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Original Article

Dental Anxiety and Phobia among Medical and Dental Undergraduates in Universiti Teknologi MARA (UiTM): A Cross-sectional Study

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ABSTRACT

Objective: *To assess the prevalence of dental anxiety and phobia among Malaysian medical and dental undergraduates of 2019.* **Materials and Methods:** *A validated Index of Dental Anxiety and Fear Scale (IDAF-4C+) questionnaires were distributed to medical and dental undergraduates in UiTM Sungai Buloh (n=460) via stratified random sampling. Demographic characteristics data were also collected. A cut point of 2.5 in average score for dental anxiety and fear (IDAF-4C) module was set to indicate the presence of dental anxiety. Descriptive statistics was used to determine the prevalence at while Pearson's correlation was used to check its correlation towards related dental stimuli. The association of sociodemographic factors towards dental anxiety and fear were evaluated by logistic regression.* **Results:** *This study found that medical undergraduates reported higher prevalence of dental fear (25.6%) as compared to dental undergraduates (18.9%). The highest stimuli correlated to dental anxiety and fear is 'feeling sick, queasy or disgusted' (r=0.537) followed by 'not being in control of what is happening' (r=0.484). Having unpleasant dental experience rose the likelihood of dental anxiety and fear by four times. Those from high-*

income family has 51.7% lower likelihood of dental anxiety and fear versus to those from low-income family. **Conclusion:** *We conclude that dental anxiety is relatively prevalent even among medical and dental undergraduates in Malaysia. Feeling sick, queasy and disgusted are found to be the most correlated stimulus among medical undergraduates.*

Keywords: *dental anxiety, dental fear, dental phobia, dental students, medical students*

Abbreviations: *Index of Dental Anxiety and Fear (consists of IDAF-4C, IDAF-P, IDAF-S) (IDAF-4C+), Dental Anxiety and fear module (IDAF-4C), Dental Phobia module (IDAF-P), Dental Stimulus Module (IDAF-S)*

INTRODUCTION

The terms anxiety, fear and phobia are often interchangeable in literature and remains unclear (Grupe & Nitschke, 2013). Even The Diagnostic and Statistical Manual of Mental Disorders (DSM) does not provide a definite distinguished criteria for these three terms (American Psychiatric Association, 2013). In general, fear is defined as *"a distressing emotion or thought a person has when they are frightened by or worried of something bad, painful, or dangerous that is happening or might happen"* (McIntosh, 2013). Individuals in a fearful state commonly experience unpleasant emotions caused by pain or danger, be it real or imagined (Steimer, 2002). As written in the Diagnostic and Statistical Manual of Mental Disorders (DSM), fear may also lead to phobia, a condition where the feared stimulus interfere with a person's normal routine, social activities, or relationship. It also discussed about anxiety, which is defined as *"the misfortune that is accompanied by a feeling of uneasiness, distress, and/or somatic symptoms of tension or apprehensive anticipation of future danger"* (American Psychiatric Association, 2013). On the other hand, anxiety is a psychophysiological sign on a triggered stress response (Keating-Biltucci, 2011).

From the dental world's perspective, fear (or often known as dental fear) is a common condition where an individual has an emotional reaction in a dental situation to one or more particular threatening stimuli (Madfa et al., 2017). Dental anxiety is referred to as a specific response by a patient towards dental situation-associated stress (Appukuttan, 2016). More severe forms of dental anxiety may lead to dental phobia that could significantly influence daily function and it can be characterized by a marked and persistent fear in relation to either clearly perceptible situations, objects or to dental procedures in general (Attaullah, 2011).

Dentist-patient relationships may be affected due to dental fear, anxiety and phobia resulting in ambiguous diagnosis of real dental problems (Appukuttan, 2016). Patients tend to avoid seeking dental care (Pohjola V, Lahti S, 2009; Serra-Negra et al., 2012) and delay treatment which can lead to the deterioration of their oral health (Armfield, Slade, & Spencer, 2009). This commonly perceived event could affect anyone regardless of age, gender, and educational background (Madfa et al., 2017). On account of fear, a study by Hakim & Razak (2014) proved that nearly 19% of dental students and 27% of their medical counterparts did not attend or cancelled appointments. According to the study, drilling and anaesthetic needles invoked the most fear, anxiety, and unpleasantness among dental and medical student. Surprisingly, the proportion is quite similar among population with non-medical or dental background where research by (Savithri, 2008) shows that 33.3% of antenatal women with moderate fear cancelled their dental appointments due to fear. Meanwhile, within the German population, elders showed less fear of dental treatment when compared to the younger generation and men were found to be less anxious than women (Enkling, Marwinski, & Jöhren, 2006).

