DENTAL STUDENTS’ PSYCHOLOGICAL WELL-BEING DURING EXAMINATION PERIOD AND HOLIDAY

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DENTAL STUDENTS’ PSYCHOLOGICAL WELL-BEING DURING EXAMINATION PERIOD AND HOLIDAY (Abstract). Introduction: Psychological well-being is recognized as an important health component, which influences the behavior, ability to cope with stressful events, work performance, and generally the ability to achieve one’s full potential. Aim: To comparatively assess the psychological well-being of dental students during the summer semester examination period and summer holiday. Material and methods: A single-arm, prospective study was conducted in second year dental students from the Faculty of Dental Medicine, Bucharest. The psychological well-being was assessed using the WHO-Five Well-being Index. Results: Students’ psychological well-being was statistically significantly better during the summer holiday (median=19) than during the summer semester examination period (median=11.5), Z=3.69, p < .001. The perceived satisfaction regarding financial means, faculty colleagues, home, family and overall life satisfaction was the same during summer semester examination period and summer holiday, but it was significantly correlated with the WHO-Five Well-being Index score corresponding to the summer holiday, and no association was observed with the WHO-Five Well-being Index score corresponding to the summer semester examination period. Conclusions: Within the limits of this study, psychological well-being is likely to be negatively influenced, on a fairly large scale, by the semester examination period. Therefore, it is recommended to identify the most appropriate methods of examination with regards to the psychological load that might be a threat to the validity of students’ evaluation. Additionally, training students about adequate coping strategies, designed as interventions at individual or group level, may be required. Keywords: DENTAL STUDENTS, MENTAL WELL-BEING, STRESS, PERSONAL SATISFACTION, EDUCATIONAL PROCESS, EDUCATION

Psychological well-being is as an important health component, rightly recognized by its inclusion in the definition of health by the World Health Organization. Well-being may influence the behavior, the ability to cope with stressful events, the work performance and generally the ability to achieve one’s full potential (1-3).

In direct relation to the academic activities, the most stressful period for the students is the examination period, with high psychological demands related to taking multiple exams in a limited time-frame, these scores usually having the greatest
impact on their academic achievements for the respective semester. The marked stress during this period can adversely affect student's health and performance, with possible implications on the correctness of his/her evaluation \((4, 5)\).

The aim of the study was to comparatively assess the psychological well-being of dental students during the summer semester examination period and summer holiday.

**MATERIAL AND METHODS**

**Study design, settings and participants.** A single-arm, prospective study was designed and implemented on a convenience sample formed by second year dental students from the Faculty of Dental Medicine, “Carol Davila” University of Medicine and Pharmacy, Bucharest, Romania. The psychological well-being was assessed through a self-administered email questionnaire, filled in during summer semester examination period and during summer holiday. Enrolment was done in the 2014 summer semester examination period, on a voluntary basis. Repeater students were excluded. Informed consent was given by the participants when providing the email address to be sent the link to the questionnaire.

**Variables.** The main study outcome was the psychological well-being, that was assessed using the WHO-Five Well-being Index (WHO-5; WBI), developed by the Psychiatric Research Unit, Mental Health Centre North Zealand, Hillerod, Denmark, a World Health Organization Collaborating Centre. The Romanian language version was used, available on the website of Psychiatric Research Unit at the Mental Health Centre North Zealand. WHO-Five Well-being Index is a depression screening tool with good psychometric validity and sensitivity \((6-8)\). It consists of a 5-item questionnaire, with a time frame of previous two weeks. Its interpretation is in accordance to the score obtained, that ranges from 0 to 25, with corresponding percentage score ranging from 0 to 100. A score below 13, corresponding to a percentage score below 50, or choosing answers with the minimum scores \((0 \text{ or } 1)\), indicates the need to perform a more detailed examination for the diagnosis of depression, the MDI questionnaire (Major Depression Inventory, World Health Organization) being recommended. For monitoring change, a difference of percentage score of 10 indicates a significant change in the psychological well-being \((1, 6)\).

Other study variables were demographics (age, sex) and satisfaction with factors that may relate to psychological well-being \((i.e. \text{ satisfaction with financial means, academic activities at faculty, faculty colleagues, home, general health, friends, family and overall life satisfaction)}}. The latter were registered as self-rated satisfaction, using a 10 point numerical rating scale, with whole numbers \((1 \text{ to } 10 \text{ integers})\), that was defined by the extremes, from 1 (very unsatisfied) to 10 (very satisfied). The respondent was asked to select the number that best reflects their satisfaction level regarding the issues mentioned.

