PROGRESS IN DRUG DISCOVERY & BIOMEDICAL SCIENCE

HH PUBLISHER

Original Research Article

Prevalence of Dental Anxiety Among Students in A Medical Institute in India

Article History

Received: 5th October 2022;

Received in Revised Form: 5th December 2022;

Accepted: 6th December 2022;

Available Online: 20th December 2022

Priyanka Mishra[1]*, Rebecca Chowdhry[2], Aastha Lamichhane[3], Jagjit Singh Dhaliwal [1,4]

[1]Senior Resident (Endodontics), Department of Dentistry and Craniomaxillofacial Surgery, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, India-249203; mishra.priyanka367@gmail.com

[2]Reader, Department of Periodontics, Seema dental college, Rishikesh, Uttarakhand, India-249203; rebeccachowdhry1987@gmail.com

[3]The Dental Town Pvt. Ltd, Chandragiri, Kathmandu, Nepal-44600; aasthalamichhane@gmail.com

[4]PAPRSB Institute of health sciences, Universiti Brunei Darussalam, Brunei Darussalam; jagjit.dhaliwal@ubd.edu.bn

*Corresponding author: Priyanka Mishra, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, India-249203; mishra.priyanka367@gmail.com

Abstract: Anxiety is a common characteristic of many patients in a dental practice setting. It is estimated that in western populations, approximately 10% to 40% undergo dental anxiety while rates are higher in non-western populations. Dental anxiety is an important challenge for many patients and clinicians and is most prime barriers to optimum and high-quality dental care. Some factors that could lead to dental anxiety include painful extractions, injections, age, gender and past dental experiences. Research have shown that extreme cases of dental anxiety can lead to the avoidance of dental visits, which then in turn results in poor oral health, and patients only seek for help when the pain becomes unbearable. This research will provide dentists a better understanding on the awareness of dental anxiety among patients and to also help them plan suitable treatments (Figure1). The aim of this study was to investigate the differences and assessment of the dental anxiety levels between genders and among medical undergraduate, postgraduate and nursing students of AIIMS, Rishikesh, India. This was a cross-sectional study using a questionnaire where an estimate of up to 500 students were asked to answer some questions upon receiving their written consents. The questionnaire included their personal demographics data and the Modified Dental Anxiety Scale (MDAS) questions. The degree of anxiety was compared in relation to different factors. Data collected was analyzed using chi-square test and one-way ANOVA.

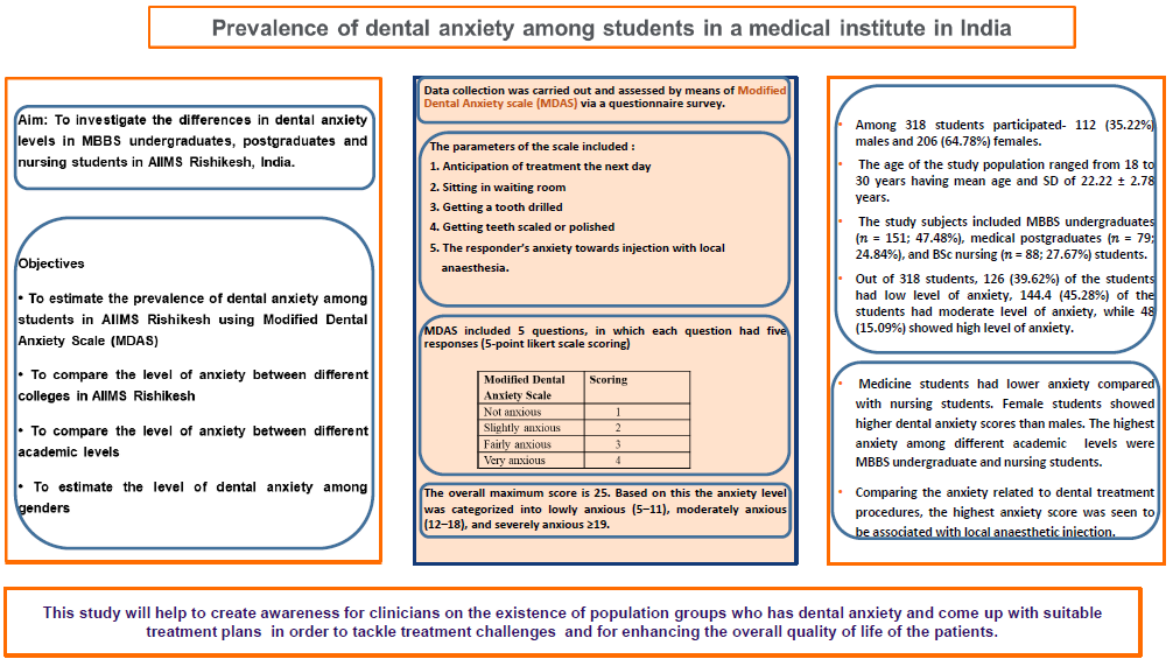

Figure 1. Prevalence of dental anxiety among students in medical institute in India.

