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PSYCHOSOCIAL WORK CONDITIONS AS PREDICTORS OF QUALITY OF LIFE AT THE BEGINNING OF OLDER AGE

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Abstract
Objectives: The purpose of this study was to assess the impact of psychosocial nature of previous work activity on different dimensions of subjective health and life satisfaction at the beginning of older age. **Materials and Methods:** The cross-sectional study was performed on a simple random sample of a 65-year-old cohort of community-dwelling citizens of Kraków. All of the 733 participants (412 women, 321 men) were interviewed face to face in their households. Two separate models have been developed to analyze indicators of health-related quality of life: the first model assessed the influence of divergences between psychological job demands and perceived job control and rewards (adjusted to job physical demands), the other explored the impact of divergences between job effort on job control and rewards (adjusted to psychological demands). **Results:** High physical job demands combined with low job control diminished job satisfaction in women. High physical job demands/efforts combined with low control/reward decreased self-rated health scores. Contrary to expectations high psychological job demands combined with low job control diminished the risk of chronic diseases in women. High physical job demands/efforts combined with low job control/rewards increased the functional independence in both genders. **Conclusions:** Psychosocial conditions of work significantly influenced health-related quality of life at the beginning of older age and their patterns of influence differed between men and women.

Key words:
Work conditions, High demand – Low decision latitude, Effort-reward imbalance, Health-related quality of life, Beginning of older age

INTRODUCTION

Psychosocial aspects of the work environment influence were considered in two models. The first one, developed by Karasek [1], suggests that the nature of work characterized by "high demand and low decision latitude" is the most relevant predictor of illness occurrence. The other one, developed by Siegrest [2], indicates the "effort-reward imbalance", i.e. if a high degree of effort does not meet a high degree of reward, then emotional tension arises and illness risk increases [3].

The relationship between psychosocial working conditions based on the above-mentioned models and the risk of cardiovascular diseases has been analyzed in many prospective and cross-sectional epidemiological studies [3–8].

The impact of retirement on the health status and general well-being has been examined with controversial results:

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the earlier studies tended to show a negative impact of retirement on physical and mental health, while the recent studies suggest some health benefits of retirement (in the psychological domain and health behavior) [9]. Longitudinal studies, regarded as highly significant from the methodological perspective, tend to show little effect of retirement on health and well-being [10].

Several studies examined the process of adaptation to retirement as a life transition and assessed retirement satisfaction in relation to psychosocial resources. From the life course perspective, retirement "as a process of adaptation to change" has been studied to investigate factors contributing to the quality of life [11,12]. In several studies Beehr's [13] model of retirement behavior was used as a basis for selecting personal, psychological, and organizational predictors of subsequent planned retirement age and retirement decisions [14]. Extensive studies of the retirement decision explored the impact of psychological and organizational variables as well as psychological factors on attitudes towards retirement, including retirement self-efficacy, expectations of social aspects of retirement, and leisure orientation [15,16]. Early retirement studies based on life-stress perspective and gender differences in the experience of life events surrounding the retirement have been evaluated. The effects of the retirement-adaptation experience among men and women were also investigated [17–20].

The contribution of work-related affective status and retirement related to psycho-social resources from an earlier job are rarely examined. Investigating the effects of patterns and nature of work activity, it has been expected that job along with organizational factors and incorporated job satisfaction, organizational commitment on health, and general well-being remain very important predictors for healthy ageing. Studies of work and retirement in older age have paid little attention to the earlier work conditions such as psychosocial demands and opportunities (including intellectual demands, work load and pace, the level of responsibilities, interpersonal and role conflicts).

Little is known about the impact of job activity on health and well-being among Polish people at the beginning of ageing and studies carried out to date suffer from a number of limitations. The purpose of the present study was to assess the impact of psychosocial nature of previous work activity on different dimensions of subjective health and life satisfaction in the early phase of ageing. The effect of job characteristics according to two models: Job Demand-Control (JD-C) and Effort-Reward Imbalance (ERI) [1–3] on the post-occupational health-related quality of life at the beginning of older age was also explored.

