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Field Study

Differences in Health Complaints among Taiwanese Workers in Different Occupational Categories

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Abstract: Differences in Health Complaints among Taiwanese Workers in Different Occupational Categories: Shu-Ling HUANG, *et al*. Department of Psychology, Chung-Shan Medical University, Taiwan—Objectives: The objectives of this study were to determine the prevalence of and differences in certain health complaints, including physical symptoms and psychological distress, among workers in different occupational categories and to explore the associations between occupational category and each complaint. **Methods:** A cross-sectional study was conducted using a self-administered questionnaire. A total of 1,628 workers representing seven occupational categories from ten companies in different industries submitted completed questionnaires. The self-administered questionnaire contained three parts: personal data, physical symptoms and psychological distress. Physical symptoms were measured using nine questions developed by a panel of ten general practitioners; the questions included nine common physical symptoms across main organ systems. Psychological distress was measured using the Chinese Health Questionnaire. **Results:** Muscle pain (44.7%) and dizziness (30.1%) were the most common symptoms reported by participants, and 16.6% of participants suffered from psychological distress. Significant differences in physical symptoms and psychological distress were found among workers in different occupational categories (χ^2=53.59, p<0.001). Compared with service workers, office workers and managers had higher prevalence rates of physical symptoms; office workers also showed a higher prevalence of psychological distress. **Conclusions:** The study merits attention in terms of prevention of health problems in the workplace by focusing on a set of physical symptoms and psychological distress (not merely morbidity). Occupational category should be taken into consideration when planning workplace health promotion. Our findings highlight the need for health promotion programs that specifically target office workers and managers.
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The World Health Organization defines health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity." This definition highlights the comprehensive nature of health. After the Declaration of Alma-Ata[1)], workplace health promotion has been developed in many countries to promote worker health[2)]. Previous studies related with occupational medicine mainly focused on occupational diseases requiring further treatment to reduce illness or disability in workers[3)]. Preventing health problems in workers is one of the main goals of workplace health promotion. In terms of prevention, it is necessary to address the health-related symptoms of individuals that occur prior to the onset of diseases.

Occupation has been reported to be associated with morbidity. Boroorah[4)] indicated that approximately one quarter and one fifth of overall inequality in health status for men and women, respectively, resulted from differences in occupational class. A study covering seven European countries evidenced

that skilled and unskilled manual workers had a higher prevalence of morbidity than the workers in the class of administrators and professionals[5]. Similar findings from national studies in Norway, Finland and the USA[6–8] also showed that blue-collar occupations, when compared with professional or managerial occupations, were at a greater risk for being in poor health. However, measuring workers' health based solely on morbidity does not provide the depth of information required in order for occupational health personnel to design effective health promotion programs.

The relationship between occupation and general health status or common health problems is still being debated. A national study in the Netherlands recruiting 136,189 working people showed that workers in lower occupational positions were more likely to perceive their general health as being poor (these results were obtained from a single survey question)[9]. Another large survey conducted in the USA with over 410,000 workers, however, did not find evidence of this association when study subjects were asked the same question[10]. Measuring worker's health based on a single question might be one of the reasons for the contradictory results. Besides, a previous study indicated that occupational group was not associated with common health problems, which were mainly focused on musculoskeletal complaints, gastrointestinal complaints and pseudoneurological complaints (such as extra heartbeats, heat flushes and anxiety)[11]. To enhance our understanding of worker health, a comprehensive survey including psychological state and broader physical symptoms across organ systems is necessary.

In Taiwan, workplace health promotion has been implemented for decades[12]. A practical model of workplace health promotion for Taiwanese workers has been established as well[13]. However, most health-promoting programs are designed for entire organizations and neglect the health needs of individual workers[14]. In order to provide more information as a base for workplace health promotion, assessing job-related health differentials should be an important issue. However, studies on the broad health-related symptoms of Taiwanese workers across occupational categories are sparse.

The current study tried to bring attention to the prevention of health problems in the workplace by focusing on a set of physical symptoms and psychological distress (health complaints rather than morbidity). The first aim of this study was to determine the prevalence of and differences in nine physical symptoms and psychological distress among workers across various occupational categories. The second aim was to explore the associations between occupational category and health complaints while controlling for gender and age. The results of this study will benefit workplace health promotion planning.

Methods

Study design

The investigation performed in this study was one component of the Taiwan Workplace Health Promotion Scheme. It was conducted by the *Center for Workplace Health Promotion and Tobacco Control* in 2006 using a cross-sectional research method with purposive sampling. Ten Taiwanese companies of different sizes (including four small/medium-scale companies and six large-scale companies) were chosen to represent a variety of industries; a total of 7,043 full-time workers were employed in these companies. The study included the following industrial sectors: manufacturing, finance and insurance, amusement and recreation services, education and public administration. Before the investigation was carried out, an announcement was made to all workers in those companies requesting their voluntary participation. Potential participants were advised that they would be invited to complete the self-administrated questionnaire anonymously and to contribute their opinions on worksite health promotion planning. Voluntary consent was obtained from all 1,651 full-time workers who participated in the study. In total, 1,628 questionnaires were successfully collected, yielding a participation rate of 23.1% (1,628 participants out of 7,043 workers). The factory nurses and occupational health personnel working in these companies were requested to distribute and collect the survey questionnaires.

