



Influence of SOC on the Mental Health Status of Postgraduate Trainee Dentists in Japan

Tohru Takarada*, Yoshihisa Sumi and Yoshinori Higuchi

Division of General Oral Care, Kyushu University Hospital, Japan

***Corresponding author:** Tohru Takarada, Division of General Oral Care, Kyushu University Hospital, 3-1-1, Maidashi, Higashi-ku, Fukuoka 812-8582, Japan, E-mail: takarada@dent.kyushu-u.ac.jp

Abstract

Purpose: The aim of this research is to examine whether dental trainees' stress-coping ability and health-maintenance capability affect their mental health during training.

Methods: Trainee dentists who began their postgraduate clinical training for one year in 2010 (n = 60) and 2011 (n = 64) at Kyushu University Hospital were eligible to participate in the study. The questionnaire survey was conducted five times throughout the training year using the 13-item Sense of Coherence (SOC-13), the 28-item General Health Questionnaire (GHQ-28), and the 22-item Job Content Questionnaire (JCQ-22).

Results: A 107 trainee dentists were completed (female n = 48, male n = 59). We identified the influence of SOC on the mental health status of postgraduate trainee dentists; that is, trainee dentists with high SOC showed favorable mental health, whereas those with low SOC showed poor mental health during the training. Concerning work conditions, trainee dentists with high SOC had adequate support from their supervisors and coworkers.

Conclusion: This study showed the possibility of applying SOC for predicting the mental health status of trainee dentists. The results also suggest the need to introduce a solid support system from the early stages of training, in order to achieve the effects of mental health support for trainee dentists with low SOC.

Keywords: Trainee dentists, Mental health, 13-item Sense of Coherence, 28-item General Health Questionnaire, 22-item Job Content Questionnaire, Longitudinal study

Introduction

In Japan, a one-year compulsory postgraduate dental training program was started in April 2006. The aim of this training is to supplement the lack of clinical training in the undergraduate curriculum and to meet social requirements [1]. New-entry dentists, who are called trainee dentists, have had their working conditions greatly improved, and are consequently able to concentrate on their clinical training. Trainee dentists must be paid reasonably and their work hours are limited to 40 hours a week by law, with no night duty or holiday work. However, even after the establishment of this compulsory training system, mental health dysfunction in trainee dentists has been discerned at a high frequency; 46% of trainee dentists were in a state of depression, which, in some cases, resulted in interruptions in training or non-completion of training [2]. Why

are there still so many trainee dentists who develop mental health disorders, even though their working conditions have been improved via great efforts by the government? Research on occupational stress reported external resources as factors affecting workers' health, such as occupational stressors and work environment [3], but also indicated the possible importance of internal resource factors of individuals, such as personality [4]. As one of the internal resources, a sense of coherence (SOC) has been focused on as a construct that predicts coping measures that are effective against stressful conditions. The sense of coherence (SOC) is a concept developed by Antonovsky that represents a person's ability to manage psychological stressors; it is strongly related to perceived health, especially mental health [5]. People with a strong SOC have a high ability to cope with stress and can be expected to maintain good health, even under stressful conditions [6]. The SOC questionnaire has been used in at least 33 languages in 32 countries [5], and some researchers have reported direct effects of SOC on workers' wellbeing [7-9]. The involvement of SOC in the wellbeing of trainee dentists during a postgraduate dental training program is also considered. Nevertheless, evidence of the extent to which SOC can act as a buffer to protect trainee dentists' mental health is still lacking. The purpose of this research is thus to examine whether dental trainees' stress-coping ability and health-maintenance capability affect their mental health during training.

Methods

This study was approved by the ethical committee of the Kyushu University Hospital.

Participants

Trainee dentists who began their postgraduate compulsory clinical training for one year in 2010 (n = 60) and 2011 (n = 64) at Kyushu University Hospital were eligible to participate in the study.

