Original Research Article

Dental Anxiety among Undergraduate Students of a National University in Brunei Darussalam

Tan Zhi Qi[1], Ishak Nurul Sa'idah[2], Hanif Abdul Rahman[1], Jagjit Singh Dhaliwal[1]*

[1]PAPRSB Institute of Health Sciences, Universiti Brunei Darussalam, Bandar Seri Begawan, Brunei Darussalam, tanzhiqi6@gmail.com; hanif.rahman@ubd.edu.bn

[2] Special Care Dentistry unit, Raja Isteri Pengiran Anak Saleha Hospital, Bandar Seri Begawan, Brunei Darussalam, nurul.ishak@gmail.com

*Corresponding author: Jagjit Singh Dhaliwal, PAPRSB Institute of Health Sciences, Universiti Brunei Darussalam, Jalan Tungku Link, Gadong, Brunei Darussalam, BE1410; jagjit.dhaliwal@ubd.edu.bn

Abstract: This study aimed to investigate the nature of dental anxiety among undergraduate students of a national university in Brunei Darussalam. Participants were undergraduate students from different faculties of a national university. It was a cross-sectional study using a questionnaire that included their personal demographics, the Modified Dental Anxiety Scale (MDAS) questions and questions regarding their last dental visit. The degree of anxiety was compared in relation to different factors as mentioned above. Data collected was analyzed using independent t-test and one-way ANOVA. Results showed that the frequency of dental anxiety among the undergraduate students was 70.8%. The mean total MDAS score was 12.3 ± 4.28. Females (13.5 ± 5.12) were more dentally anxious than males (12.2 ± 4.73) (p=0.027). There was a significant difference in the mean MDAS score ($p < 0.001$) when comparing patterns of dental visits with dental anxiety. More students were fearful of local anesthetic injection than getting tooth drilled. (4) Conclusion: Dental anxiety still remains as one of the obstacles that clinicians face. More studies need to be done to provide a better understanding on how dental anxiety can affect the pattern of dental visits. Future studies should explore the etiology of dental anxiety. This study helps to create awareness on the presence of dental anxiety amongst the existent population group and also to aid clinicians in identifying areas of dentistry where patients are most anxious about in order to come up with a suitable treatment plan.

Keywords: Dental anxiety, MDAS, anxiety scale, undergraduates, university.

1. Introduction

Dental anxiety is a common characteristic of many patients in a dental practice setting. It has been estimated that in western populations, approximately 10% to 40% experience dental anxiety while rates are higher in non-western populations[1]. Dental anxiety can be defined as a psychological and physiological behavior of having non-pharmaceutical fear after experiencing traumatic dental experiences[2].

Fear, phobia and anxiety are commonly used terms and are often being confused to have the same definition. Fear is defined as 'the anticipation of threat obtained by an identifiable source'[3]. On the contrary, dental phobia is an intense and continuous feeling of fear as a result of a dental stimulus or treatments that leads to the negligence of undergoing dental procedures[4]. In other words, it is an exaggeration of dental anxiety.

There are very few studies to determine the etiology 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, influences 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. Studies 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[7].

After performing a systematic literature review, it has been discovered that there were no published studies on dental anxiety in Brunei Darussalam. This study may also provide explanations for the low attendance rate to dental clinics and to plan more suitable treatment plans for all patients[8]. The aim of this study was to investigate the nature of dental anxiety among undergraduate students in a national university. The specific objectives of the study were to estimate the frequency of dental anxiety among undergraduate students using Modified Dental Anxiety Scale (MDAS), to determine the association of socio demographic factors with dental anxiety and to compare the level of dental anxiety and the pattern of dental visit.

2. Materials and Methods

2.1 Study Design, Population and Sample

This research was a cross-sectional study conducted from August to October 2019 and December 2019 to March 2020. The target population for this research are undergraduate university students. The faculties include, Faculty of Arts and Social Sciences (FASS), School of Business and Economics (SBE), Institute of Health Sciences (IHS), Faculty of Science (FOS), Academy of Brunei Studies (APB) and Faculty of Integrated Science (FIT). The inclusion criteria for this research were participants who are willing to participate and only undergraduate students. The exclusion criteria were master students and the research centres in the university.

The following formula was used to calculate sample size for estimating a proportion of a finite population (5,000 cases).

$$n' = \frac{NZ^2P(1-P)}{d^2(N-1) + Z^2P(1-P)}$$

Where
n' = Sample size with finite population correction,
N = Population size,
Z = Z statistic for a level of confidence
P = Expected proportion, and
D = Precision

A sample size of at least 357 was required to achieve precision (power) of 5% (d = 0.05) on a population size of 5,000 university students with expected proportion of 50% at 95% confidence level. Following the systemic literature review, the lowest response rate among the previous dental anxiety studies in university students was 74.7%.