**Data collection.** Students were prospectively followed-up, the data being collected at baseline, during the summer semester examination period \((T1)\) and during the summer holiday \((T2)\). The summer semester examination period, according to the structure of the academic year of the Faculty of Dental Medicine of the University of Medicine and Pharmacy Carol Davila in Bucharest, had a 4 weeks length, from
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07.06.2014 to 06.07.2014. Data was collected at T1 after two weeks from the beginning of the summer semester examination period, until it ended. Data was collected at T2 after three weeks from the completion of the summer semester examination period, after 28.07.2014, until the summer holiday ended. T2 moment was planned considering the need for a recovery period after the studied stress factor (semester examination period), considering the time-frame of previous two weeks of the WHO-Five Well-being Index, and also considering the possibility of student delay in responding the questionnaire.

Data collection was conducted online, by creating a questionnaire in Google Docs Form. This questionnaire was administered using the email address provided by the students. For the questionnaire completion on summer holiday (T2), two email reminders were sent to those who originally completed it in the summer semester examination period (T1). At T2, the respondents were no longer able to consult the previous responses, given at T1.

Data analysis. Statistical analysis was performed with SPSS software, version 13. The Wilcoxon signed-ranks test was used to evaluate differences in the scores of WHO-Five Well-being Index, at T1 and T2. Spearman's test was used for nonparametric correlation analysis between two factors. The significance level was set at p<.05.

RESULTS

Participants. Initially, a number of 39 second year dental students from the Faculty of Dental Medicine agreed to participate in this study and provided the email addresses. From these, 34 dental students responded to the email-delivered questionnaire during summer semester examination period (T1), corresponding to a response rate of 87%. They were aged between 19 and 24 years (mean and median - 20 years), of which more than half (n=22) were female. From the 34 dental students that responded to the questionnaire at T1, 20 students responded also to the same questionnaire in the summer holiday (T2), the response rate being 59%. They were aged between 20 and 24 years (mean=21 years; median=20 years), of which more than half (n=11) were female.

Psychological well-being. During the summer semester examination period (T1), the 34 dental students that responded to the questionnaire, obtained scores of WHO-Five Well-being Index varying from 4 (percentage score 16) to 20 (percentage score 80), with a mean of 12 (percentage score 49) and median of 12.5 (percentage score 50). According to the methodology of interpreting WHO-Five Well-being Index results, it was recommended to perform a more detailed examination for the diagnosis of depression in more than half of the analyzed students (n=20; 59%).

In the summer holiday (T2), the 20 students who completed the questionnaire again obtained scores of WHO-Five Well-being Index between 10 (percentage score 40) and 24 (percentage score 96), with a mean of 18 (percentage score 72) and median of 19 (percentage score 76). According to the interpretation methodology of WHO-Five Well-being Index results, it was recommended to perform a more detailed examination for the diagnosis of depression in only 3 (15%) of these students.

Using Wilcoxon signed-ranks test it was observed that psychological well-being is significantly better in the summer holiday (T2) than in the summer semester
examination period (T1)- in T2 median=19 (percentage score 76), in T1 median=11.5 (percentage score 46), Z = 3.69, p < .001. A significant change of psychological well-being from T1 to T2, with differences of the value of the percentage score above 10, was observed in the majority of students (n=18; 90%). Seventeen students registered a psychological well-being improvement in T2, with positive changes of the percentage score of WHO-Five Well-being Index that ranged from 12 to 52 (mean, respectively median of percentage score change of 30, respectively 28) and one student registered psychological well-being decrease, with a negative change of the percentage score of WHO-Five Well-being Index of 12. The remained two students didn’t register a significant change of their psychological well-being, one of them scoring the same at T1 and T2, and the other one scoring higher at T2, but the score difference from T1 was below the cut-off value of 10 for the percentage score of WHO-Five Well-being Index (Fig. 1).

Correlations between student psychological well-being and satisfaction with social and personal life-factors. Self-rated satisfaction with financial means, academic activities of faculty, faculty colleagues, home, general health, friends, family and his/her-own life overall was not different during the summer semester examination period (T1) and summer holiday and (T2), aspect analyzed using Wilcoxon signed-ranks test (table I). Even so, self-rated satisfaction with financial means, faculty colleagues, place of living, family and his/her-own life overall was strongly correlated with the score of WHO-Five Well-being Index during summer holiday (T2), and no correlations were found with the score of WHO-Five Well-being Index during summer semester examination period (T1) (tab. II).

