# Original Article

# Relationship between occupational stress and depression among psychiatric nurses in Japan

Kaori Yoshizawa, M.D.[a], Norio Sugawara, M.D., Ph.D.[a], Norio Yasui-Furukori, M.D., Ph.D.[a], Kazuma Danjo, M.D., Ph.D.[b], Hanako Furukori, M.D., Ph.D.[c], Yasushi Sato, M.D., Ph.D.[a, d], Tetsu Tomita, M.D.[a, e], Akira Fujii, M.D., Ph.D.[f], Taku Nakagam, M.D., Ph.D.[a, g], Masahide Sasaki, M.D.[a], Kazuhiko Nakamura, M.D., Ph.D.[a]

[a] *Department of Neuropsychiatry, Hirosaki University School of Medicine, Hirosaki*
[b] *Mizoguchi Mental Hospital, Shizuoka*
[c] *Department of Psychiatry, Kuroishi-Akebono Hospital, Kuroishi*
[d] *Department of Psychiatry, Mutsu General Hospital, Mutsu*
[e] *Department of Psychiatry, Hirosaki-Aiseikai Hospital, Hirosaki*
[f] *Department of Psychiatry, Seihoku-Chuoh Hospital, Goshogawara*
[g] *Department of Psychiatry, Odate Municipal General Hospital, Odate*

Address correspondence to:
Norio Sugawara
Department of Neuropsychiatry, Hirosaki University School of Medicine, 5 Zaifu-cho, Hirosaki city, Aomori, 036-8562, Japan
Tel: +81-172-39-5066
Fax: +81-172-34-5067
E-mail: nsuga3@yahoo.co.jp

**Abstract**

Psychiatric nursing is a stressful area of nursing practice. The purpose of this study was to examine occupational stress among psychiatric nurses in Japan. In this cross-sectional study, 238 psychiatric nurses were recruited from 7 hospitals. Data regarding the Generic Job Stress Questionnaire (GJSQ), the Center for Epidemiologic Studies for Depression scale (CES-D), and the Health Practice Index (HPI) were obtained via self-report questionnaires. After adjusting for all the variables, CES-D scores were associated with job stress, but social support reduced the effect of stress on depression among psychiatric nurses. However, the interpretation of our results was hampered by the lack of data concerning important occupational factors, such as working position, personal income, and working hours. Further longitudinal investigation into the factors associated with depression may yield useful information for administrative and psychological interventions.

**INTRODUCTION**

Psychiatric nursing has been recognized as a highly stressful occupation.[1]  Previous

studies have shown that psychiatric nurses are more depressed and emotionally exhausted

than general nurses.[2, 3]  In addition to the stressors shared with general nurses, psychiatric

nurses frequently encounter potential suicides,[4, 5] physically threatening patients, difficult or

demanding patients, verbal abuse,[6] and inadequate staffing.[7]

Poor mental health among nurses could result in a labor turnover, absenteeism, poor

morale, and reduced performance.[8, 9]  Therefore, poor mental health in the workplace is a

growing major health problem for both individual employees and organizations.

Depression is a serious affective illness with a high lifetime prevalence rate.[10]  The World

Health Organization has estimated that major depressive disorder will become the second

most important factor in worldwide disability-adjusted life-years (DALYs) by the year

2020.[11]  The reduction of occupational stress is important in preventing the development of

depression and promoting good mental health.

The number of psychiatric beds in institutions decreased in most developed countries

during the 1970s and 1980s.  Japan also has passed Mental Health Act established strict

criteria for involuntary hospitalizations in 1995.  This law intends to promote the concept

of "normalization", establishing mental illness as a disability and encouraging the re-

assimilation of psychiatric inpatients back into the community.  However, Japan currently

has 28.4 psychiatric beds per 10,000, which is the highest level in the world.    In addition,

the mean length of a hospital stay in Japan is approximately 1.5 years, which represents the

longest stay among the developed countries.[12]    Considering the large impact of mental

disabilities in the general population, Japan has likely not have spent enough expenditure

(0.5% of its GDP) on mental health.[13]    Although shifting from inpatient care to

community-based care is an ongoing effort, the Japanese psychiatric care delivery system

has been characterized as emphasizing hospital-based care and poor community resources.

