily fruit and vegetable intake	0.5–43.6	7.2 (4.9)		15
<5 portions a day			377 (37%)	
≥5 portions a day			633 (63%)	
^c Influence at work	0–100	55.5 (29.0)		31
Low			327 (33%)	
Intermediate			343 (34%)	
High			324 (33%)	
^c Possibility for development	0–100	66.1 (23.4)		37
Low			341 (35%)	
Intermediate			308 (31%)	
High			339 (34%)	
^c Quantitative demands	0–100	35.9(20.3)		21
Low			359 (36%)	
Intermediate			323 (32%)	
High			322 (32%)	
^c Cognitive demands	0–100	59.7 (24.2)		20
Low			382 (38%)	
Intermediate			285 (28%)	
High			338 (34%)	
Number of PHBs	0–4	2.5 (1.0)		
Zero			24 (2%)	
One			155 (15%)	
Two			322 (32%)	
Three			368 (36%)	
Four			156 (15%)	

^a Number of alcoholic drinks consumed on a typical day when the participant was drinking.

^b Median (interquartile range) Total MET-min/week.

^c Theoretical range 0–100.

Table 2

Mean number of protective health behaviours (PHBs) and Mann–Whitney U tests to investigate the difference within workers by socio-demographic factors.

	n = 1025		p-value*
	N (%)	Mean (SD) PHBs	
Age			0.09
50–59	689 (68%)	2.5 (1.00)	
60–69	329 (32%)	2.4 (0.97)	
Sex			0.02
Male	542 (53%)	2.4 (1.00)	
Female	483 (47%)	2.6 (0.97)	
Education			<0.01
Primary	170 (18%)	2.2 (0.95)	
Secondary	507 (52%)	2.4 (1.00)	
Tertiary	290 (30%)	2.7 (0.95)	
Type of work			<0.01
Manual Worker	532 (61%)	2.4 (0.97)	
Non-manual worker	341 (39%)	2.6 (1.00)	
Marital status			0.29
Married/cohabiting	837 (82%)	2.5 (1.00)	
Single/separated/divorced/widowed	185 (18%)	2.4 (0.95)	

* p = comparison of PHBs within sample for sociodemographic factors.

Results

Demographic details, perceived job characteristics and number of PHBs for the sample (n = 1025) are presented in Table 1. The mean age was 57.8 years. Most of the sample had two (32%) or three protective health behaviours (36%).

Approximately two thirds of the sample were moderate drinkers (68%) and ate five or more portions of fruit and vegetables a day (63%). Over three quarters of the participants were ex/non-smokers (88%) and 53% engaged in moderate/high physical activity.

Table 2 shows the average number of PHBs by socio-demographic factors. There were distinct patterns found. The higher educated, females, and those with non-manual work as their longest job were significantly more likely to have more PHBs. The number of PHBs was not clearly patterned by age or marital status.

Table 3 shows the association between perceived job characteristics and the individual protective health behaviours for workers. In relation to being physically active, there was a significant linear trend for influence at work and cognitive demands and for good diet with cognitive demands. Higher levels of quantitative demands were associated with non-smoking.

Table 4 shows the results of logistic regression analysis investigating the association between perceived job characteristics and any versus none (1–4 versus 0) and high versus low (3–4 versus 1–2) PHBs for

the sample adjusted for age, sex and education. A significant trend was seen across the tertiles of quantitative demands for any number of PHBs versus 0 with those reporting high quantitative demands being almost four times more likely to have any number of PHBs than those with low quantitative demands. A similar trend was seen for cognitive demands for high versus low PHBs.

To further clarify the association between demands and PHBs, we examined the association between job strain and PHBs. We included an interaction term in the model (high strain x education). No association was found for workers with high strain and any number of PHBs versus none or 3–4 PHBs versus 1–2. The multiplicative interaction term was non-significant in the model (data not shown).

Discussion

Main findings of this study

This study set out to investigate the association between perceived job characteristics and health behaviours and the correlates of the co-occurrence of health behaviours in an older heterogeneous working sample. We hypothesised that positive job characteristics were associated with PHBs.

