



IMPACT OF ANXIETY AND STRESS ON THE QUALITY OF LIFE OF UNDERGRADUATE DENTAL STUDENTS: A SYSTEMATIC REVIEW


IMPACTO DA ANSIEDADE E DO ESTRESSE NA QUALIDADE DE VIDA DOS ESTUDANTES DE GRADUAÇÃO EM ODONTOLOGIA: REVISÃO SISTEMÁTICA

IMPACTO DE LA ANSIEDAD Y EL ESTRÉS EN LA CALIDAD DE VIDA DE LOS ESTUDIANTES DE ODONTOLOGÍA: REVISIÓN SISTEMÁTICA

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ABSTRACT: Anxiety and stress are considered normal reactions of the body. However, in exaggerated proportions, they can compromise the quality of life. The objective was to review existing studies on anxiety and stress and their impacts on the quality of life of undergraduate dental students. A total of 358 publications were retrieved and five were included in the review. Four studies assessed anxiety, and one study assessed stress. The results of cross-sectional studies pointed to an association or correlation between anxiety and quality of life, all statistically significant. Studies that assessed stress and quality of life did not yield significant results. It is concluded that, according to the studies found, there is an association between anxiety and quality of life in undergraduate dental students, but the same was not observed for stress. No longitudinal studies were found to assess the impact of these measures.

KEYWORDS: Anxiety. Psychological Stress. Dental Students. Quality of Life. Systematic Review.

RESUMO: *A ansiedade e o estresse são considerados reações normais do organismo. No entanto, em proporções exacerbadas, podem comprometer a qualidade de vida. O objetivo foi revisar os estudos existentes sobre ansiedade e estresse e seus impactos na qualidade de vida dos estudantes de graduação em Odontologia. Foram retidas 358 publicações e cinco foram incluídas na revisão. Quatro estudos avaliaram ansiedade e um estudo avaliou estresse. Os resultados dos estudos transversais apontaram para associação ou correlação entre ansiedade e qualidade de vida, todos estatisticamente significativos. Os estudos que avaliaram estresse e qualidade de vida não apresentaram resultados significativos. Conclui-se que, de acordo com os estudos encontrados, há associação entre ansiedade e qualidade de vida nos estudantes de graduação em Odontologia, o mesmo não sendo constatado para estresse. Não foram encontrados estudos longitudinais que permitam avaliar o impacto dessas medidas.*

PALAVRAS-CHAVE: *Ansiedade. Estresse Psicológico. Estudantes de Odontologia. Qualidade de vida. Revisão Sistemática.*

RESUMEN: *Se consideran la ansiedad y el estrés reacciones normales del organismo. Sin embargo, en proporciones exacerbadas, pueden comprometer la calidad de vida. El objetivo era revisar los estudios existentes sobre la ansiedad y el estrés y su impacto en la calidad de vida de los estudiantes de odontología. Se seleccionaron 358 publicaciones y cinco se incluyeron en la revisión. Cuatro estudios evaluaron la ansiedad y uno el estrés. Los resultados de los estudios transversales apuntaron a una asociación o correlación entre ansiedad y calidad de vida, todos ellos estadísticamente significativos. Los estudios que evaluaron el estrés y la calidad de vida no mostraron resultados significativos. Se puede concluir que, según los estudios encontrados, existe una asociación entre la ansiedad y la calidad de vida en los estudiantes de odontología de pregrado, pero no se encontró lo mismo para el estrés. No se encontraron estudios longitudinales que evaluaran el impacto de estas medidas.*

PALABRAS CLAVE: *Ansiedad. Estrés Psicológico. Estudiantes de Odontología. Calidad de Vida. Revisión Sistemática.*

Introduction

Anxiety and stress are considered normal responses of the autonomic nervous system that influence the release of cortisol, sleep regulation, protection (defense), motivation (action), among other aspects (Lenhadtk; Calvetti, 2017). However, when anxiety and stress levels are exaggerated, they cause harm to the individual, generating negative impacts on quality of life, with personal, student, professional, psychological and emotional losses (Guimarães *et al.*, 2022).

The studies by Pena *et al.* (2021) and Turcio *et al.* (2022) show that university students, especially in the health field, have high levels of anxiety, stress and a greater risk of changes in mental health, with consequences for student productivity and academic performance. Factors experienced by university students that can contribute to such findings are: distance from the family, excessive working hours, demands from parents, teachers and the student himself, and uncertainty about the professional future (Garbin *et al.*, 2021). According to Malafaia, Costa and Martins (2022), the COVID-19 pandemic contributed to increased levels of anxiety and stress in the general population and especially among university students due to uncertainty regarding the continuation of their studies.