Survey instrument

The survey questionnaire was composed of three parts: personal data, physical symptoms and psychological distress. Personal data collected included demographic details and occupational information. Occupational categories comprised manager, professional, technician, office worker, service worker, technical worker and machine operator (according to the categorization system of the Directorate-General of Accounting, Budget, and Statistics of the Executive Yuan)[15].

Physical symptoms were measured using nine questions provided by a panel of ten general practitioners. Because existing questionnaires about health complaints[16] overly emphasize musculoskeletal, respiratory and digestive discomforts and do not cover the symptoms of other systems, the authors chose to develop a series of certain questions and not use existing tools for this study. To develop these questions, ten general practitioners (GPs), who were all senior

physicians in the medical center, provided a list of the most common physical symptoms for the main organ systems, according to their clinical experience within outpatient services. One symptom from each system was selected (according to the highest percentage of agreement from the GPs) for this study. The nine physical symptoms for this study were eye irritation (eye organ), dizziness (ear organ; nervous system), cough (respiratory system), palpitation (cardiovascular system), abdominal distention (digestive system), urinary frequency (urinary system), paleness (hematopoietic system), pruritus (integumentary system) and muscle pain (musculoskeletal system). Participants were asked to fill in the questionnaire about any physical symptoms that they had experienced within two weeks prior to the survey.

Psychological distress was measured using the 12-item version of the Chinese Health Questionnaire (CHQ-12), a well-validated instrument[17]. The CHQ-12 was adapted from the General Health Questionnaire (GHQ)[18] with the modification and addition of several culturally relevant items. The twelve items in the questionnaire including the questions concerning depression, anxiety, sleep disturbance, somatic concern and interpersonal difficulties were answered based on a four-point Likert scale. To differentiate cases from non-cases of emotional disturbance, the scoring method of 0-0-1-1 was adopted[17, 18]. Participants marked their answers based on their psychological conditions in the two weeks before the survey. A higher total score indicated higher psychological distress. In previous studies[19, 20], a CHQ-12 score of 5 or above was defined as indicating high psychological distress, and it showed good sensitivity (78 to 80%) and specificity (77 to 84%). The cut-off score of 4/5 was therefore adopted in the current study to discriminate the caseness of emotional disturbance.

Statistical methods

The percentages of basic characteristics and the different occupational categories of the participants were described. Gender and age data were gathered to test the consistent distributions among participants and non-participants by the chi-square test. Weighting for the prevalence of health complaints by considering gender and age distributions of all potential participants (7,043 workers) was adopted in the analysis procedures to compensate for the representative problems caused, as the distribution of personal characteristics among participants was not consistent with that of non-participants. The difference in the portion of physical and mental symptoms by occupational category was tested using the Friedman test. For statistical purposes, age was divided into two groups, under 40 and equal to or over 40, and company size was divided into two groups, small/medium-scale (less than 300 employees) and large-scale (equal to or more than 300 employees). The differences in age, gender and company size were analyzed using the chi-square test. Multivariate logistic regression was adopted to analyze the odds ratio of the different symptoms by various occupational categories, controlling for gender and age. Dummy variables were established for each occupational category, with service worker (the youngest group) as a reference, although the selection of the reference group was arbitrary. A p value less than 0.05 indicated statistical significance. All analyses were carried out using the SPSS 13.0 software package.

Ethical issues

This study was performed in compliance with international ethical rules, the Helsinki Declaration and local regulations. Under the Taiwanese Labor Health Protection Rule, occupational health personnel need to routinely assess workers' health risks and needs. This assessment is carried out in the form of public health surveillance for workers. This study was conducted with the approval of the Bureau of Health Promotion under the Department of Health, and it was designed with the collaboration of the workplace authority to assess worker health states in order to develop more efficient health-promoting programs. An information sheet was attached to the survey questions and provided an explanation of the study to each participant. All the data collected in the study remained anonymous and were treated as strictly confidential.

