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An Assessment of Psychological Resilience Levels of Dental Students as Future Healthcare Workers [a]

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Abstract

Aim: Dental education includes both theoretical knowledge and clinical practice so that students acquire the skills to prevent, diagnose and treat oral health problems. The students of this field of healthcare usually feel overwhelmed in completing clinical requirements due to difficulty in keeping up with the workload. In this perspective, this study aimed to examine the psychological resilience levels in dental students as future healthcare workers.

Methods: This cross-sectional study included 1,228 dental students: 678 from a foundation university (FU; 428 female, 250 male) and 550 from a public university (PU; 358 female, 192 male), both of which are located in Istanbul, Turkey. Data were collected through a questionnaire regarding sociodemographic profile, education related factors and the Brief Resilience Scale (BRS). The scale consists of a 6-item evaluation method with scores ranging from 1 to 6. BRS scores were categorized as low (<3) or normal/high (≥3).

Results: The results revealed a lower BRS score (3.12±0.78 for FU students vs. 2.97±0.82 for PU students) and a higher ratio of low resilience (33.9% vs. 46.5%) for PU students compared to FU students ($p<0.001$). Female students (2.98±0.77 at FU; 2.82±0.77 at PU) scored lower than males (3.35±0.77 at FU; 3.27±0.84 at PU) in both universities resulting in the BRS score ($p=0.001$). Among PU students, clinical-phase students had lower BRS scores than preclinical ones ($p<0.05$), unlike FU students ($p>0.05$).

Conclusion: Since psychological resilience levels of dental students are likely to be affected by differences in gender, educational stage and university type, both support and mentoring programs must be developed to enhance resilience during dental health education in both types of universities.

Keywords: Psychological resilience, dental health education, dentistry students, clinical practice

INTRODUCTION

Dental health education worldwide is shaped within the framework of patient-centered care, evidence-based practices, and lifelong learning principles. International accreditation bodies oversee the alignment of educational programs with quality standards, revising the key components such as curriculum, clinical training, and ethical values (CDA, 2023). In Turkey, a core curriculum program has been developed to standardize pre-graduation dental education by international principles. This program aims to structure educational processes, improve student assessment methods, and support professional development (DUÇEP, 2024). Furthermore, through multidisciplinary collaborations and the integration of digital technologies into the

education process, the program aims to develop the students' awareness of ethical and professional responsibilities, thereby preparing them more comprehensively for their careers after graduation (CDA, 2023; DUÇEP, 2024). Multidisciplinary collaboration enhances the continuity and coordination of patient care, embodying a more effective and holistic treatment process through collaboration with other healthcare professionals. This approach enhances students' preparedness for medical and dental emergencies while also fostering an understanding of patients' psychosocial factors, ensuring that they acquire both theoretical knowledge and practical skills for professional competency in dentistry education (Mariño et., al, 2022).

Dental health education includes a comprehensive curriculum based on both theoretical knowledge and clinical practices so that students acquire the skills to prevent, diagnose, and treat oral health problems (Li et., al, 2022). During this process, students acquire basic knowledge through non-clinical courses, gain experience in laboratory studies and applications, which require manual skills, and develop both technical and risk-assessment skills in patient-care while working with real patients in the clinic-based education, achieving competence in all aspects of surgical and therapeutic dental treatment before graduation (Elani et., al, 2014; Li et., al, 2022). As all the other university students, dental students also experience stressors in their educational lives such as exams, fear of failure, inability to keep up with the workload, in addition to lack of time to complete clinical and curriculum requirements, facing their physical and psychological adverse effects (Collin et., al, 2020). In addition, it is pointed out that dental health education poses difficulties in adapting to rapidly changing health needs, financial costs and technological integration creating significant challenges which lead to stress, burnout, and low academic performance among students (Ryder & Morio, 2011).

