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Sex Inequalities in Physical and Mental Functioning of British, Finnish, and Japanese Civil Servants: Role of Job Demand, Control and Work Hours

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Abstract

In general, women report more physical and mental symptoms than men. International comparisons of countries with different welfare state regimes may provide further understanding of the social determinants of sex inequalities in health. This study aims to evaluate (1) whether there are sex inequalities in health functioning as measured by the Short Form 36 (SF-36), and (2) whether work characteristics contribute to the sex inequalities in health among employees from Britain, Finland, and Japan, representing liberal, social democratic, and conservative welfare state regimes, respectively. The participants were 7340 (5122 men and 2218 women) British employees, 2297 (1638 men and 659 women) Japanese employees, and 8164 (1649 men and 6515 women) Finnish employees. All the participants were civil servants aged 40–60 years. We found that more women than men tended to have disadvantaged work characteristics (i.e. low employment grade, low job control, high job demands, and long work hours) but such sex differences were relatively smaller among employees from Finland, where more gender equal policies exist than Britain and Japan. The age-adjusted odds ratio (OR) of women for poor physical functioning was the largest for British women (OR=2.08), followed by for Japanese women (OR=1.72), and then for Finnish women (OR=1.51). The age-adjusted OR of women for poor mental functioning was the largest for Japanese women (OR=1.91), followed by for British women (OR=1.45), and then for Finnish women (OR=1.07). Thus, sex differences in physical and mental health was the smallest in the Finnish population. The larger the sex differences in work characteristics, the larger the sex differences in health and the reduction in the sex differences in health after adjustment for work characteristics. These results suggest that egalitarian and gender

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equal policies may contribute to smaller sex differences in health, through smaller differences in disadvantaged work characteristics between men and women.

Keywords

UK; Finland; Japan; Gender; Psychosocial stress; civil servants; job demand; Health inequalities

Introduction

The importance of macro-economic structure and welfare state regimes in the social determinants of health has increasingly been recognised. Navarro, et al (2006) showed that welfare state and labour market policies aimed at reducing social inequalities had beneficial effects on population health in wealthy European countries. They proposed a conceptual model that explains the pathway from politics through labour markets and welfare state to socioeconomic inequalities and health outcomes. Social democratic policies such as extensive welfare and social services, full employment policies, redistribution through tax and transfer system are considered to result in less inequalities in working conditions and health (Borrell, Espelt, Rodríguez-Sanz, & Navarro, 2007).

We previously reported that there were socioeconomic inequalities in work characteristics and physical and mental functioning among public sector employees from Britain, Finland and Japan (Martikainen, et al., 2004; Sekine, Chandola, Martikainen, Marmot, & Kagamimori, 2009). The magnitude of socioeconomic inequalities in disadvantaged work characteristics (i.e. low job control, high job demands, and long work hours) and poor physical functioning was somewhat smaller among non-manual grades of the Finnish population than among other 2 populations. According to Esping-Andersen (1990), Finland belongs to the social democratic group of welfare state regimes with an emphasis on universal and egalitarian policies, while the UK and Japan belong to liberal and conservative welfare state regimes respectively. The UK and Japan favour a relatively passive approach to labour market regulations. Egalitarian policies in Finnish society may have contributed to relatively smaller socioeconomic differences in health functioning and work characteristics.

Meanwhile, it is well-known that there are sex differences in various somatic and psychological domains of health, with women often but not always reporting poorer health than men (Macintyre, Hunt, & Sweeting, 1996; Lahelma, Martikainen, Rahkonen, & Silventoinen, 1999; Doi & Minowa, 2003). Although the reasons why physical and mental symptoms were more prevalent in women than in men are not necessarily clear, genetic, biological, social, cultural, economic, behavioural, and reporting differences between men and women are considered to be possible explanations for the sex differences (Verbrugge, 1985; Macintyre, et al., 1996; Arber, 1999, Lahelma, et al., 1999; Kuehner, 2003; Lahelma, Laaksonen, Martikainen, Rahkonen, & Sarlio-Lähteenkorva, 2006). In the Japanese civil servants, poor sleep quality was more prevalent among women than men and the sex inequalities in sleep reduced after adjustment for work and family characteristics, which indicated that sex differences in work and family characteristics contributed to some of the sex inequalities in sleep (Sekine, Chandola, Martikainen, Marmot, & Kagamimori, 2006). Kuehner (2003) reported in a review paper that female preponderance in disadvantaged social and psychological characteristics (e.g. low education, low socioeconomic status, and a lack of decision control) and in high levels of sex hormones and their interaction with psychosocial factors may potentially explain sex differences in depression.

Interestingly, the sex differences in health vary across countries. A recent study on sex differences in depression in 23 European countries showed that depression was more

prevalent among women than among men in almost all countries but there were relatively smaller sex differences in Nordic countries with no significant differences in Finland (Van de Velde, Bracke, & Levecque, 2010). In the study, socioeconomic and family-related factors were explanatory factors for the sex differences in depression and the cross-national variation.

Research on work-related factors as determinants for the different patterns of sex inequalities in health among countries may provide further understanding of the cross-national variation in sex differences in health but such studies are still lacking. In employed European population, the degree of sex differences in disadvantaged work characteristics differ among countries, and men had higher job control and lower psychological demand than women in southern and middle European regions, whereas the reverse was true in Swedish population (de Smet et al., 2005). Nordic countries employ more gender-equal policies than other countries, which may result in smaller differences in work conditions and health.

The purpose of this study is, therefore, to examine the following research questions in three comparable civil servant populations from Britain, Finland, and Japan: (1) whether there are sex differences in poor physical and mental functioning, (2) whether there are sex differences in work characteristics and whether these contribute to the sex differences in poor physical and mental functioning, and (3) whether the degree and patterns of sex differences in work characteristics and health and the potential contributions of sex differences in work characteristics to sex differences in health differ among the 3 populations.