Psychiatric nurses in Japan might encounter occupational stressors that differ from those of

other developed countries.    Thus, research is needed to evaluate the relationship between

occupational factors and depression among Japanese psychiatric nurses.

   The objective of the current investigation was to examine occupational stress among

psychiatric nurses in Japan.    The research questions for this study were: (1) What is the

prevalence of depression in a Japanese psychiatric nurses? and (2) Do sociodemographic

and occupational factors relate to depression among psychiatric nurses in Japan?    To our

knowledge, the current study is the first to examine the relationship between occupational

stress and depression in Japanese psychiatric nurses.

## METHODS

### Participants

   The present study was conducted between September and November 2012.　Self-report

questionnaire packages were mailed to 7 randomly selected hospitals that are affiliated with

Hirosaki University School of Medicine, and in these hospitals, the surveys were distributed

to 318 nurses.　The hospitals consisted of 3 psychiatric hospitals and 4 general hospitals.

Although the roles of psychiatric hospitals and general hospital psychiatric unit are

overlapped, general hospital psychiatric unit had charge of psychiatric emergency service,

treatment for patients with physical comorbidity, psychiatric consultation-liaison service, and

electroconvulsive therapy in Japan.　Support system for patients with mental illness in Japan

was shown in Figure 1.　All respondents provided their verbal informed consent to

participate in this study, and no incentives were offered for participation.　The anonymous

questionnaire was the only research instrument, and a statement was included that says

"Completion of the attached questionnaire will be taken as indicating your consent to

participate".　Of the distributed 318 surveys, responses were received back from 240 nurses,

and 238 questionnaires (response rate 74.8%) were completed from 238 nurses (66 males and

172 females).　The study protocol was approved by the Ethics Committee of the Hirosaki

University School of Medicine.　All the respondents participated in the study without any

incentive.

**Assessment of depressive symptoms**

The Japanese version of the Center for Epidemiologic Studies for Depression scale (CES-D) was administered to all the participants to measure their depressive status.[14, 15]    This questionnaire has been widely used to measure depressive symptoms in community populations and to screen individuals for probable depression.    The CES-D is a 20-item self-report instrument that focuses on depressive symptoms during the week prior to the administration of the questionnaire.    The maximum score on this scale is 60, and higher scores are associated with depression.    Based on a recent validation study,[16] the present study set a cut-off score of 19 to define probable depression.    Although a structured diagnostic clinical interview scale is necessary to confirm a diagnosis, responses self-report questionnaire are relatively quick and are suitable for examining large sample populations for research purposes.

**Assessment of occupational factors**

Job-related stress was assessed with the Generic Job Stress Questionnaire (GJSQ),[17, 18] which was developed by the National Institute for Occupational Safety and Health (NIOSH). From the GJSQ, the following measures were selected: role conflict, role ambiguity, job

control, social support from a supervisor, social support from coworkers, quantitative

workload, and variance in workload.

Because the GJSQ does not directly ask about occupational hazards, the following original

items were added to measure occupational hazards: (1) "How often did you face clients who

expressed verbal aggression?"; (2) "How often did you experience a situation in which

physical aggression might occur?"; (3) "How often during the last 12 months did you actually

experience violence?"; and (4) "How often did you experience a situation in which you might

be personally pursued for legal responsibility of an occupational episode?"   The responses

were rated on a 5-point scale that ranged from 1 (indicating that the symptom was "not at all"

present) to 5 (indicating that the symptom was present "very often").   For the participants in

this study, the alpha coefficient for the occupational hazards items was acceptable (alpha =

0.72).



**Assessment of personal health practices**

Lifestyle factors were assessed using a self-administered questionnaire that had been used

by Morimoto et al. in their earlier studies on lifestyle.[19, 20]   This instrument poses questions

regarding 8 different health practices that are outlined as follows: (1) not smoking; (2) not

drinking alcohol daily; (3) eating breakfast every morning; (4) sleeping 7 or 8 h per day; (5)

working 8 h or less per day; (6) undertaking physical activity at least twice per week; (7)

eating a nutritionally balanced diet; and (8) maintaining a moderate or low level of mental

stress.　For each factor, a score of 1 was given for "true", and 0 was given for "false".　In

addition, the Health Practice Index (HPI) score was calculated by summing the scores for the

8 health practices to produce a total score that ranged from 0 to 8 points.

