Work Environment and Mental Health Status Assessed by the General Health Questionnaire in Female Japanese Doctors

Yuko HAYASAKA¹, Kazutoshi NAKAMURA²*, Masaharu YAMAMOTO² and Shigeru SASAKI³

¹Department of Nursing, Social Welfare & Psychology, Niigata Seiryo University, Niigata 951-8121, Japan
²Department of Community Preventive Medicine, Niigata University Graduate School of Medical and Dental Sciences, Niigata 951-8510, Japan
³Niigata Medical Association, Niigata 951-8581, Japan

Received June 7, 2007 and accepted August 1, 2007

Abstract: The number of female doctors in Japan has been increasing, but the relationship between their work environment and their mental health is not clear. This study aimed to determine factors in the work environment influencing mental health status among female doctors. We mailed an anonymous survey questionnaire to 587 female doctors, and 367 (62.5%) responded. The survey included questions about age, marital status, work-related information including their specialty, affiliated medical facility, position, type of employment, working time, and night duty. The thirty-item version of the General Health Questionnaire (GHQ-30) was used to examine psychological distress. For the purposes of analysis, subjects with a GHQ-30 score greater than or equal to eight were considered to have psychological distress. The mean age of the subjects was 45.1 yr (SD 15.1). A total of 169 (46.1%) of subjects met criteria for having psychological distress. Bivariate analysis showed that age \((p=0.0009)\), marital status \((p=0.0038)\), medical facility \((p=0.0476)\), position \((p=0.0180)\), working time \((p=0.0337)\), and working at night \((p<0.0001)\) were associated with the GHQ-30 score. Multiple logistic regression analysis showed that younger age \((p=0.0030)\), engaging in night duty \((p=0.0049)\), and being divorced \((p=0.0093)\) were independently associated with psychological distress. These results suggest that work environment factors, particularly night duty, play important roles in modulating psychological distress among female doctors.

Key words: Female doctors, General Health Questionnaire (GHQ-30), Mental health, Stress, Work environment

Introduction

The number of female doctors has been increasing in Japan. The Ministry of Health and Welfare of Japan reported that the number of female doctors working in medical facilities was 42,040 (256,668 in total) in 2004, 3.7 times more than in 1974 (11,388 working in medical facilities, and 122,096 in total)¹,². Recently, much attention has been focused on work environments and related health issues of female doctors.

Mental health disorders are believed to be an important health problem among female doctors in comparison with their male counterparts. Comparative studies on gender differences in health problems among doctors have reported that female doctors have more psychiatric symptoms³, suicidal intentions³, burnout⁴, depressive moods⁵, and sickness absences⁶ than male doctors. Data from the Women Physicians’ Health Study⁷ suggested that a higher prevalence of mental health disorders in women may be associated with work stress, work environment, and job satisfaction. There are other factors related to work stress and mental health status in female doctors. Young doctors generally put in long work hours and experience stressful working conditions⁵. A doctor’s
specialty is also of general concern. Previous studies suggested that female doctors in surgical specialties had a heavier workload and less work satisfaction\textsuperscript{8}, and that the life span of doctors in surgical specialties was shorter than that of internists\textsuperscript{9}. Subgroups of female doctors may be at a higher risk of mental disorders.

The previously mentioned studies were all conducted in Western countries; however, there have been several attempts to study health problems among female doctors in Japan. Despite the recent increase in the number of female doctors, the proportion of female doctors (14.3\%) in Japan is lower than most of European and North American countries\textsuperscript{10}. This may be related to difficulties in their work life, such as limited availability of nurseries and sexual discrimination\textsuperscript{11}. Furthermore, Japanese women are often thought to be exclusively responsible for domestic affairs, and this responsibility may pose an additional burden that may impact their mental health. However, few studies regarding the mental health of female doctors in Japan have been conducted.

The primary aim of this study was to determine the occupational factors associated with mental health status among female doctors. Understanding these factors will be helpful in providing better work environments for female doctors in Japan.

**Subjects and Methods**

**Subjects**

The target population consisted of female doctors working in the Niigata Prefecture, Japan. We mailed the survey questionnaire to all of the 364 female members of the Niigata Medical Association. In addition, we sent a questionnaire to 223 non-member female doctors who worked in nine hospitals, all with over 500 beds, in the Niigata Prefecture, with the permission of the hospital directors. Non-members are generally younger doctors, such as residents, medical staff, and graduate students in a general hospital or a university hospital. This sampling strategy enabled us to contact nearly all female doctors in the Niigata Prefecture. In total, 587 female doctors were contacted, and 367 (62.5\%) returned the questionnaire.

**Data collection**

The survey results were collected and analyzed in an anonymous and confidential manner. Surveys were sent to the subjects in late September, 2006, and completed questionnaires were returned by mail in October, 2006. This study received approval from the Ethics Committee of the Niigata University School of Medicine.

