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Exploring the Stress and Resilience Levels of Dental and Nursing Students in Response to Academic Responsibilities

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Featured Application: Tailored interventions for dentistry and nursing students could include spirituality enhancement, cognitive-behavioral therapy, and peer support networks to address anxiety. Early identification and intervention for at-risk students could control negative impacts on academic achievement and well-being, enhancing future healthcare professionals' success and sustainability.

Abstract: Students studying dentistry and nursing experience anxiety daily, which affects both their general well-being and academic achievement. Anxiety is exacerbated by several circumstances, such as stressors in one's personal life, clinical environment exposure, and academic expectations. To effectively regulate anxiety and support students' achievement, treatments that take these elements into account must be designed. In this study, 271 students from the National and Kapodistrian University of Athens, Greece's departments of dentistry and nursing were polled. Being the following resources, participants filled out an electronic questionnaire that was uploaded to Google Forms and assessed their levels of stress, anxiety, depression, resilience, hope, and spiritual well-being: a) the Depression, Anxiety, Stress Scale (DASS-21), b) the Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being Scale (FACIT-12), c) the Adult Hope Scale (AHS), d) the Resilience Assessment Questionnaire (RAQ8), and e) the Brief Resilience Scale (BRS). Additionally, demographic data was gathered, such as gender, educational attainment, family income, and country of origin. Statistical analyses were performed to investigate the relationships between the variables, including hierarchical multiple linear regression and t-tests. The sample consisted of 271 students from the Department of Nursing (n=126, 46.5%) and Dentistry (n=145, 53.5%), with 68.60% of them being female, 80.10% being undergraduate students, and 48.30% being from Athens, the country's capital. Comparatively speaking, 74.50 percent of nursing students were female, while 62.80% of dental students were. Compared to dental students (2.10%), nurses (40.50%) participated in postgraduate studies at a higher rate. Compared to dental students (44.80%), nursing students reported a household income of just 13.90%, which is much less than €35,000. Anxiety was reported by 51.30% of participants overall, with dental students reporting higher anxiety than nursing students. Higher family wealth was associated with reduced stress levels, while female undergraduate students reported higher levels of anxiety than their male counterparts. Hope was a strong predictor of resilience, but stress and worry had a negative correlation. Promoting students' well-being and academic success requires effective stress-reduction and resilience-building techniques aimed to not only improve student performance but also support future healthcare professionals' personal sustainability and holistic growth.

Keywords: anxiety; dental students; hope; nursing students; resilience; stress; well-being

1. Introduction

Stress is defined by Lazarus and Folkman (1984) as "the internal and external demands that test or exceed the available response capabilities, in the individual's estimation". [1] Essentially, stress is the physiological response of the body to various stress factors [2]. Anxiety, on the other hand, is the feeling of fear that arises when a person is confronted with threatening or stressful situations. It is a normal response to danger, but if the feeling is particularly persistent, it could be considered a disorder (Dean, 2016). Affecting approximately 1 in 9 people, anxiety disorder is one of the most common mental illnesses and appears to be a significant problem for many dental and nursing students worldwide [3,4]. Resilience on the other hand was specified by Bonanno in 2004 [5]. According to the definition, "resilience is the ability of a person exposed to a single and very unpleasant event (separation, loss, violent life-threatening situation) to maintain relatively stable and healthy levels of mental and physical functioning, as well as the capacity for creative experiences and positive emotions". Therefore, resilience is about preventing health, after adversity, and rapid recovery, from mental illness-related adversity [6,7]. Further, according to Luthar (2006) and Tsigaropoulou (2020), resilience is defined as "positive adaptation despite adversity" [8]. Overall, resilience is "the effort which people need to act and recover effectively" and acts as a protective factor against stress, anxiety and depression [9,10].

In the field of dental education, the meta-analysis by Elani et al. (2014) showed that dental students experience significant levels of anxiety throughout all years of their education [11]. This anxiety is mainly due to the demanding nature of education. Additionally, studies in dentistry indicate adverse effects of increased stress on the health and well-being of students [11–13]. Based on the results of various studies, it was found that the main factors causing anxiety in dental students include dealing with psychiatric patients, patients with medical problems, uncooperative patients, managing a syncopal episode, tooth extraction, extracting the wrong tooth, accidental exposure to blood, soft tissue injury due to incorrect handling, administering incorrect treatment, and finally, infection from patients, which appears to be the main anxiety-inducing factor [12]. It is worth noting that the prevalence of anxiety among dental students during the Covid-19 era is higher compared to the general population and medical students [14]. Furthermore, differences in anxiety levels have been recorded depending on the gender of the dental student and the year of study. Regarding gender, females seem to have higher levels of anxiety than males [15,16]. Regarding the year of study, the results are conflicting, with some studies supporting that anxiety is more pronounced in preclinical years and others supporting that anxiety levels increase upon students' introduction to clinical practice) [15–17]. The high prevalence of stress among dental students underscores the importance of providing support programs and implementing preventive measures to effectively assist them, especially those who are more anxious [18].

Resilience has been proposed as a protective factor that may support dental students in managing stress. The study by Montas, et al. (2021) [19] indicated that resilience influences the academic achievement positively, while the results of another study displayed that ethnic origins and major life events, such as the Covid-19 pandemic, influenced resilience levels of dental students) [12]. A recent study presented that dental students have moderate levels of resilience [20]. Compared to medical students (M=37.1), dental students have lower rates (M=28.4). These results though lie mainly in emotional exhaustion and reduced personal performance. Dental students need targeted education to increase resilience levels [20]. In a contrary study, dental students demonstrated relatively high levels of resilience [21]. Resilience was significantly associated with gender (with females showing more resilience than males), race, overall health, and mental health [21].

As for Nursing students, a study by Dafogianni et al. (2022) during the first wave of the Covid-19 pandemic showed that depression was present in 44.8% of students, anxiety in 36.8%, and stress in 40.3%. Additionally, females develop more anxiety and stress than males, while male students' mental resilience appears to be higher than that of females [4]. Students in their final year, to a greater extent, develop coping strategies compared to first-year students. Factors that exacerbate anxiety for nursing students include demanding study programs, managing personal life with school, students' exposure to stressful situations, and ethical decisions during clinical examinations [22–25]. According

to Thomas-Davis et al. (2020), anxiety affects nursing students academically, physically, and mentally [26]. The emotional and mental health of nursing students was more affected during the pandemic [27], while resilience had a beneficial effect against the negative consequences of stress [28]. Moreover, studies have shown that the hospital environment and lack of experience contributed to increased levels of anxiety in the early years of nursing students' studies, as students deal with stressful events, interpersonal conflicts with patients and staff, their lack of skills to provide patient care and fear of making mistakes in their clinical practice) [29–31]. Additionally, nursing students face various individual pressures, such as depression, anxiety, and lack of time with their families [32]. Anxiety, according to McCarthy et al. (2018), reduces nursing students' critical thinking, impedes decision-making, and reduces success [23]. Moreover, a positive relationship was found between resilience and performance in undergraduate nursing studies including professional experience placements [33]. Resilience among nursing students plays a vital role in helping them overcome adversities and stressful situations during their nursing education [34,35]. Additionally, after graduation, nursing students can continue contributing to society as resilient Registered Nurses in the future [34]. According to the review by Smith, et al. (2023), nursing students from all around the world have experienced high levels of stress during the Covid-19 pandemic. Almost unanimously, resilience was identified as a key protective factor against stress and the development of psychological morbidity. The nursing students with higher levels of resilience were more likely to persist in their course of study, despite Covid-related challenges. The development of resilience levels has the potential to empower nursing students for academic and clinical success. Therefore, it is necessary to integrate resilience development activities into undergraduate nursing curricula [35].