Results

Background information and representativeness of participants

The personal characteristics of the participants by occupational category are listed in Table 1. The valid gender distribution was 58.5% males and 41.5% females. The average age for all participants was 37.4 yr and ranged between 18–67 yr. The majority of the participants were college graduates (52.7%), followed by senior high school graduates (38.3%). Among all the participants, managers were the fewest in number but had the highest average age, 44.2 yr (SD=7.1). Service workers had the lowest average age, 33.0 yr (SD=9.4). The comparisons of gender and age patterns among participants and non-participants showed differences ($\chi^2_{(1)}$=53.38, p<0.001 for gender; $\chi^2_{(1)}$=33.31, p<0.001 for age), which meant the distribution of personal characteristics in the study sample was not consistent with that of non-participants. The percentage of participants under 40 yr old (57.3%) was higher than that of non-participants under 40 yr old (48.8%), and the percentage of male partici-

Table 1. Personal characteristics of participants by occupational category

Variables	Manager (n=40) n (%)[a]	Professional (n=148) n (%)	Technician (n=250) n (%)	Office worker (n=302) n (%)	Service worker (n=206) n (%)	Technical worker (n=353) n (%)	Machine operator (n=219) n (%)	Total (N=1,628) n (%)
Gender								
Male	26 (66.7)	95 (65.5)	195 (80.6)	57 (19.2)	38 (18.7)	298 (86.4)	160 (74.8)	869 (58.5)
Female	13 (33.3)	50 (34.5)	47 (19.4)	240 (80.8)	165 (81.3)	47 (13.6)	54 (25.2)	616 (41.5)
Education								
Junior high or below	0 (0.0)	2 (1.4)	4 (1.6)	4 (1.3)	23 (11.8)	18 (5.2)	26 (12.2)	77 (5.2)
Senior high school	2 (5.1)	18 (12.3)	92 (37.2)	30 (10.0)	125 (64.1)	171 (49.0)	132 (62.0)	570 (38.3)
College graduate	28 (71.8)	100 (68.5)	149 (60.3)	252 (84.0)	44 (22.6)	158 (45.3)	54 (25.4)	785 (52.7)
Postgraduate	9 (23.1)	26 (17.8)	2 (0.8)	14 (4.7)	3 (1.5)	2 (0.6)	1 (0.5)	57 (3.8)
				Mean ± SD				
Age, year	44.2 ± 7.1	38.3 ± 8.9	38.4 ± 9.6	38.5 ± 7.5	33.0 ± 9.4	37.6 ± 10.1	35.6 ± 9.3	37.4 ± 9.4

[a]Calculated according to the percentage of the valid count.

Table 2. Inequality in portions of physical and psychological symptoms by occupational category (N=1,628)[a]

Symptoms	Manager %[b] (rank)[c]	Professional % (rank)	Technician % (rank)	Office worker % (rank)	Service worker % (rank)	Technical worker % (rank)	Machine operator % (rank)	Total % (rank)
Eye irritation	36.0 (2)	20.6 (4)	20.6 (4)	41.0 (3)	14.1 (6)	16.9 (5)	17.5 (5)	22.4 (4)
Dizziness	41.2 (1)	22.6 (2)	28.1 (2)	42.9 (2)	36.4 (2)	23.6 (3)	28.2 (2)	30.1 (2)
Cough	12.5 (9)	13.3 (8)	14.9 (7)	18.3 (8)	17.2 (5)	15.8 (7)	19.0 (4)	16.3 (8)
Palpitation	27.2 (5)	16.1 (7)	17.1 (5)	27.3 (4)	18.2 (4)	21.3 (4)	14.9 (6)	19.7 (5)
Abdominal distention	22.6 (6)	22.0 (3)	16.1 (6)	23.8 (7)	12.1 (7)	12.8 (8)	14.5 (7)	17.1 (6)
Urinary frequency	14.1 (8)	7.5 (9)	8.8 (9)	5.8 (10)	9.9 (9)	7.8 (9)	10.3 (9)	8.5 (9)
Paleness	3.1 (10)	4.9 (10)	4.5 (10)	12.7 (9)	6.3 (10)	4.2 (10)	3.2 (10)	5.8 (10)
Pruritus	35.7 (3)	19.6 (5)	26.5 (3)	24.9 (6)	20.8 (3)	25.9 (2)	25.6 (3)	24.8 (3)
Muscle pain	32.3 (4)	40.5 (1)	47.7 (1)	56.7 (1)	41.4 (1)	38.3 (1)	46.7 (1)	44.7 (1)
Psychological distress	17.8 (7)	17.0 (6)	13.4 (8)	26.6 (5)	11.7 (8)	16.6 (6)	10.5 (8)	16.6 (7)

[a]$\chi^2_{(9)}$=53.59 (p<0.001) calculated using the nonparametric Friedman test. [b]Calculated according to the percentage of the valid count; weighted by considering gender and age distributions of 7,043 potential participants. [c]The rank of symptoms was calculated according to each occupational category by column.

pants (58.5%) was lower than that of male non-participants (67.7%). To compensate for the representative problems caused, all the prevalence data for each complaint were weighted by adjusting for gender and age.