MATERIALS AND METHODS

The cross-sectional study was performed on a simple random sample of a 65-year-old cohort of community-dwelling citizens of Kraków. All of the 733 participants (412 women, 321 men) were interviewed in their households by specially trained interviewers, recruited from the staff of the Chair of Epidemiology and Preventive Medicine, Department of Medical Sociology. A structured questionnaire was used to collect information on history of occupational activity (including psychosocial job characteristics) and other dimensions of quality of life, such as:

(a) family history: marital status, number of children, giving support to children and grandchildren, receiving social support, conflicts in family, stressful life events in family, being victim of violence;

(b) social network: number and quality of household members, quantity and quality of contacts with children, contacts with previous co-workers, friends;

(c) health-related behaviors: dietary habits, physical activity, alcohol consumption, smoking habit;

(d) leisure time activity: physical activity, sport activity, gardening, walking, attending museums, theatres or cinemas, watching TV, listening to the radio, reading newspapers or books;

(e) financial and material resources: source of income, level of income;

(f) self-concept;

(g) health history: morbidity (twenty one chronic conditions), treatments, using medicaments.

The health-related quality of life was measured using the following indicators: 1) self-rated health (5-item scale from excellent (point = 5) to poor (point = 1) – in logistic regression model, ranges from 3 to 5 were combined

in the category of good self-rated health and from 1 to 2 to poor self-rated health; 2) general health perception – SF 36 – The Moss Short Form General Health Survey [21]; 3) psychological well-being (Geriatric Depression Scale), 4) chronic conditions (CBS Chronic Conditions Shortened Version) – in logistic regression model, three or more chronic conditions were defined as a higher number of chronic conditions, 5) functional status (Groningen Activity Restriction Scale), 6) social activity (Rand Social Activity Questionnaire), and 7) life satisfaction measured using Life Satisfaction Index A (LSI A).

Two separate indexes have been distinguished from LSI A for measuring life satisfaction with present life and life satisfaction with earlier stages of life. In models of logistic regression a higher level of life satisfaction has been defined as a result higher than median of distribution.

Several aspects of the most characteristic features of job have been evaluated with regard to physical efforts and demands, psychological effort and demands, job stress and level of autonomy at work, social interactions with co-workers (social support), income and other job benefits, occupational status (supervisor) and job satisfaction. As measures of job characteristics and outcome variable were not completely identical with the original measures of the Karasek and Siegrist models [1–2], equivalent indicators were used.

Job characteristics were based on several items describing work conditions:

(a) psychological effort: perceived need of self-development of professional skills (item 1), psychological demands (item 2), too many duties (item 3),

(b) physical effort: physical demands (item 4),

(c) physical work environment: unhealthy environment, exposure to health-damaging agents (item 5),

(d) control: job control (item 6), job autonomy (item 7),

(e) stressful events in workplace: job stress (item 8), personal conflicts at work (item 9), conflicts of co-workers (item 10),

(f) rewards: job satisfaction (item 11), positive self-evaluation of social interactions at workplace (item 12), high salaries (item 13), high self-esteem due to occupational status (item 14),

(g) social interactions with coworkers: social (informal) interactions with co-workers after stopping occupational activity (item 15), continuation of participation in leisure activities with previous co-workers out of workplace (item 16), visiting workplace (item 17), number of friends recruited from co-workers (item 18).

Dichotomous answers to all mentioned items were coded: "yes" = 1, "no" = 0.

Statistical analysis

Principal component analysis was performed to describe the structure of factors, which characterized previous psychosocial dimensions of occupational activity. Based on its results, indicators were chosen to build indexes of imbalance between demand and control, and respectively between effort and reward. In both models, job demand-control and effort-reward imbalance, indicators of demand and effort indexes were used. They were based on such variables as: job associated with high physical effort (item 4) and exposure to health-damaging agents (item 5) as an indicator of physical effort as well as work required systematic self-development (item 1), high mental effort (item 2) and too many duties (item 3) as an indicator of psychological effort. Indicators like: self-organization of work and job autonomy (items 6 and 7) were used to develop the job control index. Reward index consisted of such variables as: good salaries (item 13), high self-esteem due to occupational status (item 14), personal benefits: relations with nice and interesting people (co-workers) (item 12), and job satisfaction (item 11) (this variable was excluded from the index in model describing job satisfaction as dependent variable). Results describing particular indexes were based on the sum of ranges obtained from individual answers. A higher level of effort/reward/demand/control was defined as a value of indexes equal to or higher than median of distribution.