**Statistical Analysis**

　　The data are presented as the means±SD.　A value of $p<0.05$ was considered to be

statistically significant.　Each measure of job-related stress (role conflict, role ambiguity, job

control, social support from supervisor, social support from coworkers, quantitative workload,

variance in workload, occupational hazards) was tertilized.　To compare the prevalence of

probable depression from occupational stress, the Cochran-Armitage trend test was performed

to analyze the categorical variables.　A logistic regression analysis was performed to predict

probable depression among the participants, and the following parameters were included in

the model: age, gender, marital status, family status, HPI score, length of work in the

psychiatry department, and job-related stress factors.　Odds ratios were calculated from both

the univariate analysis and the multivariate logistic regression analysis with 95% confidence

intervals.　The data were analyzed using the PASW Statistics PC software for Windows,

Version 18.0.0 (SPSS Inc., Chicago, IL, USA) and R 2.10.1.[21]　R 2.10.1 was used only for

the Cochran-Armitage trend test.

**Results**

**Characteristics of participants**

Table 1 contains the sociodemographic and occupational factors of the participants. According to the optimal CES-D cut-off point of 19 that was determined by Wada and colleagues (2007) to identify possible cases of depression among working individuals, the frequency of probable clinical depression in the current sample was 36.4% for males (n=24) and 37.2% for females (n=64) (p>0.05). Overall, the mean CES-D score was 15.4±10.4 for males and 17.4±10.5 for females (p>0.05).

**Prevalence of depression according to tertile categories of occupational stress**

Table 2 indicates the prevalence of probable depression according to tertiles of the occupational factors. The subjects with higher scores for role conflict, role ambiguity, quantitative workload, variance in workload, and occupational hazards were more likely to display depressive symptoms. In addition, the subjects with lower scores for job control, social support from a supervisor, and social support from coworkers were more likely to display depressive symptoms.

**Effects of sociodemographic and occupational factors on depression in psychiatric nurses**

Table 3 presents the results of the multivariate logistic regression analysis used to assess the effects of sociodemographic and occupational factors on probable depression. After adjusting for all the variables, an older age, a higher HPI score, job control, and social support from a supervisor were found to be significant protective factors against depressive symptoms. Under the same conditions, a higher quantitative workload score was revealed as a risk factor for having probable depression. There were no other significant associations with probable depression.

**DISCUSSION**

The present study assessed the relationship between depression according to the CES-D assessment and occupational stress among psychiatric nurses in Japan. We found that a high proportion of participants displayed depression (36.4% of males and 37.2% of females) using a cut-off score of 19. A previous study that used the same CES-D cut-off score found that 9.5% of working individuals had depression in Japan,[16] while Korean nurses had a higher prevalence of depressive symptoms (37.7%), even when a higher CES-D cut-off

score ($\geq 21$) was used.[22]    The discrepancy between the prevalence of depression among all working individuals and that among nurses may reflect differences in occupational stress between nursing and other occupations, in the level of depressive symptoms, or in general psychopathology.

Our results using an adjusted model indicate that job control and social support from a supervisor were associated with decreased depression, whereas a heavy quantitative workload had negative repercussions among psychiatric nurses.    Previous studies support these results.    A recent cross-sectional study of 1437 female psychiatric nurses in China indicated via a multivariate logistic regression analysis that supervisor support, as assessed by the Job Content Questionnaire (JCQ), was negatively associated with depression measured by the CES-D.[23]    In a cross-sectional study from Japan that used the Brief Job Stress Questionnaire (BJSQ) to assess occupational stress, multiple linear regression analyses revealed that job control and supervisor support were negatively correlated with depression, whereas quantitative workload was positively correlated with depression among 1551 Japanese female general nurses.[24]    In a study of 141 Taiwanese female psychiatric nurses,[25] Lin et al. (2010) found a significant interaction between social support and job stress using a multiple linear regression model, which suggested that the ascending trend of depression with elevated job stress, as assessed by the Taiwanese Nurse Stress Checklist, was accelerated in subjects who had a low level of social support.