Physical and psychological states by occupational category

Nearly half of the participants (44.7%) had muscle pain. About one third of the participants indicated occurrence of dizziness (30.1%), and 16.6% of workers reported psychological distress (see Table 2). A significant difference in the occurrence of different symptoms was observed in workers across different occupational categories ($\chi^2_{(9)}$=53.59, p<0.001). Listed here are the symptoms reported by over one third of participants in each occupation. Managers experienced (in descending order) dizziness (41.2%), eye irritation (36.0%) and pruritus (35.7%). Professionals and technicians had muscle pain (40.5 and 47.7%, respectively). Office workers had muscle pain (56.7%), dizziness (42.9%) and eye irritation (41.0%). Service workers had problems with muscle pain (41.4%) and dizziness (36.4%). Technical workers and machine operators complained of muscle pain (38.3 and 46.7%, respectively).

Physical and psychological states by gender, age and company size

The occurrence rate for each symptom was higher for females than males (see Table 3). Eye irritation ($\chi^2_{(1)}$=26.58, p<0.001), dizziness ($\chi^2_{(1)}$=63.01, p<0.001), palpitation ($\chi^2_{(1)}$=12.77, p<0.001), abdominal distention ($\chi^2_{(1)}$=17.09, p<0.001), paleness ($\chi^2_{(1)}$=17.00, p<0.001), muscle pain ($\chi^2_{(1)}$=25.53, p<0.001) and psychological distress ($\chi^2_{(1)}$=11.34, p<0.01) all showed statistically significant differences for gender. Workers under 40 yr old showed a higher prevalence than those aged equal to or over 40 for all symptoms, with the exception of urinary frequency. Among the symptoms, dizziness ($\chi^2_{(1)}$=17.53, p<0.001), palpitation ($\chi^2_{(1)}$=4.32, p<0.05), pruritus ($\chi^2_{(1)}$=11.91, p<0.01) and psychological distress ($\chi^2_{(1)}$=5.02, p<0.05) showed statistically significant differences between age groups.

Table 3. Comparison of the portions of physical and psychological symptoms by gender, age and company size

Symptoms	Gender			Age			Company size[b]		
	Male n (%)[a]	Female n (%)	χ^2	Under 40 n (%)	Over 40 n (%)	χ^2	Small/Medium n (%)	Large n (%)	χ^2
Eye irritation	169 (18.4)	134 (30.9)	26.58***	173 (24.5)	130 (20.2)	3.67	30 (19.6)	272 (22.7)	0.76
Dizziness	214 (23.3)	194 (44.5)	63.01***	249 (35.0)	158 (24.6)	17.53***	37 (24.0)	370 (30.8)	3.01
Cough	145 (15.8)	74 (17.3)	0.50	120 (17.1)	99 (15.4)	0.69	24 (15.7)	195 (16.4)	0.05
Palpitation	155 (17.0)	109 (25.3)	12.77***	154 (21.8)	110 (17.3)	4.32*	33 (21.6)	232 (19.5)	0.36
Abdominal distention	128 (14.1)	100 (23.3)	17.09***	127 (18.1)	101 (16.0)	1.07	28 (18.3)	200 (16.9)	0.18
Urinary frequency	73 (8.0)	41 (9.6)	1.02	56 (8.0)	57 (8.9)	0.33	11 (7.2)	102 (8.6)	0.36
Paleness	36 (4.0)	41 (9.7)	17.00***	44 (6.3)	33 (5.3)	0.64	12 (7.8)	65 (5.5)	1.31
Pruritus	220 (23.9)	114 (26.6)	1.14	202 (28.7)	132 (20.5)	11.91**	37 (24.2)	296 (24.8)	0.03
Muscle pain	295 (39.6)	187 (56.2)	25.53***	266 (47.2)	216 (42.0)	2.87	40 (37.4)	441 (45.5)	2.55
Psychological distress	131 (14.3)	92 (21.6)	11.34**	131 (18.8)	92 (14.2)	5.02*	22 (14.6)	200 (16.8)	0.47

[a]Calculated according to the percentage of the valid count. [b]Small/medium-scale denotes less than 300 employees; large-scale denotes equal to or more than 300 employees. Asterisks indicate $p<0.05$, $p<0.01$ and $p<0.001$ (*, ** and ***, respectively) calculated using the χ^2 test; the analysis procedures used weighted cases by considering gender and age distributions of 7,043 full-time workers.

No symptom showed significant differences for company size.

