Comparative Evaluation of Oral Health Knowledge, Practices and Attitude of Pregnant and Non-Pregnant Women, and Their Awareness Regarding Adverse Pregnancy Outcomes

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ABSTRACT

Background: Adverse pregnancy outcomes are undesirable events occurring during pregnancy and childbirth in mother or child, such as Preterm Low Birth Weight (PLBW) and preeclampsia. There is growing evidence that periodontitis may be a risk factor for preterm birth even after adjusting for known risk factors.

Aim: 1. To determine the knowledge and attitude of pregnant females about oral health. 2. To evaluate the oral hygiene practices of pregnant females. 3. To evaluate their awareness regarding effect of oral health on adverse pregnancy outcomes. 4. To assess whether there was any significant difference from their non pregnant counter parts. 5. To evaluate whether their awareness towards dental treatment had increased after conceiving.

Materials and Methods: 200 pregnant and 200 non-pregnant women filled up a validated questionnaire which comprised of questions on personal data, oral hygiene knowledge, attitude, oral hygiene practices and their awareness regarding the correlation of oral health to adverse pregnancy outcomes.

Statistical Analysis: Analyses were conducted using SPSS for Windows (version 15.0; SPSS Inc., Chicago, IL, USA).

Results: The results indicate no statistically significant differences in the variables assessed in both the groups, indicating that no further knowledge had been imparted to the women after they conceived. 96% women of both groups (p>0.05) had received no knowledge from the gynaecologist regarding the impact of oral health on pregnancy outcomes. 93.9% of pregnant women, and 89.5% of non pregnant women (p>0.05) did not go for routine dental check-ups. Only 3% of pregnant women were aware of oral health having a correlation with adverse pregnancy outcomes.

Conclusion: In our study, pregnancy did little to change future attitudes to dental care. To provide better oral health care, more knowledge needs to be made available to the pregnant women and the medical community.

INTRODUCTION

It has been suggested that periodontal disease during pregnancy could have a causal relationship with low birth weight (LBW) babies and other adverse pregnancy outcomes. Premature delivery implies labour that occurs at fewer than 37 complete weeks of gestation and is generally accompanied by Low Birth Weight <2500 gm [1]. It is important to emphasize that non-specific, general inflammatory mediators induced by periodontal disease are the same ones that play an important role in initiation of labour. In a normal parturition, labour occur when there is an increased level of inflammatory cytokines such as IL-1, TNF-α, and PGE2 in placenta. In case of periodontitis, due to increased bacteraemia there are prematurely raised levels of the inflammatory mediators which are involved in normal parturition, leading to premature rupture of placental membrane causing pre-mature birth [2-4].

Moreover, microbiological data indicate that primary microorganisms, associated with mature plaque and progressing, periodontitis- *Bacteriodes forsythus, Porphyromonas gingivalis, Aggregatibacter actinomycetemcomitans* and *Treponema denticola* were detected at higher levels in mothers with PLWB babies as compared to normal birth weight (NBW) controls [5-7]. This association has further been proved by finding higher mid-trimester maternal serum antibody levels against these micro-organisms specially *Porphyromanas gingivalis* and *Capnocytophaga* [8,9].

Thus it is logically reasonable as well as biologically plausible to hypothesize that periodontal infection contributes to adverse pregnancy outcomes in the form of premature delivery.

Low birth weight is a serious challenge for mother and child health. Perinatal and infant mortality, infant morbidity, mental retardation, and the high cost of special care needed by such children are few of the public health consequences.

In the National Database 2002-2003, approximately around 1,52,000 deliveries were included from 18 centres throughout India over a period of two years. According to the database, amongst the intramural (within the included centres) live births, 14.5% were preterm and out of the total live births, 31.3% were low birth weight infants. Extreme prematurity was a primary cause in approximately 26.3% cases of neonatal deaths. Amongst the extramural live births, 52.1% infants were low birth weight infants and 31.5% were preterm. Prematurity and related complications constitute 19.3% of the share of neonatal deaths. Of much significance is the fact that out of the total LBW stillbirths, 77.7% were preterm LBW infants. This data suggests that along with many other causes, preterm and its associated complications form an important reason for high percentage of total neonatal deaths or stillbirths in the region [10].

Mannem and Chava studied 104 pregnant women residing in Andhra Pradesh, India, by dividing them into two groups {control group (those who had term labour), and case group (those who

had preterm labour)}, and measuring their Plaque Index, Bleeding Index and Birth weight of the newborn. They reported a statistically significant difference between the two groups p<0.05), and concluded that there exists a noticeable relationship between periodontal health and duration of pregnancy, and that periodontal disease could be a risk factor for preterm labour. Hence, oral hygiene maintenance should be a part of prenatal care protocol [11].

