Effect of a Rotation Training System on the Mental Health Status of Postgraduate Dental Trainees at Kyushu University Hospital, Fukuoka, Japan


Abstract: In Japan, the increasing frequency of mental health problems in postgraduate dental trainees has recently become apparent. To our knowledge, there has been no previous research to investigate the influence of the type of training program on the mental health of dental residents during one year of postgraduate clinical training. Therefore, the purpose of this study was to compare changes in the mental health of two groups of dental trainees at Kyushu University Hospital, Fukuoka, Japan: those who undertook a rotation training program and those who trained solely in one department (the control group). Study subjects in both groups completed the Profile of Mood States (POMS) and the General Health Questionnaire (GHQ) at five intervals throughout the postgraduate training year. Analysis of the questionnaire responses were performed by Student’s t-test, analysis of variance, Bonferroni’s test, and the chi-square test. Statistical tests showed differences in the mean scores of POMS-30 subscales and GHQ-28. The mood of anger was the factor that seemed to best describe the trainees’ response to stress. The study results led to the conclusion that dental trainees’ mental health is influenced by the type of training program and that dental trainees in rotation training programs may need more mental health support.

Keywords: postdoctoral dental education, advanced dental education, postgraduate dental students, mental health, stress, Japan

In Japan, the increasing frequency of mental health problems experienced by postgraduate dental trainees has recently become apparent. Several measures have been taken to address the issue, mainly by the Japanese Ministry of Health, Labour, and Welfare. Mataki et al. reported that mental health dysfunction was observed at a high frequency in dental trainees: 46 percent of trainees were in a state of depression, which, in some cases, resulted in interruptions in training or non-completion of training.1

Many studies have shown high levels of stress during the postgraduate medical training period. The first postgraduate year in particular is the most stressful year for physicians.2-7 Research on medical residents’ mental health found that depressed residents made more medication errors than residents who were not depressed,8 and higher levels of fatigue, distress, and burnout were associated with suboptimal patient care practices.9,10 The same situation may also occur in a dental resident.11 Dental trainees’ mental health is of concern not only to themselves, but also to patients. Accordingly, it is necessary for training facilities to assess trainees’ mental health status objectively and recognize changes in the early stages of the program.

In Japan, the Dental Practitioners Law was revised such that newly licensed dentists are obliged to take a clinical training program for more than one year, with implementation beginning in April 2006.12 The purpose of this training is to supplement the lack of clinical training in the undergraduate curriculum and to meet social requirements. The training program focuses on providing a solid grounding and effective training in primary care and general dentistry.
regardless of the possible future specialty choice of the dentist. New-entry dentists, who are called dental trainees, can select their training program through the Japan Residency Matching Program (JRMP), which helps to maintain a balance between trainees and educational institutions. The provider of education has to control the educational environment to ensure the quality of training. To make training effective, trainees must be paid reasonably, and their work hours are limited to prevent overwork by law. However, even after institution of this compulsory system of clinical training, mental health dysfunction in dental trainees has been observed at a high frequency.

Prior to the introduction of the postgraduate clinical training program, new-entry dentists received postgraduate clinical training in one section of the dental department in a hospital or one dental clinic. However, after the introduction of compulsory postgraduate clinical training, clinical training facilities appointed by the Ministry of Health, Labour, and Welfare now provide the training program in several hospitals and clinics in rotation or in several medical departments of a single facility in rotation to increase the opportunity for dental trainee residents to gain comprehensive clinical proficiency. Thus, the aims of this study were 1) to examine the mental health status of dental trainees at Kyushu University Hospital, Fukuoka, Japan; 2) to compare the mental health status of two groups of dental trainees (rotation training group and non-rotation training group); and 3) to investigate the influence of the rotation training system on dental trainees’ mental health status.

Materials and Methods

The participants in the study group were all of the twenty-one dental trainees who underwent training in multiple departments of Kyushu University Hospital (four months alternating training in each of the Department of Periodontics or Endodontics, Department of Prosthodontics, and Department of Oral Surgery); this group was called the rotation training group. All of the twenty dental trainees who trained in the Department of General Oral Care throughout the year were called the control training group (the non-rotation training group). After a one-week orientation period in which the two groups were joined together, each training group started its particular dental training course. All participants are scheduled, on average, to work no more than forty hours per week and have no night duty or holiday work.