Associations between occupational category and health complaints

The relationship between occupational category and each symptom is shown in Table 4. Using logistic regression with gender and age variables controlled, managers and office workers displayed more symptoms than other occupational categories. For office workers, the odds of all symptoms (with the exception of urinary frequency) were higher than those of service workers, and five symptoms had reached a level of statistical significance. These symptoms were eye irritation (OR 4.46), palpitation (OR 1.77), abdominal distention (OR 2.33), muscle pain (OR 1.96) and psychological distress (OR 2.89). For managers, the odds of eye irritation were 5.03 times higher than that of service workers ($p<0.001$), and the odds of dizziness (OR 2.42), palpitation (OR 2.47), abdominal distention (OR 3.08) and pruritus (OR 2.93) were also higher than those of service workers. Professionals had 2.09 and 2.83 times higher odds of eye irritation and abdominal distention, respectively, than service workers. Technicians had significantly higher odds than service workers for eye irritation (OR 2.26), abdominal distention (OR 2.08) and muscle pain (OR 2.09). Compared with service workers, technical workers had more instances of psychological distress (OR 2.14). Machine operators had significantly higher odds than service workers for muscle pain (OR 1.93). Occupational category showed significant relationships with specific symptoms.

Discussion

This study surveyed the prevalence of certain physical symptoms and psychological distress of Taiwanese workers in various occupational categories in order to provide some valuable insights for workplace health promotion in the future. Studying only diagnosed diseases does not seem to assist health promotion in attaining the desired high level of well-being. This study therefore surveyed workers' subjective complaints involving main organ systems. It also focused on the relationships between occupational category and certain health complaints. Household income and education are regarded as significant variables for health outcomes[21]; however, these two variables are strongly related to occupation. In addition, compared with the variables of income and education, occupational category is recognizable and seems to be more manageable, as occupational health personnel can design and implement workplace health promotion programs.

Gender was highly correlated with physical symptoms and psychological distress. Female workers had higher rates of eye irritation, dizziness, palpitation, abdominal distention, paleness and muscle pain than male workers. Two national surveys in Taiwan also consistently indicated that women have a poorer self-rated general health than men[22, 23]. In Taiwan, women seemed more likely to report poorer health states than men. With regard to musculoskeletal complaints, the finding of women having a higher prevalence than men was consistent with many studies in other countries[6, 7]. In terms of psychological distress, the present study also revealed that female workers showed a higher prevalence of psychological distress than male

Table 4. Multivariate logistic regression for each physical and psychological symptom[a]

Variables	Eye irritation OR (95% CI)	Dizziness OR (95% CI)	Cough OR (95% CI)	Palpitation OR (95% CI)	Abdominal distention OR (95% CI)	Urinary frequency OR (95% CI)	Paleness OR (95% CI)	Pruritus OR (95% CI)	Muscle pain OR (95% CI)	Psychological distress OR (95% CI)
Gender										
Male	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Female	1.61 (1.16–2.24)	2.59 (1.91–3.50)	1.14 (0.78–1.65)	1.65 (1.17–2.33)	1.84 (1.29–2.64)	1.45 (0.89–2.35)	2.01 (1.12–3.59)	1.24 (0.89–1.71)	2.00 (1.43–2.81)	1.57 (1.08–2.27)
p value	0.005	$p<0.001$	NS	0.004	0.001	NS	0.019	NS	$p<0.001$	0.018
Age										
Over 40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Under 40	1.42 (1.07–1.87)	1.72 (1.33–2.21)	1.13 (0.83–1.53)	1.41 (1.06–1.88)	1.24 (0.91–1.68)	0.90 (0.60–1.35)	1.15 (0.70–1.88)	1.64 (1.26–2.13)	1.25 (0.97–1.62)	1.54 (1.13–2.11)
p value	0.014	$p<0.001$	NS	0.018	NS	NS	NS	$p<0.001$	NS	0.006
Occupation										
Service worker	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Manager	5.03 (2.16–11.71)	2.42 (1.13–5.18)	0.77 (0.27–2.19)	2.47 (1.05–5.80)	3.08 (1.20–7.87)	1.67 (0.56–4.98)	0.68 (0.10–4.64)	2.93 (1.31–6.54)	0.99 (0.43–2.26)	2.44 (0.89–6.68)
p value	$p<0.001$	0.023	NS	0.038	0.019	NS	NS	0.009	NS	NS
Professional	2.09 (1.05–4.15)	0.83 (0.47–1.48)	0.80 (0.39–1.62)	1.14 (0.58–2.25)	2.83 (1.39–5.76)	0.86 (0.35–2.13)	1.07 (0.35–3.25)	1.11 (0.59–2.09)	1.47 (0.74–2.91)	2.07 (0.98–4.35)
p value	0.036	NS	NS	NS	0.004	NS	NS	NS	NS	NS
Technician	2.26 (1.19–4.30)	1.31 (0.78–2.19)	0.93 (0.49–1.75)	1.33 (0.72–2.47)	2.08 (1.04–4.15)	1.07 (0.48–2.39)	1.07 (0.38–3.00)	1.74 (0.99–3.06)	2.09 (1.21–3.60)	1.69 (0.82–3.47)
p value	0.012	NS	NS	NS	0.039	NS	NS	NS	0.008	NS
Office worker	4.46 (2.48–8.04)	1.39 (0.87–2.24)	1.09 (0.60–1.97)	1.77 (1.01–3.09)	2.33 (1.23–4.42)	0.55 (0.24–1.27)	2.20 (0.94–5.15)	1.35 (0.79–2.33)	1.96 (1.18–3.24)	2.89 (1.50–5.56)
p value	$p<0.001$	NS	NS	0.044	0.009	NS	NS	NS	0.009	0.001
Technical worker	1.77 (0.94–3.32)	1.05 (0.64–1.72)	1.00 (0.54–1.83)	1.76 (0.98–3.15)	1.61 (0.81–3.19)	0.94 (0.43–2.07)	1.04 (0.39–2.81)	1.65 (0.95–2.85)	1.42 (0.84–2.39)	2.14 (1.08–4.28)
p value	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.030
Machine operator	1.70 (0.88–3.29)	1.15 (0.69–1.94)	1.22 (0.65–2.27)	1.05 (0.56–1.98)	1.71 (0.85–3.47)	1.24 (0.56–2.76)	0.70 (0.23–2.16)	1.54 (0.87–2.72)	1.93 (1.11–3.37)	1.15 (0.54–2.48)
p value	NS	NS	NS	NS	NS	NS	NS	NS	0.020	NS