In addition to these situations experienced by many university students before and during the pandemic, scientific literature indicates that undergraduate Dentistry students may experience increased levels of anxiety and stress, as they also need to deal with other aspects such as: the high cost of the course – purchasing of materials/instruments with own financing; and apprehension about patient care – fear of making mistakes (Doval *et al.*, 2019; Guimarães *et al.*, 2022).

Increased levels of anxiety and stress can affect students' quality of life, with the possibility of compromising student performance and the acquisition of knowledge and skills necessary for their undergraduate training (Elagra *et al.*, 2016). According to the World Health Organization (WHO), quality of life is defined as “the individual's perception of his or her insertion in life, in the context of the culture and value systems in which he or she lives and in relation to his or her goals, expectations, standards and concerns” (WHO, 2023, our translation).

Knowledge about the impacts of anxiety and/or stress among undergraduate Dentistry students promotes the identification of the problem and allows the adoption of strategies for the recovery, prevention and promotion of the student's mental health (Pena *et al.*, 2021; Silva; Romarco, 2021).

Given the above, the objective was to review existing studies on anxiety and stress and their impacts on the quality of life of undergraduate Dentistry students.

Methodology

A systematic review of national and international scientific literature was carried out. The PRISMA methodological recommendations (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses*) were used (Page *et al.*, 2022). The study was registered on the PROSPERO platform under number CRD42023473233.

The question that guided the selection of studies was: “Does anxiety and/or stress impact the quality of life of undergraduate Dentistry students?”, considering the acronym PECO (Latorraca *et al.*, 2019): P - population: students degree in Dentistry; E - exposure: pathological levels of anxiety and stress; C - control or comparator: do not present high levels of anxiety and stress; O - outcome “*outcomes*”: health-related quality of life.

Eligibility Criteria

The following were included: studies that assessed anxiety and/or stress levels in Dentistry students and associated them with quality of life; studies in English, Spanish and Portuguese. The following were excluded: studies that were not with dentistry students or studies with dentistry students, but which did not associate anxiety and/or stress with quality of life; studies that did not present specific data on Dentistry students, as they did not allow for final quantitative analysis; and publications such as books, case reports, opinion studies and reviews.

There was no predefinition for the concepts of anxiety and stress adopted by the authors in the studies under selection, as well as studies that evaluated only one of these conditions were selected. Any construct on quality of life adopted by the study authors was considered as an outcome.

Information sources

The following databases were consulted: *PubMed*, *Web of Science*, *Virtual Health Library*, *Cochrane*, *Embase* and *Scopus*. The reference list of selected articles was also consulted.

Search Strategy

The searches were carried out in December 2022, with the following combination of descriptors: (*Dental Students*) AND (*Anxiety OR Anxiety Disorders OR Psychological Stress*) AND (*Quality of Life*). No filters were used.

Selection process

The selection of studies was carried out by two independent and previously calibrated evaluators (DBDP and IMS) (79% agreement). It began by reading and classifying titles and abstracts and, subsequently, followed by evaluating the studies selected for reading the full text according to the eligibility criteria. Two researchers (RNVM and JSP) worked on training and discussing disagreements.

Data collection process

To organize the retained publications and remove duplicates, the *EndNote*® software was used. To classify the eligibility criteria and, subsequently, to organize the data from the included studies, the *Excel*® software was used.

In summarizing the results, the following information was also extracted independently between two evaluators: author, year of publication, type of study, place of research, type of Higher Education Institution (public or private), sample (number of Dentistry students participating in the research and response rate), age, instruments used to collect data on anxiety, stress and quality of life, results found for each of these measures, statistical method used to evaluate the impact or association between anxiety and /or stress and quality of life and main results found. Finally, variables included in the studies that could be considered as predictors for anxiety or stress were listed.

