

The state of mental health among male and female medical students:
A preliminary study

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Abstract

The educational process brings a considerable amount of stress to medical students; this can influence mental health status and contribute to furthering professional burnout. This study assessed mental health status with the intention of identifying different patterns in female and male medical students. This applied cross-sectional study was conducted using two questionnaires. That is, it explored demographic data and mental health status through the 30-item General Health Questionnaire (GHQ-30) of 816 medical students who attended Nara Medical University, Japan, between 2011 and 2019. The valid response rate was 94.1 %. During the study period, female medical students assessed their physical health status as being worse compared to male medical students overall. For medical students, especially female ones, it is necessary to establish a system for early awareness and management of their mental health, and to consider appropriate support methods.

Keywords : Mental health, medical students, GHQ-30, women

Introduction

The need for mental health support for medical students has increased in recent years. Medical students often deal with human death as part of their educational content. Additionally, there is a lot of stress regarding examinations and school entrance tests. Therefore, the proportion of mental health disorders is higher in medical students compared with the general population¹⁻⁴.

Medical undergraduate education is a long process, wherein students face multiple stressors, such as academic overload, lack of leisure time, emotional pressure to maintain good grades, and specific conditions of learning complex medical procedures^{5, 6}. The resulting distress has adverse effects on professional development and can lead to a decline in empathy and compassion among medical students^{7, 8}. Additionally, stress acts as a harmful component leading to their psychological ill health. Several studies have examined the relationship between sources of stress and psychological morbidity in medical students. Depression and anxiety have been associated with concerns about mastering knowledge, personal endurance and ability, and lack of time for other activities^{9, 10}. Anxiety has also been associated with feeling of anonymity,

peer competition, long hours, and loss of social time^{9,10}.

The 30-item General Health Questionnaire (GHQ-030) is a self-administered screening instrument designed to detect current diagnosable mental disturbances and disorders, and it is among the most thoroughly tested of all health measures¹¹. It is used in surveys or clinical settings to identify potential cases, leaving the task of diagnosing the actual disorder to a psychiatric interview¹¹. It is also used globally to measure mental health status, especially to detect emotional disturbances such as distress¹²⁻¹⁴. Since Goldberg¹⁵ introduced the GHQ, it has been translated into several different languages, which is a testimony of the questionnaire's validity and reliability¹⁴.

Previous studies have shown that female students and residents have higher level of anxiety and depression¹⁶ and perceive medical school as a more stressful experience¹⁷⁻¹⁹ compared with their male counterparts. In Japan, Hayasaka *et al.*²⁰ reported that a total of 169 (46.1%) participants met the criteria for having psychological distress among women doctors as measured by the GHQ-30. Additionally, being of younger age, engaging in night duty, and being divorced were independently associated with psychological distress.

To the best of our knowledge, however, no study has assessed gender differences in mental health using the GHQ-30 among medical students in Japan. Therefore, in this nine-year study, the authors assessed the influences of academic stress and its adverse effects on mental health as psychological distress among men and women.

Participants and methods

Participants

This cross-sectional study comprised all fifth-year students at the School of Medicine in Nara Medical University between 2011 and 2019. Out of the 817 students attending over nine years, 816 responded (response rate of 94.1%).

The study protocols were approved by the appropriate Ethics Committees at Nara Medical University and were carried out in accordance with the Declaration of Helsinki. All study participants or their legal guardians provided written informed consent for their participation prior to the start of the study.

Survey instrument

The primary outcome of this study is the level of psychological distress, as measured by the previously validated Japanese version²¹ of the GHQ-30^{15,22}. The GHQ is a self-administered tool originally developed for screening nonpsychotic psychiatric illness. Students were asked to note their own perception of stress on a four-point Likert-type scale (0 = more than usual, 1 = no more than usual, 2 = less than usual, and 3 = much less than usual). The minimum total GHQ-30 score was 0, and the maximum was 30.

GHQ-30 is used in both clinical settings and epidemiologic studies on mental health status in general populations. An individual with a high GHQ score is considered to have high level of psychological distress, including depression, anxiety, and other psychiatric symptoms. For this study's analysis, participants with a GHQ-30 score greater than or equal to 7 were considered to have psychological distress²³. This cutoff value has been used in several previous epidemiologic studies on Japanese populations.

Statistics

Differences in demographic characteristics and the distribution of GHQ-30 between men and women were analyzed using a two-tailed student's *t*-test. Moreover, to assess the prevalence among men and women, we used a chi-squared test. Data were analyzed using the Prism version 8 software with significance level set at 0.05.