OR, odds ratio; 95% CI, 95% confidence interval; NS, not significant.

[a]The analysis procedures used weighted cases by considering gender and age distributions of 7,043 full-time workers.

workers. This finding was consistent with the results of a Taiwanese national survey: 3.5% of men and 6.0% of women reported depression[23]. A 20-year longitudinal mental health study in the UK also showed a similar finding: females were consistently afflicted more by mental health disorders than males[24]. Health professionals should take these gender-specific health problems into consideration when designing health promotion programs.

Muscle pain was the most common symptom in this study, irrespective of the occupation. About 30% to 55% of workers in different occupational categories suffered from muscle pain. Musculoskeletal discomfort has been evidenced to be one of the major problems in occupational health in many countries[25, 26]. Frequent musculoskeletal problems threaten the quality of life significantly[27], and this issue should therefore draw more attention. Work-related musculoskeletal disorders mainly arise from various ergonomic risk factors, such as high force, repetitive movements, unusual posture or prolonged standing or sitting[28]. In addition, work-related psychosocial factors, such as high job strain, job dissatisfaction and limited social support at work, have been found to be associated with musculoskeletal discomfort[29]. Early detection of somatic complaints, assessing the content of work and finding the causes of musculoskeletal discomfort are all important ways to prevent or remedy these discomforts.

Office workers had higher prevalence rates of physical symptoms and psychological distress compared with service workers in the study. Moreover, muscle pain, dizziness and eye irritation had a prevalence rate of over 40% among office workers. Previous studies have also shown that office workers (particularly computer users) have a high prevalence of musculoskeletal discomforts and visual problems[30]. For musculoskeletal problems of office workers, the workplace risk factors include unsuitable workstation design, long periods of computer use and constrained sitting. The influence of ergonomic factors and the physical work environment on visual health also has been identified. Studies have shown that extended video display terminal (VDT) work and poor lighting conditions have a deleterious effect on vision[31]. Office workers' duties vary by level of experience[32], and rather than performing a single specialized task, most office workers change duties often, depending on the needs of specific jobs and the employers. Office workers usually work with other office staff and have to be cooperative and comply with the demands of many different departments within an organization. High psychological demands and low control over work are characteristics of a highly stressful job[33]. Office workers exhibited the highest level of psychological distress (26.6%) compared with workers in other occupational categories (10.5 to 17.8%); this high level of risk for mental distress is consistent with other studies[34, 35]. Further studies exploring how to improve the physical and mental health of office workers are recommended.

Managers reported more physical symptoms than service workers but did not display a higher prevalence of psychological distress. Responsibilities of managers vary by industry, size of an organization and the position in a company. In general, managerial work includes planning, communicating, giving directions and helping the department work efficiently[36]. High levels of decision authority and job control, which are characteristics of managerial position, have been found to lessen work stress[33]. Previous research showed these work characteristics were one of the reasons why managers did not report a high prevalence of psychological distress[37]. In terms of physical symptoms, the highest prevalence rate of physical symptoms among managers was for dizziness (41.2%). Moreover, dizziness was common (22.6 to 42.9%) among workers across occupational categories. Dizziness is a nonspecific discomfort and is usually subclassified into four categories: vertigo (mainly caused by vestibular disorders), disequilibrium (mainly caused by neurological disorders), presyncope (mainly caused by cardiovascular disorders) and other types[38, 39]. The prevalence of dizziness in community-based surveys has been reported to vary (about 25 to 35%) because of different case definitions and different measures in studies[38]. In the field of occupational health, dizziness was found to be associated with some hazards, such as chemicals, dust and poor ventilation[40]. A prospective study on occupational consequences indicated that dizziness was an infrequent cause of certified sickness absence, but about one quarter of long-term sickness absentees with dizziness obtained a disability pension[38]. The issue of dizziness among workers should therefore not be overlooked, and appropriate health programs for dizziness are encouraged.