2.2 Data Collection

Data collection was commenced upon receiving ethical approval from the Institute of Health Science Research Ethics Committee (IHSREC). The participant information sheet, consent form and questionnaires were distributed by the Admission Registrars (AR), as the gate keepers. Participants were given the Participant Information Sheet (PIS) and explained on the study before proceeding with the questionnaire. Those who agreed to participate in the survey were given the questionnaires to be filled and collected back by the gatekeeper. Participants were given a week (7 days) to complete the questionnaire. Due to the different number of students in each faculty, the questionnaires were distributed according to the proportion of the population for each faculty.

2.3 Research Instruments

The questionnaire was drafted and discussed among researchers. The questionnaire consists of three sections. The first section included sociodemographic information which are age, gender, religion, ethnicity, faculty, programme and level of study. The second section included a question on the patterns of dental visit while the last section is comprised of the Modified Dental Anxiety Scale (MDAS) modified by Gerry Michael Humphris, 1995. The Participant Information Sheet, consent form and questionnaire were in English as the undergraduate students have a proficiency in English Language.

A pre-testing was conducted with 8–10 participants to ensure that the questionnaire was comprehensible. In the case where participants were not able to answer the questionnaire during the pre-testing, further amendments were made accordingly.

2.4 Statistical analysis

Collected data was entered and analysed using RStudio Desktop version 1.1.463 (for Mac). Estimation of dental anxiety was computed using 95% confidence intervals (CI), and one-way ANOVA was used to compare dental anxiety and sociodemographic factors. All statistical tests are two-sided and *p*-value less than 0.05 was considered significant.

2.5 Ethical Consideration

Permission was obtained from UBD administration before the study was conducted. Each participant had enough time to read through the Participant Information Sheet and they may ask questions when in doubt. Participants were also reminded that they can refuse to participate or withdraw from the study without any hesitation or penalty. Participants may do so by emailing the principal researcher with mentioned participant code before April 2020. Any information retrieved that could reveal the participants' identity will not be disclosed. All questionnaires and forms are kept locked and all input data are stored in a password-protected source which are only accessible to researchers. The questionnaire and forms, data files, will be destroyed or deleted after five years of completion of the study. Data from this study belongs to the university.

3. Results

There was a total of around 5,000 students in a national university during which the study was conducted. A total of 500 questionnaires were distributed and only 294 (58.8%) were answered. Participants were undergraduate students of UBD of which 123 were males and 171 were females with a mean age of 20.4 ± 1.94 years. The overall frequency of dental anxiety was estimated to be 70.8% where 25.9%, 32.0% and 12.9% of the students had moderate, high and extreme anxiety, respectively. The minimum MDAS score ranging from 5–9 indicates minimal anxiety, 10-12 indicated moderate anxiety, 13-17 indicates high anxiety, and 18–25 indicates very high anxiety.

3.1 Sociodemographic and Dental Anxiety

Table 1 illustrates the breakdown of MDAS score with the different sociodemographic factors. As can be seen in Table 1, majority of the participants were year 2 students (47.6%), female (58.2%), Malay (81.6%), Islam (83.7%) and from faculty of Institute of Health Science (37.1%). The mean of the total MDAS score among the undergraduate students in UBD was 12.3 ± 4.28.

There were no significant differences when comparing total MDAS score with ethnicity, religion, faculty and year of study. On the other hand, the mean total MDAS score differed significantly between males (12.2 ± 4.73) and females (13.5 ± 5.12) ($p = 0.027$).

Table 1. Sociodemographic characteristics and MDAS score (*n* = 294)

	n	%	MDAS Score Mean (SD)	*P*-value
Median age (IQR)	20	2		
Gender				
Male	123	41.8	12.2 (4.73)	**0.027**
Female	171	58.2	13.5 (5.12)	
Ethnic				
Malay	240	81.6	13.2 (5.10)	0.341
Chinese	43	14.6	12.1 (4.60)	
Others	11	3.6	12.2 (3.97)	
Dusun	6	2.0		
Indian	1	0.3		
Religion				
Islam	246	83.7	13.2 (5.06)	0.652
Buddhism	27	9.2	11.7 (3.84)	
Christianity	7	2.4	9.14 (2.85)	
Others	14	4.8	14.0 (5.70)	
Faculty				
Academy of Brunei Studies (APB)	19	6.5	13.4 (5.81)	0.782
Institute of Health Sciences (IHS)	109	37.1	12.4 (4.66)	
Faculty of Science (FOS)	88	29.9	13.3 (5.13)	
Faculty of Arts and Social Sciences (FASS)	19	6.5	13.4 (5.41)	
Faculty of Integrated Science (FIT)	30	10.2	12.9 (4.72)	
School of Business and Economics (SBE)	29	9.9	13.7 (5.42)	
Year of study				
Year 1	99	33.7	12.4 (4.86)	0.458
Year 2	140	47.6	13.4 (5.14)	
Year 3	14	4.8	12.4 (4.07)	
Year 4	41	13.9	13.1 (5.08)	