Given the rigorous nature of dental education and the high levels of stress experienced by students, psychological resilience is a critical factor influencing their academic performance and overall well-being, as academic stress can lead to underachievement, physical complaints, absenteeism, and ultimately dropping out due to mental health problems (Chyu & Chen, 2022). Given these challenges, understanding the process by which dental students develop psychological resilience is essential for supporting both their academic success and overall well-being. Psychological resilience, defined as “the ability to recover from the negative effects of challenges such as stress, illness, or mental health problems”, can more broadly be defined as “the ability to adapt successfully to disturbances that threaten the viability, functioning or development of a

system" (Fletcher & Sarkar, 2013; Masten, 2014). In this sense, students with high levels of psychological resilience are more capable of managing stressful conditions and challenges (Dong vd., 2024; Sever & Tatlıcıoğlu, 2024). Studies carried out on health science students show that psychological resilience reduces burnout (Gong et., al, 2023), and increases the sense of belonging and academic progress (Mcdermott et., al, 2020). It is generally stated that among medical students, increased psychological resilience is associated with reduced perceived stress, highlighting the importance of integrating educational interventions and stress-coping skills into medical education programs to foster positive thinking (Lu vd., 2024). Another qualitative study conducted with medical students highlights that both cooperative learning and effective interaction are crucial components of a resilient clinical education system (Jalali vd., 2025).

Despite increased study on proficiency in practicing essential clinical procedures, psychological resilience and mental readiness among dentistry students are not extensively studied. While high-level education, cutting-edge technologies, patient relationship management, and professional achievement are significant aspects that build psychological resilience in the profession, dentistry also demands interpersonal understanding, self-control, meticulousness, and cultural competency (McDonald & Paganelli, 2021).

In Turkey, The National Core Education Program for Dentistry (DUÇEP-2024) has been developed to define the minimum competency standards. The program entails a set of realistic baseline standards by considering the institutional capacities of each faculty at various universities across Turkey, encourages those with stronger resources to exceed the established standards and promotes the development of institution-specific priorities through customized curricula and Extended Education Programs (EEP) (DUÇEP, 2024) depending on their resources. Although organizational structures and cultures may vary among faculties, "communication" among the parties of the education process remains a critical component of dental education (Badur, 2024).

Taking into consideration the standards established by DUÇEP and varying standards of faculties across Turkey, understanding the differences among students' gender, educational and demographic background is vital. In this respect, analyzing the impact of academic workload, and clinical experiences on the stress levels and methods to improve the students' psychological resilience can offer valuable insights for optimizing educational strategies, particularly as dental curricula continue to evolve in response to national and global standards (Duś-Ilnicka et., al, 2024; Sabri et., al, 2024; Spielman, 2024). As predicted, workload is high in public dental schools. While

heavy workloads may increase stress and burnout among dental students, it is still unknown whether workload has a direct impact on resilience levels of dental students. Therefore, this study aimed to evaluate the psychological resilience levels of dental students and to examine whether these levels differ based on factors like gender, type of university (foundation vs. public), and educational phase (preclinical vs. clinical).

1. RESEARCH METHODOLOGY

This cross-sectional study was designed to measure psychological resilience of dental students at a Foundation (FU) and a Public university (PU) by using the "questionnaire method". The questionnaires distributed to the dental students of the universities were completed in the classroom on a voluntary basis. The principle investigator' affiliated institution was selected as a foundation university.

Ethical approval for the study was obtained from the Ethics Committee of Marmara University, Institute of Health Sciences (Approval No: 65, dated May 23, 2022), and the study was conducted between September 26, 2022, and May 30, 2023.

In this study, the "random sampling method" was used with the aim to reach the entire sample group (Public University: n = 810; Foundation University: n = 776; Total: n = 1586). Response rate was 77% of the dental students participated in the study due to its voluntary-based nature. The participants of the study consisted of 678 students (F/M: 428/250) studying at the dentistry faculty of a foundation university and 550 students (F/M: 358/192) studying at the dentistry faculty of a public university.

The dental education curricula both in public and foundation universities require that the 1st and 2nd-year students carry out laboratory studies in the preclinical stage, while the 3rd, 4th, and 5th-year students work on real patients during the clinical education stage. Students of all grades were included in the study, and both the preclinical and clinical students were compared in the study.

The inclusion criteria of students in the study were as follows: being an actively enrolled dental student and providing informed consent. Students who were not attending regularly, who did not volunteer to participate and who were diagnosed with health problems negatively affecting their education and daily life were excluded from the study.

1.1. Data Collection Tool

The survey questionnaire consists of questions on students' sociodemographic characteristics and the impact of clinical practices on professional practices. The survey was conducted and supervised by expert opinion, with the primary aim to assess the current situation and contemporary practices. As part of a pilot evaluation, the survey was administered with 30 participants, and no issues regarding its comprehensibility were identified.