Keywords: Dental anxiety; MDAS; anxiety scale; adults

1. Introduction

Biobehavioural scientists are increasingly recognizing the importance of emotion for the fundamental tasks of survival and adaptation. Emotion modulates memory, facilitates decision making, influences learning, and provides the motivation for critical action in the face of environmental incentives[1]. The terms dental fear and anxiety are highly related and often used interchangeably in the literature. A distinction between "normal" dental fear and "pathologic" dental anxiety must be made. Normal fear is a physiological, behavioural, and emotional response to a feared object or situation[2]. Pathological anxiety is characterized by the loss of the original signalling function of the anxious response, which can be triggered by objectively harmless situations[3]. It is considered too strong and persistent in relation to the dangerous stimulus, or it is related to an unreasonable future threat. A reduction in dental anxiety levels had been expected as anxiety is related to experience of invasive treatment procedures[4].

There are very few papers on studies done to determine the aetiology of dental anxiety. As a result, dental anxiety experienced by patients is usually poorly understood. However, dental anxiety is usually associated with certain factors. Possible factors of dental anxiety include age, gender, painful dental experiences, influence from peers traumatic dental visits, perceived feeling of vulnerability and other personal characteristics[5].

Dental anxiety remains as one of the most prominent barriers to optimum and high-quality dental care. Researches have shown that extreme cases of dental anxiety can lead to the avoidance of dental visits whereby patients only seek help when the pain becomes unbearable. As a result, patients experience poor oral health which further discourages to attend dental appointments due to possible lowered self-esteem. Dental anxiety does not only bring about complications to patients but also can become stressful for dentists. This is because treating such patients reduces the effectiveness of the treatment which then in turn requires more treatments in the future[6]. Extreme cases of dental anxiety may affect the patient-dentist relationship and may also lead to misdiagnosis One aid to explaining, identifying and reducing dental anxiety is a good measure of the condition that can be used in clinical and research settings. Clinicians need to diagnose the condition and evaluate strategies to reduce it. In interpreting trends and making comparisons, researchers need to attend carefully to measurement issues[7].

A recent 2016 study has found support for sequential stages involving behavioural, cognitive and emotional psychological factors in the decision to attend a dental appointment[6]. Negative evaluations of previous dental experiences influence behavioural intentions to visit the dentist via their influence on expectations of an unpleasant or painful dental experience. If the dentist is aware of the level of anxiety of his patient, he is not only forewarned about the patient's behaviour, but can also take measures to help alleviate the There are several types of scales and questionnaires used in order to determine the levels of dental anxiety and comparing it to multiple factors causing it. Examples include Dental Anxiety Question (DAQ) (Neverlien, 1990), Clarke and Rustvold Dental Concern Assessment Scale (DCAS) revised, Corah's Dental Anxiety Scale (CDAS) (Corah, 1969) and Modified Dental Anxiety Scale (MDAS) (Humphris, Morrison, & Lindsay, 1995). Both CDAS and MDAS are widely used by many researchers for its efficacy and accuracy[8].

The CDAS is comprised of 4 questions whereby the first consists of a set of answers and the last 3 consists of a different set of answers each which results in inaccurate results when comparing. Therefore, the CDAS is later modified into MDAS which comprises of five questions with an additional question relating to injection as needle injections are one of the highly ranked contributions to dental anxiety. By using the MDAS, it does not only aid in estimating the levels of dental anxiety but also provides an answer to specific treatments that patients are particularly anxious about anxiety during the operative procedure[9].

The aim of this study was to assess the dental anxiety levels among medical, and nursing undergraduate and postgraduate students. Demographic factors (gender) and factors that may increase (length of the appointment, invasiveness of treatment) were assessed. This

study estimates the prevalence of dental anxiety among students in AIIMS Rishikesh using Modified Dental Anxiety Scale (MDAS) and compared the level of anxiety between different colleges, different academic levels and between gender.