3.2 Pattern of Dental Visit and Dental Anxiety

Table 2 demonstrates the mean MDAS score compared between the different patterns of dental visit. When evaluating the pattern of dental visit with dental anxiety, there was a significant difference in the mean MDAS score (*p* < 0.001). From the results, participants who last attended the dentist less than 12 months ago (11.3 ± 3.92) has a lower mean MDAS score compared to participants attending more than 5 years ago (14.4 ± 5.59). A cutoff point of 19 or above was used to imply a highly dentally anxious individual. As shown in Figure 1, only 28 participants (9.5%) were considered to be significantly dentally anxious.

Table 2. Pattern of dental visit and MDAS score

Pattern of dental visit	*n*	%	Mean (SD)	*P*-value
<12 months ago	102	34.7	11.3 (3.92)	**<0.001**
1-2 years ago	73	24.8	13.4 (5.07)	
2-5 years ago	55	18.7	14.2 (5.42)	
>5 years ago	51	17.3	14.4 (5.59)	
never	13	4.4	13.6 (4.68)	
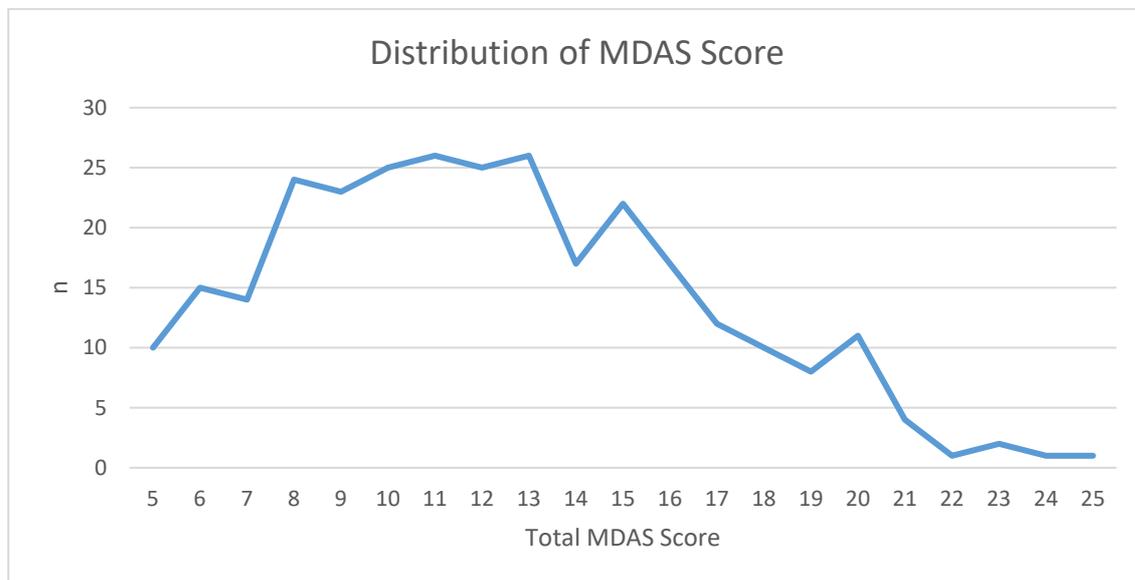
Figure 1. Distribution of MDAS scores