Two separate models have been developed to analyze indicators of health-related quality of life: in the first one, the influence of divergences between psychological job demands and perceived job control and rewards (adjusted to job physical demands) was assessed. In the other, the impact of divergences between job effort on job control

and rewards (adjusted to psychological demands) was explored. Both models were adjusted to other variables characterizing the work environment not included in ERI or JD-C models and marital status (living alone). General life satisfaction and health outcomes based on indicators like self-rated health, level of functional independence, and psychological well-being were defined as dependent variables in the logistic regression models.

Statistical analysis of the impact of divergences between job demands and control (JD-C model) and efforts and rewards (ERI model) was performed using multivariate logistic regression model. The impact of different dimensions of job characteristics on the reported number of chronic illnesses was also assessed using multivariate logistic regression model. All multidimensional models were adjusted for education and supervisor position. Statistical analysis was performed using SPSS 12 PL for Windows.

RESULTS

Sociodemographic characteristics of population under study

Significant gender-related differences in education were observed: 26.1% of women and 15.2% of men reported primary education, 17.2% of women and 34.1% of men vocational, 30.1% of women and 25.3% of men secondary, and 26.2% of women and 23% of men higher education. All men and most of women (97.6%) were involved in the paid work – only this group was included into further analysis. The proportion of men (23.7%) who continued occupational activity during the retirement was over twice as high as that of women (10.5%). The difference was statistically significant. Gender-related differences in occupations were also observed (significantly more manual workers among men and more clerks among women). Supervisor position was held by 35.3% of women and 49.8% of men (statistically significant difference) (Table 1).

Table 1. Statistical differences in demographic and occupational characteristics of respondents aged 65 years

Variables	Women		Men	
	n	%	n	%
Education:[1)]				
primary school or less	109	26.5	49	15.3
vocational	71	17.2	109	34.1
secondary	145	35.2	85	26.6
university	87	21.1	77	24.1
Occupational history: [2)]				
never paid worker	10	2.4	0	0.0
former paid worker (retired)	359	87.2	245	76.3
continuation of occupational activity	43	10.4	76	23.7
Occupation:[3)]				
manual worker	93	23.4	102	32.4
manual/non-manual worker	84	21.2	72	22.9
clerks	130	32.7	69	21.9
managers	75	18.9	60	19.0
freelance professions	6	1.5	9	2.8
unemployed	0	0.0	3	0.9
never worker	9	2.3	0	0.0
Supervisor position:[4)]				
yes	260	64.7	160	50.2
no	142	35.3	159	49.8

[1)] $Chi^2 = 36.1$, df = 3, $p < 0.05$; [2)] $Chi^2 = 33.1$, df = 2, $p < 0.05$;
[3)] $Chi^2 = 22.2$, df = 6, $p < 0.05$; [4)] $Chi^2 = 15.4$, df = 1, $p < 0.05$.

Imbalance between demands and control and between efforts and rewards

Table 2 shows a higher percentage of men than women categorized in the most adverse quadrants (i.e. high demands vs. low control or high effort vs. low reward), independently of physical or psychological effort and demand. Analysis of psychological effort revealed that nearly 38% of men perceived themselves as workers with high effort and low reward and analysis of physical effort showed that this kind of self-evaluation was characteristic of nearly 30% of men. High psychological demand and low control were reported by 28% of men and 27% of women, 29% of men perceived themselves as workers with high physical demand and low control.

Indicators of chosen dimensions of well-being in relation to the JD-C and ERI models

The health-related quality of life among women and men was analyzed using different indicators. More men than women reported that work activity was important source of satisfaction, while opposite gender-related differences

Table 2. Distribution of demand-control and effort-reward categories in respondents under study

Demands	Women		Men	
	n	%	n	%
Psychological demands:				
low demands – high control	31	7.7	24	7.5
high demands – high control	105	26.1	120	37.4
low demands – low control	158	39.3	87	27.1
high demands – low control	108	26.9	90	28.0
Physical demands:				
low demands – high control	122	30.3	100	31.2
high demands – high control	14	3.5	44	13.7
low demands – low control	198	49.3	83	25.9
high demands – low control	68	16.9	94	29.3
Psychological effort:				
low effort – high rewards	52	12.9	21	6.5
high effort – high rewards	147	36.6	86	26.8
low effort – low rewards	137	34.1	90	28.0
high effort – low rewards	66	16.4	124	38.6
Physical effort:				
low effort – high rewards	163	40.5	67	20.9
high effort – high rewards	36	9.0	40	12.5
low effort – low rewards	157	39.1	116	36.1
high effort – low rewards	46	11.4	98	30.5

were observed in relation to general life satisfaction. Self-rated health was higher in men than in women; women reported a higher number of chronic conditions and a higher level of independence in everyday activity.