2. Materials and Methods

2.1 Materials

A questionnaire study was conducted among medical, and nursing undergraduate and postgraduate students of AIIMS Rishikesh. Prior to conducting the study, the protocol of the study was submitted to Research Review Committee of AIIMS Rishikesh and approval was obtained from Institutional Ethics committee of AIIMS, Rishikesh with reference number (No. 295/IEC/NF/2020) to conduct the study. A total of 318 students were enrolled recruited in this study on a voluntary basis, and an informed consent was obtained from all students. Both male and female students were included in the study.

2.2 Questionnaire Used in the Study

The data collection was carried out and assessed by means of Modified Dental Anxiety scale (MDAS). The questionnaire included demographic questions regarding the field of study, age, gender, and level of dental anxiety. The parameters of the scale included anticipation of treatment the next day, sitting in waiting room, getting a tooth drilled, and getting teeth scaled or polished and question about the responder's anxiety towards injection with local anaesthesia. This survey is a modified version of the well-known Corah's Dental Anxiety Scale (CDAS). The CDAS unfortunately does not enquire about local anaesthetic injection, which is a focus for some patient anxiety. Hence the Modified Dental Anxiety Scale (MDAS) was used where an extra item has been included referring to the respondent's feelings towards local anaesthetic injection with especial reference to the site of the injection. MDAS included 5 questions, in which each question had five responses (5-point likert scale) ranging from not anxious, slightly anxious, fairly anxious, and very anxious to extremely anxious. The scores for each of the 5 questions were summed to give the level of dental anxiety. Table 5 shows the MDAS, which was used to assess dental anxiety. Participants were asked to respond to the questions based on their level of agreement. The sum of all five questions can range from 5 to 25, with 5 being not anxious and 25 being extremely anxious. Based on this the anxiety level was categorized into lowly anxious (5–11), moderately anxious (12–18), and severely anxious ≥19.

2.3 Data Collection

Students were informed about the objectives of the study before administration of questionnaire. They were also informed that no incentives were provided for the participation of the study. Questionnaire was distributed and participants were given sufficient time to complete them. Confidentiality of the data was maintained. The study included both male and female students. The participants were grouped into three groups based on their field of study Medical (undergraduates), Medical (postgraduates) and BSc Nursing students. Only those Participants who signed the informed consent participated in the data collection. Due to the different number of students in each course, the questionnaires were distributed according to the proportion of the population for each course.

2.4 Statistical Analysis

Collected data entered and analysed using the STATA 16. The data was compiled using Microsoft excel sheet (Windows 2010). For each variable, the mean and standard deviation were calculated. Chi-square test and one way ANOVA was performed for multiple comparisons. *P* value less than 0.05 considered statistically significant.

3. Results

Out of total 500 students, 318 students completed and returned the questionnaire, which accounted for a response rate of 63.6%. A total of 112 (35.22%) males and 206 (64.78%) female students participated. The age of the study population ranged from 18 to 30 years with a mean age of 22.22 ± 2.78 years. The study subjects included MBBS undergraduates (n = 151; 47.48%), medical postgraduates (n = 79; 24.84%), and BSc nursing (n = 88; 27.67%) students. The distribution of the study subjects according to the field, age, and gender is demonstrated in Table 1.

The prevalence of dental anxiety among the study population was 95%. Out of 318 participants only 14(5%) reported to have no anxiety at all. Table 2 depicts the field-wise distribution of study subjects by the level of dental anxiety. Out of 318 students, 126 (39.62%) of the students had low level of anxiety, 144.4 (45.28%) of the students had moderate level of anxiety, while 48(15.09%) showed high level of anxiety. The high level of anxiety was found among 20.25% of MBBS female students followed by 19.32% of BSc nursing female students. The difference was found to be statistically highly significant (P < 0.001) as compared with other groups. The female students showed relatively highly significant anxiety score (79.17%) in comparison to male students (20.83%). There was a statistically significant difference (P < 0.001) when the mean anxiety scores were compared among the three fields. Most of the students showed moderate anxiety levels (45.28%),

whereas, low anxiety was seen in 39.62% of students and only 15.09% showed high anxiety levels.