This was to some extent confirmed, however unexpected associations were also found. Our findings on PHBs were inconsistent in relation to the different measures of perceived psychosocial job characteristics and were largely confined to physical activity and diet. This sample of older workers showed positive associations between work demands (quantitative and cognitive) and PHBs. Further, our sample with high demands and low control (job strain) showed no association with PHBs. This null finding differs from previous scholars where job strain was associated with unhealthy lifestyles (Heikkilä et al., 2013).

What is already known on this topic

Previous studies have found higher demands in higher occupational classes (Rugulies et al., 2009, 2012) and a higher occupational class is typically associated with healthier lifestyles (Marmot and Smith, 1991). Our findings may be explained somewhat by the use of the COPSOQ reflecting different concepts from the commonly used demands in the Job Content Questionnaire (Karasek, 1979). The COPSOQ does not measure work intensity, but instead examines the uneven distribution of demands and backlogs at work, incorporating an extensive range of psychosocial issues (Kristensen et al., 2005; Pejtersen et al., 2010). The null finding for influence at work with PHBs is somewhat

Table 3

Odds ratios (95% Confidence Interval) for the association between perceived job characteristics and individual protective health behaviours for all workers (n = 1025).

	Non-smoker		Moderate alcohol		Physically active		Good diet	
	OR (95% CI)	p for trend	OR (95% CI)	p for trend	OR (95% CI)	p for trend	OR (95% CI)	p for trend
Influence at work								
Low	1.0	0.18	1.0	0.29	1.0	0.05	1.0	0.26
Intermediate	1.52 (0.94–2.45)		1.32 (0.86–2.03)		1.10 (0.79–1.52)		1.22 (0.86–1.73)	
High	1.38 (0.84–2.25)		0.80 (0.52–1.23)		1.40 (1.00–1.96)		0.83 (0.57–1.17)	
Possibility for development								
Low	1.0	0.55	1.0	0.60	1.0	0.27	1.0	0.14
Intermediate	1.81 (1.08–3.04)		0.85 (0.53–1.23)		1.46 (1.05–2.04)		1.50 (1.06–2.12)	
High	1.16 (0.73–1.84)		1.11 (0.72–1.72)		1.21 (0.87–1.68)		1.31 (0.92–1.85)	
Quantitative demands								
Low	1.0	<0.01	1.0	0.12	1.0	0.12	1.0	0.58
Intermediate	1.63 (1.03–2.57)		0.99 (0.64–1.51)		1.06 (0.77–1.47)		1.36 (0.98–1.90)	
High	2.67 (1.59–4.46)		0.72 (0.47–1.09)		0.77 (0.55–1.06)		1.09 (0.78–1.52)	
Cognitive demands								
Low	1.0	0.79	1.0	0.46	1.0	0.02	1.0	<0.01
Intermediate	1.01 (0.62–1.66)		1.17 (0.77–1.79)		1.18 (0.85–1.64)		1.77 (1.25–2.49)	
High	0.94 (0.59–1.50)		1.17 (0.78–1.75)		1.46 (1.06–2.01)		1.72 (1.24–2.42)	

Adjusted for age, sex and education.

Table 4
Odds ratios (95% Confidence Interval) for the association between perceived job characteristics and co-occurrence of protective health behaviours (PHBs) for all workers ($n = 1025$).

	1–4 PHBs versus None		3–4 PHBs versus 1–2 PHBs	
	OR (95% CI)	<i>p</i> for trend	OR (95% CI)	<i>p</i> for trend
Influence at work				
Low	1.0	0.78	1.0	0.86
Intermediate	2.82 (0.87–9.19)		1.30 (0.94–1.80)	
High	1.16 (0.46–2.94)		0.97 (0.70–1.36)	
Possibility for development				
Low	1.0	0.07	1.0	0.57
Intermediate	8.45 (1.89–37.87)		1.22 (0.88–1.70)	
High	2.17 (0.88–5.37)		1.10 (0.79–1.53)	
Quantitative demands				
Low	1.0	0.01	1.0	0.63
Intermediate	3.14 (1.13–8.72)		1.17 (0.85–1.61)	
High	3.77 (1.23–11.54)		0.92 (0.67–1.27)	
Cognitive demands				
Low	1.0	0.09	1.0	<0.01
Intermediate	1.47 (0.57–3.79)		1.83 (1.32–2.54)	
High	2.49 (0.86–7.21)		1.73 (1.26–2.37)	