The Global Gender Gap Report (Hausmann, Tyson, & Zahidi, 2008) ranked 130 countries from 4 aspects of gender equality: Economic participation and opportunity (e.g. labour force participation, wage equality, senior officials and managers, professional and technical workers); Educational attainment (e.g. literacy and educational levels); Political empowerment (e.g. ministerial-level workers); Health and survival (e.g. healthy life expectancy). Among 130 countries, Finland was ranked as 2nd highest country in terms of gender equality, followed by the UK (13th), and, then, Japan (98th).

Our hypothesis is, therefore, in the following. First, sex inequalities in work characteristics and health are smaller in the Finnish population than in other 2 populations. Second, the sex differences in work characteristics explain some of the sex inequalities in health. Third, the contribution of work characteristics to sex difference in health is the largest in the Japanese population, where society is much less gender equal than other 2 populations.

Methods

Participants

The British civil servants study (the Whitehall II study) comprised employees working in the London offices of twenty National Government Civil Service departments, aged 35-55 when they were recruited in 1985-1988 (Marmot, et al., 1991). In Phase 3 (1991-1993) and later phases of the survey, SF36 information on physical and mental functioning was available, so data from Phase 3 were used in this study. At baseline, the response rate for the Whitehall II study was 73%. The response rate for Phase 3 was 84% of the original population.

The Japanese civil servants study (the JACS study) comprised employees working in local government on the west coast of Japan (Sekine, et al., 2006). Phase 1 of the survey was conducted in 1998. In Phase 2 (2003) information on grades of employment was available, so data from Phase 2 were used in this study. A postal questionnaire was distributed to all

employees and gathered through the personnel section of the local government agency. The participants were 20-65 years at the time of the Phase 2 survey (response rate: 79%).

The Finnish civil servants study (the Helsinki Health Study) comprised employees working for the City of Helsinki in 2000, 2001 and 2002, aged 40, 45, 50, 55, and 60 at the time of the survey in each year (Martikainen, et al., 2004). The response rate was 67%.

For the present study, we included men and women who were 40-60 years at the time of the survey of each population. Participants who did not answer one or more questions about age, sex, grade of employment, and work characteristics were excluded in the analysis. Those excluded were 14.4% of the British respondents, 6.4% of the Japanese respondents, and 7.4% of the Finnish respondents. Although the data were broadly representative of target population, older women and lower grade employees were slightly underrepresented in the British and Japanese populations while younger men and lower grade employees were slightly underrepresented in the Finnish population (Laaksonen, et al., 2008). Altogether 7340 participants (5122 men and 2218 women) from Britain, 2297 (1638 men and 659 women) from Japan, and 8164 (1649 men and 6515 women) from Finland were included.

The British civil servants study has been approved by the University College London Medical School Committee on the ethics of human research. The Finnish civil servants study has been approved by the Ethics Committee of the Department of Public Health and the Ethics Committee of the health authorities at the City of Helsinki. The Japanese civil servants study has been conducted as a part of annual health check-ups regulated by the Industrial Safety and Health Law. An ad hoc committee of the civil service, comprising the ordinary member of the Safety and Health Committee, labour representatives and personnel representatives approved the contents and the ethical aspects of the study. All the participants are informed that they are free to participate or refuse to participate in the study. Informed consents were taken in all populations. All the participants were voluntary.

Socioeconomic status (SES)

SES was evaluated using grades of employment for all the three populations. Questions on SES were somewhat different among the 3 populations, but the SES measure reflected the hierarchical ranking that is commonly used in each population.

In the British study, grade of employment was based on questionnaire information, and three grades were obtained by collapsing the 12 non-industrial salary based grade levels used in the Civil Service in the following way: Grade 1: unified grades 1-6 (Permanent Secretary to Senior Principal); Grade 2: unified grade 7 (Principal), senior executive officers, higher executive officers and executive officers and professional equivalents; Grade 3: clerical officers, clerical assistants and office support staffs.

In the Japanese study, grade of employment was based on questionnaire information and hierarchically ranked in the following way: Grade 1: senior administrative workers with an employment grade of section leader or higher (e.g. Head of Bureau, Head of Department, and Head of Section) and professional equivalents; Grade 2: administrative workers with an employment grade of lower than section leader (e.g. Assistant Head of Section and Sub-section Chief) and professional equivalents; Grade 3: civil servants with no particular administrative title and professional equivalents.

In the Finnish study, grade was based on the combined information from the personnel registry data of the City of Helsinki and questionnaire data and included hierarchical ranking in the following way: Grade 1: managers in supervisory positions; Grade 2: professionals

and semi-professionals; Grade 3: clerical employees and other female dominated non-professional occupations within social and health care; Grade 4: manual workers.

Measures of work characteristics

Psychosocial stress at work and work hours were chosen to measure the work characteristics of the participants in this study.

Psychosocial stress at work was evaluated using the job demand-control model (Karasek, 1979). In general, low job control, high job demands, and low social support are associated with health risk behaviours (Lallukka et al., 2008), metabolic syndrome (Chandola, Brunner & Marmot, 2006), coronary heart diseases (Bosma et al., 1997), musculoskeletal diseases (Hoogendoorn, van Poppel, Bongers, Koes, & Bouter, 2000), and depression (Paterniti, Niedhammer, Lang, & Consoli, 2002).

In the British study, there were 19 self-reported items (15 items for control and 4 items for job demands) (Bosma, et al., 1997). The reliability coefficient (Cronbach's α (Cronbach, 1951)) was 0.84 for the job control measure and 0.67 for the job demand measure (Bosma, et al., 1997). In the Japanese study, a translated version of the English questionnaire was used (Sekine et al., 2006). In the Finnish study, there were also 19 self-reported items (9 items for the control measure and 10 items for the demand measure). Eight out of 9 questions for the control measure and 4 out of the 10 questions for the demand measure used in the Finnish study were the same as those in the British and Japanese studies. For this comparative study, we, therefore, used those 12 items to evaluate job control and job demands for all populations (see Appendix).

