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**Gender differences in self-perceived changes among Japanese workers with
depression**

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Abstract

Background: The number of patients living with depression continues to increase in Japan. The economic effects of depression include loss of productivity due to both absenteeism and presenteeism. Gender differences have been reported in prevalence, onset pathways, and subjective symptoms of depression.

Aims: To understand how workers with major depressive disorder (MDD) perceive problems in the workplace and examine gender differences in their self-perceived levels of functioning at work, noticed during the initial stages of depression.

Methods: This is a cross-sectional study of Japanese workers with MDD. Participants' self-perceived changes in the level of functioning at work were surveyed after the diagnosis during the first visit. The relationship between gender and changes in the level of functioning at work as initially perceived by the participants themselves was analysed using the chi-square test, supplemented by a residual analysis.

Results: We administered the survey to 147 workers with MDD. In terms of gender differences in initial self-perceived changes in the level of functioning at work, the

proportion of men reporting reduced work efficiency was significantly higher than that of women, while the proportion of women reporting deterioration in relationships with colleagues and superiors was significantly higher than that of men.

Conclusions: The findings suggest that greater attention to reduced work efficiency by men and to deterioration in work relationships by women with MDD should be essential components of self-care. Managers need to pay attention to the level of functioning and provide adequate social support for employees.

Keywords: workers, major depression disorder, change at work, self-care, social support

49 **Key points**

50

51 **What is already known about this subject:**

52 • Gender differences have been reported in the prevalence, onset pathways, and
53 subjective symptoms of MDD.

54 • Gender differences in self-perceived changes in the level of functioning at work
55 among workers with MDD remain unclear.

56

57 **What this study adds:**

58 • There were significant gender differences in self-perceived changes in the level of
59 functioning at work among workers with MDD.

60

61 **What impact this may have on practice or policy:**

62 • Male and female workers should pay attention to reduced work efficiency and
63 deterioration in work relationships as part of self-care; managers should pay attention to
64 the level of functioning in their employees to provide appropriate social support.

65

66

Introduction

Nearly 163 million people worldwide were affected by major depressive disorder (MDD), an important cause of disability in young and middle-aged adults, in 2017 [1] (refer to ‘Mental disorders’ section of Table1). The economic effects of depression include productivity loss due to both absenteeism and presenteeism [2,3]. A recent study of European workers estimated the cost of productivity loss from depression to be €77 billion per year [4]. In addition to malignancies, acute myocardial infarction, stroke and diabetes, mental illnesses have been among the five major diseases in Japan since 2011. To ensure that adequate mental health care is provided, a review of the medical system is required. In 2017, patient surveys by the Ministry of Health, Labour and Welfare in Japan reported that the number of patients with mood disorders, including MDD, had increased from about 0.9 million to about 1.2 million in the last 15 years, and that the number of patients aged under 65 years with mood disorders continues to increase [5]. In Japan, the mandatory retirement age is generally over 60, and most people under the age of 65 are expected to have sufficient work ability to work full-time.

It is necessary to recognize the fact that anyone can suffer from depression, as this can help in early detection of the disorder and appropriate treatment. Failure to diagnose MDD at an early stage may result in significant losses to patients, their families,

colleagues and employers. It is well known that individuals with MDD have a high risk of suicide [6]; improved mental health care is therefore important to prevent suicide. In this context, as a form of mental health care, self-care is an important approach to the management of long-term health and the prevention of ill health by living a healthy lifestyle [7]. The World Health Organization defines self-care as ‘the ability of individuals, families and communities to promote, maintain health, prevent disease and to cope with illness with or without the support of a health care provider’ [8]. Moreover, early detection of MDD either by workers themselves, colleagues, superiors or healthcare providers is also important to prevent economic loss to the country as a whole.

However, many patients with MDD often lack awareness of their illness and have difficulty seeking help during the early stages. Early symptoms of MDD not only include medical symptoms such as depressed mood or insomnia, but also occupational problems such as inability to perform normal work or absence from work [9,10].