Results

Demographic data

The participating medical students (587 men: mean age = 24.1 ± 2.9 years; 230 women: mean age = 23.6 ± 2.0 years) showed no significant differences between men and women in terms of gender ratio (Chi-squared test, 2011: $\chi^2=9.036$, $p=0.339$) or in among year (two-way analysis of variance: sex and year interaction $F_{8,799}=0.572$, $p=0.802$; effect of year $F_{8,799}=0.819$, $p=0.586$; effect of sex $F_{1,799}=6.658$, $p=0.010$; this was followed by a Bonferroni's post-hoc test: men vs. women in each year $p=0.213$ - >0.999 ; Table 1). The distribution of the total GHQ-30 scores is illustrated in Fig. 1. The average GHQ-30 score was higher for men than for women (two-tailed student's *t*-test, $t_{(815)}=2.539$, $p=0.011$).

As participants with a GHQ-30 score greater than or equal to 7 were considered to have psychological distress²³⁾, we divided them into two groups (low score group: ≤ 6 and high score group: ≥ 7). We found differences in prevalence between these two groups among all participants (men: 21.3%, women: 30.0%; chi-squared test, $\chi^2=6.849$, $p=0.009$; Fig. 2). However, these differences in prevalence were largely not significant when each year was considered separately (chi-squared test, 2011: $\chi^2=0.073$, $p=0.787$; 2012: $\chi^2=1.739$, $p=0.187$; 2013: $\chi^2=1.299$, $p=0.254$; 2014: $\chi^2=3.850$, $p=0.049$; 2015: $\chi^2=0.002$, $p=0.961$; 2016: $\chi^2=6.041$, $p=0.014$; 2017: $\chi^2=0.682$, $p=0.409$; 2018: $\chi^2=0.362$, $p=0.547$; 2019: $\chi^2=0.044$, $p=0.834$; Fig. 3).

We also researched the differences between men and women in athletic and non-athletic clubs included in cultural clubs over the last three years. Interestingly, these revealed that significantly more male medical students belonged to athletic clubs than did women (chi-squared test, $\chi^2=0.4188$, $p=0.041$; Fig. 4).

Table 1. Participant characteristics

	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
N (male/female)	44/14	61/19	66/30	82/36	58/36	71/29	69/21	67/24	69/21	587/230
Men's age (years)	23.6±2.2	24.3±3.2	24.4±3.4	24.1±2.8	24.2±2.9	24.1±2.7	24.3±3.8	23.8±2.4	23.7±1.8	24.1±2.9
Women's age (years)	23.3±1.8	23.5±1.1	24.0±2.1	23.2±1.1	24.2±2.9	23.5±1.4	22.8±0.8	23.8±3.1	23.3±1.0	23.6±2.0

No significant differences in gender ratio and age between men and women by year were found.

Discussion

The above findings suggest that women experienced poorer mental health than men did during medical training at the Nara Medical University, in line with previous studies¹⁶⁻¹⁹⁾.

Higher education has always been regarded as highly stressful. Although medicine has been

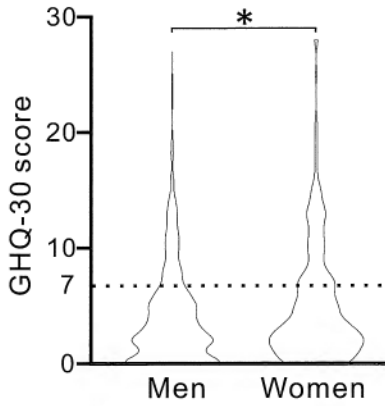


Fig. 1. Distribution of total scores of the GHQ-30 among men and women. The average GHQ-30 score was higher for men than for women. GHQ-30, 30-item General Health Questionnaire

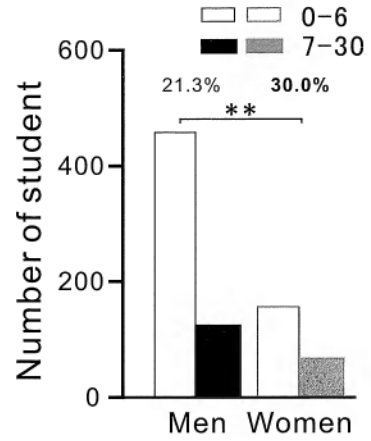


Fig. 2. The differences in the 30-item General Health Questionnaire between men and women. There are significant differences in prevalence between these two groups among all participants.

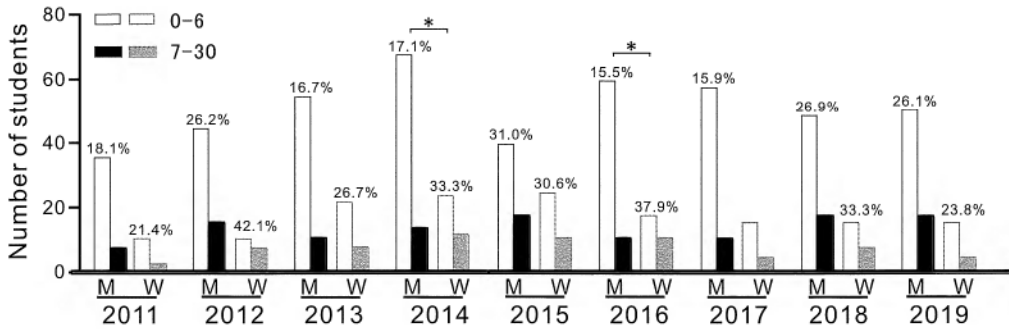


Fig. 3. Change in prevalence between 2011 and 2019. These differences in prevalence were largely not significant when each year was considered separately. M: men, W: women