As revealed from the relevant literature, the resilience and well-being of dental as well as nursing students is of paramount importance to enhance sustainability for future healthcare professionals of the two fields. Therefore, in this study, we aim to examine the assessment of anxiety, resilience, hope levels, and spiritual well-being in dental and nursing students at the Department of Dentistry and Nursing, of the School of Health Sciences, of the National and Kapodistrian University of Athens during their undergraduate and postgraduate studies and to investigate the factors contributing to anxiety among them. We further aim to evaluate how factors such as gender, year of study, family income, and region of origin may influence anxiety, resilience, hope levels, and spiritual well-being within these student populations. The research questions of the present study are then as follows: 1) What is the prevalence of anxiety among Dental and Nursing students according to their year of study? 2) What is the overall anxiety score in each department as well as for the entire population under study? 3) What is the anxiety score of undergraduate (clinical years) students compared to post-graduate students in both Departments? 4) Are there differences in anxiety levels and their causes between the two Departments? 5) Are specific demographic characteristics of students correlated with their anxiety levels?

2. Materials and Methods

This is a questionnaire study whose design is based on similar studies that have been identified in the field [36]. The study was unfolded in two stages. Initially, a literature review was conducted, and the initial questionnaire was formulated. This was followed by piloting the questionnaire with a group of 10 students from each Department who voluntarily agreed to complete it. Factors not addressed during this stage were excluded from the final questionnaire. The final questionnaire of the study had undergone review by a team of 4 professors specialized in studies of this nature (2 from each Department). The finalized questionnaire was uploaded to Google Forms and distributed to students of both departments. The lead researcher of each department was responsible for sending the online questionnaire link to the Ethics committee of each department to obtain the necessary approval and ensure that all students in each department would have the opportunity to participate in the study in the same manner. The questionnaire was anonymous, and no personal data were collected. Participation was voluntary, and no form of compensation has been provided for participation. Each student should complete the questionnaire ONLY once. The questionnaire was

open for one month, and the participation information bulletin with instructions and the link was sent twice (every 15 days) by the Secretariat of each department.

10.1. Designing the Study Questionnaire

10.1.1. Methodology for Questionnaire Design

The questionnaire of the study was developed and consisted of demographic characteristics, the Depression, Anxiety, Stress Scale (DASS-21) [37], the Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being Scale (FACIT-12) [38], the Adult Hope Scale (AHS) [39], the Resilience Assessment Questionnaire (RAQ8) [40], the Brief Resilience Scale (BRS) [41], questions based on literature review regarding anxiety and resilience, and questions aiming to address anxiety and enhance resilience (Appendix A,B,C). The DASS-21 (Depression, Anxiety, Stress) scale has been validated for the Greek population, by Lyrakos, et al. (2011) [42]. For the Depression subscale, Cronbach's a is 0.83, for the Anxiety subscale, Cronbach's a is 0.81 and for the Stress subscale, Cronbach's a is 0.89. All rates are satisfied. The Adult Hope Scale by Snyder et al. (1991) has been examined for reliability and validity. The Functional assessment of chronic illness therapy- spiritual well-being 12 (FACIT-SP-12) scale- Non illness was evaluated and rated for reliability and validity in Greek language by Fradelos et al. (2016) [43] with satisfied internal consistency (Cronbach' a= 0.789). The Resilience Scale (BRS) is validated for the Greek population by Kyriazos, et al. (2018) [44] with Cronbach's a= 0,80- 0.91 as satisfied. The Resilience Assessment Questionnaire by Mowbray (2011) which we utilized in the present study, is a reliable and validated tool [40]. The reliability and validity of these tools have been analyzed in Appendix B.

10.1.2. Components of the Questionnaire and Study Tools

The study questionnaire consisted of 5 distinct sections: 1) Section one: It included questions related to demographic characteristics, 2) Section two: It included questions comprising the DASS-21 and FACIT-12 scales, 3) Section three: It included questions comprising the Adult Hope Scale (AHS), 4) Section four: It included questions comprising the Resilience Assessment Questionnaire (RAQ8), 5) Section five: It included questions comprising the Brief Resilience Scale (BRS). The Sections are analyzed in Appendix B.

10.1.3. Statistical Analysis

Data analysis was performed with the statistical package IBM SPSS v.28. Cronbach's alpha indices were calculated to examine the reliability of the scales and subscales included in the questionnaire. Demographics of participating students were presented with absolute and relative frequencies (N,%), while quantitative variables were summarized with descriptive statistics (M, SD). Distributions were examined in terms of normality via skewness and kurtosis and were considered normally distributed [45]. The association between categorical variables was examined with chi-square tests, and differences in psychological variables and resilience between departments and demographics were investigated with independent samples t-test and One Way Analysis of Variance (ANOVA). To determine the factors that had the most substantial effects on resilience, hierarchical multiple linear regression analyses were performed for the total sample as well as for the samples of each department, adjusting for demographics, after-graduation plans, and specialization [46].

3. Results

In the Department of Dentistry responded 145 students out of 865 students (780 undergraduate and 85 postgraduate students) (response rate=16.8%). In the Department of Nursing responded 126 students out of 1.138 students (808 undergraduate and 330 postgraduate students) (response rate=11.1%).

Cronbach's alpha indicators (Cronbach's a) were calculated to examine the reliability of the scales and subscales included in the questionnaire. Our data provided the following: Cronbach's

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alpha: Stress 0.879, Anxiety 0.854, Depression 0.876, Hope 0.759, Resilience (BRS), 0.848, Resilience RAQ 0.762, Spiritual well-being 0.879, Stress somatization 0.750.

The total sample of the study consisted of 271 students: in the nursing (n=126, 46.5%) and the dentistry (n=145, 53.5%) departments (68.60% were female, 80.10% were undergraduate, 48.30% had Athens (the capital of Greece) as a place of origin, 52.20% had a family income below 25,000€). Nursing students were mostly female, at a higher percentage (74.50%) compared to dental students (62.80%). Participating nurses were postgraduate students at 40.50%, versus 2.10% for the postgraduate students of the dentistry department. Most dental students originated from the capital city of Greece (52.40%) or other urban areas in Greece (15.20%), while nursing students reported as the place of origin the capital city of Greece at a lower rate (43.70%) as well as semi-urban or rural areas in Mainland Greece (27.80%). Only 13.90% of nursing students reported a family income over 35,000€, a significantly smaller percentage compared to 44.80% for the dental students (Table 1).

Table 1. Demographic characteristics of the sample of students in total and per department of Dentistry and Nursing and associations between department and demographics.

| | | Total (N=271) | | Department | | | |
| | | | | Dentistry (n=145, 53.5%) | | Nursing (n=126, 46.5%) | |
		N	%	N	%	N	%
Gender[1]	Male	85	31.40%	54	37.30%	31	24.60%
	Female	186	68.60%	91	62.80%	95	75.40%
Educational level[2]	Postgraduate studies/PhD	54	19.90%	3	2.10%	51	40.50%
	Undergraduate studies[5]	217	80.10%	142	97.90%	75	59.50%
Place of origin [3]	Athens (Capital of Greece)	131	48.30%	76	52.40%	55	43.70%
	Another country, not Greece	19	7.00%	15	10.30%	4	3.20%
	Another city in Greece	40	14.80%	22	15.20%	18	14.30%
	Mainland Greece (towns and villages)	48	17.70%	13	9.00%	35	27.80%
	Greece Island Region (towns and villages)	33	12.20%	19	13.10%	14	11.10%
Family income[4]	<15,000 €	32	16.20%	14	14.60%	18	17.80%
	15,001-25,000 €	71	36.00%	24	25.00%	47	46.50%
	25,001-35,000 €	37	18.80%	15	15.60%	22	21.80%
	35,001-50,000 €	34	17.30%	24	25.00%	10	9.90%
	> 50,000 €	23	11.70%	19	19.80%	4	4.00%

Note. **1.** Significant association between gender and department ($\chi^2(1)$=5.00, p=.025), **2.** Significant association between educational level and department ($\chi^2(1)$=62.33, p < .001), **3.** A significant association between place of origin and department ($\chi^2(4)$=19.74, p <.001), **4.** A significant association between family income and department ($\chi^2(4)$=24.71, p < .001), **5.** For the 217 undergraduate students, the mean years of studies was 3.70 (SD=1.17) and specifically for dentistry students M=3.98, SD=1.15 and for nursing students M=3.17, SD=1.03.