Despite the advance technology and improvements in dentistry, dental anxiety and fear still persist (Saatchi, Abtahi, Mohammadi, Mirdamadi, & Binandeh, 2015; Svensson, Hakeberg, & Wideboman, 2016; White, Giblin, & Boyd, 2017). What is more concerning is that, this issue also occurs among dental and medical students (Al-Omari & Al-Omiri, 2009; Drachev, Brenn, & Trovik, 2018; Gunjal, Pateel, & Parkar,

2017). As for the Malaysian medical education system; the admission, syllabus and requirement setting assures for the production of a highly proficient future medical professional (Faculty of Dentistry Universiti Teknologi MARA, 2019; Faculty of Medicine Universiti Teknologi MARA, 2019). They are expected to be a vital member of the healthcare frontline. Therefore, there should be a low prevalence of dental anxiety and fear. It is important that dental and medical students learn to overcome their own dental anxiety so that they can be more confident in their practice which in turn, providing better patient care aligned with local and international health standards (Al-Omari & Al-Omiri, 2009; Gunjal et al., 2017). Hence, this study aims to provide information on dental anxiety and fear among Malaysian dental and medical undergraduates and its association to dental stimuli and other sociodemographic factors.

MATERIALS AND METHODS

Study design and participants

This is a cross-sectional study conducted among dental and medical undergraduates in Universiti Teknologi MARA (UiTM) Sungai Buloh Campus. Ethical approval was obtained prior conducting this study (Ref no: 600-IRMI (5/1/6)). The inclusions criteria include all undergraduates from year 1 to year 5 in academic year of 2018-2019. Postgraduate students and non-Malaysian students were excluded from being the study sample.

Sample size calculation

A minimum of 382 samples was obtained using Epi Info Sample Size and Power Calculator. Margin of error was set at 5% and expected frequency at 53.5% (Swetah & Pradeep Kumar, 2015). After considering 20% non-response rate, 460 questionnaires were distributed where 118 questionnaires were distributed to dental undergraduates and 342 questionnaires to medical undergraduates.

Stratified random sampling method was used in this study where undergraduate students (N=1384) were first stratified by faculty followed by year of study (Figure 1). Random sampling was then performed within each strata, proportionate to the strata size.

Research Tools

A validated English version of Index of Dental Anxiety and Fear (IDAF-4C+) questionnaire (Armfield, 2010) was used. All three modules in the questionnaire namely IDAF-4C (dental anxiety and fear module), IDAF-P (phobia module) and IDAF-S (stimulus module) were used in this study.

According to Armfield (2010), IDAF-4C module was designed to measure dental anxiety and fear. It consists of eight questions representing four components of anxiety and fear which are: emotional, behavioural, physiological, and cognitive. Each domain is represented by two questions. The responses ranged from “disagree” to “strongly agree” in a form of 5 points Likert Scale. For this module, overall score is calculated by averaging the total score. Average score of 2.5 is the cut point to indicate the presence of dental anxiety and fear.

IDAF-P module enable a non-clinical diagnosis of specific phobia with differential diagnosis for panic disorder and social phobia, which is based on DSM 5 diagnostic criteria (American Psychiatric Association, 2013). This module requires respondent to answer 5 statements with either ‘Yes’ or ‘No’. The indication of dental phobia would require: [1] an indication of “marked fear” on IDAF-4C module, [2] a response of ‘Yes’ to question 2a on the IDAF-P (actively avoided or endured with intense fear), [3] a response of ‘Yes’ to question 2b on the IDAF-P (present for at least 6 months), [4] a response of ‘Yes’ to question 2c on the IDAF-P (significantly affects life), [5] a response of ‘No’ to question 2d on the IDAF-P (panic disorder differential diagnosis), and [6] a response of ‘No’ to question 2e on the IDAF-P (social

phobia differential diagnosis). People who respond 'Yes' to question 2d and 2e were considered to have a dental fear as a component to their possible Panic Disorder or Social Phobia, respectively (Armfield, 2010).