Assessment of the risk of bias in studies

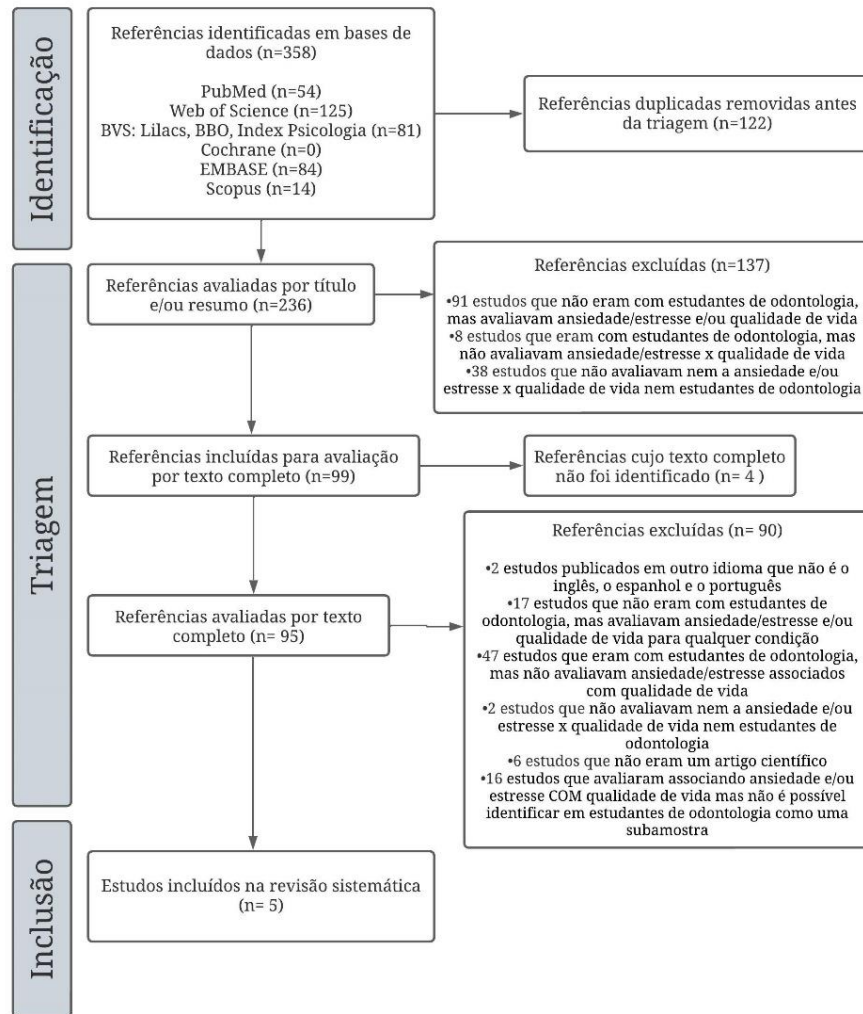
To assess the quality of studies/risk of bias, the *Joanna Briggs Institute* critical assessment scale was used. (JBI) (Santos; Secoli; Püschel, 2018).

Results

Initially, 358 publications were identified in the databases (*Pubmed*, *Web of Science*, *VHL – Lilacs*, *BBO*, *Index Psicologia*, *Cochrane*, *Embase* and *Scopus*). Of these, 122 were duplicates and were excluded. Subsequently, the titles and abstracts of 236 scientific studies

were read, subsequently keeping 95 references selected for reading the full texts. Five studies were included, according to the flowchart shown in Figure 1. After reading the reference lists of the five articles, no new references were found.

Figure 1 – Schematic representation of the methods for identifying, screening and including studies in the systematic review, according to the PRISMA methodology.



Source: Prepared by the authors.

Of the five studies included in the review, four assessed anxieties (Machado *et al.*, 2020; Silva *et al.*, 2022; Markovic *et al.*; 2022; Erguven; Kalyoncuoglu, 2021) and one assessed stress (Atif *et al.*, 2021). None of the studies evaluated stress and anxiety concomitantly.

All were published in the English language, in the years 2020 (Machado *et al.*, 2020), 2021 (Atif *et al.*, 2021; Erguven; Kalyoncuoglu, 2021) and 2022 (Silva *et al.*, 2022; Markovic *et al.*, 2022). Regarding the country of publication, it was observed that two studies were carried out in Brazil (Machado *et al.*, 2020 and Silva *et al.*, 2022) and the others were developed in

Pakistan (Atif *et al.*, 2021), Serbia (Markovic *et al.*, 2022) and Turkey (Erguven; Kalyoncuoglu, 2021). Two studies were in a public institution (Silva *et al.*, 2022; Markovic *et al.*, 2022), while all three occurred in private Higher Education Institutions (Atif *et al.*, 2021; Erguven; Kalyoncuoglu, 2021; Machado *et al.*, 2020). The average age of undergraduate Dentistry students participating in the selected studies ranged between 19.4 and 22.9 years, being in the first to sixth year of graduation.