**Survey instrument**

The self-reported questionnaire elicited information about age, marital status, work-related information including specialties, medical facility, position, type of employment, working time, night duty, and levels of psychological distress. Marital status was classified as married, single, widowed, or divorced. The medical facilities where subjects worked were classified as hospitals, clinics, or other. Subjects’ positions were classified as administrative, non-administrative, or other, which included residents, medical staff, or graduate students in a general hospital or a university hospital. Type of employment was classified as either full-time or part-time. Subjects were asked to report their working hours per week and whether they engaged in night duty at least once a month.

The primary outcome of this study was the level of psychological distress, as measured by the previously-validated Japanese version\textsuperscript{12} of the 30-item General Health Questionnaire (GHQ)\textsuperscript{13, 14}. The GHQ is a self-administered tool originally developed for the screening of non-psychotic psychiatric illness. It is used both in clinical settings, and in epidemiologic studies on mental health status in general populations. A person with a high GHQ score is considered to have a high level of psychological distress, including depression, anxiety, and other psychiatric symptoms. For the purposes of analysis here, subjects with a GHQ-30 score greater than or equal to 8 were considered to have psychological distress\textsuperscript{15}. This cutoff value has been used in several previous epidemiologic studies in Japanese populations.

**Statistical methods**

The prevalence of persons having a GHQ-30 score greater than or equal to 8 was examined in relation to age group, marital status, and variables relating to work environment. The chi-square test was used to test independence of categorical data in bivariate analyses. A stepwise multiple logistic regression analysis was used to assess independence of the associations between predictor variables and the psychological distress outcome variable. Candidate predictors were statistically significant variables obtained by bivariate analyses. Qualitative variables were dealt with as dummy variables in the multiple logistic regression analysis. The SAS statistical package (version 8.02, SAS Institute, Cary, NC, USA) was used for all analyses. A \( p \)-value <0.05 was considered to be statistically significant.

**Results**

The average age of the subjects was 45.1 yr (SD 15.1). Questions about marital status revealed that 248 subjects (68.3\%) were married, 82 (22.6\%) were single, 15 (4.1\%)
were widowed, and 18 (5.0%) were divorced. Regarding specialty, there were 126 internists (35.2%), 52 pediatricians (14.5%), 31 ophthalmologists (8.7%), 23 psychiatrists (6.4%), 20 dermatologists (5.6%), 20 obstetricians and gynecologists (5.6%), 17 general surgeons (4.8%), 16 otolaryngologists (4.5%), 15 anesthesiologists (4.2%), and 38 others (11.6%). In regards to place of employment, 213 subjects (58.8%) worked at hospitals, 119 at clinics (32.9%), and 30 at other facilities (8.3%). At these facilities, 161 subjects (45.2%) had an administrative position, 145 (40.7%) had a non-administrative position, and 50 (14.0%) others were residents, graduate students, or medical staff in a university hospital. There were 280 subjects (82.6%) who worked full-time, and 59 (17.4%) who worked part-time. The average work week was 42.4 hours (SD 19.1); while 145 (41.2%) did night duties, and 207 (58.8%) did not.

The distribution of the total GHQ-30 scores is shown in Fig. 1. The distribution was skewed towards higher values, with a median score was 6. The proportion of subjects with a GHQ-30 score greater than or equal to eight was 152/365 (41.6%).

The grouping of respondents with a high GHQ-30 score (≥8) into 10-yr age groups is shown in Table 1. The prevalence of a high GHQ-30 score was higher in younger age groups, with the 20–29-yr age group having the highest prevalence. The prevalence of a high GHQ-30 score arranged by marital status is shown in Table 2. The highest prevalence was found in the divorced group, followed by the single group.

The prevalence of a high GHQ-30 score was 55/126 (43.7%) in internists and pediatricians, 15/22 (40.5%) in surgeons and obstetricians-gynecologists, and 74/177 (41.8%) in other doctors, with no statistically significant difference ($\chi^2=0.16$, d.f.=2, $p=0.9329$). The prevalence of a high GHQ-30 score in relation to occupational factors is shown in Table 3. The group of subjects who worked in hospitals had a significantly higher prevalence than the group who worked in other facilities. Residents, graduate students, and medical staff in the university hospital showed a significantly higher prevalence of a high GHQ-30 score than subjects with an administrative or non-administrative position. There were no significant differences in the prevalence between doctors who worked full-time and doctors who worked part-time. Subjects who worked greater than fifty hours per week had a higher prevalence than other subjects. Subjects who engaged in night duty had a significantly higher prevalence than those who did not.