Colleagues and supervisors at work are usually not medical or mental health professionals and are unable to accurately detect medical symptoms of depression in workers. Therefore, understanding changes in mood, level of functioning, performance, etc., early by individuals with MDD at work and by colleagues and supervisors is

essential to improve countermeasures for MDD in the workplace. However, few previous studies have focused on initial changes in MDD patients observed at work.

In general, the prevalence of depression in women is about twice higher than in men, and gender differences in the onset pathways have been reported [11]. Blatt suggests that there are two categories of depression: anaclitic depression, which is characterized by a vulnerability to interpersonal relationships and more common among women; and introjective depression, which is characterized by a vulnerability to self-esteem and is more common among men [12]. Furthermore, there are gender differences in subjective symptoms of depression, and it has been reported that women are more likely than men to be aware of their increased appetite, weight gain, anger, etc. [13]. We have previously emphasized the significance of focusing on gender differences when studying the relationship between perceived individual-level occupational stress and hazardous alcohol consumption among Japanese teachers [14]. In the present study, we hypothesised that there may be gender differences in the initial self-perceived changes in the level of functioning at work in individuals with depression.

We aimed to identify and understand the initial self-perceived changes in the level of functioning at work among workers with MDD, and the gender differences in these changes. To our knowledge, this is the first study investigating gender differences in

self-perceived changes in the level of functioning at work among workers with MDD.

Methods

A total of 147 outpatients with MDD participated in this cross-sectional study. The study was conducted from March 2011 to March 2019, and all participants received treatment at the Department of Neuropsychiatry, Osaka City University Hospital, Osaka, Japan. All the participants were over the age of 20 and were working or on sick leave at the first visit.

MDD was diagnosed by multiple psychiatrists with over five years of training using the Mini International Neuropsychiatric Interview (MINI) for diagnosing mental illness; the International Classification of Diseases-10 [15]; and the Diagnostic and Statistical Manual, 4th Edition, Text Revision (DSM-IV-TR) criteria [16]. The MINI is a brief, structured interview developed by general clinicians and psychiatrists in Europe and the United States; its reliability and validity have been established [17,18]. We used the MINI module for the diagnosis of an MDD episode. Individuals with a primary diagnosis of schizophrenia, anxiety disorders other than MDD, other substance use disorders, intellectual disability and major medical disorders including neurological disorders, pregnancy, and serious suicide attempts were excluded.

The attending physician explained the study purpose and methods to the participants, all the participants provided informed consent to voluntarily participate, and understood that there was no penalty for choosing not to participate. After a sufficient explanation of the study for participants had been provided, written informed consent was obtained from each participant. Patient records/information were anonymised and de-identified prior to analysis. Data from 147 participants who agreed to participate in this study were analysed. The study was approved by the Human Subjects Review Committee at Osaka City University (approval number: 4245).

To maintain and promote mental health care in workers, the Ministry of Health, Labour and Welfare has called on supervisors in Japan to pay attention to changes in workers' levels of functioning at work such as reduced work efficiency, late arrival, absence from work, early departure, etc. Based on this guideline, we selected the following indicators: 'late arrival, absence from work, early departure', 'reduced work efficiency', 'deterioration in relationships with colleagues and superiors', 'increase in smoking and drinking rates' and 'other' [19]. In accordance with the above, self-perceived changes in the level of functioning of participants at work were surveyed after the diagnosis at the first visit. Participants were asked to choose the levels of functioning they thought applied to them. Data on demographic and occupational

variables of the participants were also collected, including age, sex, job category, position classification, and type of employment. The Hamilton Depression Rating Scale (HAM-D) was used to assess the severity of depression at the initial visit.

Statistical analyses were conducted using SPSS statistical version 25 (IBM Corp, Armonk, NY, USA). Sociodemographic data on participants were examined using descriptive statistics. The relationship between self-reported initial changes in the level of functioning at work and gender was analysed using the chi-square test based on Cochran's criteria, supplemented by a residual analysis (significance level set at $P < 0.05$) [20].