Response categories ranged from 0 (often) to 3 (never) for the British and Japanese studies and ranged from 0 (fully agree) to 4 (fully disagree) for the Finnish study. After all items were recoded in the same direction, scores for each scale were calculated by summing the item scores. If the participants did not answer one of the items of each scale, the mean item score of the participants was used to construct the measure (Bosma, et al., 1998). The participants who did not answer two or more items were excluded. The number of those excluded in this process corresponded to less than 2% of each population. A higher score for each scale indicates high job control and high job demands. All the scales were grouped into tertiles for the analysis. The differences in the number of response categories between the Finnish study and the other 2 studies may not affect the interpretation of the results of this study because the participants were grouped into tertiles using the scale score for each population.

The correlation coefficients of the scale score between the original questionnaire and the short version for this study ranged from 0.88 to 0.99. Thus, the reduction in the number of questions for the job control and job demands measures may not significantly affect the interpretation of psychosocial stress at work in this study. The Cronbach's α for job control was 0.77 for the British population, 0.80 for the Japanese population and 0.81 for the Finnish population. The Cronbach's α for job demands was 0.68 for the British population, 0.69 for the Japanese population and 0.65 for the Finnish population. The Cronbach's α of 0.5 or more is considered acceptable for group comparisons (Helmstadter, 1964).

Working overtime was associated with poor perceived general health, cardiovascular diseases, injuries, health risk behaviours and increased mortality (Caruso, Hitchcock, Dick, Russo & Schmit, 2004). Work hours were self-rated as one of 12 response categories, ranging from less than 1 hour a day to 12 hours a day or more in the British study, one of 10 response categories, ranging from less than 6 hours a day to 14 hours a day or more in the Japanese study, and one of 5 response categories, ranging from 1-10 hours a week to more

than 50 hours a week in the Finnish study. Participants from the British and Japanese studies were placed in 4 groups: less than 7 hours; 7-9 hours; 9-11 hours; 11 hours or more. Participants from the Finnish study were placed in 4 groups: less than 30 hours a week; 31-40 hours a week; 40-50 hours a week; more than 50 hours a week.

Measures of physical and mental functioning

The Short Form 36 (SF-36) (Ware, 1993) was used to measure physical and mental health functioning of the civil servants. For the Finnish and Japanese populations, validated translated versions of the SF-36 were used (Hagman, 1996; Fukuhara, Suzukamo, Bito, & Kurokawa, 2001). The SF-36 consists of 36 items and generates 8 subscales: physical functioning (PF), role limitations due to poor physical health (RP), bodily pain (BP), general health perception (GH), vitality (VT), social functioning (SF), role limitations due to poor emotional health (RE), and mental health (MH). For all populations, the subscale scores were standardised by using the general US population to generate a corresponding z-score (Ware, 1993; Ware, Kosinski, & Keller, 1994). Aggregate physical and mental component summary scores of the SF36 (PCS and MCS, respectively) were obtained by multiplying each z-score by its respective physical and mental factor score coefficient and summing the eight products. Finally, each aggregate component score was transformed to a norm-based score with a US population mean of 50 and standard deviation of 10. The higher scores represent better health. Poor physical and mental functioning were defined as having a PCS and MCS score below the 25th percentile. The percentile cut-off point was obtained from the score distribution of each population.

Statistical analysis

Logistic regression analysis was performed to examine (1) whether there were sex differences in poor physical and mental functioning, and disadvantaged work characteristics (low control, high demands, and long work hours of 9 hours per day or longer (For the Finnish population, long work hours of 40 hours per week or longer)) and (2) whether the work characteristics contributed to the sex inequalities in poor physical and mental functioning.

Odds ratios (ORs) and their 95% confidence intervals (95%CI) were calculated. Statistical analyses were performed using SPSS (10.0.J) (SPSS Inc.). A two-tailed P value of less than 0.05 was considered to be significant.

Results

Table 1 shows the characteristics of the participants. The mean age of the participants was approximately 50 years in all populations. More men than women occupied higher grades. In the British and Japanese populations, women were more likely to have low control, while there were no significant sex differences for the Finnish population. In the British population, men were more likely to have high demands, while more women than men had high demands for the Japanese and Finnish populations. In the British and Finnish populations, the percentage of men working long hours was higher than that of women. More women than men had long work hours for the Japanese population. Mean PCS and MCS scores were approximately 50 in all populations for the British and Finnish populations and slightly lower than 50 for the Japanese population. In addition, more men than women had higher physical and mental functioning, except for no sex differences in mental functioning in the Finnish population.

Table 2 shows the adjusted sex differences in work characteristics. Sex differences in work characteristics were observed in all populations but the pattern of the differences were

somewhat different among the 3 populations: In the age-adjusted model, while more men than women had higher job control in the British and Japanese populations (ORs = 2.79 (95%CI: 2.51-3.10) and 1.46 (1.21-1.76), respectively), no significant sex differences were observed in the Finnish population (OR=0.97 (0.86-1.10)). When SES was adjusted for, the sex differences reduced in the British and Japanese populations (ORs = 1.19(1.05-1.35) and 0.96 (0.78-1.17)), and the rather reverse sex difference (i.e. more women than men had job control) became apparent in the Finnish population (OR=0.80(0.70-0.93)), which indicated that making adjustment for SES resulted in the improvement in job control among women in all populations.

The sex differences in high job demands and long work hours (i.e. more women than men had high job demands and long work hours) were the largest in the Japanese population in the age-adjusted model (ORs =1.99 (1.63-2.43) and 1.76 (1.44-2.15), respectively), and the reverse associations were observed in the British population (ORs =0.69 (0.62-0.77) and 0.47 (0.42-0.54), respectively). In the Finnish population, while women had high job demands (OR=1.34 (1.20-1.50)) but were less likely to have long work hours (OR=0.56 (0.49-0.64)). Adjustment for SES resulted in the worsening in job demands and long work hours among women in all populations: the sex differences in job demands rather increased in all populations (ORs = 1.26(1.11-1.43) for the British population, 2.30(1.86-2.84) for the Japanese population, and 1.59(1.41-1.79) for the Finnish population); the sex difference in long work hours increased in the Japanese population (OR=1.85(1.50-2.28)) and the reverse associations (i.e. more men than women had long work hours) reduced for the British and Finnish populations (ORs = 0.77 (0.66-0.88) and 0.65(0.56-0.76), respectively).