The IDAF-S module consists of 10 questions asking respondents to record the extent to which they are anxious of a variety of dental stimuli on a response scale ranging from 'Not at all' (1) to 'Very much' (5). All questions were meant to be analysed individually and therefore total scores were not computed.

Data collection

All three modules: IDAF-4C, IDAF-P and IDAF-S were combined into one layout and distributed as a set of questionnaires. Questions on demographic were also included. Household income was categorized into "low income" which ranging from RM0-3000, "middle income" which ranging from RM3001-6275 and "high income" which ranging from RM6276-30000 (Department of Statistics Malaysia, 2017). The paper-based self-administered questionnaires were passed to the class representative together with the Consent Form and Research Information Sheet to be distributed during class session. The questionnaire took about less than 10 minutes to complete. Answered questionnaires were then collected at the end of the day for data entry and analysis. Data were collected from March 2018 until December 2018.

Statistical Analysis

IBM SPSS Version 25 was used for data management and statistical analysis.

Demographic characteristics were analysed by descriptive statistics. Pearson's Chi Square was used to determine the significance different between the two groups of students towards dental anxiety and fear. Due to the violation in the expected percentage, Fisher's Exact Test was used to determine the significance different between the two groups of students towards dental phobia.

Pearson's correlation analysis was used to determine the correlation of specific dental stimuli to dental anxiety and fear. The strength of correlation was determined according to Colton's guideline where r=0.00-0.25 (little or no correlation), r=0.26-0.50 (fair correlation), r=0.51-0.75 (moderate-good correlation) and r=0.76-1.00 (very perfect correlation) (Colton, 1974).

The association of sociodemographic factors (age, gender, faculty, year of study, parents' education, household income, and bad dental experience) towards dental anxiety and fear status were determined by multiple logistic regression. All variables with p value <0.25 at simple logistic regression were included for variables selection via Forward LR and Backward LR in multiple logistic regression. Results are interpreted in the form of odd ratio.

RESULTS

432 answered questionnaires were returned giving a response rate of 93.9%. Demographic characteristics of the respondents are shown in Table 1. There is no significant difference found on the prevalence of dental fear between medical and dental undergraduates (Table 2). However, medical undergraduates do have higher prevalence of dental fear compared to dental undergraduates.

There was no dental phobia found among dental undergraduates while medical undergraduates, 1% of them was found to have dental phobia. The results are shown in Table 3. Non-clinical dental phobia was determined by using IDAF-P module in conjunction with IDAF-4C module.

Table 1. Demographic characteristics of the medical and dental undergraduates (n=432)

Variables	n (%)
Gender	
Male	123 (28.5)
Female	309 (71.5)
Faculty	
Dental	127 (29.4)
Medical	305 (70.6)
Year of study	
Year 1	111 (25.7)
Year 2	108 (25.0)
Year 3	104 (24.1)
Year 4	89 (20.6)
Year 5	20 (4.6)
Parents' education level	
Secondary	96 (22)
STPM/ Matriculation/ Diploma	155 (35.9)
Tertiary	143 (33.1)
Others	38 (8.8)
Household income group*	
Low income	161 (37.3)
Middle income	117 (27.1)
High income	154 (35.6)
Bad Dental Experience	
No	361 (83.6)
Yes	71 (16.4)

*Low income= RM0-3000, Middle income= RM3001-6275, High income= RM6276-30000 (Department of Statistics Malaysia, 2017)

Pearson's correlation was used to determine the correlation between IDAF-4C and IDAF-S modules. All dental stimuli were found to be significantly associated to dental anxiety and fear ($p<0.001$). The *r* values ranging from 0.237 until 0.537 with 'feeling sick, queasy or disgusted' had the highest correlation ($r = 0.537$), followed by 'not being in control of what is happening' ($r = 0.484$) and 'painful and uncomfortable procedures' ($r = 0.481$). Results are shown in Table 4 and Figure 1. Further analysis by faculty reveals that for medical undergraduates, stimuli most correlated to their dental anxiety and fear ($r= 0.540$) is 'feeling sick, queasy or disgusted' while for dental undergraduates, 'feeling embarrassed or ashamed' had the highest correlation ($r= 0.525$). These results are shown in Table 5.