Several limitations of this study should be considered when interpreting the findings. Firstly, the cross-sectional study design does not allow researchers to determine the causal direction of the links between occupational category and health. Secondly, the voluntary nature of participation and the purposive sampling method used in this study might have produced some selection bias. The level of influence caused by response bias on the findings of the study was difficult to determine because the occupational details of the non-respondents were not available. Weighting for the proportion of health complaints by considering age and gender distribution was adopted

in the analysis procedures to compensate for the sampling weakness. Thirdly, the survey questions regarding physical symptoms, developed by GPs, might be a weakness. In Taiwan, the percentage of reported general clinic visits for females is slightly higher than for males[22]. It is possible that there is a gender bias regarding GPs' perceptions of common symptoms. Therefore, results pertaining to gender differences should be interpreted carefully. In addition, the fact that there were seven occupational categories in this study resulted in smaller numbers of respondents in some of the occupational categories. Future research using longitudinal studies with larger samples in each occupational category is recommended.

Conclusions

The present study revealed significant differences in the prevalence of various symptoms among workers in different occupational categories. Muscle pain and dizziness were prevalent among about one third of participants. In addition, there was a strong association between occupational category and health complaints, with office workers and managers reporting a higher prevalence of physical symptoms. Our findings highlight the need for health promotion programs that specifically target office workers and managers. The high prevalence rates of muscle pain and dizziness among workers should cause more concern when designing health promotion programs. This survey of diverse symptoms involving main organ systems sheds more light on the existing data concerning morbidity and general health status and brings about a better understanding of worker health.

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References

1) WHO Regional Office for Europe. Declaration of Alma-Ata, 1978. [Online]. 2012 [cited 2012 Feb 6]; Available from: URL: http://www.euro.who.int/en/who-we-are/policy-documents/declaration-of-alma-ata,-1978
2) Hollander RB, Lengermann JJ. Corporate characteristics and worksite health promotion programs: survey finding from fortune 500 companies. Soc Sci Med 1988; 26: 495–501.
3) Bureau of Labor Statistics. Occupational injuries and illnesses (annual) news release: workplace injuries and illnesses, 2010. [Online]. 2011 [cited 2012 Feb 6]; Available from: URL: http://www.bls.gov/news.release/archives/osh_10202011.htm
4) Borooah VK. Occupational class and the probability of long-term limiting illness. Soc Sci Med 1999; 49: 253–66.
5) Cavelaars AE, Kunst AE, Geurts JJ, et al. Morbidity differences by occupational class among men in seven European countries: an application of the Erikson-Goldthorpe social class scheme. Int J Epidemiol 1998; 27: 222–30.
6) Brage S, Bjerkedal T, Bruusgaard D. Occupation-specific morbidity of musculoskeletal disease in Norway. Scand J Soc Med 1997; 25: 50–7.
7) Leino-Arjas P, Hanninen K, Puska P. Socioeconomic variation in back and joint pain in Finland. Eur J Epidemiol 1998; 14: 79–87.
8) Grosch JW, Murphy LR. Occupational differences in depression and global health: results from a national sample of US workers. J Occup Environ Med 1998; 40: 153–64.
9) Volkers AC, Westert GP, Schellevis FG. Health disparities by occupation, modified by education: a cross-sectional population study. BMC Public Health 2007; 7: 196.
10) Lee DJ, Fleming LE, Gomez-Marin O, et al. Morbidity ranking of U.S. workers employed in 206 occupations: the National Health Interview Survey (NHIS) 1986–1994. J Occup Environ Med 2006; 48: 117–34.
11) Ihlebaek C, Eriksen HR. Occupational and social variation in subjective health complaints. Occup Med (Lond) 2003; 53: 270–8.
12) Lin YP, Hong O, Yeh MC. Occupational health nursing practice, education, and research in Taiwan. AAOHN J 2008; 56: 151–8.
13) Tang FC, Su YC, Huang SL. The experiences of workplaces health promotion in Taiwan and our model. Chinese J Ind Med 2008; 21: 344–5 (in Chinese).
14) Fan K, Yen L. Health promotion in the workplace: comparison of the experiences of Taiwan and other countries. Taiwan J Public Health 2008; 27: 271–81 (in Chinese).
15) DGBAS. Standard industrial classification system and standard occupational classification system of the Republic of China. 5th revision ed. Taipei: Directorate-General of Budget, Accounting and Statistics; 1992 (in Chinese).
16) Eriksen HR, Ihlebaek C, Ursin H. A scoring system for Subjective Health Complaints (SHC). Scand J Public Health 1999; 27: 63–72.
17) Cheng TA, Williams P. The design and development of a screening questionnaire (CHQ) for use in community studies of mental disorders in Taiwan. Psychol Med 1986; 16: 415–22.
18) Goldberg D. Manual of the General Health Questionnaire. Windsor (UK): NFER; 1978.
19) Chen CS, Tsang HY, Chong MY, Tang TC. Validation of the Chinese Health Questionnaire (CHQ-12) in community elders. Kaohsiung J Med Sci 2000; 16: 559–65.
20) Chong MY, Wilkinson G. Validation of 30-