The Spearman's correlation coefficient between age and SES was -0.062($p<0.001$) for the British population, 0.350($p<0.001$) for the Japanese population, and 0.010($p=0.337$) for the Finnish population, indicating that the changes in sex differences in work characteristics after adjustment for SES may not be explained by the multicollinearity between age and SES.

Table 3 shows the sex differences in poor physical functioning before and after adjustment for work characteristics. Among the 3 populations, the age-adjusted OR of women for poor physical functioning (Model 1) was the largest in the British population (OR= 2.08 (1.86-2.32)), followed by the Japanese population (OR=1.72 (1.42-2.09)) and, then, the Finnish population (OR=1.51 (1.32-1.73)). When SES was adjusted for (Model 2), the sex differences were mildly attenuated in all populations. Low SES individuals were more likely to have poor physical functioning. When work characteristics were adjusted for (Model 3), the sex differences in poor physical functioning were further reduced (ORs =1.72 (1.52-1.95) for British women, 1.33 (1.08-1.65) for Japanese women, and 1.31 (1.14-1.52) for Finnish women). Low job control, high job demands, and short work hours were associated with poor physical functioning.

Table 4 shows the sex differences in poor mental functioning before and after adjustment for work characteristics. Among the 3 populations, the age-adjusted OR of women for poor mental functioning (Model 1) was the largest in the Japanese population (OR= 1.91 (1.56-2.34)), followed by the British population (OR=1.45 (1.30-1.67)). No statistically significant sex differences in poor mental functioning were observed in the Finnish population (OR=1.07(0.94-1.22)). When SES was adjusted for (Model 2), the sex differences mildly attenuated in British and Japanese populations and hardly changed in the Finnish population. While there were no grade differences in poor mental functioning in the British population, low grade employees were more likely to have poor mental functioning in the Japanese population, and the reverse associations were observed for the Finnish population. When work characteristics were adjusted for (Model 3), the sex differences in

poor mental functioning further reduced in the British and Japanese populations (ORs =1.39 (1.23-1.58) and 1.33 (1.06-1.67), respectively) but hardly changed in the Finnish population. In general, low job control, high job demands, and short work hours were associated with poor mental functioning. In the Japanese population, long work hours were associated with poor mental functioning.

The Hosmer-Lemeshow test (Hosmer & Lemeshow, 1989) validated the final models (Model 3s in Tables 3-4). The likelihood ratio tests showed that the interaction terms of the demands and the control measures did not add significantly to the multivariate models (Model 3s in Tables 3-4). The findings from the Finnish study hardly changed after the exclusion of manual workers (not tabulated).

Discussion

This study showed that there were marked sex differences in physical health functioning in populations from Britain, Japan and Finland and, and in mental functioning in populations from Britain and Japan (i.e. men had better health than women). No sex differences in mental functioning were observed in the Finnish population. In addition, the sex differences in physical and mental functioning were smaller among the Finnish employees than among other 2 populations. Sex differences in work characteristics were also observed in all populations but the pattern of the sex differences were somewhat different among the 3 populations: Japanese women with the same age and employment grade as men simply had disadvantaged work characteristics (i.e. high job demands and long work hours), while British women had 2 disadvantaged and 1 advantaged work characteristics (i.e. low job control, high job demands, and not long work hours), and Finnish women had 2 advantaged and 1 disadvantaged work characteristics (i.e. not low job control, high job demands, and not long work hours) than men. These findings suggest that sex inequalities in work characteristics were also somewhat smaller in the Finnish population than in other 2 populations. In addition, the larger the sex differences in work characteristics, the larger the sex differences in health and the reduction in the sex differences in health after adjustment for work characteristics, which suggests that sex differences in work characteristics contribute to the sex differences in health and the international variation.

The findings from this study are consistent with those from previous research on sex differences in poor physical and mental health (Macintyre et al., 1996; Lahelma et, 1999; Doi & Minowa, 2003). With respect to sex differences in mental health, the findings from this study were similar to those from a recent study on sex differences in depression in 23 European countries (Van de Velde et al., 2010): The sex differences in depression were smaller in Nordic countries than in other countries, with no significant sex differences in Finland. In most countries, depression levels most strongly related to socioeconomic position (i.e. labour market position, educational level and household income). In this study, sex differences in employment grade and working conditions were the smallest in the Finnish population. Such smaller sex differences in employment position and working conditions may contribute to no significant sex differences in mental health among the Finnish employees.

According to Esping-Andersen (1990), Finland belongs to the social democratic group among the welfare states regimes with a strong emphasis on universal and egalitarian policies, while Britain and Japan belong to liberal and conservative welfare state regimes respectively. The Global Gender Gap Report (Hausmann, et al., 2008) showed that, among the 3 countries, Finland achieves the highest gender equality in terms of economic participation and opportunity, educational attainment, political empowerment and health and survival. Relatively smaller sex differences in health and work characteristics in the Finnish

population may be partly attributable to the egalitarian policies in Finland. The findings from this study may be therefore explainable from the existing data.

In this study, when SES was adjusted for, the sex differences in work control declined, whereas the differences in job demands and long work hours strengthened among women in all populations. We recently reported that high SES individuals generally had high control, high demands, and long work hours in our previous study of the 3 civil servant populations (Sekine, et al., 2009). Because more men occupied higher employment grades than women in all populations, making adjustment for SES may result in the improvement in work control and the worsening in high demands and long work hours among women. Thus, the changes in the sex difference in work characteristics after adjustment for SES may be explainable from the male predominance of high employment grade.