3.3 Dental Events and Dental Anxiety

As shown in Figure 2, more students fear local anesthetic injection (69.0%) than getting their tooth drilled (62.9%).
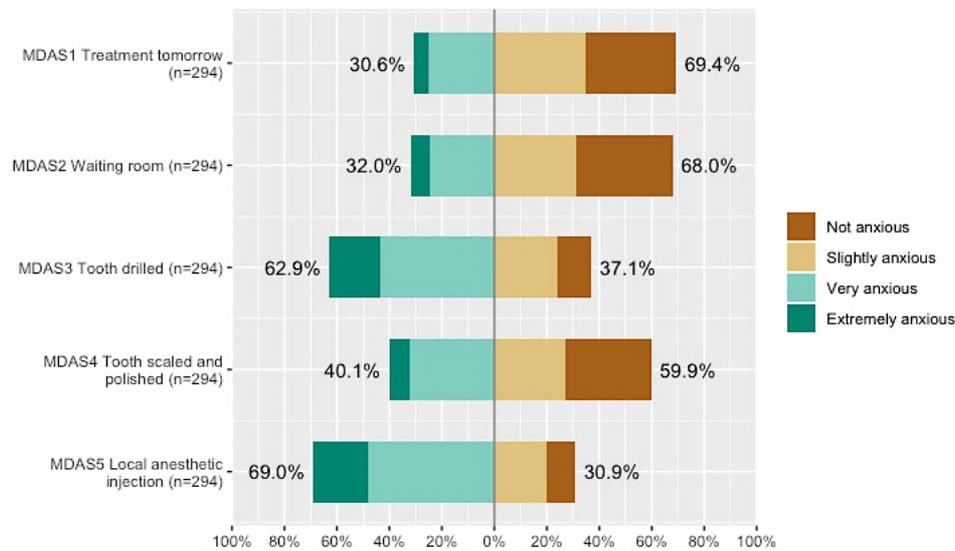
Figure 2. MDAS score for each dental item

4. Discussion

4.1 Statement of Principal Findings

The purpose of the research was to estimate the frequency of dental anxiety of undergraduate students in the university. The Modified Dental Anxiety Scale (MDAS) was used for its reliability and validity to cover important aspects of dental anxiety[9]. Results from this study reported that the mean total MDAS score was 12.3 (SD = 4.28). According to the Indicator of Sedation Need (IOSN) scale[10], the mean total MDAS score indicated that generally, students are moderately anxious. This could be due to students being knowledgeable and more aware of their oral health.

There was a significant difference when comparing levels of dental anxiety between genders. Female students have shown to be more dentally anxious than male students. The reason for this could be because females are more likely to report dental anxiety when compared to male. In other words, males tend to be more embarrassed to admit due to cultural norms[6]. In terms of racial and religious distribution, this is a representation of the population distribution in the country.

Besides that, dental anxiety is one of the crucial factors in affecting patterns of dental visits. When an individual is fearful of going to the dentist, it is very likely that he or she will reschedule or cancel the appointment. Hence, individuals will visit the dentist less often. This leads to long time intervals between dental visits which may then increase the individual's dental anxiety. On the contrary, individuals who visit the dentist regularly would usually have lower dental anxiety.

When comparing between different dental items, students were more anxious to have local anesthesia injection when compared to having their tooth drilled. These students may have fear of needles and the pain when being injected.

4.2 Findings Compared To Previous Studies

The frequency of dental anxiety among the undergraduate students was 70.8%. This frequency was higher in comparison to the study done by Fayad *et al.*[11] where they reported the mean percent anxiety to be 51.6%. Similarly, other studies done in India[2] and Saudi Arabia[12] also reported to have lower incidence of 60.75% and 27.0%, respectively. On the other hand, a different study from India, which was done among the coastal Andhra population, reported to have frequency of 77.4%[13]. This result was higher than the result reported in this study. In another study done among the medical and dental undergraduates in Malaysia, Hakim and Razak[3] reported a much higher frequency of more than 90.0%. The differences in results could be due to the sample size, demographic factors like age and gender, cultural backgrounds, and geographical variations[11,12].

When comparing between sociodemographic characteristics and dental anxiety in the present study, there was a significant difference between males and females. The results suggested that females (13.5 ± 5.12) have higher dental anxiety when compared with males (12.2 ± 4.73) (*p*=0.027). A study done by Mohammed *et al.*[13] have shown similar results where the mean Corah's dental anxiety scale (CDAS) score for male was 9.96 ± 3.9 while females had a mean CDAS score of 10.8 ± 4.2. The researcher also used dental concerns assessment scale (DCAS) that also showed greater dental anxiety in females than males and have also reported that women have lower pain tolerance. Other researchers have also indicated that females have higher dental anxiety in comparison to males[14,15].

However, other studies have reported that females have significantly higher dental anxiety than males in certain dental events like waiting at the dental chair while the dentist prepares the drill. This component was analyzed using the Dental Anxiety Scale-Revised (DAS-R). When using the Dental Anxiety Question (DAQ), there were no significant differences when comparing gender with dental anxiety, though female students had higher mean score[16]. On the other hand, a study done in the Kingdom of Saudi Arabia revealed that there was no significant difference between the MDAS score of male and females[17]. This could show that cultural backgrounds may contribute to the differences between these studies.