Results from the stepwise multiple logistic regression analysis for a high GHQ-30 score as the outcome are shown in Table 4. Model 1 included all significant variables obtained by bivariate analyses as candidate predictor variables. Engaging in night duty, divorced status, and younger age were independently associated with a high GHQ-30 score. Since age may be correlated with other variables, such as position, and working time, another model (Model 2), without age, was tested. Model 2 included all significant variables, except for age, obtained by bivariate analyses as candidate predictor variables. Engaging in night duty, divorced status, position (resident, graduate student, or medical staff), and long working time were independently associated with a high GHQ-30 score.
Discussion

Much attention has been given recently to improving work environments for female doctors. There has been only one report studying depression and its correlates in Japanese female doctors, but this did not assess occupational factors\(^{16}\). This is the first study to demonstrate occupational factors as significant determinants of mental health for female doctors in the Japanese context.

The GHQ-30 has been widely used to evaluate a person’s general mental health status or psychological distress levels, and the prevalence of high GHQ-30 scores in the population studied can be compared to other Japanese female populations. Ohta \textit{et al.}\(^{17,18}\) reported a prevalence rate of 13.7–17.4\% in the general female population, and Shigemi \textit{et al.}\(^{19,20}\) reported a prevalence rate of 16.7–34.3\% for female industrial workers. Ohta \textit{et al.}\(^{21}\) studied evacuees of a volcanic eruption (Mt. Unzen) in Japan, and found the prevalence to be as high as 66.1\% (6 months later) and 45.6\% (44 months later).

<table>
<thead>
<tr>
<th>Occupational factors</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical facility</td>
<td>(\chi^2=4.01, \text{ d.f.}=1, p=0.0452)</td>
</tr>
<tr>
<td>Hospital</td>
<td>98/213 (46.0%)</td>
</tr>
<tr>
<td>Clinic and others</td>
<td>54/152 (35.5%)</td>
</tr>
<tr>
<td>Position</td>
<td>(\chi^2=8.16, \text{ d.f.}=2, p=0.0169)</td>
</tr>
<tr>
<td>Administrative</td>
<td>57/161 (35.4%)</td>
</tr>
<tr>
<td>Non-administrative</td>
<td>62/145 (42.8%)</td>
</tr>
<tr>
<td>Others including residents, graduate students, and university medical staff</td>
<td>29/50 (58.0%)</td>
</tr>
<tr>
<td>Type of employment</td>
<td>(\chi^2=2.59, \text{ d.f.}=1, p=0.1074)</td>
</tr>
<tr>
<td>Full-time</td>
<td>122/280 (43.6%)</td>
</tr>
<tr>
<td>Part-time</td>
<td>19/59 (32.2%)</td>
</tr>
<tr>
<td>Working time (hours/week)</td>
<td>(\chi^2=10.1, \text{ d.f.}=3, p=0.0179)</td>
</tr>
<tr>
<td>(\leq30)</td>
<td>41/115 (35.7%)</td>
</tr>
<tr>
<td>&gt;30, (\leq40)</td>
<td>39/100 (39.0%)</td>
</tr>
<tr>
<td>&gt;40, (\leq50)</td>
<td>26/69 (37.7%)</td>
</tr>
<tr>
<td>&gt;50</td>
<td>46/81 (56.8%)</td>
</tr>
<tr>
<td>Night duty</td>
<td>(\chi^2=17.4, \text{ d.f.}=1, p&lt;0.0001)</td>
</tr>
<tr>
<td>Present</td>
<td>80/145 (55.2%)</td>
</tr>
<tr>
<td>Absent</td>
<td>68/207 (32.9%)</td>
</tr>
</tbody>
</table>

**Table 4. Independent predictors selected by stepwise multiple logistic regression analyses for the high (\(\geq8\)) or low (\(\leq7\)) GHQ-30 score as an outcome variable**

<table>
<thead>
<tr>
<th>Predictor variable</th>
<th>Parameter estimate</th>
<th>Standard error</th>
<th>(p)-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1* (“Age” included as a candidate predictor)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (yr)</td>
<td>-0.0298</td>
<td>0.0100</td>
<td>0.0028</td>
</tr>
<tr>
<td>Night duty (1, yes; 0, no)</td>
<td>0.682</td>
<td>0.234</td>
<td>0.0035</td>
</tr>
<tr>
<td>Divorce (1, yes; 0, no)</td>
<td>1.50</td>
<td>0.57</td>
<td>0.0091</td>
</tr>
<tr>
<td>Model 2* (“Age” not included as a candidate predictor)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Night duty (1, yes; 0, no)</td>
<td>0.670</td>
<td>0.243</td>
<td>0.0057</td>
</tr>
<tr>
<td>Divorce (1, yes; 0, no)</td>
<td>1.50</td>
<td>0.57</td>
<td>0.0084</td>
</tr>
<tr>
<td>Position (1, residents, graduate students, or university medical staff; 0, others)</td>
<td>0.807</td>
<td>0.351</td>
<td>0.0215</td>
</tr>
<tr>
<td>Working time (1, &gt;50 h/wk; 0, (\leq50) h/wk)</td>
<td>0.635</td>
<td>0.291</td>
<td>0.0293</td>
</tr>
</tbody>
</table>