In this study, when SES was adjusted for, the sex differences in physical functioning slightly attenuated in all populations. This attenuation may be attributable to the fact that there were SES differences in physical functioning (i.e. the higher the employment grade, the better the health) and more men than women occupied higher grades of employment. In contrast, changes in the sex differences in mental functioning after adjustment for SES differed among the 3 countries. Like in physical functioning, the sex differences in mental functioning attenuated in the Japanese population; the sex differences increased in the Finnish population; the sex differences hardly changed in the British population. The different sex patterns may be attributable to different patterns of SES differences in mental functioning. In the Japanese population, the majority of women occupied low SES which are associated with poor mental functioning so making adjustment for SES may have resulted in the reduction in sex differences in mental functioning. In contrast, in the Finnish population, low SES had better mental functioning so making adjustment for SES may have resulted in the increase in the sex differences. In the British population, there were no consistent SES differences in mental functioning so making adjustment for SES may have resulted in no significant changes in the sex differences. While the different patterns on SES differences in mental functioning in the Finnish population deserve further research, the patterns were the same as those reported in our previous study of the 3 civil servant populations (Sekine, et al., 2009).

In this study, when work characteristics were adjusted for, the sex differences further attenuated in both physical and mental functioning in all populations. In addition, the largest reductions in the sex differences in both physical and mental health were observed in the Japanese population. These findings may be attributable to the facts that psychosocial stress at work (low control and high demands) and short and long work hours were generally associated with poor physical and mental functioning and Japanese women tended to have more disadvantaged work characteristics than those of other 2 countries. In contrast, the smallest reduction in the sex differences was observed in the Finnish population. This may be attributable to the facts that Finnish women did not necessarily have more disadvantaged work characteristics than men and Finnish women occupied relatively higher employment grade than those of other 2 populations.

There are several methodological limitations. Firstly, this study is cross-sectional, which makes it hard to determine the causal nature of the associations of sex, SES, psychosocial stress and work hours with physical and mental functioning. However, there is little evidence for an effect of poor physical and mental health on employment grade changes in the British civil servants study (Chandola, Bartley, Sacker, Jenkinson & Marmot, 2003).

Secondly, it may be difficult to generalize the results of this study as the participants were recruited from occupations and regions that may not be representative of whole populations

in the countries and this study contained only 3 countries. While the British and Finnish populations came from capital cities of those countries, the Japanese population came from a non-metropolitan area. The civil servants were middle-aged, well-educated, and white-collar dominant in comparison to the general adult population. Also, gender equality policies are introduced in this population of Japanese civil servants. Thus, sex inequalities in health may be larger in the general adult population. In addition, it should be mentioned that long work hours and high job stress were more prevalent among men than among women in a nationally representative sample of Japanese adults (Ministry of Internal Affairs and Communications, 2007; Ministry of Health, Labour and Welfare, 2010). Further investigation is necessary.

Thirdly, there may be data comparability problems. There were the 10-year differences in data collection. The working style has changed (e.g. computerisation) during the 10 years. We did not use the data from a later phase of the Whitehall II study, because the study was set up in 1985 for those aged 35-55 at the time of survey (Marmot et al., 1991) and about half of them had already retired when the Japanese and Finnish data were collected in early 2000s. In addition, the results from making adjustment for SES in the Japanese population should be treated cautiously due to the very small number of high grade female employees. There may also be data comparability problems for grades of employment, work characteristics and health measures, although the factor scores from the US population have been widely used for Japanese population (Fukuhara et al., 2001) and the items pertaining to the job demands and control were carefully chosen.

Fourthly, we did not adjust for other factors such as factors that affect reporting, family-related factors, health behaviours, and biological factors as explanatory factors for sex differences in health. Consideration of these factors may result in further explanation of sex differences in health in each country and the cross-national variation.

In conclusion, we observed that more women than men had poor physical and mental functioning with one exception for mental functioning in the Finnish population. In addition, more women than men tended to have disadvantaged work characteristics but there were relatively smaller sex differences in work characteristics in the Finnish population. The larger the sex differences in work characteristics, the larger the sex differences in health and the reduction in the sex differences in health after adjustment for work characteristics. These results suggest that egalitarian and gender equal policies may contribute to smaller sex differences in health, through smaller differences in disadvantaged work characteristics between men and women.

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Appendix

The characteristics of psychosocial stress at work (i.e. job control and job demands) were assessed by means of 12 items. The job control measure consisted of the following 8 items: Do you have a choice in deciding how you do your job? Do you have a choice in deciding what you do at work? I have a good deal of say in decisions about work; Do you have to do the same thing over and over again? Does your job provide you with a variety of interesting things? Do you have the possibility of learning new things through your work? Does your work demand a high level of skill or expertise? Does your job require you to take the initiative? The job demand measure consisted of the following 4 items: Do you have to work very fast? Do you have to work very intensively? Do you have enough time to do everything? Do different groups at work demand things from you that you think are hard to combine?