Fig. 1. Percentage scores of WHO-Five Well-being Index during summer semester examination period (T1) and summer holiday (T2)
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TABLE I
Perceived satisfaction with social and personal life-factors, during summer semester examination period (T1) and summer holiday (T2)

<table>
<thead>
<tr>
<th>Self-rated satisfaction with</th>
<th>T1 (median)</th>
<th>T2 (median)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial means</td>
<td>7.0</td>
<td>7.5</td>
<td>nss</td>
</tr>
<tr>
<td>Academic activities of faculty</td>
<td>6.0</td>
<td>6.5</td>
<td>nss</td>
</tr>
<tr>
<td>Faculty colleagues</td>
<td>8.0</td>
<td>8.5</td>
<td>nss</td>
</tr>
<tr>
<td>Home</td>
<td>9.0</td>
<td>10.0</td>
<td>nss</td>
</tr>
<tr>
<td>General health</td>
<td>9.0</td>
<td>9.0</td>
<td>nss</td>
</tr>
<tr>
<td>Friends</td>
<td>8.5</td>
<td>9.0</td>
<td>nss</td>
</tr>
<tr>
<td>Family</td>
<td>10.0</td>
<td>9.0</td>
<td>nss</td>
</tr>
<tr>
<td>Overall life satisfaction</td>
<td>8.0</td>
<td>9.0</td>
<td>nss</td>
</tr>
</tbody>
</table>

T1 - summer semester examination period
T2 – summer holiday nss - not statistically significant

TABLE II
Correlation coefficients between the scores of WHO-Five Well-being Index and perceived satisfaction with social and personal life-factors

<table>
<thead>
<tr>
<th>Self-rated satisfaction with</th>
<th>WHO-Five (T1)</th>
<th>WHO-Five (T2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial means</td>
<td>.24</td>
<td>.56*</td>
</tr>
<tr>
<td>Academic activities of faculty</td>
<td>.11</td>
<td>.04</td>
</tr>
<tr>
<td>Faculty colleagues</td>
<td>.12</td>
<td>.72**</td>
</tr>
<tr>
<td>Home</td>
<td>-.11</td>
<td>.58**</td>
</tr>
<tr>
<td>General health</td>
<td>-.00</td>
<td>.22</td>
</tr>
<tr>
<td>Friends</td>
<td>-.07</td>
<td>.43</td>
</tr>
<tr>
<td>Family</td>
<td>.20</td>
<td>.57**</td>
</tr>
<tr>
<td>Overall life satisfaction</td>
<td>.29</td>
<td>.82**</td>
</tr>
</tbody>
</table>

T1 - examination period  ** significant at the 0.01 level
T2 – summer holiday  * significant at the 0.05 level

DISCUSSION
These results suggest that dental students have a poor psychological well-being during summer semester examination period, much worse compared to the one during summer holiday period, during which the scores of WHO-Five Well-being Index are similar to the ones in general population (i.e. percentage score of approximately 70) (1, 6).

The significant difference of psychological well-being during semester examination period and holiday can be argued by the differences between them, as mental demand. The poor psychological well-being during summer semester examination period may be explained by the sustained mental demand, generally present during semester examination period in relation to the high number of exams taken in a relatively short time-frame. Also, during summer semester examination period it is possible that the students experience the highest stress levels, due to the cumulative effect of whole-year academic activities stress. In contrast, during summer holiday
the students have the longest period of vacation of the academic activities, which probably associates mental relaxation that promotes psychological change with improved well-being.

Academic examination stress has been related to various manifestations, such as higher level of anxiety, lower levels of self-esteem, somatic symptoms, eating disorders such as emotional eating, higher blood pressure (4, 9-11). Examinations are perceived as acting as unavoidable stressors, with possible negative consequences that depend on individual characteristics, such as personality traits, smoking habit, family medical history, like hypertension (2, 4, 9). Additionally, specific aspects related to the method of examinations have been related to the stress level. Among the aspects identified by medical students as contributing to exam anxiety, extensive course loads, long duration of exams, inadequate rest are included (12, 13).

