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Risk factors for mental disorders develop early in German students of dentistry

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ABSTRACT

Purpose: We investigated mental risk factors such as symptoms of burnout and sense of coherence in students of dental medicine at the University of Erlangen in the context of a learning type survey. Our aim was to assess the presence of analogies to the results we had previously determined for students of human medicine.
Methods: We surveyed a total of 163 dentistry students during the first 2.5 years, up to the first state examination. To ensure comparability, the data were collected from all students at the beginning of each semester. Standardized, validated questionnaires on burnout symptoms (Burnout Screening Scales; BOSS-II), sense of coherence (Sense of Coherence Scale; SOC-L9) and learning type according to Kolb were used in the survey.
Results: A total of about 90% of the students provided responses to the voluntary survey. The extent and manifest dynamics of the stress levels observed can be characterized as dramatic. Having started out at cognitive and emotional stress levels typical of the normal populace, a massive deterioration of these parameters was observed in the students by the time they were facing their first state examination in the 5th semester. At the same time, their sense of coherence also suffered a pronounced drop-off. No significant learning type-correlated differences were determined in a mean comparison of the measured parameters.
Conclusion: Based on the results obtained, we see a need for preventive course offerings to students of dentistry to reduce the prevalence of mental disorders in this group. We discern additional potential for enhancement of mental health with courses more specifically geared to the different learning styles among the students.

1. Introduction

Students of dental medicine – like those studying human medicine – are at much greater risk than the normal populace for mental disorders such as depression (Bailer et al., 2008; Mache et al., 2015; Vered et al., 2014). Emotional exhaustion, depersonalization and reduced performance levels are among the frequent signs of burnout observed in dental medical student collectives (Gorter and Freeman, 2011; Pohlmann et al., 2005; Prinz et al., 2012). In the cited studies to date, the data on mental stress were usually collected later in the course of studies, e.g. in the fourth or fifth year.

In our study of mental stress in students of human medicine, based on the largest study collective to date in Central Europe, we demonstrated development of mental problems as early as the first preclinical semesters. After four semesters, 40.8% of the students showed at least minimal depressive symptoms (Burger et al., 2014). Significant deterioration was also observed at this point in cognitive and emotional burnout levels and the sense of coherence (Scholz et al., 2015). Also noted in the human medicine student collective was a correlation of the learning type according to Kolb with the symptoms of mental and emotional burnout and sense of coherence (Burger and Scholz, 2014).

The study presented here investigated whether the results obtained for students of human medicine also applied to students of dental medicine at the University of Erlangen and what implications the results might have for the dental medical curriculum.

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2. Material and methods

Methods included proper consent and approval, complied with the declaration of Helsinki, and had been approved by the ethics committee of the Friedrich-Alexander University (FAU), Erlangen, Germany.

The preclinical student collective comprised the first five semesters of the course of studies in dental medicine at Friedrich Alexander University of Erlangen-Nürnberg. The survey of a total of 163 students was conducted in winter semester 2012/13. The collection of the individual data from all students was done at the start of the semester during the first two weeks of lectures, and thus at comparable points in time between semesters without upcoming exams. This was done to reduce the distorting effect of end-of-semester stress and anxiety factors, e.g. related to exams. Studies published to date on the general stress curve throughout a course of studies used only data collected at unspecified points of time during the semester. In our view, this procedure fails to assign sufficient weight to potentially confounding events (e.g. circumstances related to exams), for which reason we selected the study design as described.

The students were surveyed using standardized and validated questionnaires on burnout symptoms (BOSS-II), coherence (SOC-L9) and the learning type according to the Kolb theory. The Burnout Symptom Scales (BOSS-II) comprise a self-assessment method for the subjective mental and physical symptoms typical of burnout syndrome. Two independent questionnaires with 30 items each are available. BOSS-II is made up of three scales (for physical, cognitive and emotional symptoms) with ten items each, covering an assessment period of seven days. This questionnaire can be used for both dimensional diagnostics (symptom quantification) and categorical diagnostics (suspected burnout syndrome diagnosis). The higher the value obtained, the more pronounced the symptoms (Hagemann and Geuenich, 2009).

To obtain the burnout diagnostics in this particular collective we decided to use the BOSS-II, since its items appear to be optimally suited to preclinical medical students. In contrast to other established tools, e.g. the Maslach Burnout Inventory, it includes no questions regarding patient-client contacts, an aspect that is irrelevant or nearly so for preclinical students in the first four semesters in Erlangen.