The mean scores of the items were compared among all the three fields (Table 3). One-way ANOVA test was used to compare the MDAS for each item according to field of study. On comparing the mean score of each questionnaire items among MBBS, Postgraduates and Nursing students, the difference was statistically significant ($P < 0.05$) in all the questionnaire items except "About to have tooth drilled which is not statistically significant ($P = 0.07$). The year-wise comparison of mean dental anxiety scores for all the three faculties was made (Table 4). The year-wise comparison of dental anxiety among MBBS (UG) and nursing students revealed statistically significant difference ($P = 0.007$ & 0.009) respectively (Table 4). However, no significant difference was seen in year wise comparison of dental anxiety among MBBS (PG) students. The mean score of anxiety with increasing year of study among MBBS (UG) and MBBS (PG) students seems decreasing.

Table 1. Distribution of study subjects according to age, gender and field of study

Field	**Age in years**	**Gender**		**Total**
	(mean±SD)	Male n (%)	Female n (%)	n (%)
MBBS (UG)	20.82±1.94	72 (22.64)	79 (24.84)	151 (47.48)
MBBS(PG)	25.91±1.68	40 (12.58)	39 (12.26)	79 (24.84)
Nursing	21.30±1.61	0	88 (27.67)	88 (27.67)

Table 2. Distribution of the study subjects according to field of study and level of dental anxiety.

Level of anxiety	**MBBS (UG's) *n* (%)**		**MBBS (PG's) *n* (%)**		**Nursing *n* (%)**	***P* value**
	Male	Female	Male	Female	Female	
Low	41 (56.94)	30 (37.97)	23 (57.50)	11 (28.21)	21 (23.86)	<0.001
Moderate	24 (33.33)	33 (41.77)	14 (35.00)	23 (58.87)	50 (56.82)	<0.001
High	3 (9.72)	16 (20.25)	48 (7.50)	5 (12.82)	17 (19.32)	<0.001
Total	72 (100)	79 (100)	40 (100)	39 (100)	88 (100)	<0.001

Table 3. Comparison of mean MDAS for each item according to field of study.

Questionnaire items	MBBS(UG's)	MBBS(PG's)	Nursing	*P*-value
Go to dentist tomorrow	1.91±0.99	2.08±0.98	2.40±1.16	0.002**
sitting in dentist's waiting room	2.17±1.12	2.02±1.10	2.57±1.13	0.003**
About to have tooth drilled	3.11±1.28	3.07±1.28	3.45±1.03	0.07*
About to have teeth scaled and polished	2.56±1.21	1.97±0.93	2.55±0.96	<0.001**
About too have L.A. injection in the gum	3.10±1.14	3.16±1.14	3.93±1.16	<0.001**

Data are presented as mean ± SD and compared by One-way ANOVA test.

$*P < 0.05$, statistically significant; $**P < 0.001$, statistically highly significant.

Table 4. Comparison of mean MDAS for each item according to field of study.

Level of anxiety	First *n* (%)	Second *n* (%)	Third *n* (%)	Final *n* (%)	Fifth *n* (%)	Total *n* (%)	*P* value
			MBBS (UG's)				
Low	21 (13.9)	6 (3.9)	23 (15.23)	13 (8.6)	8 (5.29)	71 (47.01)	
Moderate	28 (18.54)	7 (4.63)	5 (3.3)	14 (9.27)	6 (3.97)	60 (39.74)	0.007*
High	11 (7.28)	3 (1.98)	0 (0)	4 (2.64)	2 (1.32)	20 (13.4)	
Total	60 (39.73)	16 (10.59)	28 (18.54)	31 (20.52)	16 (10.59)	151 (100)	
			MBBS (PG's)				
Low	13 (16.45)	17 (21.51)	7 (8.86)			37 (46.83)	
Moderate	16 (20.25)	15 (18.98)	4 (5.06)			35 (44.30)	0.4
High	4 (5.06)	1 (1.26)	2 (2.53)			7 (8.86)	
Total	33 (41.77)	33 (41.77)	13 (16.45)			79 (100)	
			Nursing				
Low	7 (7.95)	3 (3.40)	11 (12.52)			21 (23.86)	
Moderate	14 (15.90)	12 (13.63)	24 (27.27)			50 (56.81)	0.009*
High	0 (0)	10 (11.36)	7 (7.95)			17 (19.31)	
Total	21 (23.86)	25 (28.40)	42 (47.72)			88 (100)	

Data are presented in proportion and compared by Chi square test. $*P < 0.05$, statistically significant.

Table 5. Modified dental anxiety scale scoring.