The present study has shown that students report greater fear when they visit the dentist less. A study done in Singapore revealed that their university students have reported higher dental fear when the time interval between dental visits were longer[18]. Furthermore, Kaakko *et al.*[19] showed that longer time interval after last dental visit results in greater signs dental anxiety. A research by Taani[20] indicated that irregular dental visits can be due to the fear pain where more than 50% of the participants fear pain when going to the dentist. Other reasons also include lack of time, fear from the dentist, cost and fear of catastrophe at the dentist. Additionally, another study in Turkey have also shown that adolescents visits the dentist more frequently when parents have higher educational levels[15]. However, a study

done by Gaffar *et al*.[12] showed that there was no correlation between dental anxiety and irregular dental visits.

In the present study, greater number of students fear local anesthesia when compared to getting a tooth drilled. The results are similar to other studies in Saudi Arabia where injection has the highest mean score[11,20]. On the contrary, Bhola and Malhotra[2] reported that teenagers were more anxious when having a tooth drilled than getting local anesthetic with mean percent scores of 78.3% and 75.8% respectively. Other studies have also demonstrated that the most feared dental items were anesthetic injection and tooth drilling[3,14].

5. Strengths and Limitations of the Study

5.1 Strengths

The present study aimed to estimate the levels of dental anxiety among undergraduate students of UBD and this study has managed to include students from all 6 faculties: Academy of Brunei Studies (APB), Faculty of Arts and Social Sciences (FASS), Faculty of Integrated Technologies (FIT), Faculty of Science (FOS), Institute of Health Sciences (IHS) and School of Business and Economics (SBE). As there are not many studies done in Brunei Darussalam, this study adds to the current oral health research data in Brunei and hopefully worldwide. This study also supports the oral health population survey in Brunei that dental anxiety could be related to poor dental attendance behavior.

5.2 Limitations

There were several limitations when the present research was conducted. Firstly, only 294 out of 500 questionnaires were answered (58.8%). Reasons could be due to the lack of awareness of the study or the inconvenient access to the questionnaire. Additionally, many students were abroad for 'Discovery Year' and for those who responded, a number were master students who are in the exclusion criteria for this research. Secondly, the distribution was heavily skewed towards second year students in the Faculty of Science and Institute of Health Sciences. Therefore, it does not accurately represent the population of the national university. Thirdly, the sample only included undergraduate students and hence, the results could not be used to represent the whole population of Brunei Darussalam.

Another limitation to this study was the use of questionnaire in one language only. The questionnaire was only delivered in English language as the study sample was deemed to have a proficiency in English Language. Despite that, response rate could have been improved if the questionnaire was also administered in Bahasa Melayu language, which is the most widely spoken language in Brunei Darussalam.

6. Clinical Implications of Study

As mentioned previously, there were no studies published on dental anxiety in Brunei Darussalam. Hence with the present study, it helps to create awareness for clinicians on the

existence of population groups who has dental anxiety. With the use of quantitative survey like MDAS, it helps to identify which areas of dentistry are they most likely anxious about. Hopefully by knowing this, clinicians can be prepared to manage such patients and come up with suitable treatment plans to ensure that the treatment is carried out safely and successfully.

Furthermore, this report aimed to hopefully provide a better insight on the dental anxiety and its relation to patterns of dental visits. Results from this study have shown that dental anxiety play a role in explaining the poor dental attendance behavior. When comparing with the existing data available, it showed that there is a relation between dental anxiety and poor dental attendance. However, other factors can also lead to poor attendance which are not included in this study and requires more research.

7. Conclusion

Dental anxiety or fear still remain as one of the biggest obstacles for clinicians and patients when it comes to achieving optimal oral health. There is still lack of information in understanding dental anxiety. The present study aimed to estimate the frequency of dental anxiety where factors that can affect dental anxiety were not investigated. Therefore, there is a critical need to explore these factors in order to fully understand the etiology of both dental anxiety and poor dental attendance. Proper managements should be established in order to tackle treatment challenges with dental anxiety and it can affect patients' oral health which also can compromise their overall quality of life.

8. Recommendations for a Future Study

  I.   Future studies should look into the etiology of dental anxiety to further understand the poor dental attendance in Brunei. Different sets of questions should be administered in future studies in order to determine the causes of dental anxiety.
 II.   Other population groups can be investigated such as school children, parents, elderlies and patients at dental clinics.
III.   The sample size should also be enlarged to better represent the population of Brunei.
 IV.   Questionnaires can be done in Bahasa Melayu language, which is the most widely spoken language in Brunei Darussalam.
  V.   More ways of delivering questionnaires can be used in future studies i.e. online questionnaires.

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

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