References

- Arber, S. Gender. In: Gordon, D.; Shaw, M.; Dorling, D.; Smith, GD., editors. *Inequalities in health*. The Policy Press; 1999.
- Borrell C, Espelt A, Rodríguez-Sanz M, Navarro V. Politics and health. *Journal of Epidemiology and Community Health*. 2007; 61:658–9. [PubMed: 17630361]
- Bosma H, Marmot MG, Hemingway H, Nicholson AC, Brunner E, Stansfeld SA. Low job control and risk of coronary heart disease in Whitehall II (prospective cohort) study. *British Medical Journal*. 1997; 314:558–565. [PubMed: 9055714]
- Caruso, C.; Hitchcock, E.; Dick, R.; Russo, J.; Schmit, J. *Overtime and extended work shifts: Recent findings on illnesses, injuries, and health behaviors*. Cincinnati: National Institute for Occupational Safety and Health; 2004.
- Chandola T, Bartley M, Sacker A, Jenkinson C, Marmot M. Health selection in the Whitehall II study, UK. *Social Science & Medicine*. 2003; 56:2059–2072. [PubMed: 12697197]
- Chandola T, Brunner E, Marmot M. Chronic stress at work and the metabolic syndrome: prospective study. *British Medical Journal*. 2006; 332:521–525. [PubMed: 16428252]
- Cronbach LJ. Coefficient alpha and the internal structure of tests. *Psychometrika*. 1951; 16:297–334.
- Doi Y, Minowa M. Gender differences in excessive daytime sleepiness among Japanese workers. *Social Science and Medicine*. 2003; 56:883–894. [PubMed: 12560020]
- Esping-Andersen, G. *Three worlds of welfare capitalism*. Oxford: Polity Press; 1990.
- Fukuhara, S.; Suzukamo, Y.; Bito, S.; Kurokawa, K. *Manual of SF-36 Japanese version 1.2*. Public Health Research Foundation; Tokyo (in Japanese); 2001.
- Hagman E. SF-36 terveystarkastus koetun terveyden ja toimintakyvyn mittarina (in Finnish). *Suomen Lääkärilehti*. 1996; 51:3534–3540.
- Hausmann R, Tyson LD, Zahidi S. *The Global Gender Gap Report*. World Economic Forum. 2008
- Helmstadter, GC. *Principles of psychological measurement*. New York, NY: Appleton-Century-Crofts, Inc.; 1964.
- Hoogendoorn WE, van Poppel MN, Bongers PM, Koes BW, Bouter LM. Systematic review of psychosocial factors at work and private life as risk factors for back pain. *Spine*. 2000; 25:2114–2125. [PubMed: 10954644]
- Hosmer, DW.; Lemeshow, S. *Applied Logistic Regression*. New York: Wiley-Interscience; 1989.
- Karasek RA. Job demands, job decision latitude and mental strain: Implications for job design. *Administrative Science Quarterly*. 1979; 24:285–308.
- Kuehner C. Gender differences in unipolar depression: an update of epidemiological findings and possible explanations. *Acta Psychiatrica Scandinavica*. 2003; 108:163–174. [PubMed: 12890270]
- Laaksonen M, Aittomäki A, Lallukka T, Rahkonen O, Saastamoinen P, Silventoinen K, Lahelma E. Register-based study among employees shows small non-participation bias in health surveys and check-ups. *Journal of Clinical Epidemiology*. 2008; 69:900–906. [PubMed: 18486445]

- Lahelma E, Martikainen P, Rahkonen O, Silventoinen K. Gender inequalities in health: patterns, magnitude and change. *Social Science & Medicine*. 1999; 48:7–19. [PubMed: 10048834]
- Lahelma E, Laaksonen M, Martikainen P, Rahkonen O, Sarlio-Lähteenkorva S. Multiple socioeconomic circumstances and common mental disorders. *Social Science & Medicine*. 2006; 63:1383–1399. [PubMed: 16690186]
- Lallukka T, Lahelma E, Rahkonen O, Roos E, Laaksonen E, Martikainen P, et al. Associations of job strain and working overtime with adverse health behaviors and obesity: evidence from the Whitehall II Study, Helsinki Health Study, and the Japanese Civil Servants Study. *Social Science and Medicine*. 2008; 66:1681–1698. [PubMed: 18261833]
- Marmot MG, Smith GD, Stansfeld S, Patel C, North F, Head J, et al. Health inequalities among British civil servants: the Whitehall II study. *Lancet*. 1991; 337:1387–1393. [PubMed: 1674771]
- Martikainen P, Lahelma E, Marmot M, Sekine M, Nishi N, Kagamimori S. A comparison of socioeconomic differences in physical functioning and perceived health among male and female employees in Britain, Finland and Japan. *Social Science & Medicine*. 2004; 54:1287–1295. [PubMed: 15210099]
- Macintyre S, Hunt K, Sweeting H. Gender differences in health: are things really as simple as they seem? *Social Science & Medicine*. 1996; 42:617–624. [PubMed: 8643986]
- Ministry of Internal Affairs and Communications. Survey of Time Use and Leisure Activities 2006. 2007. Available at: <http://www.stat.go.jp/data/shakai/2006/index.htm>
- Ministry of Health, Labour and Welfare. Survey on State of Employees' Health 2009. 2010. Available at: <http://www.mhlw.go.jp/toukei/itiran/roudou/saigai/anzen/kenkou07/>
- Navarro V, Muntaner C, Borrell C, Benach J, Quiroga A, Rodríguez-Sanz M, et al. Politics and health outcomes. *Lancet*. 2006; 368(9540):1033–1037. [PubMed: 16980120]
- Paterniti S, Niedhammer I, Lang T, Consoli SM. Psychosocial factors at work, personality traits and depressive symptoms. Longitudinal results from the GAZEL Study. *British Journal of Psychiatry*. 2002; 181:111–117. [PubMed: 12151280]
- Sekine M, Chandola T, Martikainen P, Marmot M, Kagamimori S. Work and family characteristics as determinants of socioeconomic and sex inequalities in sleep: the Japanese civil servants study. *Sleep*. 2006; 29:206–216. [PubMed: 16494089]
- Sekine M, Chandola T, Martikainen P, Marmot M, Kagamimori S. Socioeconomic inequalities in physical and mental functioning of British, Finnish and Japanese civil servants: Role of Job Demand, Control and Work Hours. *Social Science and Medicine*. 2009; 69:1417–1425. [PubMed: 19767137]
- de Smet P, Sans S, Dramaix M, Boulenguez C, de Backer G, Ferrario M, et al. Gender and regional differences in perceived job stress across Europe. *European Journal of Public Health*. 2005; 15:536–545. [PubMed: 16037076]
- SPSS, Inc.. SPSS 10.0J for Windows. Tokyo: SPSS Inc.; 1999.
- Van de Velde S, Bracke P, Levecque K. Gender differences in depression in 23 European countries. Cross-national variation in the gender gap in depression. *Social Science and Medicine*. 2010; 71:305–313. [PubMed: 20483518]
- Verbrugge LM. Gender and health: an update on hypotheses and evidence. *Journal of Health and Social Behavior*. 1985; 26:156–82. [PubMed: 3905939]
- Ware, JE. SF-36 Health Survey Manual & Interpretation Guide. Boston, MA: The Health Institute, New England Medical Center; 1993.
- Ware, JE.; Kosinski, M.; Keller, SD. SF-36 Physical & Mental Health Summary Scales: A User's Manual. Boston, MA: The Health Institute, New England Medical Center; 1994.

- In general, women had more stressful work characteristics and poorer physical and mental health than men.
- The smallest sex differences in stressful work characteristics and health were observed in the Finnish population.
- Gender equal policies may lead to smaller sex differences in health, through smaller sex differences in work conditions.