As described in Table 2, most dental students (57.9%) will pursue postgraduate studies in their field after graduation or work as an employee in a dental office to gain experience (24.1%). Only 8.3% are considering opening their dental practice immediately after graduation and only 3.5% reported that they won't practice dentistry by continuing their studies in other disciplines. As for nursing students, most of them are pursuing postgraduate studies (33.3%), followed by those who are considering working in a public hospital (26.9%) or at a private clinic (19.8%) immediately after

graduation. Yet, a significant portion of nursing students (19.8%) reported that they will not practice nursing, either by continuing their studies in another discipline or following another profession.

General dentistry (20%), orthodontics (19.3%), Prosthetics-implants (12.4%) and Periodontology (10.3%) are the most common dental fields followed by dental students. Nursing students have chosen mostly the specializations of Emergency Nursing (23%), Surgical Nursing (19.8%), Psychiatric Nursing (19.1%) and Community Nursing (12.7%).

Table 2. Absolute and relative frequencies of responses related to what students are thinking of doing after graduation and the specialization they are following.

		Dentistry (n=145, 53.5%)			Nursing (n=126, 46.5%)	
		N	%		N	%
After graduation	Open my dental practice	12	8.28%	Work as a nurse in a private clinic	25	19.84%
	Work as an employee in a dental office	35	24.14%	Work as a nurse in a public hospital	34	26.98%
	Work abroad as a dentist	9	6.21%	Pursue postgraduate studies	42	33.33%
	Pursue postgraduate studies in dentistry	84	57.93%	I will not practice nursing	25	19.84%
	I will not practice dentistry	5	3.45%			
Specialization	General dentistry	29	20.00%	Emergency Nursing	29	23.02%
	Endodontics	12	8.28%	Community Nursing	16	12.70%
	Dentistry-cosmetic dentistry	13	8.97%	Oncology Nursing	6	4.76%
	Orthodontics	28	19.31%	Pathological Nursing	2	1.59%
	Pediatric dentistry	10	6.90%	Surgical Nursing	25	19.84%
	Periodontology	15	10.34%	Psychiatric Nursing	24	19.05%
	Prosthetic-Implants	18	12.41%			
	Oral Surgery	14	9.66%			
	Stomatology/hospital dentistry	4	2.76%			

Table 3 presents stress, anxiety and depression levels and raw scores of DASS21 subscales for the total sample of students as well as the differences between the samples of the dentistry and nursing departments. Overall, 48.70%, 51.30%, and 53.50% of participants presented some level of stress, anxiety, and depression symptoms respectively. Specifically, severe, or extremely severe symptoms were reported for stress by 21.3%, anxiety by 29.9% and depression by 18.1% of participants. Stress levels were significantly associated with the department ($\chi2(4)=9.69$, p=.046), i.e., dental students were more likely to fall into the severe (16.6%) or extremely severe (9.7%) stress category, compared to nursing students (11.9% and 1.6%, respectively). Stress scores (t(267)=2.18, p=.030, Cohen's d=0.26) and anxiety scores (t(267)=2.03, p=.046, Cohen's d=0.24) were significantly different between departments, with higher mean scores of stress and anxiety for dental students compared to nursing students.

Table 3. Stress, anxiety, and depression levels and raw scores of DASS21 for the total sample and differences between the samples of the two departments.

| | | Total (N=271) | | Department | | | |
| | | | | Dentistry (n=145, 53.5%) | | Nursing (n=126, 46.5%) | |
		N	%	N	%	N	%
Stress levels[1]	normal	139	51.3%	71	49.0%	68	54.0%
	mild	32	11.8%	14	9.7%	18	14.3%
	moderate	45	16.6%	22	15.2%	23	18.3%
	severe	39	14.4%	24	16.6%	15	11.9%
	extremely severe	16	5.9%	14	9.7%	2	1.6%
Anxiety levels[2]	normal	132	48.7%	67	46.2%	65	51.6%
	mild	28	10.3%	12	8.3%	16	12.7%
	moderate	30	11.1%	16	11.0%	14	11.1%
	severe	31	11.4%	18	12.4%	13	10.3%
	extremely severe	50	18.5%	32	22.1%	18	14.3%
Depression levels[3]	normal	126	46.5%	65	44.8%	61	48.4%
	mild	30	11.1%	12	8.3%	18	14.3%
	moderate	66	24.4%	39	26.9%	27	21.4%
	severe	27	10.0%	12	8.3%	15	11.9%
	extremely severe	22	8.1%	17	11.7%	5	4.0%
Raw scores of DASS21 subscales (M, SD)	Stress[4]	7.96	5.10	8.58$_a$	5.58	7.25$_b$	4.41
	Anxiety[5]	5.14	4.67	5.66$_a$	5.10	4.55$_b$	4.05
	Depression	5.98	4.86	6.40$_a$	5.33	5.49$_a$	4.23
	Stress somatization	9.56	5.62	9.96$_a$	5.93	9.10$_a$	5.22

Note. **1.** significant association between stress levels and department ($\chi^2(4)=10.38$, p=.034), **2.** non-significant association between anxiety level and department ($\chi^2(4)=4.15$, p = .386), **3.** non-significant association between depression level and department ($\chi^2(4)=9.10$, p = .059), **4.** significant difference between departments in stress scores (t(267)=2.18, p=.030, Cohen's d=0.26), **5.** significant difference between departments in anxiety scores (t(267)=2.03, p=.046, Cohen's d=0.24), **6.** Values in the same row and subtable not sharing the same subscript are significantly different at p < .05 in the two-sided independent samples t-tests.

Table 4 presents resilience, hope and spiritual well-being scores for the total sample and the samples of the two departments. Overall, the sample presented scores of resilience at the lower end of the normal range (M=3.42, SD=0.79), hope scores and spiritual well-being scores (M=2.38, SD=0.76) at a moderate level with no significant differences between departments. There was a weak but significant difference between departments in the determination factor of resilience (t(269)=2.13, p=.034, Cohen's d=0.26), with dental students being slightly more determined than nursing students. Moreover, organization (t(269)=2.22, p=.027, Cohen's d=0.27) and relationships' factors (t(269)=-2.89, p=.04, Cohen's d=0.35) were also higher for dental students. On the other hand, the problem-solving factor was higher in nursing students (t(269)=-2.03, p=.043, Cohen's d=0.25).

