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Prevalence and factors associated with dental anxiety among pregnant women seeking care at a tertiary care dental institution in Sri Lanka

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ABSTRACT

Objective: To determine the prevalence and factors associated with dental anxiety among pregnant women seeking care at the Preventive Oral Health Unit, Institute of Oral Health, Maharagama, Sri Lanka.
Materials and Methods: The participants of this descriptive cross-sectional study were 402 pregnant women seeking care at the Institute of Oral Health, Maharagama for the first time. A validated Sri Lankan version of the Modified Dental Anxiety Scale (MDAS) was used to measure dental anxiety and an interviewer-administered questionnaire collected information about demographics, dental service utilization, knowledge, and the importance of oral health during pregnancy.
Results: The prevalence of dental anxiety was 61.7% and the mean MDAS score in the dentally anxious and not anxious were 13.4±3.8 and 9.20 ± 1.7 respectively. According to the binary multiple logistic regression model current employment status, household income, dental care seeking pattern, having had a negative experience during a previous visit to a dentist, poor awareness about the importance of oral health in pregnancy, not receiving oral health instructions from health care providers during pregnancy, the perception that oral care should be avoided during pregnancy were independently associated with dental anxiety.
Conclusions: The prevalence of dental anxiety was high among this sample of pregnant women.

1. Introduction

Pregnant women are vulnerable to developing oral diseases such as gingivitis, periodontitis, caries, pregnancy tumors, gingival tissue ulcerations, pregnancy granuloma, dry mouth, enamel erosion, and tooth mobility.[1] The changing hormone levels in pregnancy directly affect periodontal tissues, particularly the gingivae.[2,3]

Anxiety, an emotional experience for most people, is the body's natural response to stress.[4] It can cause nervousness and terror. Dental anxiety is an emotional state that precedes the actual encounter with a threatening stimulus in a dental situation.[4]

Dental anxiety can affect both the general and oral health of an individual. It is well-known that the dentally anxious are irregular dental attendees.[5,6] Dental anxiety is linked to poor self-reported and clinically assessed oral health outcomes such as having more carious and missing teeth,[5,6] fewer filled teeth,[5] and worse periodontal health.[7] Also, dental anxiety is linked to poor self-reported general health,[8] psychological disorders,[9] temperamental and psychological traits.[10]

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Dental anxiety is a global problem and has been assessed in different population subgroups such as children,[11] students[12] dental patients,[13] adults,[14–16] pregnant mothers,[17] and military groups.[18]

According to the literature, the prevalence of dental anxiety ranges from 4% - 77% in adults[19,20] whilst an Australian study has reported that dental fear ranges from 8%-19% in children.[21]

The prevalence of dental anxiety among Sri Lankan adults has been reported only in two studies. One study found that 32% of adult patients who visited a tertiary care dental hospital had some form of dental anxiety, while 12% were highly anxious. Females were more dentally anxious than males.[13] In a comprehensive population based study on dental anxiety conducted among 20–44-year adults, Jayashantha[22] found that 39% of adults had some form of dental anxiety, and females were more dentally anxious than males.

Pregnancy could affect oral health due to the physiological changes in female sex hormone levels, resulting in gingivitis and oedema of gingivae in about 50% of pregnant women.[23,24] Further periodontal diseases are linked to adverse pregnancy outcomes, including gestational diabetes, preterm deliveries, pre-eclampsia and low birth weight babies.[25] Some studies have reported that microorganisms in a pregnant woman's oral cavity could vertically transmit to the child and colonize the child's oral cavity, affecting the child's oral health in later life.[26] Though pregnant women are vulnerable to oral diseases, dental anxiety is a common obstacle to seeking oral care during pregnancy.[27]

Only a few studies have assessed the prevalence of dental anxiety among pregnant women. A study conducted in Saudi Arabia has reported a prevalence of 16%, while according to Dourado,[28] 81% of Brazilian pregnant women showed mild to moderate dental anxiety.

To date, no studies have been conducted on dental anxiety in pregnant women in Sri Lanka. Therefore, the aim of this study was to assess the prevalence of dental anxiety and related factors in Sri Lankan pregnant women. Sri Lanka has a well-established National Oral Healthcare Programme for pregnant women, which aims to improve oral health of these women. Identifying pregnant women with dental phobia and the factors that contribute to it will help healthcare providers involved in this programme to consider these factors when providing oral health care to these women.