Procedure

The participants were provided with an information sheet, and written informed consent was obtained in the initial one-week orientation period. Of the invited trainees, 94% (117 of 124) agreed to take part.

The questionnaire survey was conducted five times throughout the year, with time 1 in April (in the orientation period), time 2 in June, time 3 in September, time 4 in December, and time 5 in March of the following year (at the end of the training). At time 1,

the participants completed the demographic characteristics survey (gender and age), the Japanese version of Sense of Coherence, 13 items (SOC-13) [10], and the Japanese version of General Health Questionnaire, 28 items (GHQ-28) [11]. At times 2-4, they completed only GHQ-28. At time 5, they completed GHQ-28 and the Japanese version of the Job Content Questionnaire, 22 items (JCQ-22) [12].

Measurement of sense of coherence

SOC-13 was used to measure the sense of coherence. The items were rated on a 7-point Likert scale, so total SOC-13 score could range from 13 to 91. Higher scores indicate stronger SOC, which means a greater ability to cope with stress.

Measurement of mental health status

GHQ-28 was employed to assess the mental health status. Responders were asked to evaluate their psychological condition over the previous two to three weeks using a four-point scale ('never': 0, 'sometimes': 1, 'frequently': 2, or 'nearly all the time': 3). The total score on the GHQ-28 ranges from 0 to 84. The higher the GHQ-28 score, the poorer the mental health. In the present study, we used the recommended GHQ-28 cut-off point (more than 23) as a screening threshold [13].

Working conditions

JCQ-22 was used to measure working conditions, which consist of four subscales: job demands regarding quantitative and qualitative workloads (5 items), job control regarding decision-making authority and skill discretion (9 items), and social support from supervisors and coworkers (4 items each). All items were scored on a Likert scale of 1 to 4 (1 = strongly disagree, 2 = disagree, 3 = agree and 4 = strongly agree).

Statistical Analyses

Participants were categorized into three groups according to their SOC-13 total score tertile (low, medium, and high). All results are expressed as mean and standard deviation (SD). Proportions (gender ratio) were compared among the three SOC groups using the chi-square test. Continuous variables (age) were compared using one-way analysis of variance (ANOVA).

The GHQ-28 total scores of the three SOC groups were compared using two-way ANOVA with time as the repeated parameter. Significant intergroup differences at each time point were assessed using Bonferroni's test. The JCQ-22 subscale scores of the three SOC groups were compared by one-way ANOVA, followed by Bonferroni's test.

SPSS Statistics Ver.19 (IBM Japan, Co., Ltd., Tokyo, Japan) was used for the data management and analysis. A probability value of $p < 0.05$ was considered to indicate statistical significance.

Results

A total of 94% (117 of 124) of trainee dentists agreed to take part in this study, and 86% (107 of 117) of them completed it (females, n = 48; males, n = 59) (Figure 1). No participants were found to have any psychological or physical health problems in the pre-employment medical examination. The mean (SD) SOC scores were 57.7 (11.6) in females and 58.6 (8.6) in males ($p > 0.05$ between the genders). A total of 37 participants were categorized into the low SOC group (SOC score, 36-52), 36 into the medium SOC group (SOC score, 53-63) and 34 into the high SOC group (SOC score, 64-81). No significant differences were found in age or gender ratio among the three SOC groups ($p > 0.05$) (Table 1).

Figure 2 shows the change of the mean (SD) values of the GHQ-28 total score throughout one year for the three SOC groups. Repeated two-way ANOVA revealed significant main effects of SOC group [$F = 31.93, p < 0.01$], time [$F = 3.32, p < 0.05$] and the SOC group \times time interaction [$F = 0.76, p > 0.05$]. Bonferroni's post hoc test indicated that GHQ-28 score was significantly higher in the medium SOC group than in the high SOC group at times 2 and 3 (both $p < 0.01$), and in the low SOC group than in the high SOC group at all times (all $p < 0.01$).