The scientific studies included in the review used the following research instruments to collect data on anxiety: *Depression, Anxiety and Stress Scale (DASS-21)* (Silva *et al.*, 2022), *General Anxiety Disorder-7 (GAD-7)* (Markovic *et al.*, 2022), *State-trait anxiety inventory (STAI-S)* (Machado *et al.*, 2020) and *Social Appearance Anxiety Scale (SAAS)* (Erguven; Kalyoncuoglu, 2021). And to assess stress: *Perceived Stress Scale (PSS)* (Atif *et al.*, 2021).

To collect data on quality of life, the following instruments were used: WHOQOL - bref summarized version developed by the World Health Organization (Machado *et al.*, 2020), *Life of the health student and health resident (VERAS-Q)* (Silva *et al.*, 2022), *Quality of life among COVID-19 (COV19-QoL)* (Markovic *et al.*, 2022) and *Oral Health Impact Profile (OHIP)* (Atif *et al.*, 2021; Erguven; Kalyoncuoglu, 2021).

The selected studies evaluated the impact of anxiety and/or stress on the quality of life of undergraduate Dentistry students as follows:

- Machado *et al.* (2020): evaluated the impact of anxiety and sleep quality on the quality of life in undergraduate Dentistry students. To associate it with anxiety, the authors considered global quality of life, analyzing the total score of the questionnaire, including the physical, psychological, social relationships and environment domains;
- Atif *et al.* (2021): evaluated the relationship between stress, xerostomia, salivary flow rate and quality of life of undergraduate Dentistry students. The authors considered global quality of life, analyzing the total score of the questionnaire, including the areas of physical, social and psychological well-being of individuals;
- Erguven and Kalyoncuoglu (2021): evaluated the level of social appearance anxiety and quality of life related to oral health among undergraduate Dentistry students. The authors considered global quality of life, analyzing the total score of the questionnaire, including the areas of physical, social and psychological well-being of individuals;
- Silva *et al.* (2022): examined sociodemographic, socioeconomic characteristics, academic information, social support and psychosocial factors (anxiety and stress) among dentistry students and how this influence quality of life. The authors demonstrated that, among

other variables, lower anxiety directly led to a better quality of life. They also showed that anxiety mediated the relationship between the current academic semester and social support with quality of life and also highlighted the relevance of structural and intermediate determinants in quality of life;

- Markovic *et al.* (2022): investigated the impact of the COVID-19 pandemic on quality of life and mental health (anxiety and depression) in undergraduate Dentistry students, also analyzing sociodemographic and academic characteristics. The authors considered the total score of the questionnaire, which assessed the feeling of impact on the quality of life of mental and physical health, anxiety, depression and personal safety.

The results of cross-sectional studies pointed to an association or correlation between anxiety and quality of life, all statistically significant (Machado *et al.*, 2020; Silva *et al.*, 2022; Markovic *et al.*; 2022; Erguven; Kalyoncuoglu, 2021). Studies that assessed stress and quality of life did not present significant results (Atif *et al.*, 2021). It should also be considered the absence of studies that evaluated the impact, with longitudinal observation, of anxiety and/or stress on the quality of life of undergraduate Dentistry students.

When considering the predictive elements of stress or anxiety in the studies selected in this review, the variables analyzed by the authors with statistically significant results were: university exams at the end of the year (Atif *et al.*, 2021); longer academic semester and social support and thoughts about requesting student leave (Silva *et al.*, 2022); depression disorder, place of residence, second and third years of study and death of a relative (Markovic *et al.*; 2022); first and last year of study (Machado *et al.*, 2020). Two studies found an association between anxiety and female gender (Silva *et al.*, 2022; Markovic *et al.*, 2022) and, in the study by Erguven and Kalyoncuoglu (2021), none of the covariates analyzed, besides quality of life, were related to anxiety.

In Table 1, individual data from the studies collected and included in the review are presented.

Table 1 – Information about the studies included in the systematic review.

