A Study on the Occupational Stress of Trainee Dentists in Post-graduate Dental Education

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Abstract
For trainee dentists to focus on clinical training under mentally and physically stable conditions and improve the quality of their work, it is extremely important to provide mental health support and improve the environment by treating trainee dentists as workers. However, very few studies exist regarding occupational stress among trainee dentists. The present study investigated and analyzed occupational stress with the objective of assessing mental health conditions to consider environmental improvements for enhancing mental health among trainee dentists in post-graduate dental education. The questionnaire was administered to dental trainees. It covered potential stress factors: mental and physical reactions to stress and other factors affecting stress responses; stress-relieving factors; and task satisfaction levels.

The risk scores in males and females that were obtained using a diagram for the determination of occupational stress (100 for a standard risk) were 111 and 113 for amount-control risk, 85 and 74 for risk with support from work fellows, and 94 and 83 for combined health risk, respectively. A significant correlation was found only between the scores for stress responses and stress-relieving factors (p<0.05). The scores of subjects at high risk for stress responses and stress-relieving factors were significantly different (p<0.01) from those from subjects at low risk of stress responses and stress-relieving factors. The degrees of stress in the satisfactory task group and the unsatisfactory task group for stress responses (p<0.001), and for stress-relieving factors (p<0.01), respectively, showed significant differences. These results suggest that the low combined health risk obtained in trainee dentists indicates that stress possibly from quantitative burdens and insufficient control of tasks is lessened by support from persons the trainees work with, including bosses and colleagues. A correlation was also found between stress responses to tasks and stress-relieving factors as well as an association between degree of task satisfaction and degree of stress. Concrete measures are needed to reduce health risks from quantitative burden and insufficient control of tasks.

Keywords:
occupational stress, trainee dentist, mental health, professionalism, behavioral science in dental practice

Introduction
With recent structural changes in the economy and industry, the employment environment has changed dramatically. It is well known that overwork leads to an increase in stress levels such as fatigue and depression, and the number of workers experiencing strong anxiety, distress, or stress is increasing (1). It has been reported that

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the particular coping behavior selected by an employee when experiencing stress largely affects the process of developing health issues due to occupational stress (2-4).

In association with post-graduate dental clinical training becoming compulsory, the status and condition of trainee dentists improved, allowing the training system to provide a working environment in which the trainees can focus on clinical training (5.6). Although the clinical training carried out by physicians and dentists after graduation is essential to improving the quality of young health professionals, the training period is well known as being extremely stressful. It has been reported that physicians are subjected to a great deal of stress during the first year of training (6-11). Trainee dentists are exposed to various stress factors throughout their short 1-year training period, wherein conditions change from moment to moment. There are reports of cases in which clinical training was temporarily discontinued or not completed due to training-derived mental health issues among trainee dentists.

For trainee dentists to be able to focus on clinical training under mentally and physically stable conditions and improve the quality of their training, it is extremely important to provide mental health support and improve the environment by treating trainee dentists as workers. However, very few studies exist regarding occupational stress among trainee dentists. The present study analyzed occupational stress with the objective of investigating mental health conditions to determine how to improve the environment with respect to mental health for trainee dentists during their postgraduate dental education.

Materials and Methods

An examination was conducted among trainee dentists (male: 12 subjects, female: 7 subjects) at Nihon University Hospital at Matsudo in March 2013 at the end of their clinical training of a single-type program. An occupational stress questionnaire (stressors factors: 17 items; mental and physical reactions caused by stress and other factors affecting stress responses: 29 items; stress-relieving factors: 9 items; task and home satisfaction level: 2 items; 57 items in total) was used and evaluated using a four-step scale. Moreover, in order to determine the health risks associated with occupational stress, the results were analyzed using a work-stress determination chart for the occupational stress questionnaire developed by the Ministry of Health, Labour and Welfare (12). The study was approved by the Ethics Committee of the Nihon University School of Dentistry at Matsudo (EC09-028).

For the statistical analysis, the t-test was used to compare the mean values between two groups. Spearman's correlation coefficient test was performed for correlation analysis.

Results

Table 1 (1-1, 1-2, 1-3, 1-4) shows the mean scores (mean ± standard deviation [SD]) of the items in the investigation of occupational stress. The scores of males and females were 8.9 and 9.6 for the quantitative burden of tasks (1+2+3 of Table 1-1), 6.6 and 8.0 for the control of tasks (8+9+10 of Table 1-1), 8.2 and 7.7 for support from bosses (1+4+7 of Table 1-3), and 9.2 and 10.0 for support from colleagues (2+5+8 of Table 1-3), respectively.

The risks in males and females that were determined using the diagram for the determination of occupational stress (100 for a standard risk) were 113 and 111 for amount-control risk, 85 and 74 for risk with support from work colleagues, and 94 and 83 for combined health risk, respectively (Fig.1).

No significant correlation was found among all subjects between scores for stressors and stress responses (r=0.33, not significant) and between scores for stressors and stress-relieving factors (r=0.14, not significant). A significant correlation was found only between the scores for stress responses and stress-relieving factors (Fig.2, r=0.47, p<0.05).