Table 2 shows the mean (SD) values on the JCQ-22 subscale at time 5. The results from one-way ANOVA revealed that JCQ-22 scores on supervisor support were significantly higher in the high SOC group

Table 1: Characteristics of the study population.

SOC category	score range	n (female/male) ^a	Age, mean (SD) ^b
Low	(36-52)	37 (20/17)	26.3 (2.1)
Medium	(53-63)	36 (12/24)	25.9 (1.7)
High	(64-81)	34 (16/18)	25.9 (1.8)

^a Chi-squared test, $p > 0.05$

^b One-way ANOVA, $p > 0.05$

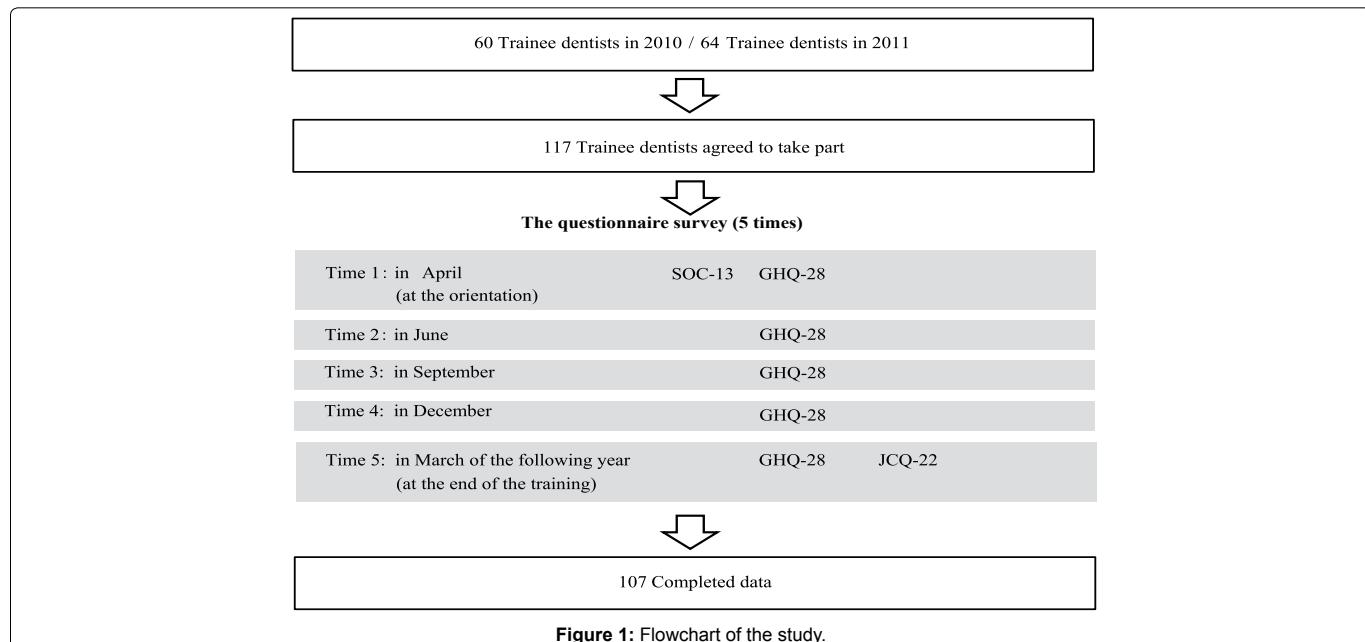
Table 2: Differences in JCQ-22 subscale scores among the three SOC groups.

SOC category	Job demands	Job control	Supervisor support	Coworker support
Low	35.2 ± 5.1	71.0 ± 9.0	12.8 ± 2.1 **	13.1 ± 1.6 *
Medium	35.3 ± 4.4	72.8 ± 6.5	12.5 ± 2.0 **	13.0 ± 1.8 *
High	33.0 ± 4.0	73.8 ± 7.9	14.2 ± 1.7	14.1 ± 1.7

Data are mean \pm SD.