2. Materials and Methods

This hospital-based descriptive cross-sectional study was conducted from October 2021 to January 2022. As the level of dental anxiety could vary from visit to visit,[29] it was decided to include only the first visit patients. The sample size required for the study was determined using the formula for calculating a population proportion with absolute precision.[30] As there are no data related to dental anxiety among pregnant women in Sri Lanka, to calculate the sample size, the prevalence of dental anxiety among Sri Lankan adults (39%),[22] was used. Considering a prevalence of 39%, margin of error of 0.05, confidence level of 95%, and a non-response rate of 10%, a minimum sample of 402 was required.

Pregnant mothers diagnosed with mental illnesses, those who have taken antipsychotic medications in the last 24 hours, any illness that impairs cognitive capacity, and those illiterate were excluded. The sample was selected using systematic sampling. The first patient to be included in the sample on a particular day was selected randomly, drawing lots. Subsequently, every 3^{rd} pregnant woman visiting the hospital for the first time from Monday to Saturday (except on public holidays) were selected until the required sample size was obtained.

Data were collected by the first author using two questionnaires. The first was used to collect information about demographics, dental service utilization, previous negative dental experiences and oral health awareness. This questionnaire was pre-tested on 20 first-visit pregnant women. Based on the pilot test, minor modifications were made to the questionnaire. The second questionnaire included the Modified Dental Anxiety Scale (MDAS)[31] to assess dental anxiety. The Sinhala and Tamil versions of the MDAS have been previously validated and culturally adapted to be used among Sri Lankans.[22] The MDAS is a 5-item questionnaire where the responses to items are recorded on a 5 -point scale ranging from 'not anxious' (1) to 'extremely anxious' (5), and the total score would therefore range from 5 (not anxious) to 25 (extremely anxious).[31]

MDAS score of 12 was used as the cutoff to determine dental anxiety; those with a MDAS score of $\geq$ 12 were considered dentally anxious.[22] Each participant was interviewed separately, thus guaranteeing the privacy of the participant. Following the interview, the self-administered MDAS questionnaire was distributed to the participant.

IBM Statistical Package for Social Sciences (SPSS) software version 21 was used for data analysis. Chi –square test was used to determine the differences in categorical exposure variables. Binary multiple logistic regression analysis was used to determine the independent effects of exposure variables on dental anxiety. Only those variables associated with dental anxiety at $p<0.05$ in the bivariate analysis were included in the binary multiple logistic regression model.

3. Results

The mean age of the sample was 29.04 years (SD; ± 5.05 years), and 65% were under 30 years of age. Most were in their second or third trimester (73%). A majority

(38%) had up to 11 years of education while 42% were not currently employed. According to Table 1, the prevalence of dental anxiety among the participants was 61.7%. The mean MDAS of the dentally anxious and non anxious were 13.4 (SD± 3.8) and 9.20 (SD± 1.7) respectively.

Table 2 shows the associations between demographic factors and dental anxiety. Women with ≤ 11 years of education, currently unemployed, and with a monthly household income of <Rs20,000 were significantly dentally anxious compared to those with >11 years of education, currently employed, and with a monthly household income of >Rs20,000.

Those who have had a dental visit ≤ 12 months ago were significantly less dentally anxious than those who had a dental visit > 12 months ago. Further pregnant women who had visited a dental clinic due to the presence of symptoms and received treatment for those symptoms were significantly more dentally anxious than those who visited for a check-up.

Also, those who were aware of the associations between the impact of oral health on pregnancy were significantly less anxious compared to those who were not aware.

According to the binary multiple logistic regression analysis, having ≤ 11 years of education, and a household income of <Rs 20,000, had visited a dental clinic more than a year ago before the current pregnancy, had a negative experience during a previous dental visit, not being aware of the possible association between oral health and pregnancy, not receiving oral health instructions from an oral health care provider during pregnancy and having the opinion that dental treatment should be avoided during the pregnancy were associated with dental anxiety (Table 4).

4. Discussion

The prevalence of dental anxiety among the sample was 61.7%, when the MDAS was used to assess dental anxiety with a cut-off of ≥12 to differentiate those with dental anxiety from those without. Nazir and Alhareky[32] in their study on Saudi pregnant women reported that the prevalence of dental anxiety was 16.1% when MDAS with a cut-off of 19 was used. In another study where dental anxiety was assessed using MDAS in Saudi pregnant women, Al Ratroot[33] reported a very high prevalence of dental anxiety (91%). As that study had used a cut-off of 5 to differentiate those dentally anxious from those not anxious, the high prevalence could be due to using a very low cut-off score.