The scores of subjects at high risk (n=9) for stress responses (2.1 ± 1.7, 2.1 ± 0.8) and stress-relieving factors (2.6 ± 0.7, 2.0 ± 1.0) were significantly different (p<0.01) from the scores of subjects at low risk (n=10) for stress responses (1.7 ± 0.8, 1.9 ± 0.9) and stress-relieving factors (2.7 ± 1.1, 1.7 ± 1.0), respectively. However, the scores of subjects at high risk for stressors (1.9 ± 0.9, 1.9 ± 1.1) were not significantly different from those of subjects at low risk (2.0 ± 0.8, 1.8 ± 0.9) (Figs. 3, 4 and 5).

The degrees of stress in the satisfactory task group (satisfactory plus relatively satisfactory) and the unsatisfactory task group (unsatisfactory plus relatively unsatisfactory) were 2.6 ± 1.0 and 2.7 ± 0.8 for stressors, 1.7 ± 0.9 and 2.2 ± 1.1 for stress responses (p<0.001), and 1.8 ± 0.8 and 2.2 ± 0.9 for stress-relieving factors (p<0.01), respectively, showing significant differences (Fig.6).
Discussion

The post-graduate clinical training program is compulsory. The principle behind the clinical training is "to foster the personality as a physician and acquire basic medical examination competency for primary care, in addition to improving the environment such that trainees can focus on training without working part-time jobs" (5, 6). According to a survey on occupational stress conducted by the Ministry of Health, Labour and Welfare (12), the national mean scores for males and females, respectively, were as follows: quantitative burden of work (8.7, 7.6); control over work (8.7, 7.9); support from their bosses (7.6, 6.9); and support from their coworkers (8.1, 8.1). Comparing these results, the trainee dentists in our department demonstrated a tendency for higher scores in females than in males for the quantitative burden of work, insufficient control over work in males than in females; and favorable results in both males and females regarding support from their bosses or coworkers.

It has been reported that while the factors that alleviated stress in trainees included increased sleeping hours, decreased interpersonal relationship issues, and increased support from their bosses and coworkers, factors that worsened stress included a decreased sense of accomplishment (13–20). Moreover, it has also been reported that the impact that stress-relieving factors have on stress is larger than that of stress-enhancing factors. This suggests the importance of appropriately recognizing the stress factors for each trainee in order to decrease the enhancing factors and increase the relieving factors. In the present study, the risk was somewhat high for factors believed to be stress-derived, while the risk derived from stress-relieving factors was low. The overall health risk was low, suggesting that stresses believed to be caused by quantitative work burden and lack of work control were eased by support from their bosses and coworkers. In the future, specific methods to decrease the health risks caused by quantitative work burden and lack of control over work are required.

The scores of subjects at high risk for stress responses and stress-relieving factors were significantly different from those of subjects at low risk. However, the scores of subjects at high risk for stressors were not significantly different from the scores of subjects at low risk. A significant correlation was found only between the scores for stress responses and stress-relieving factors.

Based on these results, the present study showed an association between stress responses and stress-relieving factors, but stressors had a distinct mechanism among the stress factors.

Negative correlations have been reported between occupational stress and the degree of task satisfaction in personnel working in medical and welfare institutions (7, 21, 22). The same has also been reported with respect to physicians, and an association between the degree of task

### Table 1-1. Work stressors factors

|                      | male: AV±SD | female: AV±SD |
|----------------------|-------------|---------------|
| 1) Must complete an extremely large number of tasks | 2.83±0.72  | 3.14±0.69     |
| 2) Unable to handle the tasks on time               | 2.67±0.89  | 2.86±1.21     |
| 3) Must work hard                                    | 3.42±0.51  | 3.57±0.53     |
| 4) Need to focus considerable attention              | 3.17±0.39  | 3.86±0.83     |
| 5) Difficult job that requires a high level of knowledge and skill | 3.33±0.49  | 4.00±0.00     |
| 6) Must constantly think about work while on duty    | 3.00±0.95  | 2.86±0.69     |
| 7) The job involves a lot of physical labor          | 3.33±0.65  | 2.86±0.69     |
| 8) Able to work at own pace                         | 3.00±0.60  | 2.29±0.95     |
| 9) Able to decide the order/way of completing tasks  | 2.67±0.65  | 1.86±0.69     |
| 10) Able to influence policy at your work place through your opinion | 2.75±0.97  | 2.86±0.69     |
| 11) Few opportunities to use your skill and knowledge at work | 1.92±0.67  | 1.57±0.98     |
| 12) Disagreements exist within your department       | 2.18±0.75  | 2.43±0.98     |
| 13) Your department does not get along with other departments | 2.09±0.70  | 2.14±0.69     |
| 14) Workplace has a friendly atmosphere              | 2.09±0.70  | 1.71±0.49     |
| 15) Working environment is not good (noise, lights, temperature, ventilation, etc.) | 3.00±0.63  | 3.00±1.00     |
| 16) The work content suits you                       | 2.09±0.30  | 2.00±1.00     |
| 17) It is a meaningful job                           | 1.67±0.78  | 1.86±1.07     |
Table 1-2. Your situation within the past month: mental and physical reaction caused by stress and other factors affecting stress responses