Academic examination stress and its relation to psychological well-being should be especially considered in medical and dental students, considering that evidence show that they register higher prevalence of depression and anxiety, with levels of overall psychological distress consistently higher than in the general population, which could have an impact on their health, and also academic performance, dropout rates and professional development (3, 14, 15). Medical students register relatively frequently signs of burnout syndrome, as emotional exhaustion and depersonalization, which favors a higher degree of dysfunctional coping (5, 16, 17). In addition to this, there is limited evidence that indicates that the second year medical students experience the highest stress levels, exhibiting most frequently anxiety (18).

The results of this study also suggest that during the summer holiday, as a situation with a high degree of relaxation, there are many factors associated with student’s psychological well-being, as self-rated satisfaction with their financial means, home (living conditions), family, faculty colleagues and overall life satisfaction. Even if the perception on these aspects is the same during the summer semester examination period, they are not correlated with the psychological well-being at that time. A possible interpretation of these results could be that during examination period students are extremely focused on the academic activities, other factors that typically influence their psychological well-being having a lower impact at that time.

It was noted that on the self-rated satisfaction matter, students were most dissatisfied with the academic activities of the faculty, even so, that was not related to their psychological well-being. These aspects may be in relation to their perceived opportunity to draw attention to issues that dissatisfy them about aspects related to the faculty, considering that this research was conducted in the academic settings. Additionally, these study results suggest that academic activities have an impact on students’ psychological well-being, but their satisfaction with them is not a determining factor.

Study limitations are mainly related to the small convenient sample size, which may have affected the results. Also, a more accurate evaluation would include prospective follow-up during the entire academic year, in order to observe if indeed, poor well-being reaches its highest peak in the summer semester evaluation period, or it is the same with other evaluation periods. Additionally, comparison should be made...
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with other Faculties of Dental Medicine, in order to assess if results are not biased by specific particularities of this faculty. Even so, this research has the advantage of prospective follow-up, drawing attention to an issue that should be further investigated, considering the importance of psychological well-being and understanding its determinants.

CONCLUSIONS
Within the limitations of this study, psychological well-being is likely to be negatively influenced on a fairly large scale, by the semester examination period, with possible impact on students’ health and performance on academic activities. Therefore, it is recommended to identify the most appropriate methods of examination regarding the psychological load that might be a threat to the validity of students’ evaluation. Additionally, strategies for training students about adequate coping methods, designed as interventions at individual or group level, may be required.

ACKNOWLEDGEMENTS
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REFERENCES
IN VITRO COMPARISON OF THREE DIFFERENT IMAGE RECEPTORS FOR DETERMINING THE LENGTH OF ENDODONTIC FILES

The correct evaluation of working length is one of the most important conditions of successful endodontic treatment. Both digital and traditional radiographs have been used for these assessments. However, the accuracy of these methods is still controversial. The aim of this study was to evaluate the accuracy of endodontic file length measurements of E-speed radiographs, Digora storage phosphor plates, and Schick charge-coupled device sensors, with a secondary aim of assessing the influence of image enhancement on the measurement accuracy. Forty-seven extracted mandibular first premolar teeth were selected. ISO size 8, 10, and 15 files were inserted into each canal, and the files were fixed when the tip was seen at the apical foramen. The teeth were mounted in acrylic blocks and exposed using E-speed films, Digora storage phosphor plates, and Schick charge-coupled device sensors. Two radiologists and two endodontists measured the length of each file between the file stopper and tip on each image. Measurements were carried out on original and magnified images as well as on revealer images for Schick CDR. The actual lengths of the files were measured using a calipers to the nearest 0.01 mm and served as the “true length”. Repeated measures analysis of difference and Tukey honestly significant difference tests were used to analyze the data (P < 0.05). E-speed films were superior to digital systems for the measurement accuracy of the size 08 file (P < 0.05). Revealer images gave equivalent results with E-speed films for the measurement of the size 10 file (P > 0.05). The most accurate results were obtained with the size 15 file regardless of the image receptor (P > 0.05). Size 15 or larger files should be used for endodontic working length determinations. Revealer images gave equivalent results with E-speed films and may be utilized for determining the file length of size 10 files (Betul Ilhan, Ilgin Akcay, Nesrin Dundar. In vitro comparison of three different image receptors for determining the length of endodontic files. Journal of Dental Sciences 2014; 9(4): 345-350).