Two models that are related to well-being and subjective indicators, which characterize health parameters of working populations were developed. Model I evaluated the effect of discrepancy between psychological job demands and job control (in JDC model) or psychological effort-reward imbalance (in ERI model) controlled for physical job demands upon the indicators of life satisfaction and health-related quality of life. Model II focused on the impact of differences between physical job demands and worker's job control (JDC model) or physical effort-reward imbalance (ERI model) controlled for psychological job demands upon the indicators of life satisfaction and health-related quality of life.

Table 3a. Job satisfaction in relation to job demand-control (JD-C) model (multivariate logistic regression model)

Women	Model I	Model II
Low demands-high control	1	1
High demands-high control	1.00 (0.10; 10.6)	126 (0; 800)
Low demands-low control	0.05 (0.01; 0.44)*	0.10 (0.03; 0.33)*
High demands-low control	0.19 (0.01; 1.02)	0.15 (0.04; 0.58)*
Low physical demands	1	
High physical demands	1.55 (0.75; 3.21)	
Low psychological demands		1
High psychological demands		2.06 (0.96; 4.42)
Men		
Low demands-high control	1	1
High demands-high control	7.61 (0.53; 109)	0.78 (0.06; 10.2)
Low demands-low control	0.19 (0.03; 1.27)	0.08 (0.01; 0.50)*
High demands-low control	0.53 (0.08; 3.39)	0.21 (0.03; 1.41)
Low physical demands	1	
High physical demands	2.29 (0.94; 5.56)	
Low psychological demands		1
High psychological demands		3.27 (1.19; 9.03)*

Odds ratio and 95% CI in parentheses; * $p < 0.05$.

Table 3b. Job satisfaction in relation to effort-reward imbalance (ERI) model (multivariate logistic regression model)

Women	Model I	Model II
Low effort-high reward	1	1
High effort-high reward	0.68 (0.17; 2.79)	0.64 (0.16; 2.55)
Low effort-low reward	0.12 (0.03; 0.44)*	0.22 (0.09; 0.54)*
High effort-low reward	0.40 (0.10; 1.69)	0.34 (0.11; 1.07)
Low physical effort	1	
High physical effort	1.24 (0.59; 2.59)	
Low psychological effort		1
High psychological effort		2.02 (0.94; 4.37)
Men		
Low effort-high reward	1	1
High effort-high reward	2.49 (0.13; 46.8)	1.10 (0.06; 20.0)
Low effort-low reward	0.16 (0.02; 1.42)	0.13 (0.02; 1.13)
High effort-low reward	0.47 (0.05; 4.32)	0.27 (0.03; 2.51)
Low physical effort	1	
High physical effort	1.97 (0.82; 4.72)	
Low psychological effort		1
High psychological effort		2.96 (1.10; 8.00)*

Odds ratio and 95% CI in parentheses; * $p < 0.05$.

JD-C model II showed that in women high physical job demands combined with low job control lowered their job satisfaction (Table 3a).

In model I, in both JD-C and ERI models, low psychological job demands/efforts combined with low control/reward markedly diminished job satisfaction in women. According to model II, low physical demands/efforts combined with low job control/rewards decreased job satisfaction in women. A similar effect was obtained in men who had low physical job demands combined with low job control (Tables 3a, 3b).

In model I, only high physical job demands increased well-being (life satisfaction) of male respondents (JD-C) while low psychological effort combined with low rewards lowered well-being in women (ERI). In model II, high physical demands combined with high control (JD-C) increased well-being of males while high physical effort combined with high reward lowered life satisfaction in women (Tables 4a, 4b).

According to JD-C and ERI models, in model II, high physical job demands/efforts combined with low control/reward decreased self-rated health scores in men (Tables 5a, 5b).

It is necessary to mention that in model I contrary to expectation, high demand vs. high control was related to the decrease of self-rated health in women (Table 5a). Self-rated health was also lower in men with low effort and low reward (Table 5b).