Adjusted for age, sex and education.

puzzling although not altogether inconsistent with previous published work using other job characteristic questionnaires (Ishizaki et al., 2004; Mezuk et al., 2011). Influence at work as measured by the COPSOQ could possibly relate more heavily to the white collar role (Rugulies et al., 2010). Systematic measurement bias may have affected our results as the majority (61%) of our sample characterised their work as mainly manual. However, the means for influence at work between manual and non-manual workers in our sample (manual $M = 58.8$, non-manual $M = 48.6$) did not differ greatly indicating that this variable did not differentiate between them.

Individual protective health behaviours have been encouraged at the population level through public health legislation in Ireland (e.g. smoking ban in workplaces). However, the co-occurrence of protective health behaviours needs to be promoted to further address chronic disease and mortality (Khaw et al., 2008). Self-control has been shown to remain at a high level when the individual is making choices (Hagger et al., 2010). Nevertheless, how this relates to perceived job characteristics deserves further attention. A situation of high control and opportunity for choices at work may also result in high self-control in relation to health behaviours among workers. The possibility for control and choice was measured by the two scales ‘influence at work’ and ‘possibility for development’, however there was only a tendency for a positive association with some health behaviours or co-occurrence of health behaviours. Work demands, self-control and health behaviours need further attention in future research.

Engagement in one health behaviour can enhance engagement in another. For example, scholars have reported that individuals engaging in regular exercise were also taking a healthy diet and were more inspired to continue with this healthy diet, however others thought they could compensate for an unhealthy diet with regular physical activity (Fleig et al., 2015). The issue of compensatory health beliefs and self-control needs to be explored further in relation to perceived job characteristics. Our data did not allow for this type of investigation.

What this study adds

This study adds valuable information about an older group of heterogeneous workers. The use of a population sample allowed the researchers to collect data on people employed in various occupations, a key strength of the current study. However, the generalizability of the results to the working population may be hampered due to two factors. Firstly, some workers may not have been able to attend the clinic for the health screen which was carried out on weekdays during normal working hours (8 am–5 pm). Nevertheless, letters of attendance were made available to working participants for their employer if required.

Secondly, to be invited to participate in the study, people needed to be currently registered with the clinic which healthy workers might not be. Nonetheless, the proportion of workers recruited into our sample was similar to national proportions for that age group during that period (Central Statistics Office, 2014) and they were comparable with the source population (Kearney et al., 2012).

Limitations of this study

Causality cannot be determined due to the cross-sectional study design and response bias from self-reports can alter the results obtained such as an overestimation of physical activity levels or an underestimation of alcohol intake (Hiro et al., 2007; Midanik, 1988). Nevertheless we are confident that this bias did not affect our findings with regard to associations between perceived job characteristics and PHBs to a great extent. Over half of our sample (61%) were manual workers. Unfortunately, we cannot distinguish physical activity done in work from that engaged in outside of the workplace. Nonetheless, 53% of our sample of workers reported engaging in moderate or high physical activity which was very similar to physical activity levels reported by non-workers (51%) sampled from the same health clinic. Previous research has shown that self-reports of smoking behaviours are reasonably accurate (Steffensen et al., 1995) and fruit and vegetable intake, for our sample, was very similar to that reported previously in an Irish context (Harrington et al., 2010). The healthy worker effect may have influenced our findings with those in better health staying at work (Jones et al., 2013). Our findings support this somewhat. The difference between male and female workers needs to be explored further in future research.

Conclusion

A multifaceted approach to health addressing a range of positive health behaviours rather than just focusing on a particular aspect has been recommended to obtain the best results at the population level. There is a need for more research on positive factors in the workplace that encourage the uptake of healthy behaviours rather than just focusing on stress aspects.

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Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Conflicts of interest

The authors declare that they have no conflict of interest.

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