Modified Dental Anxiety Scale	Scoring
Not anxious	1
Slightly anxious	2
Fairly anxious	3
Very anxious	4

4. Discussions

An anxious patient provides a source of concern for the dental practitioner. There are a number of assessment scales available which vary in length, content and measurement sophistication.[10] Several assessment scales had been used for example, the UK Adult Dental

Health Survey contained a question about nervousness about visiting the dentist[9]. The reports are difficult to interpret as the measurement properties of this item have not been investigated. Conversely, measures based on the Dental Fear Survey consist of many questions and are more suitable for intensive research purposes than routine clinical use. Other measures are based on Corah's Dental Anxiety Scale (CDAS) extensively used widely. The CDAS unfortunately does not enquire about local anaesthetic injection, which is a focus for some patient's anxiety. Psychometric details for another dental anxiety measure, the Modified Dental Anxiety Scale (MDAS) are provides an insight and includes a question on local anaesthesia.

In the present study, the mean dental anxiety score for medical students was significantly lower compared to nursing students. The reason for higher anxiety scores in nursing students compared to medical students may be due to lack of dental awareness, while the medical students may be more familiar with stress management related to health measures. This result was in line with previous studies done by Cesar *et* al,[11] Sghaireen *et al*[12].

In the present study, the mean dental anxiety score declined with each successive year of study. Also, first-year students showed higher anxiety score than senior students. These findings is consistent with studies done by other researchers who reported that dental anxiety declines with advanced year of study[13,14]. This might be because the students become more aware and more professionally developed and acquire more clinical experience when they advance in their clinical years[15].

The results of this study showed that the students were more anxious when they probed about how they feel if given local anaesthetic injection. Similar findings were also reported in the studies conducted by Acharya and Sangam[13], Ali *et al*[15] and Humphris[16]. The fear of injection is one of the most common hindrances in seeking good medical/ dental care. Most likely, this can be because “anesthetic needle” are common clinical procedures that can invoke pain. Students in the present study were less fearful towards the non-operative dental procedures. The lowest mean score was reported for dental appointment. This study suggests that the respondents were more fearful towards the operative procedures than the non-operative work. The possible reason for this is that the operative dental procedures are directly or bodily applied to them[17].

It should be noted that the number of female participant students were higher, as nursing course had only female students. Research shows that females have higher levels of dental anxiety with highest amongst MBBS Undergraduate female students (20.25%) followed by BSc nursing female participants (19.32%). This can be explained by the fact that

males are more emotionally stable than females[12,18]. These findings corroborated the results from previous studies that showed higher levels of anxiety among females[2,19,20]. Furthermore, Schuurs and Hoogstraten[21] suggested that the higher dental anxiety score of women in their study did not necessarily mean that women are more anxious than men, but that they express anxiety more readily than men do. However, few other studies showed no significant difference in the level of anxiety between the two genders. These differences among researchers might be due to cultural differences[22].

Lack of dental health education might result in patients' fear and anxiety which in turn might end with poor patient compliance and attitudes. This information will be further utilized in developing the best strategies to manage patient anxiety. The patient attitude and behaviour towards the dental treatment can be best understood by assessing the anxiety before starting the dental treatment.

There are a few limitations of this study. The study was hospital based; it does not represent the level of dental anxiety of general population. Hence, the findings of this study cannot be extrapolated to the entire population. Secondly, it is a self-administered questionnaire study, where the respondents may hide their true feeling and may also have underreported their dental fear, anxiety, and unpleasantness related to seeking and obtaining dental care. Another bias could be the uneven sex distribution since female participants were more than males, as research shows a higher prevalence of anxiety among females, the results might have been affected by the more number of female participants.

This study may help to create awareness for clinicians on the existence of population groups who has dental anxiety. Hopefully by knowing this, clinicians can be prepared to manage such patients and come up with suitable treatment plans in order to tackle treatment challenges with dental anxiety and for the amelioration of overall quality of life.

5. Conclusion

The study based on the Modified dental anxiety scale showed the anxiety levels of students of different field of study. It was concluded that the students of medicine has lower anxiety compared with nursing students. Highest anxiety levels were among the MBBS undergraduate and nursing students and females showed higher dental anxiety scores than males. Among the various treatment procedures highest anxiety score was seen to be associated with a local anaesthetic injection.

Even though the current study used the modified anxiety scale and examined the levels of dental anxiety among students from different fields of study, further studies are required to investigate the effect of various factors on dental anxiety.