and 12-item versions of the Chinese Health Questionnaire (CHQ) in patients admitted for general health screening. Psychol Med 1989; 19: 495–505.
21) Kim HJ, Ruger JP. Socioeconomic disparities in behavioral risk factors and health outcomes by gender in the Republic of Korea. BMC Public Health 2010; 10: 195.
22) Taiwan Bureau of Health Promotion. 2005 National health interview survey. [Online]. 2012 [cited 2012 Feb 6]; Available from: URL: http://olap.bhp.doh.gov.tw/en_US/Search/ListHealth1.aspx?menu=1&mode=1&year=94
23) Taiwan Bureau of Health Promotion. 2002 National survey on knowledge, attitude and practice of health promotion survey index. [Online]. 2012 [cited 2012 Feb 6]; Available from: URL: http://olap.bhp.doh.gov.tw/en_US/Search/ListHealth1.aspx?menu=1&mode=1&year=91
24) Llena-Nozal A, Lindeboom M, Portrait F. The effect of work on mental health: does occupation matter? Health Econ 2004; 13: 1045–62.
25) Driscoll TR, Hendrie AL. Surveillance of work-related disorders in Australia using general practitioner data. Aust N Z J Public Health 2002; 26: 346–51.
26) Roquelaure Y, Ha C, Leclerc A, et al. Epidemiologic surveillance of upper-extremity musculoskeletal disorders in the working population. Arthritis Rheum 2006; 55: 765–78.
27) Morken T, Riise T, Moen B, et al. Frequent musculoskeletal symptoms and reduced health-related quality of life among industrial workers. Occup Med (Lond) 2002; 52: 91–8.
28) Gallagher S. Physical limitations and musculoskeletal complaints associated with work in unusual or restricted postures: a literature review. J Safety Res 2005; 36: 51–61.
29) Menzel NN. Psychosocial factors in musculoskeletal disorders. Crit Care Nurs Clin North Am 2007; 19: 145–53.
30) Brewer S, Van Eerd D, Amick III BC, et al. Workplace interventions to prevent musculoskeletal and visual symptoms and disorders among computer users: a systematic review. J Occup Rehabil 2006; 16: 325–58.
31) Gobba FM, Broglia A, Sarti R, Luberto F, Cavalleri A. Visual fatigue in video display terminal operators: objective measure and relation to environmental conditions. Int Arch Occup Environ Health 1988; 60: 81–7.
32) Bureau of Labor Statistics. Occupational outlook handbook, 2010-11 edition: office clerks, general. [Online]. 2009 [cited 2012 Feb 6]; Available from: URL: http://www.bls.gov/oco/ocos130.htm
33) Karasek R, Brisson C, Kawakami N, Houtman I, Bongers P, Amick B. The Job Content Questionnaire (JCQ): an instrument for internationally comparative assessments of psychosocial job characteristics. J Occup Health Psychol 1998; 3: 322–55.
34) Stansfeld SA, Head J, Fuhrer R, Wardle J, Cattell V. Social inequalities in depressive symptoms and physical functioning in the Whitehall II study: exploring a common cause explanation. J Epidemiol Community Health 2003; 57: 361–7.
35) Niedhammer I, Goldberg M, Leclerc A, Bugel I, David S. Psychosocial factors at work and subsequent depressive symptoms in the Gazel cohort. Scand J Work Environ Health 1998; 24: 197–205.
36) Bureau of Labor Statistics. Occupational outlook handbook, 2010-11 edition: administrative services managers. [Online]. 2009 [cited 2012 Feb 6]; Available from: URL: http://www.bls.gov/oco/ocos002.htm
37) Cohidon C, Niedhammer I, Wild P, Gueguen A, Bonenfant S, Chouaniere D. Exposure to job-stress factors in a national survey in France. Scand J Work Environ Health 2004; 30: 379–89.
38) Skoien AK, Wilhemsen K, Gjesdal S. Occupational disability caused by dizziness and vertigo: a register-based prospective study. Br J Gen Pract 2008; 58: 619–23.
39) Post RE, Dickerson LM. Dizziness: a diagnostic approach. Am Fam Physician 2010; 82: 361–8, 369.
40) Lu JL. Occupational hazards and illnesses of Filipino women workers in export processing zones. Int J Occup Saf Ergon 2008; 14: 333–42.