Results

The demographic and occupational characteristics of the participants are summarised in Table 1. Of the 147 participants, 101 were men (69%) and 46 were women (31%). The mean age was 39.8 years (standard deviation [SD] = 10.2). There were 82 professionals (56%), 34 clerical workers (23%) and 31 hospitality workers (21%); 54 managerial employees (37%) and 93 non-managerial employees (63%). In terms of type of employment, 128 (87%) were regular employees and 19 (13%) temporary employees. The mean HAM-D score was 21.0 (SD = 8.3), and there were no significant gender

differences in HAM-D scores.

Initial self-reported changes in the level of functioning at work by gender are summarised in Table 2. The most common change in the level of functioning at work as perceived by the participants themselves was ‘reduced work efficiency’, followed by ‘late arrival, absence from work, early departure’. By gender, the most common change in the level of functioning at work that male participants initially perceived was ‘reduced work efficiency’, followed by ‘late arrival, absence from work, early departure’, while for female participants, it was ‘reduced work efficiency’, followed by ‘deterioration in relationships with colleagues and superiors’. The chi-square test showed that initial self-reported changes in the level of functioning at work were significantly associated with gender. In addition, residual analysis showed that the proportion of men reporting ‘reduced work efficiency’ was significantly higher than that of women, while the proportion of women reporting ‘deterioration in relationships with colleagues and superiors’ was significantly higher than that of men. The answers of the eleven participants who chose ‘other’ were ‘increased time spent alone’ for seven, ‘headache’ for one, and unknown for the other three.

Discussion

In this study, we investigated self-perceived changes in the level of functioning at work in the initial stages of depression among workers with MDD, and gender differences in these changes. Our results show that the most common self-perceived change in the level of functioning at work in workers with MDD was ‘reduced work efficiency’: the proportion of males reporting ‘reduced work efficiency’ was significantly higher than that of females and the proportion of females reporting ‘deterioration in relationships with colleagues and superiors’ was significantly higher than that of males.

The strength of this study is that this is the first study to our knowledge to investigate gender differences in self-perceived changes in the level of functioning at work among workers with MDD. Our results suggest that gender differences should be taken into account to ensure early detection of depression among workers. The limitations of this study are as follows. First, the sample size was small. Second, although the prevalence of depression was almost twice as high in women [21], there were more male than female participants; therefore, the sex ratio was biased. Third, the study included items about past memory, and recall bias may have influenced participant responses. Fourth, as this was a single-centre study, the study sample has limited representativeness. Future multicentre studies should be conducted for further research into the early detection of MDD in the workplace. Fifth, it was considered that there were differences in the way

211 of working between male and female workers based on differences in position
212 classification, and the impact of position classification on self-reported initial changes
213 in the level of functioning at work should be adjusted for. However, we could not
214 evaluate the effect of position classification for these outcomes due to the lack of
215 statistical power. They should be focused on in future studies.

216 Results of Kendler et al.'s study on gender differences in the pathogenesis of
217 depression among 208 pairs of heterosexual dizygotic twins in whom only one of the
218 twins developed depression suggest that parental warmth, neuroticism, divorce, social
219 support and marital satisfaction had a greater impact in women as risk factors for
220 developing depression. In contrast, childhood sexual abuse, conduct disorder, drug
221 abuse, prior history of major depression, and distal and dependent proximal stressful life
222 events had a greater impact in men as risk factors for developing depression. In men,
223 financial, occupational and legal categories of life events had a stronger effect on the
224 development of depression [11]. Blatt suggests that depression can be divided into two
225 types: anaclitic depression and introjective depression. The former arises from
226 interpersonal problems and tends to be more prevalent among women, while the latter
227 arises from stressful events affecting self-esteem such as academic failure, and tends to
228 be more prevalent among males. He attributes this to the fact that women are more

likely than men to interact with same-sex friends and think more about their relationships [12].