Author Contributions: Conceptualization - Jagjit Singh Dhaliwal; Writing -original draft and data collection- Dr Priyanka Mishra; Writing -review & editing, Jagjit Singh Dhaliwal, Dr Rebecca Chowdhry and Dr Aastha Lamichhane. All authors approved the final version of the study and assume public responsibility for its content.

Acknowledgement: The authors would like to thank the students of All India Institute of Medical Sciences, Rishikesh for their contribution and completing the questionnaires.

Conflict of Interest: The authors declare no conflict of interest.

References

1. Zimmerman C. Damasio's proposition: A review of Damasio. Canad J Exper Psycho 1996; 50(3):330–332.

2. Armfield JM, Spencer AJ, Stewart, JF. Dental fear in Australia: who's afraid of the dentist?. Aust Dent J 2006; 51(1):78–85.

3. Malt UF, Rettersdol N, Dahl AA. Laerebok I Psykiatri. GyldendalNorsk Forlag,Oslo, Norway, 2006.

4. Lee KC, Bassiur JP. Salivary alpha amylase, dental anxiety, and extraction pain: A pilot study Anaesth prog 2017; 64(1): 22–28.

5. Rodolfa ER., Kraft W, Reilley RR. Etiology and treatment of dental anxiety and phobia. Am J Clinic Hyp, 1990; 33(1):22–28.

6. Appukuttan D. Strategies to manage patients with dental anxiety and dental phobia: literature review. Clin Cosmet Investig Dent 2016; 8: 35–50.

7. Acharya S and Sangam DK. Dental anxiety and its relationship with self-perceived health locus of control among Indian dental students. Oral Health and Preventive Dentistry 2010; 8: 9–14.

8. Tunc E, Firat D, Onur O, Sar V. Reliability and validity of the Modified Dental Anxiety Scale (MDAS) in a Turkish population. Community Dent Oral Epidemiol 2005; 33(5): 357–362.

9. Humphris GM, Morrison T, Lindsay SJ. The modified dental anxiety scale: Validation and United Kingdom norms. Community Dent Health 1995; 12: 143–150.

10. Corah NL, Gale EN, Illig SJ. Assessment of a dental anxiety scale. J Am Dent Assoc. 1978; 97: 816–819.

11. Cesar J, de Moraes AB, Milgrom P, Kleinknecht RA. Cross validation of a Brazilian version of the Dental Fear Survey. Community Dent Oral Epidemiol. 1993; 21(3): 148–150.

12. Sghaireen MG, Zwiri AMA, Alzoubi IA, *et al*. Anxiety due to dental treatment and procedures among university students and its correlation with their gender and field of study. Int J Dent 2013.

13. Acharya S and Sangam DK, Dental anxiety and its relationship with self-perceived health locus of control among Indian dental students. Oral Health Prev Dent 2010;8(1):9–14.

14. Peretz B and.Mann J. Dental anxiety among Israeli dental students:a 4-year longitudinal study. Europ J Dent Edu 2000; 4(3): 133–137.

15. Ali S, Farooq I,. Khan SQ, *et al*. Self-reported anxiety of dental procedures among dental students and its relation to gender and level of education. J Taibah University Med Sci 2015; 10(4): 449–453.

16. Humphris and King K. The prevalence of dental anxiety across previous distressing experiences. J Anxiety Disord 2011; 25(2): 232–236.

17. Domoto PK, Weinstein P, Melnick S, *et al*. Results of a dental fear survey in Japan: implications for dental public health in Asia. Community Dent Oral Epidemiol 1988; 16(4): 199–201.

18. Al-Omari WM and Al-Omiri MK. Dental anxiety among university students and its correlation with their field of study. J Appli Ora Sci 2009; 17(3): 199–203.

19. Enkling N, Marwinski G, Johren P. Dental anxiety in a representative sample of residents of a large German city. Clin Oral Investig. 2006; 10(1) :84–91.

20. Hakeberg M, Hallonsten A, Hagglin C, *et al*. Tandvårdsrädslans epidemiologi. [The epidemiology of dental anxiety]. Tandläkartidningen. 2003; 95: 22–29.

21. Schuurs AH, Hoogstraten J. Appraisal of dental anxiety and fear questionnaires: A review. Community Dent Oral Epidemiol 1993; 21: 329–339.

22. Storjord H, Teodorsen M, Bergdahl J, *et al*. J Multidiscip Healthcare 2014; 7: 413–418.