Previous studies have reported that psychiatric nurses frequently encounter occupational hazards such as aggressive behavior or injuries.[26, 27]   In a study of 225 psychiatric nurses in Japan, Inoue et al. (2006) reported that 141 nurses replied that they had experienced verbal abuse or violence that had left an impression on them.[28]   In addition, of the nurses who had been exposed to such verbal abuse or violence, 21% had Impact of Event Scale-Revised (IES-R) scores that exceeded the cut-off point for psychological impact.   In a study of 1163 nurses in Poland,[29] aggression from patients was associated with higher levels of exhaustion, greater cynicism, and lower professional efficacy, as assessed by the Maslach Burnout Inventory (MBI), and poorer mental health, as assessed by the General Health Questionnaire (GHQ-28). In our study, we found no association between occupational hazards and depression. Although occupational hazards may cause burnout or poor mental health status, this factor might not have a strong impact on the development of depression.   Another explanation is that the nature of the cross-sectional design did not allow a sufficient observation period for the detection of the development of depression.

Our study has several limitations.   First, a causal effect of the sociodemographic and occupational factors on the depressive symptoms of psychiatric nurses could not be determined.   To detect a causal effect, a longitudinal study must be conducted.   Second, responses to the self-report questionnaires may have been influenced by response style, social desirability, and personality factors.   In addition, these findings may be limited because of a

lack of a structured clinical diagnostic interview scale.    Third, some important occupational

factors, such as working position, personal income, shift work, overtime work, and working

schedule irregularity, were not included in the study.    Fourth, selection bias may exist

because the characteristics of excluded subjects may differ from those of the study

participants.

   In conclusion, our study revealed that age, the HPI score, job control, social support from a

supervisor, and quantitative workload were associated with depression in Japanese psychiatric

nurses.    Our results have important implications for the management of job control, social

support from a supervisor, and quantitative workload in nursing.    Furthermore, the

promotion of healthy lifestyle practices among nurses may aid in the prevention of depression.

However, the interpretation of our results was hampered by the lack of data concerning

personal income, working hours, and organizational commitment.    Further longitudinal

investigation into the factors associated with depression may yield practical information that

is useful for administrative and psychological interventions.

contributions to the collection and management of the data.

**References**

1. Pompili M, Rinaldi G, Lester D, Girardi P, Ruberto A, Tatarelli R. Hopelessness and suicide risk emerge in psychiatric nurses suffering from burnout and using specific defense mechanisms. *Arch Psychiatr Nurs.* 2006;20:135-43.

2. De Leo D, Magni G, Vallerini A, Dal Palù C. Assessment of anxiety and depression in general and psychiatric nurses. *Psychol Rep*. 1983;52:335-7.

3. Tummers GE, Janssen PP, Landeweerd A, Houkes I. A comparative study of work characteristics and reactions between general and mental health nurses: a multi-sample analysis. *J Adv Nurs*. 2001;36:151-62.

4. Kishi Y, Kurosawa H, Morimura H, Hatta K, Thurber S. Attitudes of Japanese nursing personnel toward patients who have attempted suicide. *Gen Hosp Psychiatry*. 2011;33:393-7.

5. Takahashi C, Chida F, Nakamura H, et al. The impact of inpatient suicide on psychiatric nurses and their need for support. *BMC Psychiatry*. 2011;11:38.

6. Inoue M, Tsukano K, Muraoka M, Kaneko F, Okamura H. Psychological impact of verbal abuse and violence by patients on nurses working in psychiatric departments. *Psychiatry Clin Neurosci*. 2006;60:29-36.

7. Jenkins R, Elliott P. Stressors, burnout and social support: nurses in acute mental health settings. *J Adv Nurs*. 2004;48:622-31.

8. Borritz M, Rugulies R, Bjorner JB, Villadsen E, Mikkelsen OA, Kristensen TS. Burnout

among employees in human service work: design and baseline findings of the PUMA study. Scand J Public Health. 2006;34:49-58.

9. Lou JH, Li RH, Yu HY, Chen SH. Relationships among self-esteem, job adjustment and service attitude amongst male nurses: a structural equation model. *J Clin Nurs*. 2011;20:864-72.