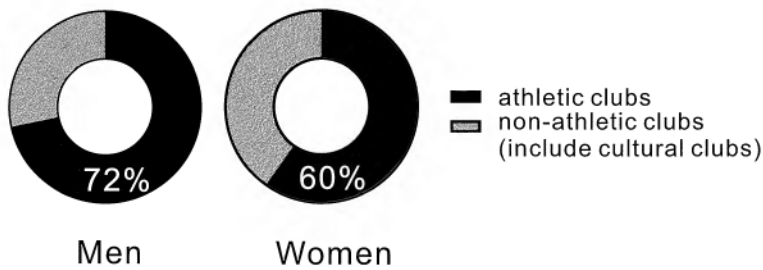


Fig. 4. Differences in club activity between men and women. Significantly more male medical students belonged to athletic clubs than did females.

a popular choice in higher education, the associated stressful environment can exert a negative effect on the students' psychological and physical well-being. This ultimately results in poor academic achievement and possibly a large number of psychological casualties. As a result of an excess of applicants, only candidates with excellent academic attainment can successfully enter medicine. Therefore, the medical program is even more competitive and stressful for medical students.

Psychiatric disorders were often reported in students due to examinations. Other causes of psychiatric disorders were the fear of failure, uncertainty regarding supervisors' expectations and uncertainties regarding achievement. Undergraduate medical students, compared with students of any other undergraduate course, have been shown to be the most distressed^{24, 25)}. There have also been reports of significant psychiatric morbidity in young doctors^{25, 26)}. In particular, the present study revealed that female medical students assessed their physical health status as being worse compared with males. One factor contributing to these findings might be related to exercise. The connection between exercise and improved physical and psychological health has been well established^{27, 28)}. Past sports experiences before adulthood have a direct and strong effect on enjoyment of exercise, and that enjoyment of exercise has a direct and strong effect on exercising habit in adults²⁹⁾. These facts suggest that exercising at a young age may lead to exercising habits in adults and eventually contribute to their quality of life.

Although this study was a cross-sectional survey during medical training, a previous study showed that female medical students' mental health deteriorated as they progressed to the sixth year³⁰⁾. Therefore, dealing with the stress of medical students in the final year is an important issue. Shapiro et al.³¹⁾ reported that although there have many cases of mental health related issues for medical students, few intervention studies have been conducted. Previous studies have shown that creating a place where medical students can talk can be stress-relieving for them³²⁾. In addition to university lectures, students talking about themselves, the future, and their feelings may also help support them. Thus, it may be necessary to expand the range of options for students and provide risk avoidance education so that students can select from several training destinations and career paths.

This survey of medical students revealed that they had poor mental health, and thus some intervention or support would be needed for these students. Since this survey was anonymous, it is not possible to provide intervention and support to specific students. Therefore, it is necessary to use a registration method so that students with mental health issues can be identified in the future. Specifically, more detailed psychological examinations and interviews could be conducted directly for people with mental health problems, and depending on the severity of their issues, referrals to a specialist, psychological education, or environmental maintenance is required. However, there is a possibility that students may not be honest in such a study, because they may think that it will affect their grades and their future, which will thus influence the evaluation. Therefore, it is necessary to provide health education and psychological education to all medical students through lectures so that their mental health can be correctly evaluated.

This survey was conducted anonymously using a questionnaire—only the students'

demographic characteristics of age and gender were measured, and their family composition, educational background, and lifestyle were not surveyed. In addition, many factors can affect mental health, including relationships with friends and family, medical history, relationships with teachers and the opposite sex, participation in club activities both inside and outside the university, self-efficacy regarding career choices, and whether or not there is support from the environment or the university. Therefore, in the future, it is necessary to investigate these background factors and examine their correlations with mental health.

Conclusion

In this study, we conducted a health survey with medical students during hospital training between 2010 and 2019. We found that female medical students had poorer mental health compared with male students. It is possible that the number of female medical students will increase in the future. Therefore, it is necessary to grasp their mental health status more carefully, and to ensure that they are aware of their own mental health at an early stage for their health management and to carry out appropriate screening for mental health. Medical students with mental health problems may need individualized medical treatment, support such as environmental maintenance, and preventive psychoeducation for those with low stress tolerance.

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Conflict of interest

The authors report no conflicts of interest. The authors alone are responsible for the content in and writing of the paper.

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