Brief Resilience Scale (BRS): The brief psychological resilience scale used in the survey was developed by Smith et al. (2008) to assess the ability to cope with lifelong risks and difficulties (Doğan, 2015; B. W. Smith et., al, 2008). The BRS, which has a single-factor structure, is a 6-item self-report style measurement tool and is graded on a 5-point Likert scale. The participants are categorized into 3 groups as low resilience (<3 points), normal resilience (3-4.3 points), and high resilience (4.31-6 points) (Rojas et., al, 2018; B. W. Smith et., al, 2013). It was adapted by Doğan (2015) to be used by Turkish researchers. Reliability and validity studies were conducted after its adaptation (Doğan, 2015). The reliability of the Turkish version of the BRS was assessed using internal consistency analysis, and the Cronbach's alpha coefficient was reported to be 0.83 (Doğan, 2015). Similar results were obtained in a different study (Kaiser-Meyer-Olkin measure = 0.75; $p < 0.001$) (Fung, 2020).

In the present study, the Cronbach's alpha internal reliability coefficient for 6 items of the BRS was found to be 0.859, which was rather high. The construct validity of the BRS was examined through factor analysis (Kaiser-Meyer-Olkin measure = 0.85; $p < 0.000$), confirming that all six items loaded onto a single factor were consistent with the original scale. In a recently published article, a similar result found in a survey conducted on Turkish patients with Primary Sjögren's syndrome, the BRS demonstrated a reasonable construct validity (KMO = 0.71; $p < 0.001$), with items loaded onto a single factor consistent with the original scale (Sevimli vd., 2024).

1.2. Data Analysis

Data were analysed using the SPSS 28.0 (IBM, USA). As the collected data did not turn out to follow a normal distribution, non-parametric tests, such as Mann-Whitney U and Kruskall-Wallis tests were employed to measure the differences between groups. The effect sizes and confidence intervals are presented in the tables. Effect sizes were calculated using Cliff's delta and interpreted as follows: small ($|\delta| < 0.147$), medium ($0.147 \leq |\delta| < 0.33$), and large ($|\delta| \geq 0.33$) (Cliff, 1993).

1.3. Ethical Approval

Ethical approval for the study was obtained from the Marmara University Health Sciences Institute Ethics Committee on 23 May 2022, under number 65.

2. ANALYSIS

The ratio of female students was found to be 63.1% at the Foundation University to 65.1% at the Public University. The mean age of Foundation University students was 21.94±2.35 and that of Public University students was 21.44±2.03 (Table 1).

Table 1. Demographic Characteristics of Dental Students in Both Universities

		Foundation University (n=678)		Public University (n=550)	
Variables		**Mean**	**SD**	**Mean**	**SD**
Age (years)		21.94	2.35	21.81	2.06
		n	**%**	**n**	**%**
Gender	**Female**	428	63.1	358	65.1
	Male	250	36.9	192	34.9
Grade Level	**1 st Grade**	87	12.8	129	23.5
	2 st Grade	129	19	134	24.4
	3 st Grade	137	20.2	75	13.6
	4 st Grade	112	16.5	107	19.5
	5 st Grade	213	31.4	105	19.1

In the study group, the mean score of Foundation University students (3.12±0.78) was higher than that of the Public University students (2.97±0.82) by the BRS (p=0.001). Another considerable result was that while 59.9% of students attending the Foundation University displayed normal resilience, 46.5% of students at the Public University showed low resilience. The results are shown in Table 2.

On the BRS, the mean scores of females (2.98±0.77, 2.82±0.77) turned out to be considerably lower than the those of male students (3.35±0.77, 3.27±0.84) at the dental schools of both universities (p = 0.001). At the Public University, a decrease in the BRS score was observed at the clinical phase (2.79±0.82 vs. that at the preclinical phase (3.17±0.77) (p=0.001), unlike the

Foundation University (p>0.05). The results also suggest that at both universities, female students demonstrate lower psychological resilience scores than their male peers (p<0.05) (Table 3).