Ideally, women should begin their pregnancy without gingival and periodontal infection, and they should be educated and motivated to maintain a high level of oral hygiene prior to and throughout pregnancy. Therefore, researchers and health program planners should give increased attention to the oral health needs and behaviour of pregnant women.

Numerous evidence based studies are available which find a positive co- relationship between periodontitis and adverse pregnancy outcomes [2-9]. Offenbacher and colleagues were the first to report data that suggested periodontal diseases could represent a previously unrecognized and clinically significant risk factor for preterm low birth weight in humans [12]. They suggested that maternal periodontal disease could lead to a seven-fold increased risk of delivery of a PLBW infant. Tarannum et al., reported that Indian women who did not receive prenatal periodontal treatment were 3.4 to 4.5 times more likely to deliver infants who were preterm, low birth weight, or both [13]. Radnai et al., reported that women with threatened pre-term delivery and initial localized chronic periodontitis had significantly lower chance of adverse pregnancy outcome if they received periodontal therapy before the 35th gestational week [14].

If we are able to evaluate the knowledge and practices of pregnant women, and compare it with that of non-pregnant women, we can ascertain as to whether there is a significant difference in terms of the same, whether the would-be-mothers were educated regarding the role of oral health in adverse pregnancy outcomes or whether their knowledge and awareness levels remained the same, indicating no extra gain in knowledge after conceiving.

MATERIALS AND METHODS

Data collection: The present study was designed as questionnaire based survey. After preliminary construction of the questionnaire, it was sent to Dr Alka Sehgal, Associate professor, Department of Obstetrics and Gynaecology, Government Medical College and Hospital, Sector-32 to test its validity, and her suggestions regarding some modifications in the design of some of the questions were taken into account. Pilot study was conducted on 20 pregnant and 20 non pregnant women. These filled questionnaires were used to measure the reliability of the test using Cronbach's alpha test. The coefficient of reliability was more than 0.7, indicating that the questionnaire is reliable, and meets the purpose of this study. The structured questionnaire was checked for validity by three experts from the field of Gynecology and Periodontology (annexure 1). The questionnaire was verbally explained in the local language to illiterate women and those facing any problem. Written consent was taken from all the participating women. Permission was taken from Medical Superintendants of the Government Hospitals. The ethical clearance for the study was received from Ethical Committee, Panjab University, Chandigarh.

Sample size was estimated based on the results of the pilot study. The mean difference for knowledge score between pregnant and non-pregnant group was 0.93 with a SD of 3.5. Hence sample size was estimated to bee 176 subjects per group at a power of 80 % and confidence interval of 95%. The study was conducted between September 2011 - December 2012 on 200 non-pregnant females (Group A) and 200 pregnant (Group B) females randomly selected amongst expecting mothers and the family members of the expecting mothers visiting the obstetrics and gynaecological departments of Government Medical College and Hospital, Sector-32 and Government Hospital Sector-16, Chandigarh. A computer

generated randomisation was utilized for selecting them. Women not willing to participate in the study, having less than 20 teeth in their oral cavity, of <20 years or >50 years of age were excluded from the study.

STATISTICAL ANALYSIS

Discrete categorical data were presented as n (%). For categorical data comparisons were made by Pearson Chi-square test. All statistical tests were two-sided and performed at a significance level of $\alpha=0.05$. An analysis was conducted using SPSS for Windows (version 15.0; SPSS Inc., Chicago, IL, USA).

RESULTS

We applied factor analysis to the questionnaire. The Kaiser-Meyer-Olkin value (KMO value) was 0.737, and the questions in the questionnaire fell under 6 main subheadings, namely, questions on Socio-demographic background, Oral hygiene habits, Aetiology of dental caries, Signs and symptoms of gum disease, Assessment of awareness of both the groups regarding oral and systemic inter-relationship and Assessment of knowledge regarding correlation of oral health to adverse pregnancy outcomes in pregnant females.

Socio-demographic background: The mean range of age of women was 20-50 years. Respondents' data has been compiled in [Table/Fig-1], and the variables which showed a statistically significant association with Education in [Table/Fig-2].

Oral hygiene habits: Majority reported quite favourable oral hygiene habits [Table/Fig-3]. The reasons for the gap between knowledge and practice of the best methods of tooth cleaning have been depicted in [Table/Fig-4].