Author and year	Machado <i>et al.</i> (2020)	Atif <i>et al.</i> (2021)	Erguven and Kalyoncuoglu (2021)	Silva <i>et al.</i> (2022)	Markovic <i>et al.</i> (2022)
Kind of study	Transversal	Transversal	Case-control	Transversal	Transversal
Local	Curitiba Brazil	Pakistan	Gulhane, Turkey	Rio de janeiro Brazil	Belgrade - Serbia
Type of Higher Education Institution	Private	Private	Private	Public	Public

Sample/response fee	141 (92.8%)	72 (96%)	205 (no information)	233 (90.3%)	797 (no information)
Age	22.9 (standard deviation 5.2)	19.4 (Range 18-21)	20.32 (Standard Deviation 1.707)	22.2 (Standard Deviation 3.7)	21.7 (Standard Deviation 2.4)
Stress assessment instrument/Result found	Did not assess stress	PSS- <i>Perceived Stress Scale</i> / Median 23 (interquartile range 15-33)	Did not assess stress	Did not assess stress	Did not assess stress
Anxiety assessment instrument/ Result found	STAI-S <i>State-trait anxiety inventory</i> / Average 50.3 ± 9.4	Did not assess anxiety	SAAS <i>Social Appearance Anxiety Scale</i> / Mean 28.01 ± 10.432	DASS-21 <i>Depression, Anxiety and Stress Scale</i> / Average 13.6 (12.2-15.0 95%CI)	GAD-7 <i>General Anxiety Disorder - 7</i> / Mean 5.4 and standard deviation 5.1
Quality of life assessment instrument/Results found	WHOQOL- <i>briefWorld Health Organization Quality of Life</i> / Average 13.2 ± 2.0	OHIP <i>Oral Health Impact Profile</i> - short version / Median 10 (interquartile range 2.75-17.25)	OHIP-14 <i>Oral Health Impact Profile -14</i> / Average 9.81 ± 6.586	VERAS-Q <i>Life of the health student and health resident</i> / Total score Average 123.3 (120.3-126.2 95%CI)	COV19-QoL <i>Quality of life (QoL) among COVID-19</i> / The highest total score was for the impact of the pandemic in quality of life and increased sensation of tension (3.29 ± 1.17, 3.28 ± 1.24, respectively), while the lowest score was for concerns about personal safety (2.35 ± 1.19).
Statistical method	<i>Kruskal - Wallis test. Poisson regression model</i>	<i>KruskalWillis Test</i>	<i>Spearman correlation coefficient</i>	<i>Structural equation modeling (SEM), using Confirmatory Factor Analysis (CFA)</i>	<i>Correlation with Pearson Coefficient</i>
Results	Anxiety scores showed a significant association with all dimensions of the WHOQOL –	The S-OHIP scores for the low and high groups showed no significant differences (p=0.627)	There was a positive and significant correlation between anxiety scores and quality of life (p<0.001)	Lower anxiety was directly associated with better quality of life (p<0.001)	Quality of life and anxiety were significantly correlated (p<0.001).

bref
($p < 0.05$)

Source: Prepared by the authors.

Regarding the assessment of the quality of the studies (Table 2), gaps were identified in relation to the sampling criteria in most studies. Aspects relating to data collection and analysis were adequate in all studies.

Table 2 – Results of the critical assessment of the methodological quality of the studies.

Author and year	Sample structure	Selection of participants	Sample size	Subjects described in detail	Data analysis	Valid methods	Standard and reliable measurements	Appropriate statistical analysis	Adequate response rate
Machado <i>et al.</i> (2020)	N	S	N	s	s	s	s	s	s
Atif <i>et al.</i> (2021)	s	S	s	s	s	s	s	s	s
Erguven and Kalyoncuoglu (2021)	N	N	N	s	s	s	s	s	NC
Silva <i>et al.</i> (2022)	s	S	s	s	s	s	s	s	s
Markovic <i>et al.</i> (2022)	N	N	N	s	s	s	s	s	NC

Suitable: Y – Yes; N – No; NC – Not Clear; NA – Not Applicable.

Source: Prepared by the authors.

Discussion

This is a systematic review that verified the impact of anxiety and/or stress on the quality of life of undergraduate Dentistry students. Among the five studies, four of them (Silva *et al.*, 2022; Markovic *et al.*, 2022; Erguven and Kalyoncuoglu, 2021 and Machado *et al.*, 2020) showed an association between anxiety and quality of life of undergraduate Dentistry students.

All studies found are recent, published in less than five years of publication, a fact that highlighted the current interest in research on this topic and the growing concern in measures aimed at mental health (Gundim *et al.*, 2021; George *et al.*, 2022). Two of these studies (Machado *et al.*, 2020; Silva *et al.*, 2022) were carried out in Brazil, this fact may be related to the large number of Dentistry schools that exist in the country compared to the rest of the world (Martin *et al.*, 2018).