This study assessed the independent associations between some socio-demographic factors, dental utilization and awareness about oral health in pregnancy, and dental anxiety. Of the socio-demographic factors, only employment status and household income level were independently associated with dental anxiety. Those unemployed and with a household income of Rs<20,000 were more likely to be dentally anxious than those employed and with an income of ≥ Rs 20,000. On the other hand, monthly family income was not associated with dental anxiety in Saudi pregnant women.[33] Consistent with the findings of other studies on dental anxiety in pregnant women,[32,33] age and level of education were not associated with dental anxiety in the present study. Nazir & Alhareky[32] found that women in the first trimester were more likely to be dentally anxious. But such an association was not apparent in the present study.

As evident from the odds ratio (4.13), the strongest predictor of dental anxiety was not having an awareness about the importance of oral health during pregnancy. A similar finding has been reported by Nazir and Alhareky.[32] According to Yildirim,[34] poor awareness about oral health is associated with dental anxiety. As expected and consistent with many other studies on dental anxiety in pregnant women,[32] a negative dental experience was associated with dental anxiety. Dental treatment is stressful to many individuals,[35] and particularly a negative dental experience could have a profound impact. Stressful circumstances are shown to be related to anxiety symptoms. Those who visited a dentist >12 months before the current pregnancy were more likely to be dentally anxious than those who visited ≤12 months before which supports the findings of Al Ratroot.[33] It is possible that those who had a dental visit ≤12 months prior to the current pregnancy may be regular attendees and therefore familiar with the dental clinic environment. Thus they may not have felt anxious when they visited the dentist during pregnancy.

Further, those who believed that dental treatment should be avoided during pregnancy were more anxious than those who did not. Pregnant women have myths and misconceptions regarding obtaining oral care during pregnancy.[36] Misconceptions about the safety and appropriateness of oral care during pregnancy are considered a barrier to obtaining oral care during pregnancy.[37] Therefore, pregnant women who have misconceptions regarding obtaining oral care during pregnancy may feel anxious when they have to seek dental care during pregnancy.

Pregnant women who did not receive advice regarding oral health from a healthcare provider were more dentally anxious than those who received advice. This is to be expected because receiving advice regarding oral care would raise their awareness about the importance of oral health during pregnancy. Poor awareness about oral health is associated with dental anxiety.[34] Although public health midwives are required to provide oral health education to pregnant women, over 50% of this sample have not received such advice from them.

This study has some limitations. As the study was limited to pregnant women seeking care at one public sector tertiary

Table 1: Dental anxiety in the participants

Dental Anxiety	N (%)	Mean MDAS (SD) score
Dentally anxious (MDAS ≥12)	248 (61.7%)	13.40 (SD± 3.8)
Dentally not anxious (MDAS <12)	154 (38.3%)	9.20 (SD± 1.7)

Table 2: Associations between demographic characteristics and dental anxiety (MDAS ≥12)

Variable	Dental anxiety status		Significance +
	Anxious (248) No. (%)	Not anxious (154) No. (%)	
Age in years			
16 – 30 (n= 262)	164 (62.6)	98 (37.4)	p=0.610
31 – 45 (n= 140)	84 (60.0)	56 (40.0)	X^2 =0.260
Trimester			
First & Second (n= 251)	149 (59.4)	102 (40.6)	p=0.216
Third (n= 151)	99 (65.6)	52 (34.4)	X^2 =1.534
Ethnicity			
Sinhala (n= 359)	217 (60.4)	142 (39.6)	p=0.138
Other (n= 43)	31 (72.1)	12 (27.9)	X^2 =2.204
Education level			
≤ 11 years (n= 191)	137 (71.7)	54 (28.3)	p<0.001
> 11 years (n= 211)	111 (52.6)	100 (47.4)	X^2 =15.509
Current employment status			
Employed (n= 142)	77 (54.2)	65 (45.8)	p=0.023
Unemployed (n= 260)	171 (65.8)	89 (34.2)	X^2 =5.179
Monthly household income			
≤ Rs. 20,000 (n= 166)	130 (78.3)	36 (21.7)	p<0.001
>Rs.20,000 (n= 236)	118 (50.0)	118 (50.0)	X^2 =33.056

Table 3: Associations between dental service utilization, awareness about oral health in pregnancy, and dental anxiety (MDAS ≥12)