10. Kessler RC, Angermeyer M, Anthony JC, et al. Lifetime prevalence and age-of-onset distributions of mental disorders in the 11. World Health Organization's World Mental Health Survey Initiative. *World Psychiatry*. 2007;6:168-76.

11. World Health Organization: The world health report 2001 - Mental Health: New Understanding, New Hope. Available from http://www.who.int/whr/2001/en/ Accessed 27 August 2013.

12. Statistics and Information Department Minister's Secretariat, Ministry of Health, Labour and Welfare: Patient Survey Tokyo, Japan: Ministry of Health, Labour and Welfare; 2008

13. Hamid H, Abanilla K, Bauta B, Huang KY. Evaluating the WHO Assessment Instrument for Mental Health Systems by comparing mental health policies in four countries. Bull World Health Organ. 2008; 86: 467-473.

14. Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. *Appl Psychol Meas*. 1977;1:385-401.

15. Shima S, Shikano T, Kitamura T. New self-rating scales for depression. *Clin Psychiatry*. 1985;27:717-723 (in Japanese).

16. Wada K, Tanaka K, Theriault G, et al. Validity of the Center for Epidemiologic Studies Depression Scale as a screening instrument of major depressive disorder among Japanese workers. *Am J Ind Med*. 2007;50:8-12.

17. Hurrell JJ Jr, McLaney MA. Exposure to job stress--a new psychometric instrument. *Scand J Work Environ Health*. 1988;14:27-8.

18. Haratani T, Kawakami N, Araki S. Relability and validity of the Japanese version of NIOSH Generic Job Stress Questionnaire. *Jpn J Ind Health*. 1993;35:S214 (in Japanese).

19. Morimoto K, Takeshita T, Takeuchi T, et al. Chromosome alterations in peripheral lymphocytes as indices of lifestyle and genotoxicity. *Int Arch Occup Environ Health*. 1993;65:S37-41.

20. Ezoe S, Morimoto K. Behavioral lifestyle and mental health status of Japanese factory workers. *Prev Med*. 1994;23:98-105.

21. Venables WN, Smith DM, the R Development Core Team: An Introduction to R, Notes on R: A Programming Environment for Data Analysis and Graphics Version 2.10.1. Bristol: Network Theory; 2009.

22. Yoon SL, Kim JH. Job-related stress, emotional labor, and depressive symptoms among Korean nurses. *J Nurs Scholarsh*. 2013;45:169-76.

23. Gao YQ, Pan BC, Sun W, Wu H, Wang JN, Wang L. Depressive symptoms among Chinese nurses: prevalence and the associated factors. *J Adv Nurs*. 2012;68:1166-75.

24. Kawano Y. Association of job-related stress factors with psychological and somatic symptoms among Japanese hospital nurses: effect of departmental environment in acute care hospitals. *J Occup Health*. 2008;50:79-85.

25. Lin HS, Probst JC, Hsu YC. Depression among female psychiatric nurses in southern Taiwan: main and moderating effects of job stress, coping behaviour and social support. *J Clin Nurs*. 2010;19:2342-54.

26. Bowers L, Allan T, Simpson A, Jones J, Van Der Merwe M, Jeffery D. Identifying key factors associated with aggression on acute inpatient psychiatric wards. *Issues Ment Health Nurs*. 2009;30:260-71.

27. Langsrud K, Linaker OM, Morken G. Staff injuries after patient-staff incidences in psychiatric acute wards. *Nord J Psychiatry*. 2007;61:121-5.

28. Inoue M, Tsukano K, Muraoka M, Kaneko F, Okamura H. Psychological impact of verbal abuse and violence by patients on nurses working in psychiatric departments. *Psychiatry Clin Neurosci*. 2006;60:29-36.

29. Merecz D, Drabek M, Mościcka A. Aggression at the workplace--psychological consequences of abusive encounter with coworkers and clients. *Int J Occup Med Environ Health*. 2009;22:243-60.