Table 4. Resilience, hope and spiritual well-being for the total sample and differences between the samples of the two departments.

| | Total (N=271) | | Department | | | |
| | | | Dentistry (n=145, 53.5%) | | Nursing (n=126, 46.5%) | |
	M	SD	M	SD	M	SD
Brief Resilience Scale (BRS) score	3.42	.79	3.45a	.82	3.39a	.76
Resilience assessment questionnaire						
⁻ Self-awareness	3.14	.86	3.16a	.91	3.12a	.80
⁻ Determination[1]	3.97	.85	4.07a	.86	3.85b	.83
⁻ Vision	2.93	.97	2.99a	1.00	2.87a	.92
⁻ Self-confidence	2.77	1.05	2.83a	1.08	2.71a	1.03
⁻ Organization[2]	3.35	1.22	3.50a	1.24	3.17b	1.18
⁻ Problem solving[3]	3.30	1.20	3.17a	1.17	3.46b	1.22
⁻ Interaction	3.69	1.05	3.72a	1.07	3.66a	1.04
⁻ Relationships[4]	4.34	.80	4.47a	.74	4.19b	.85
Hope	5.23	1.03	5.24a	1.07	5.21a	.98
Spiritual well-being	2.38	.76	2.40a	.76	2.36a	.77

Note. **1.** significant difference between departments in determination (t(269)=2.13, p=.034, Cohen's d=0.26), **2.** significant difference between departments in organization (t(269)=2.22, p=.027, Cohen's d=0.27), **3.** significant difference between departments in problem solving (t(269)=-2.03, p=.043, Cohen's d=0.25), **4.** significant difference between departments in relationships (t(269)=-2.89, p=.04, Cohen's d=0.35), **5.** Values in the same row and subtable not sharing the same subscript are significantly different at p < .05 in the two-sided independent samples t-tests.

Table 5 presents the results of t-tests for the differences between male and female participants per educational level in psychological variables. Male postgraduate students reported significantly higher resilience compared to females (t(52)=2.39, p=.020, Cohen's d=0.97), Female undergraduate students showed higher scores of stress (t(215)=3.96, p<.001, Cohen's d=0.56), and anxiety (t(193)=-4.30, p<.001, Cohen's d=0.57), and lower levels of resilience (t(215)=-3.43, p<.001, Cohen's d=0.49), compared to male undergraduate students.

Table 5. Differences between male and female participants per educational level.

| | | Total | | Gender | | | |
| | | | | Male (31.4%) | | Female (68.6%) | |
Educational level		M	SD	M	SD	M	SD
Postgraduate studies/PhD (19.9%)	Stress	6.26	4.61	4.00a	3.92	6.60a	4.64
	Anxiety	3.28	3.58	1.43a	2.15	3.55a	3.68
	Depression	4.00	3.90	1.43a	2.57	4.38a	3.94
	Resilience	3.56	.81	4.21a	.56	3.46b	.80
Undergraduate studies (80.1%)	Stress	8.39	5.14	6.60a	5.24	9.39b	4.83
	Anxiety	5.61	4.79	3.92a	3.88	6.55b	5.00
	Depression	6.47	4.95	5.69a	5.10	6.91a	4.83
	Resilience	3.39	.79	3.63a	.79	3.26b	.75

Note. **1.** significant difference between genders of postgraduate students in resilience (t(52)=2.39, p=.020, Cohen's d=0.97), **2.** significant difference between genders of undergraduate students in stress (t(215)=3.96, p<.001, Cohen's d=0.56), **3.** significant difference between genders of undergraduate students in anxiety (t(193)=-4.30, p<.001, Cohen's d=0.57), **4.** significant difference between genders of undergraduate students in resilience (t(215)=-3.43, p<.001, Cohen's d=0.49), **5.** Values in the same row and subtable not sharing the same subscript are significantly different at p < .05 in the two-sided independent samples t-tests.

Family income was significant for stress, with lower values of stress for the 25.001-35.000 € income group, and higher values of stress both for lower income (< 25.000 €) and higher income levels (> 35.000 €). Yet, significant at p<.05 was only the difference between the 25.001-35.000 € and 35.001-50.000 € family income groups. (Table 6).

Table 6. Assessment of the family income factor.

	Family income									
	< 15.000 €		15.001-25.000 €		25.001-35.000 €		35.001-50.000 €		> 50.000 €	
	M	SD	M	SD	M	SD	M	SD	M	SD
Stress	8.38 a,b	6.16	8.34a,b	4.71	6.54a	4.49	9.91b	5.16	7.26a,b	5.25
Anxiety	5.78a	5.87	5.10a	4.51	4.11a	3.64	6.24a	4.86	4.74a	5.14
Depression	6.94a	5.56	5.94a	5.08	5.24a	4.51	6.76a	4.60	5.74a	5.33
Resilience	3.36a	.86	3.47a	.73	3.54a	.78	3.26a	.70	3.59a	.79

Note. Values in the same row and subtable not sharing the same subscript are significantly different at p< .05 in the two-sided ANOVA tests with Bonferroni correction. Values with both subscripts (a,b) do not differ significantly at p< .05 from either the values with a subscript or the values with b subscript.

No significant differences between place of origin groups were detected, meaning that stress, anxiety, depression, and resilience do not vary according to place of origin. (Table 7).

Table 7. Place of origin as a factor of analysis.

	Place of origin									
	Athens		Other country		Another city in Greece		Mainland Greece		Greece Island Region	
	M	SD	M	SD	M	SD	M	SD	M	SD
Stress	8.42a	5.04	9.53a	4.93	7.08a	5.67	7.33a	4.84	7.24a	4.98
Anxiety	5.46a	4.75	5.11a	3.93	4.68a	4.77	5.08a	4.84	4.58a	4.47
Depression	6.24a	5.00	7.53a	4.49	6.15a	5.36	4.90a	4.35	5.39a	4.43
Resilience	3.38a	.76	3.38a	.73	3.50a	.86	3.46a	.81	3.46a	.88

Note. Values in the same row and subtable not sharing the same subscript are significantly different at p< .05 in the two-sided ANOVA tests with Bonferroni correction.

Table 8 presents the results of hierarchical multiple linear regression for the factors that affect resilience in the total sample. Hope was a significant predictor of higher resilience (β=.394, p < .001) while stress (β=-.174, p < .05) and anxiety (β=-.152, p < .05) were associated with lower resilience levels after adjusting for demographics (department, educational level, and gender). Yet, hope was the only significant predictor of resilience of dental (β=.434, p < .001) and nursing students (β=.426, p < .001), when the samples were examined separately.

Table 8. Hierarchical multiple linear regression results for the factors that affect resilience in the total sample and the department samples.

Model	Independent variables	Total sample B	SE	β	p	Dentistry students B	SE	β	p	Nursing students B	SE	β	p
1	(Constant)	2.166	.263		<.001	2.033	.361		<.001	2.496	.393		<,001
	Stress	-.027	.012	-.177	.022	-.028	.016	-.189	.084	-.036	.017	-.213	.042
	Anxiety	-.027	.012	-.157	.024	-.026	.015	-.160	.094	-.029	.018	-.161	.100
	Depression	-.011	.012	-.069	.361	-.007	.016	-.044	.675	-.017	.018	-.099	.347
	Hope	.315	.046	.409	<.001	.321	.065	.416	<.001	.319	.067	.417	<.001
	Spiritual well-being	.014	.062	.014	.818	.068	.088	.062	.441	-.105	.089	-.109	.240
2	(Constant)	2.255	.276		<.001	1.631	.399		<.001	2.403	.455		<.001
	Stress	-.027	.012	-.174	.026	-.026	.016	-.174	.113	-.029	.018	-.170	.117
	Anxiety	-.026	.012	-.152	.030	-.027	.016	-.169	.089	-.023	.019	-.124	.230
	Depression	-.014	.012	-.085	.264	-.005	.017	-.035	.742	-.024	.019	-.137	.211
	Hope	.303	.047	.394	<.001	.334	.067	.434	<.001	.326	.071	.426	<.001
	Spiritual well-being	.015	.062	.014	.812	.086	.092	.079	.353	-.113	.094	-.118	.229
	Department: Dentistry vs Nursing	.101	.083	.064	.223	-				-			
	Education level: Post- vs Under-graduate	-.026	.107	-.013	.808	.237	.341	.041	.489	.326	.071	.426	.983