This study was approved by the Ethics Committee of Kyushu University Hospital. The participants were provided with an information sheet, and informed consent was obtained at an orientation session. An anonymous self-reported questionnaire on demographic characteristics and two self-administered questionnaires about mental health status were completed during the year. Demographic characteristics consisted of age, gender, and the selected training program. The questionnaires about mental health status consisted of the Profile of Mood States, Short Form, Japanese version (POMS-30)\(^{13}\) and the General Health Questionnaire, twenty-eight items, Japanese version (GHQ-28).\(^{14}\)

The survey was conducted five times throughout the year, with Time 1 in April 2010 (at the end of the orientation period), Time 2 in June 2010, Time 3 in September 2010, Time 4 in December 2010, and Time 5 in March 2011 (at the end of the training). At Time 1, the participants completed the demographic characteristics survey and the POMS-30, and at Times 2-5, they completed the GHQ-28 and additional POMS-30. The completed questionnaires were sealed in an envelope and placed into a secure box situated in the hospital.

The POMS-30 was used to evaluate mood states.\(^{15}\) The reliability and validity of POMS-30 among Japanese people were confirmed in previous studies.\(^{13}\) Respondents were asked to evaluate their mood states over the previous week according to a five-point scale ranging from no=0 to quite frequently=4. This scale measures five negative moods (Tension-Anxiety, T-A; Depression-Dejection, D; Anger-Hostility, A-H; Fatigue, F; and Confusion, C) and one positive mood (Vigor, V). The scores of each group were totaled, giving a score range of 0-20. Higher scores indicated a more negative mood, except for Vigor, for which higher scores indicated more vigor. Cronbach’s alpha values in this study ranged from 0.82 to 0.97 for T-A, 0.79 to 0.92 for D, 0.71 to 0.86 for A-H, 0.80 to 0.92 for F, 0.57 to 0.84 for C, and 0.83 to 0.92 for V.

The GHQ-28 was administered to assess mental well-being.\(^{16}\) Reliability and validity of the GHQ-28 have been established in a Japanese population.\(^{14}\) Respondents were asked to evaluate their psychological condition over the previous two to three weeks by a scale with options of never, sometimes, frequently, or nearly all the time. The scoring system used in this study was a traditional scoring which gives no points to responses of never and sometimes and one point to responses of frequently and nearly all the time.\(^{17}\)
The total possible score on the GHQ-28 ranges from 0 to 28. The higher the GHQ-28 score, the poorer the state of mental health. Cronbach’s alpha values in this study ranged from 0.70 to 0.87.

All results were expressed as means and standard deviations (SD). Proportions (gender ratio) were compared between the rotation training group and non-rotation training group using the chi-square test. Continuous variables (age) were compared using the independent t-test. Participants’ subscale scores on the POMS-30 were compared by using two-way analysis of variance (ANOVA), followed by Bonferroni’s test. Because we did not identify dental trainees, scores were treated as independent samples, thus providing a conservative discernment of the significance of differences among means. Student’s t-test was used for two-group comparisons at each time.

To compare the mental health status of two groups of dental trainees with that of adult norms, the mean GHQ-28 scores of the participants were compared with that of Japanese general population norms\(^1\) by Student’s t-test. Statistical analyses were carried out using SPSS Version 19 (IBM Co., Ltd., Japan). The significance level was set at \(p<0.05\).

### Results

The demographics of participants at Time 1 are shown in Table 1. There was no significant difference between the mean ages of the two groups (\(t(39)=1.447, p>0.05\)). The gender ratios of the two groups were also similar, with females comprising 57 percent of the rotation training group and 55 percent of the non-rotation training group (chi-squared=0.019, \(p>0.05\)). No participant was found to have any psychological or physical health problems in the pre-employment medical examination.

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<tr>
<th>Table 1. Demographic characteristics of dental trainees in study</th>
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<td><strong>Age (y)</strong></td>
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<td>Rotation program</td>
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<td>Non-rotation program</td>
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At Time 1, the POMS-30 was completed by thirty-two participants (78 percent). At Times 2, 3, 4, and 5, the POMS-30 and GHQ-28 were completed by thirty-two (78 percent), thirty-five (85 percent), thirty-four (83 percent), and thirty-four (83 percent) participants, respectively. Table 2 shows the score distributions of all respondents for the POMS-30 and GHQ-28.

Figure 1 shows the change of the mean (SD) values on the six POMS-30 subscales for each training group. Low scores for Vigor reflect a poor mood state, as do high scores for the other subscales. The ANOVA results revealed that four of the five negative subscales in the rotation training group were significantly higher than in the non-rotation training group: Tension-Anxiety (\(p<0.01\)), Depression-Dejection (\(p<0.05\)), Fatigue (\(p<0.001\)), and Confusion (\(p<0.01\)). Furthermore, comparison between the two training groups at each time showed that Tension-Anxiety (\(p<0.01\)), Depression-Dejection (\(p<0.05\)), and Confusion (\(p<0.01\)) in the rotation training group were significantly higher than that in the non-rotation training group at Time 2, and Fatigue was higher at Time 2 and Time 3 (\(p<0.01, p<0.001\), respectively). Tension-Anxiety weakened over time (\(p<0.05\)). Tension-Anxiety at Time 3 was lower than Tension-Anxiety at Time 1 (\(p<0.05\)) according to post hoc comparisons. In contrast, Anger-Hostility