* $p < 0.05$ compared with high SOC group.

** $p < 0.01$ compared with high SOC group.



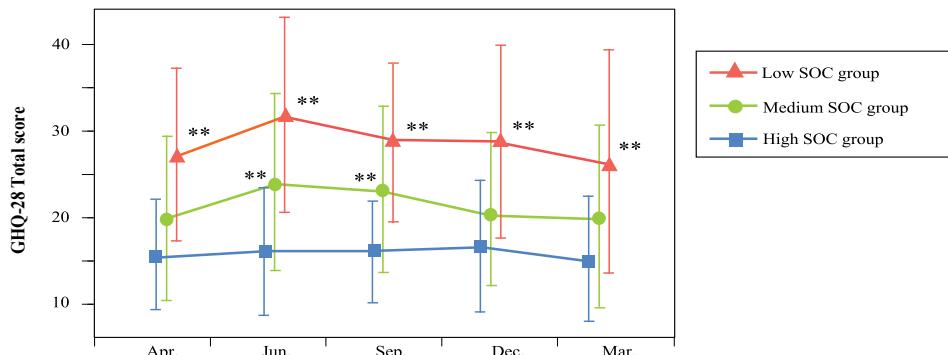


Figure 2: Mean (SD) total scores of GHQ-28 in each SOC group (Low, Medium, and High SOC group) at each measuring point throughout one year.

* $p < 0.05$ compared with high SOC group.

** $p < 0.01$ compared with high SOC group.

than in the medium and low SOC groups (both $p < 0.01$). Likewise, JCQ-22 scores on coworker support were significantly higher in the high SOC group than in the medium and low SOC groups (both $p < 0.05$). No significant differences were found in JCQ-22 scores on job demands or job control among the three SOC groups ($p > 0.05$).

Discussion

This study examined the influence of SOC on the mental health status of postgraduate trainee dentists over one year. In terms of the results, we identified the influence of SOC on the mental health status of postgraduate trainee dentists; that is, trainee dentists with high SOC showed favorable mental health, whereas those with low SOC showed poor mental health during the training.

Concerning work conditions, trainee dentists with high SOC had adequate support from their supervisors and coworkers. However, no significant difference was observed in the job demands and job control in terms of the level of SOC.

In the present study, the high SOC group showed a lower GHQ-28 total score than the threshold score of 23/24 during the 1-year training, and maintained favorable mental health by dealing with stress. However, trainee dentists with low SOC had poor mental health as they showed a higher GHQ-28 total score than the threshold score of 23/24 throughout the training. GHQ-28 total score of trainee dentists with medium SOC was close to the threshold score of 23/24 after 3 and 6 months, but it never exceeded the threshold. Although various factors are indicated to relieve stress, the results suggest that SOC can be considered as one of the effective stress relief factors for trainee dentists.

Evaluation of the work environment using the JCQ-22 showed differences in the work environment, particularly social support, depending on the level of SOC of trainee dentists. This means that the high SOC group had favorable support from their supervisors and coworkers compared with the low and medium SOC groups. On the other hand, no difference was observed in the job demands and job control among the three groups. This result was considered to be quite reasonable because the details of the training program were predetermined under the postgraduate dental training system, and all trainee dentists underwent the same quality and quantity of training. People with high SOC are considered to have the ability to use coping resources around them. This ability may have contributed to the effective use of support from their supervisors and coworkers. This was considered to be one of the reasons why the high SOC group maintained favorable mental health throughout the training compared with the other groups. Social support is reported to have an important role in relieving occupational stress [7,14], as has similarly been reported in studies on postgraduate medical training [15]. The roles of dental trainers who provide direct supervision for trainee dentists are important in the mental health care of postgraduate trainee dentists who are inexperienced at performing medical examinations. However, we have to note the possibility that trainee dentists with low SOC cannot adequately use social support including dental trainers.