Table 2. Prevalence of dental anxiety and fear among Dental and Medical Students (n=432)

Faculty	Fear n (%)	No fear n (%)	P value*
Dentistry	24 (18.9)	103 (81.1)	0.137
Medical	78 (25.6)	227 (74.4)	

* Pearson's Chi-Square

Table 3. Prevalence of phobia among Dental and Medical Students (n=432)

Faculty	Phobia n (%)	No Phobia n (%)	P value*
Dentistry	0 (0)	127 (100)	0.559
Medical	3 (1)	302 (99)	

*Fisher's Exact Test

Table 4. Strength of association of each dental stimuli towards dental anxiety and fear (n=432)

Dental stimuli	*r*	Strength of association	P value
Feeling sick, queasy or disgusted	0.537	Moderate-good	<0.001
Not being in control of what is happening	0.484	Fair	<0.001
Painful or uncomfortable procedures	0.481	Fair	<0.001
Feeling embarrassed or ashamed	0.451	Fair	<0.001
Not knowing what the dentist is going to do	0.391	Fair	<0.001
Numbness caused by the anesthetic	0.373	Fair	<0.001
Gagging or choking	0.356	Fair	<0.001
Needles or injections	0.317	Fair	<0.001
Having an unsympathetic or unkind dentist	0.245	Little correlation	<0.001
The cost of dental treatment	0.237	Little correlation	<0.001

*Pearson's correlation

From the simple logistic regression, only household income and bad dental experience were found to be significantly associated ($p<0.05$) to dental anxiety and fear among study respondents. However, to avoid loss of important variable, other variables with $p<0.25$ was also included in the variable selection steps in multiple logistic regression: [1] faculty, [2] year of study, [3] parents' education, [4] household income and [5[bad dental experience.

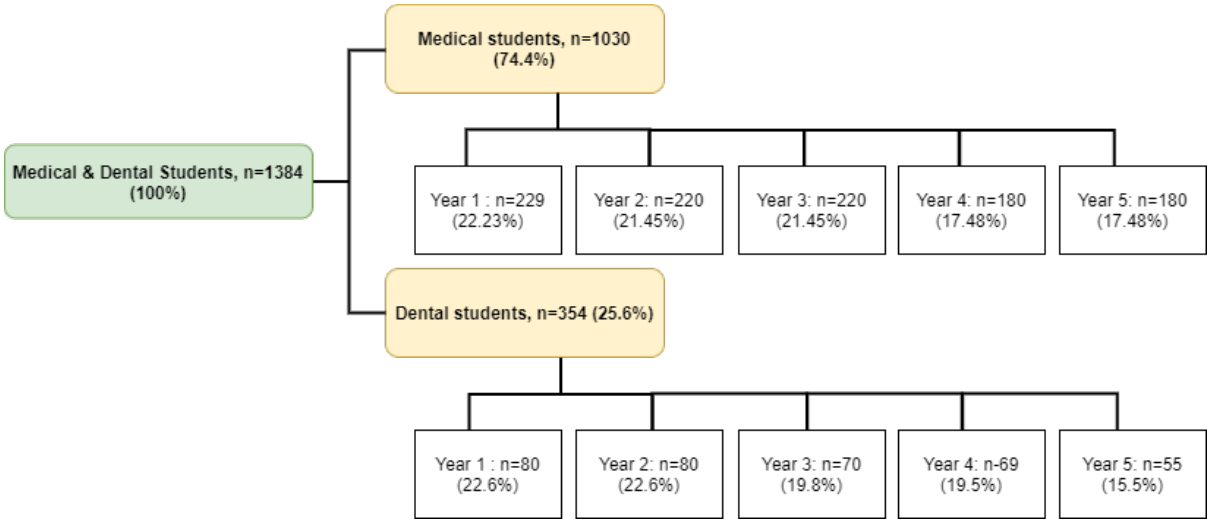

Figure 1: Distribution of Dental and Medical Undergraduates in UiTM

Multiple logistic regression confirmed that bad dental experience and household income were significantly associated with dental anxiety and fear ($p<0.05$). Based on the results, students with bad dental experience are four times more likely to have dental anxiety and fear compared to those without bad dental experience when adjusted for household income ($p<0.001$). On the other hand, those from high income group have 51.7% less likelihood to have dental anxiety and fear compared to those from low-income group. The results are shown in Table 6.