Table 1. Sociodemographic and occupational characteristics of participants

|  |  | n | % | mean±SD |
|---|---|---|---|---|
| Age (years) |  |  |  | 45.8±12.9 |
| Gender | Male | 66 | 27.7 |  |
|  | Female | 172 | 72.3 |  |
| Marital Status | Married | 152 | 63.9 |  |
|  | Never married | 49 | 20.6 |  |
|  | Divorced | 29 | 12.2 |  |
|  | Widowed | 8 | 3.4 |  |
| Family | With children | 137 | 57.6 |  |
|  | No children | 101 | 42.4 |  |
| Health practice index |  |  |  | 3.6±2.0 |
| Length of work in the psychiatry department (years) |  |  |  | 10.8±9.5 |
| Job-related stress factor |  |  |  |  |
| Role conflict |  |  |  | 18.4±5.4 |
| Role ambiguity |  |  |  | 27.6±8.5 |
| Job control |  |  |  | 40.0±13.2 |
| Social support from a supervisor |  |  |  | 12.1±2.5 |
| Social support from coworkers |  |  |  | 12.6±2.1 |
| Quantitative workload |  |  |  | 11.9±3.9 |
| Variance in workload |  |  |  | 8.3±3.2 |
| Occupational hazards |  |  |  | 7.6±2.5 |

Table 2. Prevalence of depression according to tertile categories of occupational stress in psychiatric nurses

| Variables | | Total n | (%) | % Not depressed (n=150) | % Depressed (n=88) | p value [a] |
|---|---|---|---|---|---|---|
| Role conflict | low | 92 | (38.7) | 70.7 | 29.3 | <0.001 |
| | mid | 80 | (33.6) | 71.3 | 28.7 | |
| | high | 66 | (27.7) | 42.4 | 57.6 | |
| Role ambiguity | low | 85 | (35.7) | 78.8 | 21.2 | <0.001 |
| | mid | 85 | (35.7) | 64.7 | 35.3 | |
| | high | 68 | (28.6) | 41.2 | 58.8 | |
| Job control | low | 82 | (34.5) | 50.0 | 50.0 | <0.001 |
| | mid | 77 | (32.4) | 74.0 | 26.0 | |
| | high | 79 | (33.2) | 65.8 | 34.2 | |
| Social support from a supervisor | low | 83 | (34.9) | 44.6 | 55.4 | <0.001 |
| | mid | 113 | (47.5) | 72.6 | 27.4 | |
| | high | 42 | (17.6) | 73.8 | 26.2 | |
| Social support from coworkers | low | 111 | (46.6) | 54.1 | 45.9 | <0.001 |
| | mid | 73 | (30.7) | 72.6 | 27.4 | |
| | high | 54 | (22.7) | 68.5 | 31.5 | |
| Quantitative workload | low | 88 | (37.0) | 84.1 | 15.9 | <0.001 |
| | mid | 76 | (31.9) | 64.5 | 35.5 | |
| | high | 74 | (31.1) | 36.5 | 63.5 | |
| Variance in workload | low | 78 | (32.8) | 80.8 | 19.2 | <0.001 |
| | mid | 91 | (38.2) | 67.0 | 33.0 | |
| | high | 69 | (29.0) | 37.7 | 62.3 | |
| Occupational hazards | low | 89 | (37.4) | 78.7 | 21.3 | <0.001 |
| | mid | 79 | (33.2) | 60.8 | 39.2 | |
| | high | 70 | (29.4) | 45.7 | 54.3 | |

a On the basis of the Cochran–Armitage trend test for categorical variables.

Table 3. Effects of sociodemographic and occupational factors on depression in psychiatric nurses