*Common candidate predictors are statistically significant variables obtained by bivariate analyses, such as marital status (as dummy variables), medical facility (1, hospital; 2, clinic and others), position, working time (as continuous and dichotomous variables), and night duty.
with these previous reports, the prevalence of high GHQ-30 scores in the female doctors in this study (41.6%) was high. Researchers in the UK have shown that psychological distress levels among doctors are higher than that of the general population\(^3,22\). General practitioners in Australia were also shown to have high GHQ scores, which is attributed to their low work-related morale and dissatisfaction with their job\(^23\). Our data were consistent with these reports. International comparisons of doctors’ psychological distress levels are of interest; however, a GHQ score cannot be compared directly between populations with a different ethnic or cultural background\(^12\).

This study showed night duty to be a significant factor associated with psychological distress, even when adjusting for other factors, including working time. Other studies have shown that night work is a critical occupational stressor\(^24\), and that night duty for doctors has more impact on physical and mental health because of sleep deprivation and psychological pressure\(^25\). Furthermore, for female doctors, night duty may be an obstacle to their household duties. All of these factors may affect the mental health of female doctors.

Additionally, we found a significant linear association between age and GHQ. Previous reports on the association between age and GHQ scores are inconsistent. Shigemi et al.\(^{20}\) reported no significant association between age and GHQ-30 scores, while Hodiamont et al.\(^{26}\) reported that high GHQ scores increase with age. Conversely, this study showed an inverse association between age and GHQ scores. Our findings should be interpreted with caution, however, since the association between these two factors may be partly explained by different confounders. Model 1 in Table 4 showed “age” to be a significant factor, whereas Model 2 showed that “position” and “working time” were selected, replacing “age” after excluding it from candidate predictors, indicating that “age” was correlated with “position” and “working time”. It seems natural that younger female doctors are disproportionately employed in positions with hard work and long hours, resulting in increased levels of psychological distress. Previous studies have also shown that junior hospital doctors faced greater sources of stress and poorer mental health outcomes than their senior counterparts\(^27\), and that working long hours is associated with levels of psychological symptoms in general practitioners\(^28\). These studies did not specifically target female doctors, however. The present study demonstrated similar findings in Japanese female doctors. Regarding working time, Carr et al. have previously shown that women physicians who work their preferred number of hours achieve the best balance of work-related and personal goals\(^29\). Control over work hours may be a key factor in improving the mental health of female doctors.

The mental health status of doctors in relation to their specialty may generally be of concern. In this study, however, no significant differences in GHQ-30 levels were found among specialties. A lack of association may be due to the small sample size of this study, and thus a larger study may be needed to detect a potential difference among specialties.

This study showed that being divorced is significantly associated with high GHQ scores, as found in previous studies. Hodiamont et al.\(^{25}\) showed a higher mean GHQ score among divorced people than for any other marital status. The reason for this association has not been fully understood; however, several hypotheses have been proposed. When comparing married (n=247) and divorced (n=18) women in this study, the proportion having children was 21.3% and 27.8% (p=0.5189); the proportion living with their parent(s) was 17.5% and 33.3% (p=0.1237), and the average time spent on domestic affairs was 2.8 and 2.3 h/d (p=0.1710), respectively (data not shown in Results). Although such differences were not statistically significant, divorced women may potentially experience problems related to having a fatherless family, which may have affected the mental health of divorced female doctors. Therefore, psychological distress levels among female doctors may be affected by their personal lives, as well their work environment. A social-psychological approach may be useful to understand more comprehensively the mental health of female doctors.

There were several important limitations of this study. The response rate of this questionnaire was relatively high for mail-in surveys, exceeding 60%, but we have no information on non-respondents to this study. Consequently, the results of this study may be biased. Characteristics of non-respondents should be examined in future studies. Secondly, the design of this study was cross-sectional, a method that cannot always determine causality. For example, divorce may cause decreased mental health, or decreased mental health may cause divorce. A longitudinal study is needed to resolve this underlying limitation.

This study demonstrated that younger age, divorced status, and engaging in night shifts are independently associated with high GHQ-30 scores, and that younger age may be confounded both by stressful and long work hours among female doctors. As such, improving occupational factors, including night shifts, as well as reducing stressful and long work hours among young doctors may help to improve the mental health outcomes of female doctors. A better sense of control over one’s work hours, such as engaging in part-time work and work sharing, may be a more practical solution.
Acknowledgement

The authors wish to thank Dr. Hiroko Nagai for her valuable comments on this study.

References


Industrial Health 2007, 45, 781–786