Different instruments used to assess the level of stress and/or anxiety, as well as quality of life, were identified. The respondents used to assess psychosocial aspects were diverse, with emphasis on widely used measures such as the abbreviated version of the *Perceived Stress Scale* (PSS) and the *Depression, Anxiety and Stress Scale* (DASS-21). A systematic review carried out by Elani *et al.* (2014), on stress in dentistry students, evaluated 124 studies that used different instruments, and found that the most used tool was the *Dental Environment Stress questionnaire* (DES), present in 25% of studies, followed by the PSS tool, used in 20.5% of studies. It should therefore be highlighted that there is no methodological standard in studies on the topic. Regarding quality of life, the use of the *Oral Health Impact Profile* (OHIP) (Atif *et al.*, 2021; Erguven and Kalyoncuoglu, 2021) prevailed, in addition to a specific questionnaire for certain situations such as COVID-19 (Markovic *et al.*, 2022).

Despite the lack of standardization, the use of validated data collection instruments contributes to the investigation of the questions intended to be measured in a study being more effective and reliable, as in the validation process the instrument is rigorously tested by researchers (Bellucci; Matsuda, 2012), which consider the influence of cultural, ethnic aspects, values and patterns of behavior, which are different across different nationalities (Bisol, 2012).

The research by Graner and Cerqueira (2019) presented academic factors as the most stressful reported by undergraduate Dentistry students. Situations such as the transition from adolescence to adulthood, considerable changes in the daily routine, and many responsibilities, naturally generate anxiety and stress in undergraduates (Graner; Cerqueira, 2019). And for Dentistry students, in addition to the situations mentioned, dealing with the first patient care, the fear of errors occurring, the ability to associate theory and practice at the time of care, the high cost of materials/instruments needed during the graduation and other scenarios can increase the anxiety and stress levels of these students (Doval *et al.*, 2019; Guimarães *et al.*, 2022).

Therefore, changes in personal/social life, academic demands, concerns about learning and carrying out clinical procedures can trigger or accentuate stress and anxiety among Dentistry students (Rodrigues *et al.*, 2019). Saxena's studies *et al.* (2019) and Fujita and Maki (2018) cited the relationship between risk behaviors, stress and anxiety among students, triggered by unpleasant academic experiences.

The university student's perception of little emotional and/or social support represents an aspect associated with psychological suffering and social relationships can play a role of risk or protection for students' mental health (Graner; Cerqueira, 2019). Furthermore, the university

student's understanding of their experience at university can influence their sense of well-being, that is, individuals who have social support tend to have a better perception of their academic performance (Graner; Cerqueira, 2019).

Among the studies included in this review, the importance of undergraduate Dentistry students receiving guidance, social/emotional support (Machado *et al.*, 2020) and information about attitudes/behaviors that favor their health and quality of life was mentioned (Basudan; Alhassan, 2017); Greater social support and a healthier lifestyle were associated with lower levels of anxiety and better quality of life among undergraduate Dentistry students in the cross-sectional study developed by Silva *et al.* (2022). It is noted that social and emotional issues, including the academic environment, can influence the anxiety levels of undergraduate Dentistry students, with the possibility of impacts on their quality of life. This fact presents evidence of a potential that can be further explored within investigations into the anxiety and/or stress that affects Dentistry students, such as the relationship with social and emotional aspects and the impacts on quality of life.

Regarding the quality of the studies, the critical aspect referred to the sample criteria and response rate. It is worth highlighting the low level of evidence from cross-sectional observational studies, resulting in the obstacle of this review to answer the previously defined research question (Santos; Fonseca; Xavier, 2019; Gualdani *et al.*, 2022).

The lack of meta-analysis is considered a limitation of the present study, due to the heterogeneity of the data. It is also considered that the use of the term “*dental students*” may have limited the scope of studies for Dentistry students in countries where this specific course is not available. Finally, the gray literature was not researched.

Conclusion

According to the cross-sectional studies found, there is an association between anxiety and quality of life of undergraduate Dentistry students, the same not being found for stress. No longitudinal studies were found that allow evaluating the impact of these measures.

The need and importance of implementing, in undergraduate Dentistry schools/faculties, educational and support measures in relation to the adoption of habits, behaviors and attitudes to control anxiety and that favor the quality of life and health of the patient was noted, as well as strategies that offer welcoming, social and emotional support to the student.

When considering the specificities of the Dentistry course, especially regarding the high cost and frequent contact with clinical procedures, measures regarding student assistance, listening or welcoming space and mental health care network must be adopted. Furthermore, it is imperative to guarantee space for discussions regarding the teaching-learning process and the psychosocial aspects that permeate students' academic lives.

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