| Variables | | | Crude | | Adjusted | |
|---|---|---|---|---|---|---|
| | | | OR | 95% CI | OR | 95% CI |
| Age (years) | | | 0.96 | (0.94-0.99)** | 0.95 | (0.91-1.00)* |
| Gender (male) | Female | | 1.00 | | 1.00 | |
| | Male | | 0.96 | (0.54-1.74) | 0.50 | (0.20-1.26) |
| Marital Status | Married | | 1.00 | | 1.00 | |
| | Never married | | 1.52 | (0.79-2.93) | 0.85 | (0.27-2.73) |
| | Divorced | | 1.14 | (0.50-2.59) | 0.94 | (0.27-3.30) |
| | Widowed | | 0.62 | (0.12-3.19) | 1.01 | (0.12-8.73) |
| Family | With children | | 1.00 | | 1.00 | |
| | No children | | 0.66 | (0.39-1.12) | 0.72 | (0.29-1.78) |
| Health practice index | | | 0.61 | (0.52-0.72)*** | 0.62 | (0.50-0.77) *** |
| Length of work in the psychiatry department (years) | | | 1.01 | (0.98-1.04) | 1.04 | (0.99-1.09) |
| | | | | | | |
| Job-related stress factor | | | | | | |
| Role conflict | | low | 1.00 | | 1.00 | |
| | | mid | 0.97 | (0.50-1.88) | 0.67 | (0.27-1.66) |
| | | high | 3.27 | (1.68-6.34)*** | 1.40 | (0.52-3.74) |
| Role ambiguity | | low | 1.00 | | 1.00 | |
| | | mid | 2.03 | (1.02-4.03)* | 1.80 | (0.67-4.88) |
| | | high | 5.32 | (2.61-10.82)*** | 2.45 | (0.85-7.05) |
| Job control | | low | 1.00 | | 1.00 | |
| | | mid | 0.35 | (0.18-0.69)** | 0.39 | (0.15-1.01) |
| | | high | 0.52 | (0.28-0.98)* | 0.36 | (0.13-0.97)* |
| Social support from a supervisor | | low | 1.00 | | 1.00 | |
| | | mid | 0.30 | (0.17-0.55)*** | 0.40 | (0.16-1.00)* |
| | | high | 0.29 | (0.13-0.64)** | 0.18 | (0.05-0.65)** |
| Social support from coworkers | | low | 1.00 | | 1.00 | |
| | | mid | 0.44 | (0.24-0.84)* | 0.83 | (0.32-2.13) |
| | | high | 0.54 | (0.27-1.07) | 1.20 | (0.41-3.53) |
| Quantitative workload | | low | 1.00 | | 1.00 | |
| | | mid | 2.91 | (1.39-6.10)** | 2.23 | (0.69-7.23) |
| | | high | 9.20 | (4.38-19.32)*** | 5.18 | (1.34-19.97)* |
| Variance in workload | | low | 1.00 | | 1.00 | |
| | | mid | 2.07 | (1.01-4.21)* | 1.04 | (0.33-3.28) |
| | | high | 6.95 | (3.30-14.62)*** | 2.01 | (0.48-8.30) |
| Occupational hazards | | low | 1.00 | | 1.00 | |
| | | mid | 2.38 | (1.21-4.69)* | 1.21 | (0.47-3.10) |
| | | high | 4.38 | (2.19-8.74)*** | 1.79 | (0.65-4.97) |

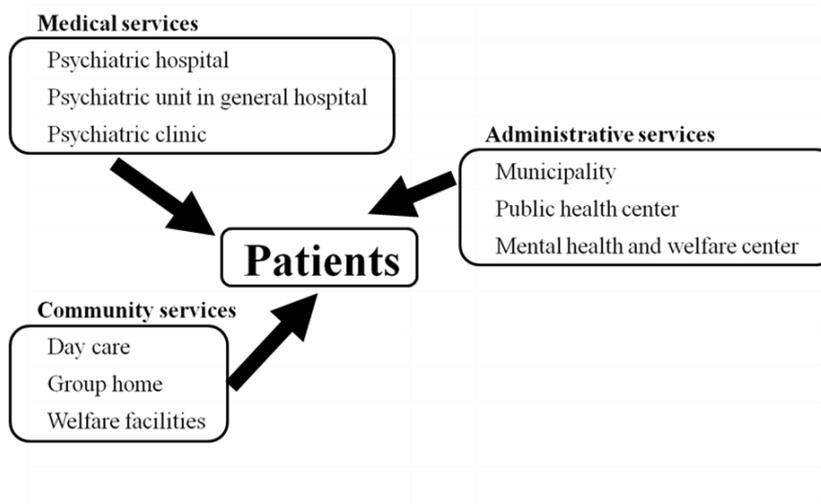*: $p < 0.05$, **: $p < 0.01$, ***: $p < 0.001$

Figure 1. Support system for patients with mental illness in Japan