Table 2. BRS Scores of Students in both Foundation and Public Universities

	Foundation University (n=678)		Public University (n=550)				
	Mean	**SD**	**Mean**	**SD**	**p**	**Cliff's delta**	**95% CI**
Brief Resilience Scale (BRS)	3.12	0.78	2.97	0.82	***0.001****	0.131	0.044-0.216
	n	**%**	**n**	**%**			
BRS-Low resilience**	230	33.9	256	46.5	***0.000****		
BRS-Normal resilience and High resilience ****	448	66.1	294	53.5			

** Mann Whitney-U test was used for analysis.* **Low BRS score: 1,0-2,99 points; *** BRS score: 3.0-4,3 points in Normal Resilience and 4.31-6.0 points in High resilience

Table 3. Comparisons of Brief Resilience Scale Scores by Gender and Educational Stage Dental Students

		Foundation University (n=678)					Public University (n=550)				
		Mean	**SD**	***p***	**Cliff's delta***	**95% CI**	**Mean**	**SD**	***p***	**Cliff's delta**	**95% CI**
BRS	**Female**	2.98	0.77	***0.001****	-0.342	(-0.417, -0.266)	2.82	0.77	***0.001****	-0.391	(-0.474, -0.308)
	Male	3.35	0.75				3.27	0.84			
	Pre-clinic	3.07	0.74	0.099	0.330	(0.247, 0.412)	3.17	0.77	***0.001****	-0.059	(-0.145, 0.028)
	Clinic	3.14	0.80				2.79	0.82			
	Pre-clinic 1 st Grade	3.14	0.85	0.089**			3.18	0.81	***0.001****		
	Pre-clinic 2 st Grade	3.02	0.65				3.17	0.72			
	Clinic 3 st Grade	3.14	0.82				2.76	0.80			
	Clinic 4 st Grade	3.27	0.84				2.71	0.86			
	Clinic 5 st Grade	3.07	0.77				2.89	0.80			

**Mann Whitney-U test and . **Kruskall-Wallis test were used for analyses*

In both universities, elevated BRS scores were observed among dental students, who reported that clinical practice increased their self-confidence and motivation while improving their problem-solving skills and decreasing their anxiety levels ($p<0.01$) (Table 4).

Tablo 4. Evaluations of BRS Score according to Effects of Clinical Practice in Dental Education

		Foundation University (n=678)			Public University (n=550)		
		BRS Score			BRS Score		
		Mean	SD	*p**	Mean	SD	*p**
Clinical practice increased my self-confidence.	Disagree	2.94	0.81	**0.001**	2.83	0.84	***0.001***
	Agree	3.20	0.76		3.08	0.78	
Clinical practice increased my anxiety level.	Disagree	3.24	0.74	**0.001**	3.29	0.74	***0.001***
	Agree	2.96	0.81		2.81	0.81	
Clinical practice increased my motivation.	Disagree	3.06	0.80	***0.001***	2.92	0.78	***0.001***
	Agree	3.16	0.77		3.01	0.84	
Clinical practice improved my problem-solving skills.	Disagree	3.02	0.79	***0.008***	2.75	0.74	***0.001***
	Agree	3.16	0.78		3.06	0.83	

**Mann Whitney-U test was used for analysis.. *p-Value < 0.05. BRS, brief resilience scale,*

3. DISCUSSION

It is stated that dentistry students experience high levels of stress and anxiety as well as high workload during their education periods (Stormon vd., 2019). Therefore, evidence-based dental education programs are essential to develop dental students' professional competence and problem-solving skills. Once they are qualified with these skills, dentistry students will practice with an ethical, scientific, and patient-oriented approach (Imorde et., al, 2020). Therefore, this study aimed to examine the psychological resilience levels of dental students and related factors affecting their overall well-being as future healthcare workers.

A thorough analysis reveals that the BRS scores of students at the Foundation University were higher than those of the Public University students. Moreover, the female students scored lower than the male students on the BRS indicating that female students experience more difficulty in coping with stress and have lower psychological resilience than male students. Similar results were obtained in the previous studies carried out by Aydın and Egemberdiyeva (2018) and Kılıç et al. (2020). The psychological resilience scores of male students were found to be significantly higher than those of female students (Aydın & Egemberdiyeva, 2018; Kılıç et., al, 2020). In a