Table 1

Characteristics of the Participants

	Britain			Japan			Finland		
	Men (n=5122) %	Women (n=2218) %	P value	Men (n=1638) %	Women (n=659) %	P value	Men (n=1649) %	Women (n=6515) %	P value
Mean age	48.6(5.57)	49.7(5.78)	<0.001	50.4(5.49)	49.9(5.59)	0.022	50.0(6.61)	49.1(6.59)	<0.001
Age groups									
40-49	59.9	50.8		45.5	51.3		38.3	43.2	
50-60	40.1	49.2	<0.001	54.5	48.7	0.013	61.7	56.8	<0.001
Grades									
Grade 1	48.3	16.5		24.2	3.2		43.6	27.6	
Grade 2	45.1	45.0		31.2	24.4		19.4	19.1	
Grade 3	6.6	38.5	<0.001	44.5	72.4	<0.001	10.1	42.1	
Grade 4	–	–		–	–		26.9	11.2	<0.001
Control									
Low	25.7	49.4		30.8	39.5		28.3	27.5	
Intermediate	31.9	27.8		34.6	37.0		31.5	33.0	
High	42.5	22.8	<0.001	34.6	23.5	<0.001	40.2	39.5	<0.497
Demand									
Low	31.2	42.8		37.8	24.6		38.0	31.1	
Intermediate	33.8	30.5		40.6	39.8		25.8	25.6	
High	35.1	26.7	<0.001	21.6	35.7	<0.001	36.3	43.3	<0.001
Work hours*									
<7 hours /day	2.1	5.8		10.0	5.2		7.3	10.5	
7-9 hours /day	69.7	78.7		67.6	60.7		71.3	76.3	
9-11 hours / day	22.3	13.3		16.2	26.4		17.8	11.6	
11 <hours /day	5.9	2.2	<0.001	6.1	7.7	<0.001	3.6	1.6	<0.001
Mean PCS	53.2(5.91)	50.6(8.05)	<0.001	49.5(6.20)	47.3(7.05)	<0.001	50.5(7.47)	48.9(8.56)	<0.001
Mean MCS	51.2(8.31)	50.1(9.18)	<0.001	47.4(9.80)	44.1(10.9)	<0.001	51.5(10.0)	51.6(9.81)	0.792

Abbreviations: In the British population, Grade 1: unified grade 1-6; Grade 2: unified grade 7 and executive officers; Grade 3: clerical officers, In the Japanese population, Grade 1: senior administrative officers; Grade 2: administrative officers; Grade 3: civil servants with no administrative title. In the Finnish population, Grade 1: managers; Grade 2: professionals; Grade 3: clerical officers; Grade 4: manual workers. PCS: physical component summary scale; MCS: mental component summary scale. Data on age, PCS and MCS are expressed as mean (standard deviation).

* In the Finnish population, work hours was categorised as less than 30 hours /week, 30-40 hours /week, 41-50 hours /week, and more than 50 hours / week.

Table 2
Sex Differences in Low Control, High Demand, and Long Work Hours

		Britain			Japan			Finland		
	%	Model 1 (Age-adjusted) OR (95%CI)	Model 2 (Model 1 +SES) OR (95%CI)	%	Model 1 (Age-adjusted) OR (95%CI)	Model 2 (Model 1 +SES) OR (95%CI)	%	Model 1 (Age-adjusted) OR (95%CI)	Model 2 (Model 1 +SES) OR (95%CI)	
Low control										
Men	25.7	1.00	1.00	30.8	1.00	1.00	28.3	1.00	1.00	
Women	49.4	2.79(2.51-3.10)	1.19(1.05-1.35)	39.5	1.46(1.21-1.76)	0.96(0.78-1.17)	27.5	0.97(0.86-1.10)	0.80(0.70-0.93)	
High demand										
Men	35.1	1.00	1.00	21.6	1.00	1.00	36.3	1.00	1.00	
Women	26.7	0.69(0.62-0.77)	1.26(1.11-1.43)	35.7	1.99(1.63-2.43)	2.30(1.86-2.84)	43.3	1.34(1.20-1.50)	1.59(1.41-1.79)	
Long Work										
Men	28.2	1.00	1.00	22.3	1.00	1.00	21.5	1.00	1.00	
Women	15.5	0.47(0.42-0.54)	0.77(0.66-0.88)	34.1	1.76(1.44-2.15)	1.85(1.50-2.28)	13.2	0.56(0.49-0.64)	0.65(0.56-0.76)	

Abbreviations: OR: odds ratio; 95%CI: 95% confidence interval; SES: socioeconomic status (i.e. grades of employment)

Model 1 was adjusted for age.

Model 2 was adjusted for age and SES.

Table 3
Sex Differences in Poor Physical Functioning before and after Adjustment for Work Characteristics