The JD-C framework applied in model I showed that high psychological job demands combined with low job control independently lowered the risk of chronic diseases in women (Table 6a), however, the same tendency was observed in women characterized by high demand – high control and low demand – low control (respectively to psychological demands) and low demand – low control (respectively to physical demands) (Table 6a). A high risk of chronic conditions was observed in male respondents with high psychological demand and high control (Table 6a, 6b).

In model I, high psychological job demands combined with low job control (JD-C model) increased the level of functional independence in men. In model II, high physical job demands/efforts combined with low job control/rewards

Table 4a. Satisfaction with present life in relation to job demand-control (JD-C) model (multivariate logistic regression model)

Women	Model I	Model II
Low demands-high control	1	1
High demands-high control	0.72 (0.28; 1.87)	0.79 (0.20; 2.83)
Low demands-low control	0.60 (0.23; 1.59)	1.17 (0.62; 2.22)
High demands-low control	1.08 (0.41; 2.87)	0.67 (0.27; 1.65)
Low physical demands	1	
High physical demands	0.62 (0.31; 1.17)	
Low psychological demands		1
High psychological demands		1.34 (0.77; 2.34)
Men		
Low demands-high control	1	1
High demands-high control	1.44 (0.49; 4.21)	2.86 (1.16; 7.07)*
Low demands-low control	0.72 (0.23; 2.20)	0.76 (0.36; 1.63)
High demands-low control	0.74 (0.25; 2.18)	1.02 (0.46; 2.26)
Low physical demands	1	
High physical demands	1.83 (1.02; 3.29)*	
Low psychological demands		1
High psychological demands		1.15 (0.61; 2.18)

Odds ratio and 95% CI in parentheses; * $p < 0.05$.

Table 4b. Satisfaction with present life in relation to effort-reward imbalance (ERI) model (multivariate logistic regression model)

Women	Model I	Model II
Low effort-high reward	1	1
High effort-high reward	0.82 (0.38; 1.73)	0.34 (0.13; 0.85)*
Low effort-low reward	0.43 (0.20; 0.96)*	0.56 (0.32; 1.00)
High effort-low reward	0.79 (0.34; 1.87)	0.56 (0.22; 1.44)
Low physical effort	1	
High physical effort	0.59 (0.30; 1.14)	
Low psychological effort		1
High psychological effort		1.26 (0.71; 2.24)
Men		
Low effort-high reward	1	1
High effort-high reward	1.75 (0.54; 5.73)	1.82 (0.68; 4.87)
Low effort-low reward	1.08 (0.35; 3.40)	0.77 (0.37; 1.63)
High effort-low reward	1.15 (0.38; 3.50)	1.31 (0.58; 2.93)
Low physical effort	1	
High physical effort	1.74 (0.98; 3.10)	
Low psychological effort		1
High psychological effort		1.20 (0.64; 2.27)

Odds ratio and 95% CI in parentheses; * $p < 0.05$.

Table 5a. Self-rated health in relation to job demand-control (JD-C) model (multivariate logistic regression model)

Women	Model I	Model II
Low demands-high control	1	1
High demands-high control	0.26 (0.09; 0.80)*	0.81 (0.20; 3.28)
Low demands-low control	0.40 (0.13; 1.22)	0.95 (0.47; 1.91)
High demands-low control	0.34 (0.11; 1.02)	0.56 (0.21; 1.50)
Low physical demands	1	
High physical demands	0.62 (0.31; 1.26)	
Low psychological demands		1
High psychological demands		0.60 (0.32; 1.12)
Men		
Low demands-high control	1	1
High demands-high control	0.77 (0.23; 2.41)	0.50 (0.20; 1.26)
Low demands-low control	0.35 (0.10; 1.18)	0.50 (0.21; 1.16)
High demands-low control	0.52 (0.17; 1.64)	0.35 (0.14; 0.86)*
Low physical demands	1	
High physical demands	0.60 (0.32; 1.11)	
Low psychological demands		1
High psychological demands		1.19 (0.59; 2.40)

Odds ratio and 95% CI in parentheses; *p < 0.05.