similar study conducted by Yılmaz and Oz (2015) on university students in the fields of dentistry, pharmacy, medicine, and health sciences, similarly, the resilience scores of male students were found to be higher than those of the female students in the same fields of study (Bahadir-Yilmaz & Oz, 2015). Another research by Mangoulia et al. (2025) also reported that male dental students had higher psychological resilience levels than their female counterparts (Mangoulia vd., 2025). In another study conducted with university students at different faculties in Oman, the scores of psychological resilience of male students also proved to be higher than those of the females (Al Omari et., al, 2023). In another study conducted by Alsharif (2020) on dental students, female students expressed higher levels of emotional exhaustion associated with resilience (Alsharif, 2020). Montas et al. (2021), also came up with the results that male dental students had higher BRS score than those of the female ones (Montas vd., 2021). In short, studies seem to reveal similar results with few exceptions. For example, other studies conducted on dental students in Saudi Arabia and the United States indicated that female students demonstrated higher psychological resilience than males (Aboalshamat et., al, 2018; C. S. Smith et., al, 2020). These contradictory results could be interpreted as follows: psychological resilience may vary by gender across different cultural and academic contexts, and is influenced by both internal and external factors (Aboalshamat vd., 2018; Montas vd., 2021; Smith vd., 2020; Zhao vd., 2016). The results of our present study basically align with most of the previous study results.

The BRS scores of the dental students at the Public University revealed that the pre-clinic students were endowed with higher psychological resilience, suggesting that the new students of the faculty were equipped with better coping skills with stress or face fewer challenging situations than the ones in higher grades. Additionally, the higher scores of pre-clinic students compared to those commencing their clinical training suggested that the increasing academic workload and clinical responsibilities through the years may adversely affect their psychological resilience. The scores of the students at the Public University, varying considerably from the ones at the Foundation University may be explained by the heavier workload at public universities than the foundation universities. While dental education programs emphasize patient-centred care and professional competency, it is also important to consider students' psychological resilience and the challenges they face during their training periods (Maragha vd., 2023; Weraarchakul vd., 2016).

Our study carried out with students at two types of universities in Istanbul Turkey, namely Public and Foundation, examined the relationship between students' evaluations of clinical

practices and their BRS scores. The results revealed that the increased resilience level was associated with enhancing the students' self-confidence and motivation while improving their problem-solving skills and decreasing their anxiety levels. Rodriguez-Molinero et al. (2024) conducted a similar study on dental students, suggesting that students exhibit high resilience skills along with low levels of anxiety (Rodríguez-Molinero vd., 2024). It is a commonly accepted fact that problem-solving skills are one of the most efficient components of the education process (Coşkun vd., 2014). When dental students develop these skills, they, like all the other healthcare students possessing these skills, demonstrate higher levels of psychological resilience and become academically successful. With the help of greater resilience, even under stress, dental students exhibit more advanced team behaviour, patient-centred approaches, analytical thinking and improved problem-solving skills (McKenzie & Cruz Walma, 2024). Therefore, it should be emphasized to expand training programs with a mental health component and problem-solving techniques using the implementation of targeted seminars, curriculum revisions and the strengthening of peer support systems (Ertekin Pinar vd., 2018; Kunzler vd., 2020). Our results indicated that effective clinical education enhances professional competency and supports students' psychological resilience. Moreover, educational programs should incorporate supportive interventions to raise students' psychological resilience levels, particularly during the transition period to the clinical phase, in line with a focus on patient-centred care and professional competence.

4. CONCLUSIONS

This study revealed that the psychological resilience level of dental students could be affected by gender, educational stage and type of university. Based on these findings, it is recommended that well-structured resilience-enhancement programs—such as mindfulness training, stress management workshops, and peer support groups—be integrated into the curriculum of dentistry faculties, particularly during the transition process to clinical training. Faculties should provide periodic counselling and psychoeducational services aimed at strengthening students' self-awareness and stress-management skills. Given the lower resilience levels observed among female students, the development of targeted support mechanisms, such as female mentor pairing and motivational group therapy sessions, should be prioritized. The assessment and improvement of educational environments, advisor accessibility, and student guidance systems available for

dentistry students all play crucial roles during the education and training periods. Since developing strategies to strengthen students' psychological resilience is critical for academic success, our results may contribute to developing mentoring and support programs to enhance the psychological resilience of dental students during the education period.

While this study had the potential to be one of the pioneers to systematically and scientifically examine psychological resilience among dental students in comparison to other student populations, its ability to fully elucidate cause-and-effect relationships was limited due to its cross-sectional approach. In addition, the sample was restricted to dental students selected from two specific universities in the same geographic region. This may limit the generalizability of the results and affect their applicability to large student populations in other universities and regions. Future studies are necessary to focus on the factors related to psychological resilience with follow-up studies.

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