Furthermore, we must pay attention to the fact that trainee dentists with low SOC had exhibited poor mental health at the beginning of the training. Trainee dentists expend a lot of effort preparing for the national dentist examination conducted immediately before (February) the postgraduate dental training. We have to consider the possibility that such hard work during this period results in poor mental health in trainee dentists with low SOC. It may be necessary to pay special attention to them from the beginning of the training. It is necessary for training facilities to assess trainee dentists' SOC, and appropriately provide mental support according to the level of an individual's SOC.

Conclusion

The results of this study showed that trainee dentists with high SOC had the ability to use social support adequately, and their mental health was favorable during the training. Trainee dentists with low SOC could not adequately utilize social support, so their mental health deteriorated. These findings suggest the possibility of applying SOC for predicting the mental health status of trainee dentists. The results also suggest the need to introduce a solid support system from the early stages of training, in order to achieve the effects of mental health support for trainee dentists with low SOC.

References

1. Kikuchi M (2007) The Japanese system of dental clinical training. *Prosthodont Res Pract* 6: 78-80.
2. Mataki S, Akiyama H, Nitta H, Hirata S (2009) Report on evaluation of the new clinical dental training system. 2008 Health Labour Sciences Research, Health Promotion in the Local Community in Japan. Saitama, Japan: National Institute of Public Health.
3. Takarada T, Asada T, Sumi Y, Higuchi Y (2014) Effect of a rotation training system on the mental health status of postgraduate dental trainees at Kyushu University Hospital, Fukuoka, Japan. *J Dent Educ* 78: 243-249.
4. Gallo LC, Matthews KA (2003) Understanding the association between socioeconomic status and physical health: do negative emotions play a role? *Psychol Bull* 129: 10-51.
5. Eriksson M, Lindström B (2005) Validity of Antonovsky's sense of coherence scale: a systematic review. *J Epidemiol Community Health* 59: 460-466.
6. Mehlum L (1998) Suicidal ideation and sense of coherence in male conscripts. *Acta Psychiatr Scand* 98: 487-492.
7. Urakawa K, Yokoyama K (2009) Sense of coherence (SOC) may reduce the effects of occupational stress on mental health status among Japanese factory workers. *Ind Health* 47: 503-508.
8. Suominen S, Helenius H, Blomberg H, Uutela A, Koskenvuo M (2001) Sense of coherence as a predictor of subjective state of health: results of 4 years of follow-up of adults. *J Psychosom Res* 50: 77-86.
9. Feldt T (1997) The role of sense of coherence in well-being at work: analysis of main and moderator effects. *Work Stress* 11: 134-147.
10. Yamazaki Y (1999) SOC: a new concept for shaping and preserving health. *Quality Nursing* 5: 81-88.
11. Nakagawa Y, Daibo I (1985) Manual of the Japanese Version of the General Health Questionnaire. Tokyo: Nihon Bunka Kagakusha.
12. Kawakami N, Kobayashi F, Araki S, Haratani T, Furui H (1995) Assessment of

job stress dimensions based on the job demands-control model of employees of telecommunication and electric power companies in Japan: reliability and validity of the Japanese version of the Job Content Questionnaire. *Int J Behav Med* 2: 358-375.

13. Goldberg DP, Gater R, Sartorius N, Ustun TB, Piccinelli M, et al. (1997) The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychol Med* 27: 191-197.

14. Marcelissen FH, Winnubst JA, Buunk B, de Wolff CJ (1988) Social support and occupational stress: a causal analysis. *Soc Sci Med* 26: 365-373.

15. Boerjan M, Bluyssen SJ, Bleichrodt RP, van Weel-Baumgarten EM, van Goor H (2010) Work-related health complaints in surgical residents and the influence of social support and job-related autonomy. *Med Educ* 44: 835-844.