Table 5b. Self-rated health in relation to effort-reward imbalance (ERI) model (multivariate logistic regression model)

Women	Model I	Model II
Low effort-high reward	1	1
High effort-high reward	0.54 (0.23; 1.28)	0.73 (0.27; 1.93)
Low effort-low reward	0.73 (0.30; 1.77)	0.80 (0.43; 1.50)
High effort-low reward	0.43 (0.16; 1.12)	0.42 (0.15; 1.21)
Low physical effort	1	
High physical effort	0.61 (0.30; 1.24)	
Low psychological effort		1
High psychological effort		0.55 (0.29; 1.05)
Men		
Low effort-high reward	1	1
High effort-high reward	1.37 (0.38; 5.00)	0.40 (0.14; 1.18)
Low effort-low reward	0.57 (0.16; 1.96)	0.37 (0.15; 0.87)*
High effort-low reward	0.60 (0.18; 2.03)	0.25 (0.10; 0.65)*
Low physical effort	1	
High physical effort	0.59 (0.32; 1.10)	
Low psychological effort		1
High psychological effort		1.13 (0.59; 2.27)

Odds ratio and 95% CI in parentheses; * p < 0.05.

Table 6a. Number of chronic conditions (more than 3) in relation to job demand-control (JD-C) model (multivariate logistic regression model)

Women	Model I	Model II
Low demands-high control	1	1
High demands-high control	0.38 (0.14; 0.99)*	1.41 (0.41; 4.87)
Low demands-low control	0.29 (0.11; 0.79)*	0.49 (0.26; 0.93)*
High demands-low control	0.25 (0.09; 0.67)*	0.89 (0.39; 2.03)
Low physical demands	1	
High physical demands	1.71 (0.95; 3.07)	
Low psychological demands		1
High psychological demands		0.68 (0.40; 1.15)
Men		
Low demands-high control	1	1
High demands-high control	4.32 (1.39; 13.4)*	0.97 (0.41; 2.31)
Low demands-low control	1.39 (0.45; 4.39)	0.74 (0.34; 1.63)
High demands-low control	2.02 (0.67; 6.13)	0.51 (0.22; 1.16)
Low physical demands	1	
High physical demands	0.78 (0.45; 1.36)	
Low psychological demands		1
High psychological demands		1.97 (1.06;3.67)*

Odds ratio and 95% CI in parentheses; * p < 0.05

Table 6b. Number of chronic conditions (more than 3) in relation to effort-reward imbalance (ERI) model (multivariate logistic regression model)

Women	Model I	Model II
Low effort-high reward	1	1
High effort-high reward	0.83 (0.41; 1.74)	1.48 (0.63; 3.51)
Low effort-low reward	1.07 (0.50; 2.23)	0.85 (0.49; 1.47)
High effort-low reward	0.64 (0.28; 1.48)	1.55 (0.66; 3.60)
Low physical effort	1	
High physical effort	1.67 (0.93; 3.01)	
Low psychological effort		1
High psychological effort		0.73 (0.42; 1.24)
Men		
Low effort-high reward	1	1
High effort-high reward	2.60 (0.79; 8.48)	0.59 (0.22; 1.58)
Low effort-low reward	1.20 (0.39; 3.69)	0.83 (0.39; 1.75)
High effort-low reward	2.30 (0.76; 6.70)	0.70 (0.32; 1.57)
Low physical effort	1	
High physical effort	0.78 (0.44; 1.33)	
Low psychological effort		1
High psychological effort		2.09 (1.12; 3.91)*

Odds ratio and 95% CI in parentheses; * p < 0.05.

Table 7a. Independence in daily living activities (measured by GARS Scale) in relation to job demand-control (JD-C) model (multivariate logistic regression model)

Women	Model I	Model II
Low demands-high control	1	1
High demands-high control	1.09 (0.41; 2.92)	1.74 (0.42; 7.22)
Low demands-low control	1.49 (0.58; 3.97)	1.79 (0.90; 3.55)
High demands-low control	2.07 (0.75; 5.69)	2.50 (1.01; 6.17)*
Low physical demands	1	
High physical demands	1.46 (0.76; 2.80)	
Low psychological demands		1
High psychological demands		1.29 (0.73; 2.29)
Men		
Low demands-high control	1	1
High demands-high control	2.34 (0.75; 7.30)	3.12 (1.19; 8.20)*
Low demands-low control	3.67 (1.16; 11.6)*	2.92 (1.23; 6.90)*
High demands-low control	3.05 (1.00; 9.38)*	2.83 (1.18; 6.79)*
Low physical demands	1	
High physical demands	1.51 (0.84; 2.73)	
Low psychological demands		1
High psychological demands		1.13 (0.58; 2.21)

Odds ratio and 95% CI in parentheses; *p < 0.05.