Gender: Female vs Male	-.096	.083	-.056	.246	-.014	.107	-.008	.897	.003	.139	.002	.058
Dentists' specialization												
General dentistry					.013	.141	.006	.925				
Orthodontics					.158	.134	.076	.241				
Periodontology					.358	.174	.133	.041				
Prosthetic-Implants					.393	.155	.158	.012				
After graduation plans												
Practice dentistry as an employee in a dental office					0.215	0.153	.112	.221				
Pursue postgraduate studies in dentistry					0.178	0.14	.180	.140				
Nurses' specialization												
Emergency Nursing									.195	.169	.113	.252
Community Nursing									.437	.205	.202	.035
Surgical Nursing									.131	.173	.068	.452
Psychiatric Nursing									.269	.184	.146	.145
After graduation plans												
Pursue postgraduate studies in nursing									.078	.137	.049	.572
Won't practice nursing									.058	.155	.035	.712

4. Discussion

The aim of this study was to investigate anxiety, stress, resilience, hope, and spiritual well-being among dental and nursing students. The sample consisted of students from the Department of Dentistry and Nursing at the National and Kapodistrian University of Athens. Most participants were female and undergraduate students, with a significant portion from the capital, Athens. Nursing students were predominantly female compared to dental students, and there was a higher proportion of postgraduate students among nurses. Overall, more than half of the participants experienced anxiety, with dental students showing higher levels than nursing students. Factors such as gender, educational level, and family income were significantly linked to anxiety levels.

4.1. Overall Levels of Stress, Anxiety and Depression among Dental and Nursing Students

The present survey indicated that half of nursing and dental students experienced at least mild levels of stress (for the overall sample: 48.7%, for dentistry: 51% and for nursing 46%), anxiety (for

the overall sample: 51.3%, for dentistry: 53.8% and for nursing 48.4%) and depression (for the overall sample: 53.5%, for dentistry: 55.2% and for nursing 51.6%). The prevalence of depression was the highest, followed by anxiety and stress. However, it is particularly significant that one-third of students experienced severe and very severe levels of stress (for the overall sample: 29.9%, for dentistry: 34.5% and for nursing: 24.6%), while 2 in 10 students experienced severe and very severe stress (for the overall sample: 20. 3%, for dentistry: 26.3% and for nursing 13.5%) and depression (for the total sample: 18%, for dentistry: 20% and for nursing 15.9%). These rates are higher than in other studies in Greek nursing students during the first wave of Covid-19 pandemic [4]and frontline nurses in referral hospitals for Covid-19 [47]. It's also noteworthy to observe that working nurses experience anxiety, while nursing students experience depression at a higher rate. According to Kapourani et al. (2020) [48], the prevalence of clinical depression among university students is 2.5–3 times higher than the 5-6% expected prevalence in the general population. Furthermore, compared to the 1.23% estimated among the general population [49], there was an approximately eight-fold increase in suicidal ideation, with 9.7% currently thinking about suicide and making precise plans on how to accomplish it. Suicide ideation was found in 16.7% of medical Greek students, while use of sleeping pills in the previous month was reported by 8.8% [50]. Furthermore, according to Eleftheriou et al. (2021) 8.8% of Greek medical students reported using sleeping drugs in the previous month, while 16.7% reported having suicidal thoughts [50].

As for dental students, in contrast to the Harris et al. (2018) study [51], which showed that dental students' anxiety, stress, and depression fell between a normal and a moderate range, and the study of Zenthöfer et al. (2023)[52] where stress and anxiety levels among dental students were moderate both during the university breaks and during the academic year, in our study dental students experienced high level stress as was also reported in the Deeb et al. (2018) survey [53] which showed that 9% of dental students had depression levels above the moderate range and the Ahad et al., (2021) study [15] where the prevalence of anxiety in dental students was also highest, followed by depression and stress . The present study found also that dental students experience higher stress, anxiety, and depression levels compared to nursing students as reported elsewhere too [18].

Overall, those majoring in dentistry, nursing, and other health sciences reported higher levels of tension and anxiety than those not pursuing health-related careers as mentioned elsewhere too (Bartlett et al., 2016; Papadopoulou et al., 2021). For example, among European College students, the prevalence of depression, anxiety, and stress was 39%, 47%, and 35.8%, respectively (Habihirwe et al., 2018) [54] while our data reveal higher percentages in all three parameters for both dental and nursing students. Like dental students' high levels of stress (Da Silva et al., 2022) [55], nursing students have also been shown to experience high levels of anxiety and depression (Moscaritolo, 2009; Turner and McCarthy, 2017) [56,57], as well as high levels of stress (Gibbons, 2010; Goff, 2011; Van der Riet et al., 2015) [58–60] as also confirmed in our study.

4.2. _Factors Affecting Stress, Anxiety and Depression of Both Dental and Nursing Students_

4.2.1. Gender

Female undergraduate students showed higher scores of stress and anxiety compared to male undergraduate students. According to Dafogianni et al. (2022) [4], female students experienced noticeably higher levels of stress and anxiety than males. Patsali et al. (2020) [61] suggested that female students were at double risk of developing depression in comparison to males. In the study of Eleftheriou et al. (2021) [50] on Greek medical students, a comparison between genders revealed that females had noticeably more severe symptoms across the board for all mental health metrics. Results from previous research on university students (Simegn et al., 2021; Kebede et al., 2019) [62,63] and in general population (Qiu et al., 2020; Rossi et al., 2020) [64,65] support that conclusion.

The available research on the relationship between gender and mental health is not entirely conclusive. In Xie et al. (2021) [66] study, males reported depressed symptoms more frequently, and Liu et al. (2020) [67] observed no statistically significant difference in anxiety or depression between the genders. But, according to Batra et al. (2021) [68] systematic review, female students had higher stress and anxiety levels. Our study's findings are supported by these outcomes.

Thus far, various elements related to the environment, genetic background, and physiological makeup have been proposed as influences on the variations in mental health issues between genders (Tambs, 2011; Amstadter, 2016) [69,70].

4.2.2. Department and Educational Level (Undergraduate, Postgraduate)

Stress levels were significantly associated with the department i.e., dental students were more likely to fall into the severe (16.6%) or extremely severe (9.7%) stress category, compared to nursing students (11.9% and 1.6%, respectively). Stress scores and anxiety scores were significantly different between departments, with higher mean scores of stress and anxiety for dentistry students compared to nursing students**.** There was no significant difference between educational level and the levels of anxiety, stress, and depression. Simegn et al. (2021) [62] concluded that students from non-health-related departments were significantly associated with anxiety, while students attending 1st and 2nd years were significantly associated with stress. The same findings were reported by Labrague et al. (2018) [72], who discovered that nursing students' year of study had a significant impact on their total stress experiences. Senior students perceived less stress than junior students did. Year of study and social support were determinants of anxiety (Kebede et al., 2019) [63], while academic performance (Othman et al., 2019) [71] and age (Shah et al., 2020) [72] were associated with stress. The reason why the percentage of mental health issues reported by nursing students was likely lower than that of dental students in the current study is likely because the nurses who participated were postgraduate students, making up 40.50% of the participants, compared to 2.10% of the dentistry department students.