Table 5. Strength of association of each dental stimuli towards dental anxiety and fear by faculty (n=432)

Dental Stimuli	Faculty					
	Dental			Medical		
	r	Strength	p value	r	Strength	p value
Painful or uncomfortable procedures	0.443	Fair	<0.001	0.501	Fair	<0.001
Feeling embarrassed or ashamed	0.525	Moderate-good	<0.001	0.418	Fair	<0.001
Not being in control of what is happening	0.519	Moderate-good	<0.001	0.469	Fair	<0.001
Feeling sick, queasy or disgusted	0.518	Moderate-good	<0.001	0.540	Moderate-good	<0.001
Numbness caused by the anesthetic	0.453	Fair	<0.001	0.348	Fair	<0.001
Not knowing what the dentist is going to do	0.405	Fair	<0.001	0.375	Fair	<0.001

The cost of dental treatment	0.262	Fair	<0.001	0.213	Little–no correlation	<0.001
Needles or injections	0.412	Fair	<0.001	0.278	Fair	<0.001
Gagging or choking	0.415	Fair	<0.001	0.342	Fair	<0.001
Having an unsympathetic or unkind dentist	0.226	Little correlation	<0.001	0.250	Little correlation	<0.001

Table 6. Association of students' sociodemographic factors towards dental anxiety and fear (n=432)

Variables	Simple Logistic Regression			Multiple Logistic Regression[a]		
	b	Crude OR (95% CI)	P value	b	Adjusted OR (95% CI)	P value
Age	0.28	1.029 (0.865-1.223)	0.749	-	-	-
Gender						
Male	0	1		-	-	-
Female	-0.122	0.885 (0.545-1.439)	0.623	-	-	-
Faculty						
Dental	0	1		-	-	-
Medical	0.388	1.475 (0.883-2.464)	0.138	-	-	-
Year of study						
Year 1	0	1		-	-	-
Year 2	0.243	1.275 (0.677-2.401)	0.451	-	-	-
Year 3	0.083	1.086 (0.566-2.085)	0.803	-	-	-
Year 4	0.457	1.579 (0.826-3.017)	0.167	-	-	-
Year 5	-0.393	0.675 (0.182-2.503)	0.557	-	-	-
Parents' education						
SPM	0	1		-	-	-
STPM/ Matriculation/ Diploma	-0.345	0.708 (0.397-1.264)	0.243	-	-	-
Degree	-0.570	0.565 (0.308-1.038)	0.066	-	-	-
Others	0.114	1.121 (0.497-2.528)	0.783	-	-	-

Household income group*						
Low income	0	1		0	1	
Middle income	-0.476	0.621 (0.357-1.082)	0.093	-0.486	0.615 (0.346-1.092)	0.097
High income	-0.677	0.508 (0.299-0.863)	0.012	-0.728	0.483 (0.279-0.836)	0.009
Bad Dental Experience						
No	0	1				
Yes	1.376	3.959 (2.319-6.762)	<0.001	1.404	4.072 (2.365-7.009)	<0.001

[a]Backward LR multiple logistic regression was applied. Multicollinearity and interaction term were checked and not found. Hosmer-Lemeshow test (p = 0.385), classification table (overall correctly classified percentage = 76.6%) and area under the curve (65.9%) were applied to check the model fitness.

*Simple logistic regression and multiple logistic regression were run

DISCUSSIONS

Response rate is influenced by the method of administration, sampling process, type of questionnaire and characteristics of the sample (Fincham, 2008). A low response rate would indicate a non-response bias which would give a huge impact. This study has exceeded the recommended 60% by Fincham (2008). Even though data collection for Year 5 medical undergraduates was not achievable due to their demanding schedule, this study has achieved the minimum sample size required.