Variable	Dental anxiety status		Significance+
	Anxious (248) No. (%)	Not anxious (154) No. (%)	
Ever visited a dental clinic			
Yes (n= 302)	180 (59.6%)	122 (40.4%)	p=0.134
No (n= 100)	68 (68.0%)	32 (32.0%)	X^2 =2.24
Last visit to a dental clinic before the current pregnancy *			
≤ 12 months ago (n= 81)	26 (32.1%)	55 (67.9%)	p<0.001
>12 months ago (n= 221)	154 (69.7%)	67 (30.3%)	X^2 =34.78
Reasons for visit *			
Presence of symptoms (n= 233)	146(62.7%)	87 (37.3%)	p=0.047
Checkup (n= 69)	34 (49.3%)	35 (50.7%)	X^2 =3.96
Negative experiences during previous dental visit/s			
Yes (n= 176)	138 (78.4%)	38 (21.6%)	p<0.001
No/Don't know (n= 226)	110 (48.7%)	116 (51.3%)	X^2 =37.02
Awareness of the possible associations between oral health and pregnancy			
Yes (n= 227)	94(41.4%)	133(58.6%)	p<0.001
No (n= 175)	154(88.0%)	21(12.0%)	X^2 =90.76
Whether received advice about oral health from a health care provider during pregnancy			
Yes (n= 192)	100(52.1%)	92(47.9%)	p<0.001
No (n= 210)	148(70.5%)	62(29.5%)	X^2 =14.35
Opinion regarding whether dental treatment should be avoided during pregnancy?			
Yes (n= 227)	155(68.3%)	72(31.7%)	p=0.002
No (n= 175)	93(53.1%)	82(46.9%)	X^2 =9.58

* Women who never visited a dental clinic were excluded

Table 4: Binary multiplelogistic regression model for predictors of dental anxiety

Independent variable	OR	95% CI	P value
Level of education			
> 11 years	1.00		
≤ 11 years	1.43	0.78-2.25	0.16
Current employment status			
Employed	1.00		
Unemployed	1.96	1.10-3.49	0.022
Monthly household income			
> Rs. 20,000	1.00		
≤ Rs.20,000	2.49	1.79-3.19	<0.001
Last visit to a dental clinic before the current pregnancy			
≤ 12 months	1.00		
>12 months	2.36	1.79-3.19	<0.001
Reasons for visit			
Check up	1.00		
Presence of symptoms	0.95	0.48-1.91	0.903
Whether had a negative experience during a previous visit			
No/Don't know	1.00		
Yes	3.33	1.76-6.29	<0.001
Awareness about the importance of oral health during pregnancy			
Yes	1.00		
No	4.13	3.01-8.44	<0.001
Whether received advice about oral health from a health care provider during pregnancy			
Yes	1.00		
No	3.81	2.21- 6.98	<0.001
Opinion about whether dental treatment should be avoided during pregnancy			
No	1.00		
Yes	3.34	1.84-6.02	<0.001

Dependent variable dichotomized as 0= not dentally anxious, 1= dentally anxious

dental hospital, caution is warranted when generalizing the findings to the wider population of pregnant women in Sri Lanka.

There are inherent limitations related to the MDAS. Armfield[21] has argued that dental fear is multidimensional, containing cognitive, behavioural, emotional and psychological perspectives, and to assess dental fear correctly, each component should be assessed. However, as MDAS is the only scale that has been culturally adapted and validated for use among Sri Lankans. Further it has several advantages such as ease of use, minimal time required for completion and also widely used in the dental clinic setting and epidemiological surveys.

5. Conclusion

The prevalence of dental anxiety among this sample of pregnant women who had sought oral care at a tertiary dental care institution was high. Some socio-demographic factors, dental care-seeking patterns, having had a negative experience during a previous visit to a dentist, and misconceptions regarding obtaining dental care during pregnancy, were independently associated with dental anxiety. Thus, it is the responsibility of dentists to identify dentally anxious pregnant women and ascertain the causes for dental anxiety. This will help in better management of such patients.

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7. Conflict of Interest

The authors state that they have no conflicting financial interests or personal connections that may seem to have influenced the work presented in this publication.

8. Ethical Approval

Ethical approval for this study was obtained from the Ethics Review Committee of the Postgraduate Institute of Medicine, Colombo, Sri Lanka.

9. Consent to Participate

An informed consent (written) was taken from the participants.

10. Author Contributions

TH conceived, designed, and disseminated the questionnaire; TH, NW and MJ were in responsible of data analysis, interpretation, and manuscript writing. The manuscript was revised by LE. The final manuscript was reviewed and approved by all writers.

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