University students are more likely than the general population to experience mental health issues, and numerous studies have shown that this is the case (Mortier et al., 2018; Williams et al., 2018; Tran et al., 2017) [73–75]. The prevalence of mental health problems among college students may be caused by a wide range of intricately linked causes. They deal with a variety of stressors, including changes in life stages, worries about the future, accommodation issues, academic pressure from exams, study loads, and intense pressure to perform well at university (Heckman et al., 2014; Acharya et al., 2018) [76,77].

Furthermore, the demanding requirements of clinical training and the development of complex communication skills to deal with patients are important sources of increasing stress among dental students (Sanders & Lushington, 1999; Naidu et al., 2002; Gambetta-Tessini, et al., 2013; Hayes, et al., 2017; Alhajj et al., 2018; Da Silva, et al., 2022) [11,78–83]while Aloufi et al. (2021) [84] suggest that stress, anxiety, and depression should be decreased in nursing students. However, it has been noted that nursing students have higher stress levels and more associated physical and psychological symptoms than students in other health-related fields (Kumar, 2018) [85]. A range of issues, such as first-hand hospital experience, clinical assignments and coursework, nursing skills practices, evaluation and clinical examinations, and connections with patients, families, and other health professionals, can result in clinical stressors for nursing students. Furthermore, other stressors include gaps in theory and practice, fear of making a mistake and unknown events, dealing with equipment, and interacting with patients, peers staff, and faculty members (Rezaei et al., 2018; Delaney et al., 2016; Sun et al., 2016) [86–88]. Stress can cause illness, health problems, poor academic performance, and program withdrawal among nursing students. These outcomes can then have an impact on the standard of patient care (Mousavi & Kamali, 2021; Zhao et al., 2015) [89,90].

On the impact of the educational level the issue discussed here, we can mention the study of Antoniadou et al. (2023) [36] in academic dental and nursing personnel showed that education had a significant moderate–strong effect on psychological health, while the department had a significant moderate effect on social ties. Participants in both departments who were PhD-level showed better psychological health than those who were less educated. Results showed that PhD individuals' psychological health was generally better.

Numerous studies looking at stress in dental undergraduate students have found that stress levels significantly rise with each year of education (Uraz et al., 2013) [91]. Alzahem et al. (2011) [92] divided stresses into five categories in their systematic review: living arrangements, educational

setting, personal, academic, and clinical issues. One of the most stressful aspects, according to several reports, is not having enough time for leisure and studying for exams (Elani et al., 2014; Alzahem et al., 2011) [11,92]. Furthermore, studies have shown that stresses are influenced by geographical and cultural characteristics and are not universally equal (Alzahem et al., 2011, 2013) [92,93]. Gender, academic year, marital status, first choice of admission, money issues, housing situation, exams and grades, workload, and patients are the stressors that are most frequently mentioned (Al-Samadani et al., 2013; Al-Sowygh et al., 2013; Alzahem et al., 2013; Pani et al., 2011; Al-Saleh et al., 2010) [94–97].

4.2.3. Family Income

Family income was significant for stress in our study, with lower values of stress for the 25.001-35.000 € income group, and higher values of stress both for lower income (< 25.000 €) and higher income levels (> 35.000 €). Adjepong et al. (2022) [98] found that financial stress was positively correlated with repetitive negative thinking, negative mood and anxiety. In the systematic review by McCloud et al. (2019) [99], several financial stress indicators had varying outcomes. For instance, financial challenges such as bill payment difficulties or stress related to debt concerns were more reliable indicators of mental health disorders than debt quantity. The study by Da Silva et al. (2022) [55] demonstrated that dental students with low family incomes presented higher levels of anxiety and stress. Furthermore, students' well-being may be significantly impacted by the financial strain of their education (Jones et al., 2018)[100]. More research is required to understand how students' financial circumstances affect their academic and health performance.

4.3. Resilience Level of Both Nursing and Dental Students

As regards resilience, the present study indicated that it appeared to be at the lower end of the normal range, whereas hope and spiritual well-being scores appeared to be at a moderate level, with no significant differences between departments, in comparison to a recent study (Schwitters & Kiesewetter, 2023) [20] which demonstrated that dental students have moderate levels of resilience and lower levels of resilience than medical students. In another study (Smith, et al., 2020) [21], dental students demonstrated relatively high levels of resilience and similarly, the study by Harris et al. (2018) [51] showed high levels of well-being among dental students. The study by Schwitters & Kiesewetter (2023) [20] displayed these effects lie in emotional exhaustion and decreased personal performance. In the current study, the determination factor of resilience, organization, and relationships' factors were higher for dentistry students and the problem-solving factor was higher for nursing students.

Moderate to high degrees of resilience were found in the Labrague (2021) [72] study, which lessened the detrimental effects of COVID-associated stress on psychological well-being and life satisfaction. In a similar vein, Dafogianni et al. (2022) [4] found that stress, anxiety, and depression were significantly negatively connected with resilience, life orientation, and active/positive coping, and positively correlated with negative affect score. In our study, stress and anxiety were associated with lower resilience levels. Pineda et al. (2022) [101] investigated the association between social support, personal resilience, and quality of life in nursing students and discovered that most of them had normal levels of resilience, which improved the participants' quality of life. These results support the usefulness of resilience as a stress-reduction strategy, emphasizing the need to help university students develop resilience to minimize the damaging effects of stressors.

The study by Montas et al. (2021) [19] indicated resilience influences academic achievement positively, while the results of another study (Maragha, et al., 2023) [12], which concerned dental students, found that ethnic origins and major life events, such as the Covid-19 pandemic, influenced resilience levels. Following the review by Smith et al. (2023) [35], nursing students from all around the world have experienced high levels of stress during the Covid-19 pandemic. Almost unanimously, resilience was identified as a key protective factor against stress and the development of psychological morbidity. Nursing students with higher levels of resilience were deemed more likely to continue their studies, despite Covid-related challenges. The development of resilience levels has the potential to empower nursing students for academic and clinical success. Therefore, it

is needed to integrate resilience development activities into undergraduate nursing curricula (Smith, et al., 2023) [35].

Finally, another study found a positive relationship between resilience and performance in undergraduate nursing studies including professional experience placements (Cleary, et al., 2018) [33]. Resilience among nursing students plays a vital role in helping them to overcome adversities and stressful situations during their nursing education (Aryuwat, et al., 2023; Smith, et al., 2023) [34,35]. After graduation, nursing students can continue contributing to society as resilient Registered Nurses in the future (Aryuwat, et al., 2023) [34].

4.3.2. Factors Affecting Resilience in Nursing and Dental Students

In the present study, male postgraduate students reported significantly higher resilience compared to females, whilst female undergraduate students displayed higher scores of stress and anxiety, compared to male undergraduate students, such as the study by Dafogianni, et al. (2022) [4] which demonstrated high anxiety and stress levels of Greek nursing students, during the Covid-19 pandemic, with increased levels of anxiety, stress and negative affect score in females and increased levels of resilience in males, and as the study by Da Silva et al. (2022) [55], with greater anxiety scores in females compared to males. Moreover, the study by Da Silva et al. (2022) [55] pointed out higher academic semester was associated with higher anxiety and stress levels, particularly, in the final academic year.

When compared to female students, male undergraduate and postgraduate students showed much greater resilience. In Smith et al. (2020) [21] study, resilience was significantly associated with gender, with females showing more resilience than males and overall health. The Adjepong et al. (2022) [98] study, in which female students reported higher stress levels and demonstrated lesser resilience and higher negative mood ratings, came to the same conclusion.