In this study, medical undergraduates show higher prevalence of dental anxiety and fear (25.6%) as compared to dental undergraduates (18.9%). In terms of prevalence, this result was consistent to the result of other studies which found higher prevalence of dental anxiety and fear among medical students compared to dental students (Al-Omari & Al-Omiri, 2009; Gunjal et al., 2017; Hantash, 2014). Hantash (2014) suggested that it could be due to the exposure to dental knowledge which is less among medical students. However, interesting finding was reported by Al-Omiri & Al-Omari (2009) where Engineering students who did not receive health or dental awareness education showed lower dental anxiety score as compared to medical students. This raises a question whether knowledge in dentistry would influence the experience of having dental anxiety in oneself.

In this study, only 3 out of 432 undergraduates which all of them from medical faculty have dental phobia (0.7%). It contradicts to another study done among students in Islamabad universities which showed the prevalence of dental phobia as much as 21.8% (Attaullah, 2011). Similar lower prevalence of dental phobia was reported among Australian population (2.2%) by Armfield et al. (2009) . The advancement of technology in dental treatment could be the reason why dental phobia, which may be due to bad dental experience is low in Australia. The same scenario could be assumed for Malaysia since we are now considered a developing country with advance dental technologies.

Pearson's correlation was used to determine which stimuli that concern participants the most which later lead into dental anxiety and fear. This study revealed some exciting findings. When we look closely at the data, the highest concern raised by dental students when seeking dental care was 'feeling embarrassed or ashamed'. They might have certain thinking that dental students are expected to have good oral hygiene

thus the embarrassment if they are diagnosed with dental related disease. For medical students, the highest concern when seeking dental care was 'feeling sick, queasy or disgusted' which might be referring to the dental treatment itself where equipment's are being put inside their mouth. Surprisingly, despite being a student, cost of dental treatment had the lowest correlation to dental anxiety and fear. This may be due to all basic dental treatment in Malaysian government clinic are subsidized (Official Portal Ministry of Health Malaysia, 2019).

Looking at the factors associated to dental anxiety and fear, this study reported that age is not significantly associated with dental anxiety and fear. This may be due to the slight difference of age among study respondents which range 19 to 25 years old. However, another study concluded that young adults tend to experience higher dental anxiety than other age groups (Kirova, Atanasov, Lalabonova, & Janevska, 2010; Locker, Liddell, & Burman, 1991; Locker, Thomson, & Poulton, 2001). In term of gender, it is not significantly associated with dental anxiety and fear. This is contradicting with finding from another study which stated that dental fear was higher in females as compared to males who are more emotionally stable and far more reluctant to show their fears (Hantash, 2014).

Our study also revealed that household income is one of the two factors that associated with dental anxiety and fear. Those from high income group (salary between RM 6276-RM 30000) are 51.7% less likely to have dental dear anxiety compared to low income group (salary less than RM 3000). Those from higher income groups might have better exposure to dental treatments compared to those from lower income group (Doerr, Lang, Nyquist, & Ronis, 1998). Another associated factor is negative dental experience. Those with negative dental experience are having 4 times more likelihood to have dental anxiety and fear as compared to those without negative dental experience. This result was supported by many other studies (Attaullah, 2011; Hakim & Razak, 2014; Hantash, 2014; Humphris & King, 2011; Locker, Shapiro, & Liddell, 1996; Madfa et al., 2017; Serra-Negra et al., 2012).

There are some limitations to the study. First, the study was conducted only in UiTM Sungai Buloh. Looking at the lack of ethnic variation in UiTM students' population, this result could be bias if we wanted to generalize to the whole Malaysian dental and medical student. Second, as in any questionnaire survey, response bias could be there as 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.

CONCLUSION

The prevalence of dental anxiety and fear among dental and medical students are high despite being well exposed to the procedures. A significant higher prevalence was observed among medical students which highly correlated towards feeling sick, queasy, and disgusted. Our study suggested that low household income and negative dental experience are found to have a significant association towards dental anxiety and fear. The community oral health awareness program should be focusing at these two areas. Dentists should also be more aware of the demographic of their patients during the treatment to help them overcome their fear and anxiety as well as phobia.

ETHICS

This study was approved by the UiTM Research Ethics Committee, Universiti Teknologi MARA (600-IRMI (5/1/6)). This research was conducted in full accordance with the World Medical Association Declaration of Helsinki.

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