	Britain					Japan					Finland				
	poor PCS %	Model 1 (Age-adjusted) OR (95%CI)	Model 2 (Model1 +SES) OR (95%CI)	Model 3 (Model 2+ work) OR (95%CI)	poor PCS %	Model 1 (Age-adjusted) OR (95%CI)	Model 2 (Model 1 +SES) OR (95%CI)	Model 3 (Model 2+ work) OR (95%CI)	poor PCS %	Model 1 (Age-adjusted) OR (95%CI)	Model 2 (Model 1 +SES) OR (95%CI)	Model 3 (Model 2+ work) OR (95%CI)			
Sex															
Men	20.4	1.00	1.00	1.00	24.3	1.00	1.00	1.00	19.8	1.00	1.00	1.00			
Women	35.5	2.08(1.86-2.32)	1.76(1.55-1.99)	1.72(1.52-1.95)	35.5	1.72 (1.42-2.09)	1.52 (1.24-1.86)	1.33 (1.08-1.65)	26.3	1.51(1.32-1.73)	1.43(1.24-1.65)	1.31(1.14-1.52)			
Age															
40-49	21.4	1.00	1.00	1.00	27.1	1.00	1.00	1.00	17.3	1.00	1.00	1.00			
50-60	29.8	1.49(1.33-1.65)	1.45(1.32-1.62)	1.47(1.32-1.64)	21.8	1.07 (0.89-1.28)	1.22 (1.00-1.48)	1.32 (1.08-1.61)	30.6	2.15(1.93-2.39)	2.16(1.93-2.40)	2.16(1.93-2.41)			
Grades															
Grade 1	19.1	1.00	1.00	1.00	17.7	1.00	1.00	1.00	18.0	1.00	1.00	1.00			
Grade 2	25.7	1.34(1.18-1.52)	1.39(1.22-1.56)	1.39(1.22-1.56)	27.8	1.75(1.28-2.39)	1.71(1.24-2.35)	1.71(1.24-2.35)	23.4	1.47(1.25-1.72)	1.56(1.33-1.84)	1.56(1.33-1.84)			
Grade 3	37.3	1.71(1.44-2.02)	1.85(1.52-2.26)	1.85(1.52-2.26)	30.7	1.94(1.43-2.63)	1.95(1.41-2.69)	1.95(1.41-2.69)	29.3	1.80(1.57-2.05)	1.80(1.57-2.05)	1.94(1.67-2.26)			
Grade 4									31.3	2.15(1.83-2.53)	2.11(1.76-2.53)				
Control															
Low	29.7			1.17(1.00-1.36)	28.5			1.24(0.96-1.62)	32.5			1.35(1.17-1.55)			
Intermediate	24.9			1.15(1.00-1.32)	29.1			1.22(0.96-1.55)	23.9			1.06(0.93-1.21)			
High	20.8			1.00	24.7			1.00	20.6			1.00			
Demand															
Low	24.9			1.00	20.6			1.00	18.6			1.00			
Intermediate	25.6			1.30(1.13-1.49)	27.4			1.53(1.20-1.95)	25.0			1.56(1.35-1.80)			
High	24.5			1.41(1.21-1.63)	36.8			2.27(1.72-32.99)	29.9			2.15(1.89-2.45)			
Work hours*															
<7 hours /day	34.7			1.33(1.00-1.76))	30.8			1.59(1.14-2.22)	29.5			1.48(1.24-1.75)			
7-9 hours /day	25.2			1.00	24.3			1.00	24.6			1.00			
9-11 hours /day	23.6			1.10(0.95-1.28)	35.0			1.34(1.05-1.71)	23.7			1.02(0.86-1.20)			
11< hours /day	21.1			1.00(0.76-1.31)	33.8			1.26(0.87-1.84)	24.7			1.06(0.74-1.54)			

Table 4
Sex Differences in Poor Mental Functioning before and after Adjustment for Work Characteristics

	Britain				Japan				Finland			
	poor MCS %	Model 1 (Age -adjusted) OR (95%CI)	Model 2 (Model 1 +SES) OR (95%CI)	Model 3 (Model 2+ work) OR (95%CI)	poor MCS %	Model 1 (Age -adjusted) OR (95%CI)	Model 2 (Model 1 +SES) OR (95%CI)	Model 3 (Model 2+ work) OR (95%CI)	poor MCS %	Model 1 (Age -adjusted) OR (95%CI)	Model 2 (Model 1 +SES) OR (95%CI)	Model 3 (Model 2+ work) OR (95%CI)
Sex												
Men	23.1	1.00	1.00	1.00	19.6	1.00	1.00	1.00	24.0	1.00	1.00	1.00
Women	29.4	1.45(1.30-1.63)	1.47(1.30-1.67)	1.39(1.23-1.58)	32.2	1.91 (1.56-2.34)	1.71 (1.39-2.12)	1.33 (1.06-1.67)	25.3	1.07(0.94-1.22)	1.11(0.97-1.26)	1.02(0.89-1.17)
Age												
40-49	28.6	1.00	1.00	1.00	27.4	1.00	1.00	1.00	25.6	1.00	1.00	1.00
50-60	20.3	0.62(0.55-0.69)	0.62(0.55-0.69)	0.63(0.57-0.71)	19.4	0.66 (0.54-0.80)	0.74 (0.60-0.91)	0.82(0.66-1.02)	24.6	0.95(0.86-1.06)	0.96(0.86-1.06)	0.93(0.84-1.03)
Grades												
Grade 1	23.6		1.00	1.00	12.2		1.00	1.00	27.8		1.00	1.00
Grade 2	26.1		1.05(0.94-1.19)	1.07(0.94-1.22)	23.5		1.81 (1.27-2.57)	1.67(1.16-2.42)	25.5		0.88(0.76-1.01)	0.85(0.73-0.99)
Grade 3	25.4		0.96(0.80-1.14)	1.00(0.82-1.23)	26.8		1.90 (1.34-2.67)	1.78(1.23-2.57)	23.6		0.78(0.69-0.89)	0.68(0.59-0.79)
Grade 4									21.9		0.73(0.62-0.86)	0.54(0.45-0.65)
Control												
Low	28.0			1.77(1.52-2.07)	24.7			2.04(1.52-2.74)	31.7			2.31(2.00-2.67)
Intermediate	25.9			1.42(1.23-1.63)	26.9			1.95(1.49-2.54)	24.2			1.42(1.25-1.62)
High	21.5			1.00	17.5			1.00	21.0			1.00
Demand												
Low	19.2			1.00	13.4			1.00	16.6			1.00
Intermediate	24.6			1.56(1.35-1.80)	21.9			1.83(1.39-2.42)	21.9			1.38(1.19-1.60)
High	31.7			2.52(2.17-2.93)	38.2			3.74(2.75-5.07)	33.4			2.43(2.13-2.76)
Work hours*												
<7 hours /day	26.3			1.20(0.88-1.63)	20.7			1.47(1.00-2.16)	29.2			1.34(1.13-1.59)
7-9 hours /day	25.1			1.00	18.2			1.00	24.2			1.00
9-11 hours /day	24.9			0.92(0.79-1.06)	35.7			1.74(1.35-2.25)	26.5			1.01(0.87-1.19)
11< hours /day	22.6			0.82(0.63-1.08)	40.4			2.30(1.58-3.34)	24.7			0.96(0.66-1.39)