In opposition to the study by Maragha, et al. (2023) [12], which showed that dental students influenced resilience levels related to ethnic origins, no significant differences between place of origin groups were detected in the present study. Hence, depression, anxiety, stress, and resilience do not vary according to place of origin.

Stress and anxiety were linked to lower levels of resilience, whereas hope was a strong predictor of better resilience. However, the only significant predictor of resilience among nursing and dental students was hope. Less symptoms of stress, anxiety, and sadness were substantially correlated with more resilience and optimism (Dafogianni et al., 2021) [4]. The study by Da Silva et al. (2022) [55] among dental students presented that higher social support was associated with lower anxiety and lower anxiety was linked with a better quality of life. Therefore, the study suggested a healthier academic environment and student educational programs for reducing stress and anxiety levels (Da Silva, et al., 2022) [55]. Park et al. (2022) [102] found that problem-solving was the most popular coping method among university students, followed by seeking out social support and avoidance.

Psychopathological symptomatology was predicted by the presence of stressors and an avoidant coping style, but a greater level of life satisfaction was predicted by an active coping style that controlled such stressors (Main et al., 2011) [103]. Ziarko et al. (2020) [104] demonstrated resilience's mediation role in the process of choosing coping strategies based on the demands of a particularly challenging circumstance. Although young adults extensively utilized avoidance throughout the pandemic (Young et al., 2021) [105], their coping mechanisms may change depending on the sociocultural situation (Stephenson et al., 2020) [106].

In Dafogianni et al. (2022) [4], significantly higher indicators of depression were seen in older students, those who engaged in more behavioral withdrawal and avoidance coping as coping mechanisms, individuals with a higher negative affect score, individuals with a lower positive affect score, and those who expressed greater optimism. Additionally, there were noticeably higher manifestations of worry and tension in students who used drugs more frequently, used negative emotions as coping mechanisms, had higher negative affect scores, and were less resilient. According to the same study, fourth-year students employed considerably more proactive and constructive coping mechanisms than first- or second-year students. Previous research has identified key

predictors of stress and coping strategies among students, including age and academic year (Dafogiani et al., 2021; Kumar, 2018; Labrague et al., 2018) [47,72,85].

In a study of Greek dental and nursing academic personnel (Antoniadou et al., 2023) [36], compared to individuals from the Department of Nursing, participants from the Department of Dentistry showed higher levels of social interaction QOL across all educational categories. Married participants and those from the Department of Dentistry had higher levels of social connections than those from the Department of Nursing, while those under 40 had higher levels of physical health and environmental quality of life. Through these results, the correlation between the academic staff and the students is perceived, as the former are role models for the students. It seems, then, that there is a sequence in terms of the pattern of these conditions, that is, the resilience, but also the various mental disorders of the students coming in agreement with the resilience and the quality of life of the academic staff. Therefore, interventions to develop mental resilience and improve the quality of life of the staff could indirectly affect the students as well. Another hypothesis that can be made is that there is probably a certain personality profile of people who choose Nursing and Dentistry. These elements can be further search in future relevant projects.

4.4. Limitations of the Present Study

However, the present study has some limitations. The studied sample was composed of dental and nursing students recruited from the Dentistry Department and Nursing Department in Athens. Therefore, the present findings should not be extrapolated to undergraduates and postgraduates attending other, non-health subjects. Also, the sample is predominantly composed of females. In addition, most nursing students were postgraduate students, as opposed to dental students, who were mostly undergraduate students. These limitations may impose restrictions on the generalization of our results. Furthermore, the respondents' responses might have been impacted by the cross-sectional research methodology. Given the dynamic character of the variables under investigation, longitudinal research may help monitor its advancement or decline. Additionally, there was a low response rate, which might have had an impact on the study's findings because the experiences of those who consented to participate and those who did not might have been different. Nevertheless, a qualitative investigation using semi-structured interviews with nursing and dental students will also be carried out in the same sample to provide a more comprehensive understanding of the elements that both favorably and unfavorably impact the growth of resilience in our sample.

5. Conclusions

The present study indicates that anxiety is prevalent among dentistry and nursing students affecting more than half of the sample, with dental students reporting higher anxiety than nursing students. Anxiety was further substantially correlated with factors like family income, gender, and educational attainment which influence its manifestation. Resilience was positively predicted by hope and negatively associated with stress and anxiety. Promoting students' well-being and academic success requires effective stress-reduction and resilience-building techniques aimed to not only improve student performance but also support future healthcare professionals' personal sustainability and holistic growth.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board (or Ethics Committee) of the department of Dentistry (609/03.10.2023) and Nursing (467/26-10-2023) of the School of health Sciences of the National and Kapodistrian University of Athens, Greece.

Informed Consent Statement: "Informed consent was obtained from all subjects involved in the study."

Data Availability Statement: The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

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Conflicts of Interest: "The authors declare no conflicts of interest."

Appendix A

Information about Components of the Questionnaire and Study Tools
DASS-21
Description of the tool

For this study we will use the DASS-21 tool, (Lovibond & Lovibond, 1995) [37], a shorter version of the full survey (DASS-42). It consists of three self-report scales designed to measure the negative emotional states of depression, anxiety, and stress. Each of them contains seven items. Participants respond using a 4-point severity and frequency scale to rate the extent to which they had experienced each in the past week: 0 = did not apply to me at all, 1 = applied to me to some extent, or some of the time, 2 = applied to me to a significant extent, or much of the time, and 3 = applied to me very much, or most of the time. Separate scores for depression, anxiety and stress are calculated by summing the scores for each. Then, they are multiplied by two to match the DASS 42 scale. The DASS 21 scale has been translated and validated in Greek population (Lyrakos, et al., 2011; Pezirkianidis et al., 2018) [42,107].

FACIT-12
Description of the tool

The most widely validated questionnaire for measuring spirituality is the Functional assessment of chronic illness therapy- spiritual well-being 12 (FACIT-SP-12) scale - Non illness (Brady et al., 1999) [38]. The scale was validated and measured for reliability and validity in Greek (Fradelos, et al., 2016) [43]. The internal consistency of the scale was rated highly satisfactory (Chronbach a = 0.789) and statistical analysis revealed three factors: faith, meaning, and peace. The tool is demonstrated in Appendix C. The FACIT- Score can be found at the following link: *https://www.facit.org/measures/facit-sp-12*

ADULT HOPE SCALE (AHS) (Snyder, 1991).
Description of the tool

The Adult Hope Scale is a 12-item tool that identifies a respondent's level of hope. Specifically, the scale is divided into two subscales that comprises Snyder's cognitive model of hope: (1) Self-action (i.e., goal-directed action) and (2) Pathways (i.e., planning to achieve goals). Of the 12 elements, 4 compose the Agency subscale and 4 constitute the Pathways subscale. The remaining 4 elements are complementary. Each item is answered using an 8-point Likert-type scale ranging from Definitely False to Definitely True. It should be noted that the authors recommend that when administering the scale, it should be called "The Future Scale" (*http://www.ppc.sas.upenn.edu/hopescale.pdf*)

Researchers can either examine the results at the subscale level or combine the two subscales to create an overall hope score. There is no specific score that defines high and low hope, however an early study by the author of the AHS suggested that "high hope" and "low hope" equated to a combined agency and pathway score of >60 and <35 respectively. (Snyder et al, 1998) [108–111].

Resilience Assessment Questionnaire (RAQ8)

The Resilience Assessment Questionnaire created by psychologist Derek Mowbray (2011) [40]. In our study, the short form of Questionnaire is used (8 questions) (RAQ8). The longer version consists of 40 questions (RAQ 40). The RAQ8 has been examined for reliability and validity (Mowbray, 2011) [40].