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<th>Table 2. Score distributions of all respondents for the POMS-30 and GHQ-28</th>
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<td><strong>POMS-30 subscale score</strong></td>
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<td>Tension-Anxiety</td>
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<td>Depression-Dejection</td>
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<td>Anger-Hostility</td>
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<td>Vigor</td>
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<td>Fatigue</td>
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<td>Confusion</td>
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<td><strong>GHQ-28 score</strong></td>
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became stronger, particularly at the end of the training period (p<0.01), regardless of the training program. Only Vigor did not change over time (p>0.05), and there was no significant difference between the Vigor scores in the participants in the rotation program and the non-rotation program (p>0.05).

Table 3 shows the dental trainees’ GHQ-28 score distributions from Time 2 to Time 5 in comparison with Japanese general population adult norms. At Time 2, there was no significant difference in the GHQ-28 scores of both training program groups compared with the scores of the norms. However, at Time 3, the GHQ-28 score in the rotation training group was significantly higher than in the norm group, whereas the GHQ-28 score in the non-rotation training group was not significantly different from that in the norm group.

Discussion

This study examined the influence of two types of training programs on the mental health status of dental trainees over one year. The results showed that deterioration in mental health was greater among the trainees who underwent a rotation training program than in those who underwent a non-rotation training program, indicating that trainees’ mental health status was affected by the type of training program.

Figure 1. Changes in POMS-30 subscale scores over time
Hostility may best describe the residents’ response to stress. Therefore, attention should be paid to the feeling of Anger-Hostility because this mood may carry the risk of developing into both physical and psychological health disorders. The POMS is an optimal screening tool to assess transient and fluctuating mood states that can be evoked through the occupational stress response as it can identify dental trainees with mental health impairments in the early stages.

The GHQ was developed as a screening tool to detect persons likely to have or be at risk for developing psychiatric disorders. It is a measure of common mental health problems. An advantage of the GHQ is that it is widely used in occupational research, which allows simple comparisons with results obtained in other studies. The GHQ-28 data that emerged from our study showed a difference in the level of mental well-being between trainees in the rotation training program and in the non-rotation training program. Dentists encounter numerous sources of stress, beginning in dental school. On entering clinical practice, new dentists find that the number and variety of stressors often grow. Research using the GHQ has shown that the mental health status of dental students and practitioners is poorer than the population norms. Our study also demonstrated that the mental well-being of the trainees in the rotation training group became gradually poorer and then significantly worse than the norms at six months after the start of training. In contrast, there was no significant difference in the mental well-being between the trainees in the non-rotation training program and the Japanese norms during the training period. The implication of this result is that dental trainees in rotation training programs need more mental health support and preparation.

It is well established that medical professionals accomplish their training by rotating among various fields of practice, in other words, through workplace transition. In the postgraduate dental training course, the protocol has been developed to promote enrollment in the rotation training program to gain comprehensive clinical proficiency in the diverse fields of dental practice. Studies on employees’ mental health have reported that workplace transition can be a source of stress, associated with negative outcomes in terms of psychological health. Dental trainees in a rotation training program change workplaces several times during their training period, and each time they must adjust to a new environment, a new atmosphere created by the clinical faculty, new clinical requirements, new clinical support staff, and new
supervisors. Accordingly, there is a great possibility that the repeated workplace transition itself during dental residents’ training affects the mental health of the dental trainees.

Several limitations of our study warrant mention. First, the study did not investigate participants’ personality traits. A relationship between personality traits and stress is often indicated in stress studies. Stress response levels differ among individuals during their training, as stress vulnerability differs among individuals. The provision of meaningful mental health care thus requires examination of the effects of dental trainees’ personality traits on their mental health. Second, we did not examine the influence of gender differences on the mental health of dental trainees. Women typically report higher levels of negative affect than men in response to psychosocial stressors. Some previous research has shown a preponderance of female dental students and trainees having mental health problems during their training, while others have failed to show any gender difference or found that males experienced greater stress than females. Thus, follow-up studies are needed to evaluate whether there is any relationship between dental trainees’ gender and mental health status. Finally, this study involved dental trainees at our hospital only; therefore, the results cannot be generalized. Given that each institution has developed its own training program, the selection of study subjects for a nationwide survey requires examination of the details of the individual programs. We are currently considering conducting a multi-year follow-up study involving our dental trainees in rotation and non-rotation training groups.

Conclusions

Our study found that the mental health of dental trainees was influenced by the selected training program; that is, the rotations as an element of the training program were a stress factor. Dental trainees who select the rotation type of training program should be provided access to a professional who can assess their mental health status and provide mental health support during training. A system is also required to provide feedback from the trainees to the respective departments and their supervisory dentists.

REFERENCES