| Item                                                                 | Male: AV±SD | Female: AV±SD |
|----------------------------------------------------------------------|--------------|---------------|
| 1) Vigorous                                                          | 3.08±0.79    | 2.48±0.98     |
| 2) Have a lot of energy                                              | 3.00±0.85    | 2.43±0.79     |
| 3) Vivacious                                                        | 2.83±0.94    | 2.57±0.98     |
| 4) Feel angry                                                        | 2.67±1.15    | 2.14±0.69     |
| 5) Feel inwardly annoyed                                            | 2.42±0.90    | 1.71±0.95     |
| 6) Irritated                                                        | 2.25±0.97    | 2±0.82        |
| 7) Exhausted                                                        | 2.08±1.00    | 2.71±0.76     |
| 8) Completely worn out                                               | 1.75±1.06    | 2.43±0.98     |
| 9) Feel listless                                                     | 1.92±1.08    | 2.43±0.79     |
| 10) Growing tension                                                  | 1.92±1.00    | 1.71±1.11     |
| 11) Anxious                                                         | 2.75±0.97    | 2.14±1.07     |
| 12) Be ill at ease                                                   | 2.08±1.00    | 2±1.15        |
| 13) Depressed                                                        | 2.08±1.00    | 2±1.15        |
| 14) Doing anything is troublesome                                    | 1.67±0.98    | 1.71±1.11     |
| 15) Unable to concentrate on things                                  | 1.67±0.98    | 1.71±1.11     |
| 16) Not feeling well                                                 | 2.08±1.24    | 1.71±1.11     |
| 17) Unable to settle down and work                                   | 1.58±0.67    | 1.43±1.13     |
| 18) Feel sad                                                        | 1.58±0.79    | 1.14±0.38     |
| 19) Have vertigo                                                     | 1.25±0.45    | 1±0.00        |
| 20) Have joint pain                                                  | 1.25±0.62    | 1.14±0.38     |
| 21) Feel heavy-headed or have a headache                             | 1.67±0.98    | 1.28±0.49     |
| 22) Stiff neck and shoulders                                         | 1.33±0.65    | 2.71±0.95     |
| 23) Have back pain                                                   | 1.83±0.83    | 1.86±0.90     |
| 24) Have tired eyes                                                  | 1.92±0.90    | 2.43±0.79     |
| 25) Experiencing palpitations and shortness of breath                | 1.17±0.39    | 1±0.00        |
| 26) Have poor digestion                                              | 1.42±0.90    | 1±0.00        |
| 27) Have no appetite                                                 | 1.33±0.65    | 1±0.00        |
| 28) Constipation or diarrhea                                         | 1.33±0.65    | 1±0.00        |
| 29) Unable to sleep well                                             | 1.42±0.67    | 1.14±0.38     |

Table 1-3. People around you: stress relieving factors:

| How readily can you talk with the following people                  | Male: AV±SD | Female: AV±SD |
|----------------------------------------------------------------------|--------------|---------------|
| 1) Supervisors                                                      | 2.25±0.87    | 2.57±0.53     |
| 2) Coworkers                                                        | 1.75±0.75    | 1.43±0.53     |
| 3) Spouse/family/friends                                            | 1.33±0.49    | 1.14±0.38     |

To what extent can you rely on the following people when you are in trouble

| How readily can you talk with the following people                  | Male: AV±SD | Female: AV±SD |
|----------------------------------------------------------------------|--------------|---------------|
| 1) Supervisors                                                      | 2.17±1.11    | 2.14±0.90     |
| 2) Coworkers                                                        | 2±1.04       | 1.57±0.79     |
| 3) Spouse/family/friends                                            | 1.58±0.90    | 1.71±0.76     |

To what extent will the following people listen to you if you ask for advice regarding a personal issue

| How readily can you talk with the following people                  | Male: AV±SD | Female: AV±SD |
|----------------------------------------------------------------------|--------------|---------------|
| 1) Supervisors                                                      | 2.42±1.00    | 2.57±0.79     |
| 2) Coworkers                                                        | 2.08±0.90    | 2±1.00        |
| 3) Spouse/family/friends                                            | 1.58±0.67    | 1.57±0.79     |
satisfaction and stress has also been reported in medical residents (7,22). The present study of the relationship between the degree of task satisfaction and occupational stress in trainee dentists also found an association between stress responses and stress-relieving factors. This suggests that environmental improvement for an increased degree of task satisfaction is important in reducing stress.
In conclusion, the low combined health risk obtained in trainee dentists suggests that stress possibly from quantitative burdens and insufficient control of tasks is lessened by support from the persons they work with, including bosses and colleagues. A correlation between stress responses to tasks and stress-relieving factors, as well as an association between the degree of task satisfaction and the degree of stress were also found. Concrete measures to reduce health risk from quantitative burden and insufficient control of tasks are needed.

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