Brief Resilience Scale (BRS)

The Brief Resilience Scale (BRS) (Smith et al., 2008) [41] was among the scales with the most satisfactory psychometric properties. Moreover, it was evaluated (Salisu & Hashim, 2017) as one of the most frequently used resilience scales in a total of 25 scales (Kyriazos, et al., 2018) [44]. Kyriazos,

et al. (2018) [44] examined the reliability and validity of the Brief Resilience Scale in the Greek population, with satisfied Chronbach'a indicator (a=0,80-0,91).

Appendix B

Questionnaire
PART ONE
Q1. What is your gender?
Q2. What is your level of education (1- 5 years, degree/diploma) undergraduate, postgraduate, PhD, postdoctoral)
Q3. What is your place of origin?
1) Athens, 2) Other urban center (capital of a prefecture), 3) Continental region (towns and villages), 4) Island region (towns and villages), 5) Other country outside Greece
Q4. Which dental specialty would you like to pursue in the future? (for dental students)
1) General dentistry, 2) Pedodontics, 3) Orthodontics, 4) Oral surgery, 5) Dentistry-sensitive dentistry, 6) Endodontics, 7) Periodontology, 8) Stomatology/hospital dentistry, 9) Prosthetics – implants, 10) I will not practice dentistry, 11) I am not a dental student
Q5. Which nursing specialization would you like to pursue? (for nursing students)
1) Community nursing, 2) Psychiatric nursing, 3) Surgical nursing, 4) Pathological nursing, 5) Emergency nursing, 6) Oncology nursing, 7) I will not practice nursing, 8) I am not a nursing student
Q6. What is your family's annual income?
P1. less than 15.000 €, P2. 15.001-25.000 €, P3. 25.001-35.000 €, P4. 35.001-50.000 €, P5. more than € 50.000, P6. I do not know, P7. I have never worried about this issue
Q7.1.What are you thinking of doing after graduation? (for dental students)
P1. I will open my own clinic, P2. I will work as a clerk in a colleague's office for a few years until I see what I can do, P3. I will work as a dentist abroad, P4. I will do postgraduate studies and work in a colleague's office at the same time, P5. I will not practice clinical dentistry but will do something else in the field, P6. I will do something else professionally, P7. I will continue my studies in another discipline, P8. I am not a student of dentistry
Q7.2 What do you plan to do when you graduate? (for nursing students)
P1. I will work in a private clinic, P2. I will work in a public hospital, P3. I will do postgraduate studies, P4. I will do something else professionally, P5. I will continue my studies in another science, P6. I am not a nursing student
PART TWO
DASS-21
Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement. The rating scale is as follows: 0 = Did not apply to me at all, 1 = Applied to me to some degree, or some of the time, 2 = Applied to me to a considerable degree or a good part of time, 3 = Applied to me very much or most of the time

1 (s)	I found it hard to wind down	0	1	2	3
2 (a)	I was aware of the dryness of my mouth	0	1	2	3
3 (d)	I couldn't seem to experience any positive feelings at all	0	1	2	3
4 (a)	I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5 (d)	I found it difficult to work up the initiative to do things	0	1	2	3

6 (s)	I tended to over-react to situations	0	1	2	3
7 (a)	I experienced trembling (e.g. in the hands)	0	1	2	3
8 (s)	I felt that I was using a lot of nervous energy	0	1	2	3
9 (a)	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10 (d)	I felt that I had nothing to look forward to	0	1	2	3
11 (s)	I found myself getting agitated	0	1	2	3
12 (s)	I found it difficult to relax	0	1	2	3
13 (d)	I felt downhearted and blue	0	1	2	3
14 (s)	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15 (a)	I felt I was close to panic	0	1	2	3
16 (d)	I was unable to become enthusiastic about anything	0	1	2	3
17 (d)	I felt I wasn't worth much as a person	0	1	2	3
18 (s)	I felt that I was rather touchy	0	1	2	3
19 (a)	I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)	0	1	2	3
20 (a)	I felt scared without any good reason	0	1	2	3
21 (d)	I felt that life was meaningless	0	1	2	3

FACIT- Sp-12 (Version 4)

Below is a list of statements that other people with your illness have said are important. Please circle or mark one number per line to indicate your response as it applies to the <u>past 7 days</u>.

		Not at all	A little bit	Some-what	Quite a bit	Very much
Sp1	I feel peaceful	0	1	2	3	4
Sp2	I have a reason for living	0	1	2	3	4
Sp3	My life has been productive	0	1	2	3	4
Sp4	I have trouble feeling peace of mind	0	1	2	3	4
Sp5	I feel a sense of purpose in my life	0	1	2	3	4
Sp6	I can reach down deep into myself for comfort	0	1	2	3	4
Sp7	I feel a sense of harmony within myself	0	1	2	3	4
Sp8	My life lacks meaning and purpose	0	1	2	3	4
Sp9	I find comfort in my faith or spiritual beliefs	0	1	2	3	4
Sp10	I find strength in my faith or spiritual beliefs	0	1	2	3	4

| Sp11 | My illness has strengthened my faith or spiritual beliefs | 0 | 1 | 2 | 3 | 4 |
| Sp12 | I know that whatever happens with my illness, things will be okay | 0 | 1 | 2 | 3 | 4 |

PART THREE

The Adult Hope Scale (AHS)

Directions: Read each item carefully. Using the scale shown below, please select the number that best describes YOU and put that number in the blank provided. 1. = Definitely False, 2. = Mostly False, 3. = Somewhat False, 4. = Slightly False, 5. = Slightly True, 6. = Somewhat True, 7. = Mostly True, 8. = Definitely True.

___ 1. I can think of many ways to get out of a jam.

___ 2. I energetically pursue my goals.

___ 3. I feel tired most of the time.

___ 4. There are lots of ways around any problem.

___ 5. I am easily downed in an argument.

___ 6. I can think of many ways to get the things in life that are important to me.

___ 7. I worry about my health.

___ 8. Even when others get discouraged, I know I can find a way to solve the problem.

___ 9. My past experiences have prepared me well for my future.

___10. I've been pretty successful in life.

___11. I usually find myself worrying about something.

___12. I meet the goals that I set for myself.

PART FOUR

Resilience Assessment Questionnaire-8 (RAQ-8)

Please answer the following questions by circling the relevant number.

1= Never - 5=Always

1	I usually know how others perceive me	1	2	3	4	5
2	I am determined to achieve my lifetime ambitions	1	2	3	4	5
3	I can see my future clearly	1	2	3	4	5
4	I normally feel comfortable in new situations	1	2	3	4	5
5	I plan my next day in advance	1	2	3	4	5
6	I enjoy the challenge of unravelling puzzles and solving problems	1	2	3	4	5
7	In general I like people	1	2	3	4	5
8	My most important relationships are my strongest	1	2	3	4	5

PART FIVE

Brief Resilience Scale (Please respond to each item by marking one box per row)

	Strongly agree	Disagree	neutral	agree	Strongly agree

BRS1	I tend to not bounce back quickly after hard times	1	2	3	4	5
BRS2	I have a hard time making it through stressful events	5	4	3	2	1
BRS3	It takes me long to recover from a stressful event	1	2	3	4	5
BRS4	It is hard for me to snap back when something bad happens	5	4	3	2	1
BRS5	I usually come through difficult times with little trouble	1	2	3	4	5
BRS6	I tend to take a long time to get over setbacks in my life	5	4	3	2	1

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