Table 7b. Independence in daily living activities in relation to effort-reward imbalance (ERI) model (multivariate logistic regression model)

Women	Model I	Model II
Low effort-high reward	1	1
High effort-high reward	1.67 (0.76; 3.63)	0.67 (0.26; 1.71)
Low effort-low reward	1.67 (0.75; 3.69)	0.91 (0.50; 1.67)
High effort-low reward	1.52 (0.62; 3.74)	2.66 (1.01; 6.97)*
Low physical effort	1	
High physical effort	1.55 (0.80; 2.99)	
Low psychological effort		1
High psychological effort		1.33 (0.73; 2.40)
Men		
Low effort-high reward	1	1
High effort-high reward	2.66 (0.77; 9.18)	1.31 (0.46; 3.68)
Low effort-low reward	3.64 (1.12; 11.8)*	1.45 (0.65; 3.22)
High effort-low reward	3.09 (0.98; 9.84)	2.43 (1.01; 5.84)*
Low physical effort	1	
High physical effort	1.57 (0.87; 2.82)	
Low psychological effort		1
High psychological effort		1.14 (0.59; 2.23)

Odds ratio and 95% CI in parentheses; * p < 0.05.

increased the chance of functional independence in both genders (Tables 7a, 7b).

In model I, low job control/rewards combined with low job psychological demands/efforts increased the chance of functional independence in men. In model II, high physical job demands combined with high job control like in low physical job demands combined with low job control, increased the chance of functional independence in men (Tables 7a, 7b).

DISCUSSION AND CONCLUSIONS

In the life course approach as well as in dynamic model of health, future health potential (during older age) depends on determinants coming from the earlier stages of life [11,12,22]. The role of work and occupational environment – physical and psychosocial determinants of job activity and the impact of these conditions on subjective health status as well as on morbidity and mortality patterns – have been the subject of many studies. The health-related quality of life in older age is influenced by several determinants, such as general well-being and functioning, social activity and social support, physical and psychological well-being and functioning, and overall personal health resources [22], but among those determinants occupational activity exerts the strongest effect. Several studies supported the accumulated evidence that job stress (job demand-control and effort-reward imbalance) is related to cardiovascular risk in both men and women, mostly in the middle aged working population [4,23,24].

In our study, the relation between past work conditions (job stress in terms of effort-reward and demands-control imbalance) and different dimensions of subjective health at the beginning of older age was examined in 412 women and 320 men aged 65 years.

In comparison to other studies [7], we observed twice as high or even higher proportion of men with high demands vs. low control and high effort vs. low reward due to physical and psychological dimensions of work characteristics.

Our results, corresponding to some degree with data obtained from other studies [7,25], confirmed the relation between job stress and general well-being or self-reported

health, however, we also found other determinants of self-rated health resulting from demand-control and effort-reward models. De Jonge [7] found the independent cumulative effects of both models, JD-C and ERI, on employee well-being (in both men and women as well as in young and old people). Niedhammer et al. [25] showed in the cross-sectional analysis that effort-reward imbalance and overcommitment were significant risk factors for self-reported health for men and women, and in the prospective analysis (one year follow-up) reward was confirmed to be a significant predictive factor of poor health for men and women.

Contrary to expectations our data showed an inverse relation between effort-reward imbalance and job demand-control models due to the increasing risk of chronic conditions and the level of independence in daily living activity. Other authors summarizing the results of different surveys, involving the Karasek and Siegrist models, also showed some controversial results [26,27].

The results of our study can be burdened with two limitations: first, the results are restricted because retrospective data perception could change over time; and second, the assessment of effort-reward imbalance is also limited by changes over time. The fact that we developed equivalent indicators of job stress (based on the Karasek and Siegrist models) was supported by other researchers who also used replacement indicators instead of original ones [7].

We showed in our study that after adjustment for relevant confounders, the results of multivariate logistic regression models confirmed the relation between psychosocial dimensions of work and predictors of healthy ageing and health outcomes of some job characteristics. These results indicate gender-related differences in the association between characteristics of earlier job and subjective health.

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