The Sense of Coherence Scale reflects Antonovsky's salutogenesis model. A sense of coherence "describes the inner world of a person, his surroundings and the things that happen to him as comprehensible, feasible and meaningful – and thus as coherent" (Schumacher et al., 2000). According to the SOC-L9, the average score for men between the ages of 18 and 40 years is 50.6 points (standard deviation 8.4 points) and for women in the same age range 48.05 points (standard deviation 8.55 points). This scale is an established investigatory instrument in psychiatric/psychosomatic diagnostics and has been shown to be a reliable predictor in several studies involving instruments for determination of depression and anxiety (Schumacher et al., 2000).

For quantification of our own survey data we decided to use the learning type analysis afforded by the Kolb model (Kolb and Kolb, 2005; Kolb, 1984). This model takes learning to be a never-ending and continuous process in which the learner first collects different experiences, then processes them. The multimodal approach used to teach dental medicine gives Kolb's model a clear edge for our work in this case. Individual integration of the subject matter has to take place in prior experience, both concrete and abstract. Kolb differentiates four different "learning styles" used to acquire knowledge: active experimentation (AE), reflective observation (RO), concrete experience (CE) and abstract conceptualization (AC), on which his definitions of four learning types are based (diverging, assimilating, converging and accommodating). We used an established questionnaire comprising 10 questions on each learning style.

Statistical evaluation of the collected data was done with the programme IBM SPSS Statistics, Version 21. In addition to descriptive statistics with normal distribution, mean value comparisons were also done by applying a single factor ANOVA analysis. Bivariate correlations were also used to estimate relationships among the determined results. A respective p-value of <0.05 was considered significant. The local Ethics Committee issued a positive vote on realization of the study. All participants provided written consent to pseudonymized collection and evaluation of their test results.

3. Results

About 90% of the dental medical students from the semesters listed above, prior to the 1st state examination, provided responses to the voluntary survey. In all, 163 students of dental medicine in preclinical semesters 1, 2, 4 and 5 participated in the survey at the start of the semester (Table 1). Conflicting deadlines unfortunately prevented collection of data from third-semester students. Students in their first semester obtained BOSS-II scores of 0.90 physical symptoms (standard deviation (sd) 0.60), 0.97 cognitive symptoms (sd 0.84) and 0.77 emotional symptoms (sd 0.77).

The burnout levels rose in the second semester to 0.74 (sd 0.62) for physical, 1.15 (sd 0.95) for cognitive and 0.88 (sd 1.01) for emotional symptoms. The average score revealed for physical symptoms in semester 4 was 0.94 (sd 0.78). Cognitive and emotional symptoms continued to rise with results of 1.47 (sd 1.06)/1.02 (sd 0.84). The values in all three burnout scales rose to 1.52 (sd 1.03) for physical, 1.82 (sd 1.13) for cognitive and 1.57 (sd 1.20) for emotional symptoms (Figs. 1 and 2).

The average sum scores in the described collective for SOC-L9 were 47.67 (♀) and 50.60 (♂) points. In the second semester, the sum score for SOC-L9 dropped to 45.94 (♀)/46.69 (♂) and in the fourth semester to 45.33 (♀)/46.00 (♂) points.

The falling tendency in successive semesters continued into the fifth, in which the average of 40.64 (♀)/45.63 (♂) points represented the lowest values observed in the investigated collective.

The values for cognitive and emotional burnout also showed a highly significant level of correlation ($p<0.01$ respectively in all four semesters recorded) with sense of coherence (Table 2).

A comparison of the mean values for the different semesters reveals significant differences. The differences between the means for the fourth and fifth semesters and those for the starting semesters are all significant (Table 3).

Quantification of the learning types among the students revealed a total of 11 accommodators (7♀, 4♂), 21 divergers (16♀, 5♂), 34 convergers (21♀, 13♂) and 61 assimilators (40♀, 21♂). 12 of the students (11♀, 1♂) could not be assigned unequivocally to

Table 1
Distribution of age and sexes of the participating dental medical students.

Semester	Age Min. (years)	Age Max. (years)	Age average (years)	Percentage (%) male/female
1	18	30	21.25	31.3/68.7
2	18	32	21.37	29.8/70.2
4	20	31	22.72	40.0/60.0
5	20	32	23.26	25.8/74.2

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