Our study found that ‘reduced work efficiency’ was reported significantly more often by men than by women, while women were more significantly more likely than men to perceive a ‘deterioration in relationships with colleagues and superiors’. The results of the Kendler et al. study and the analytical study by Blatt suggest that men are more sensitive to failure to achieve goals and women more sensitive to interpersonal relationships, which may also help explain our results. Failure to achieve goals might be interpreted as ‘reduced work efficiency’ after the onset of depression in men, while women may perceive vulnerability in interpersonal relationships as a ‘deterioration in relationships with colleagues and superiors’ after the onset of depression.

Martin et al. analysed data from a cohort of 265 patients with mild depression who reported current employment to show that even subclinical depression has been reported to reduce performance at work [22]. Beck et al. analysed data from 771 patients with depression with current employment to highlight the relationship between minor symptoms of depression and productivity loss [23]. These explain the fact that the most common early changes in the level of functioning at work due to MDD among both men and women in this study was reduced work efficiency. This finding may be consistent

with the main signs and symptoms of a depressive episode, such as having low motivation, poor concentration, cognitive functioning decline, and difficulty in making decisions.

It has also been reported that women with depression were more likely than men to express anger or hostility toward others, which may lead to a significantly higher percentage of women with MDD reporting ‘deterioration in relationships with colleagues and superiors’ than men [13].

Enhanced self-care and social support are essential for the early detection of MDD.

Our results suggest that as self-care measures, workers, especially males, should pay greater attention to their reduced work efficiency, and female workers should pay more attention to the deterioration in their relationships with colleagues and superiors.

Managers are in a position to lead workers to seek further advice from their health care providers by noticing reduced work efficiency in male and female workers and the deterioration of relationships with colleagues and superiors among female workers and by subsequently having heart-to-heart conversations with them. Therefore, managers are required to acquire and improve their communication skills. By focusing on changes in workers’ performance and interactions at the workplace, early detection of MDD and therefore, early treatment may be possible.

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Competing interests

None declared.

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- 346

347 Table 1. Demographic and occupational characteristics ($n = 147$).

	Men	Women	t -test	chi-square test
	($n = 101$)	($n = 46$)		
	n (%)	n (%)		
Age, years, mean ($\pm$ SD)	40.4 ($\pm$ 10.1)	38.6 ($\pm$ 10.3)	NS	
Job category				
<i>Professionals</i>	51 (50%)	31 (67%)		NS
<i>Clerical workers</i>	25 (25%)	9 (20%)		
<i>Hospitality workers</i>	25 (25%)	6 (13%)		
Position classification				
<i>Non-managerial</i>	57 (56%)	36 (78%)		**
<i>Managerial</i>	44 (44%)	10 (22%)		
Type of employment				
<i>Regular</i>	91 (90%)	37 (80%)		NS
<i>Temporary</i>	10 (10%)	9 (20%)		
HAM-D score, mean ($\pm$ SD)	21.9 ($\pm$ 8.5)	19.0 ($\pm$ 7.4)	NS	

348 SD: standard deviation; HAM-D: Hamilton Depression Rating Scale; NS: not

349 significant, ** $P < 0.01$

350 Table 2. Gender differences in self-perceived initial changes in the level of functioning at work

	Men	Women	chi-square test	Adjusted residual	
	(<i>n</i> = 101)	(<i>n</i> = 46)			
	<i>n</i> (%)	<i>n</i> (%)		Men	Women
Reduced work efficiency	54 (53%)	16 (35%)	*	2.1	−2.1
Late arrival, absence from work, early departure	21 (21%)	6 (13%)	NS	1.1	−1.1
Deterioration of relationships with colleagues and superiors	9 (9%)	13 (28%)	**	−3.0	3.0
Increase in smoking and drinking rates	12 (12%)	5 (11%)	NS	0.2	−0.2
Other	5 (5%)	6 (13%)	NS	−1.7	1.7

351 NS: not significant, * $P < 0.05$, ** $P < 0.01$