Aetiology of dental caries: Out of total, 33.5% of women in Group A and 19.0% in Group B had no knowledge about cariogenic food. [Table/Fig-5] depicts the awareness of both the groups regarding signs and symptoms of periodontal/ gum diseases.

Assessment of awareness of both the groups regarding oral and systemic inter-relationship has been tabulated in [Table/Fig-6]. Majority of women of both groups (97.5% of Group A and 94% of Group B respectively, p>0.05) were of the opinion that if they were made aware about the relationship of oral and overall health they would have been more careful in maintaining a good oral health.

Assessment of knowledge regarding correlation of oral health to adverse pregnancy outcomes in pregnant females has been tabulated in [Table/Fig-7]. Among pregnant women (Group B): 25.8% had history of abortion and 14.7% reported that their previous child was born prematurely.

Characteristics	Pregnant (%)	Non Pregnant (%)
Age group		
20-29 yrs	79%	43%
30-39 yrs	20%	39.5%
40-50 yrs	1%	17.5%
Education		
No formal education	5.5%	16%
Primary school	14.5%	24.5%
Secondary school	48.5%	34%
Graduates	16%	18.5%
Post- Graduates	15%	7%
Employment Status		
Self employed	1%	9%
Government Jobs	3.5%	8%
Private Jobs	7%	14%
Housewife	88.5%	61.5%
Retired and others	0%	7.5%

[Table/Fig-1]: Characteristics of the participants

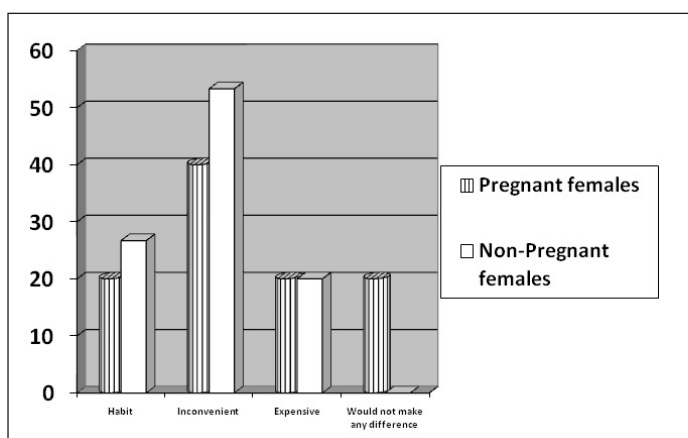| Characteristic		No formal education	Primary school	Location	Size	Type	Grade
How often do you think the teeth should be brushed?							
Pregnant	(n) correct response	8	16	70	26	27	0.061
Pregnant	(n) incorrect response	3	13	27	6	4	
Non Pregnant	(n) correct response	14	27	35	30	8	0.018
Non Pregnant	(n) incorrect response	18	22	33	7	6	
In your opinion, which is the best method for cleaning the teeth?							
Pregnant	(n) correct response	11	25	95	31	30	0.067
Pregnant	(n) incorrect response	0	4	2	1	1	
Non Pregnant	(n) correct response	25	44	65	37	14	0.004
Non Pregnant	(n) incorrect response	7	5	3	0	0	
Which food can lead to dental caries?							
Pregnant	(n) correct response	6	10	55	23	27	0.001
Pregnant	(n) incorrect response	5	19	42	9	4	
Non Pregnant	(n) correct response	19	35	50	33	14	0.10
Non Pregnant	(n) incorrect response	13	14	18	4	0	
In your opinion, when teeth start to decay, what is the treatment?							
Pregnant	(n) correct response	1	6	27	19	26	0.000
Pregnant	(n) incorrect response	10	23	70	13	5	
Non Pregnant	(n) correct response	6	16	30	23	12	0.000
Non Pregnant	(n) incorrect response	26	33	38	14	2	
What is calculus?							
Pregnant	(n) correct response	0	3	3	7	6	0.005
Pregnant	(n) incorrect response	11	26	94	25	25	
Non Pregnant	(n) correct response	8	9	11	10	3	0.683
Non Pregnant	(n) incorrect response	24	40	57	27	11	
Do you think oral health has any role in overall health?							
Pregnant	(n) correct response	10	19	72	25	28	0.141
Pregnant	(n) incorrect response	1	10	25	7	3	
Non Pregnant	(n) correct response	11	20	42	27	12	0.001
Non Pregnant	(n) incorrect response	21	29	26	10	2	

[Table/Fig-2]: Variables which showed a statistically significant association with Education (Chi-square test applied)
p ≥ 0.05 indicates Not significant results, p < 0.05 indicates Statistically significant results, p <0.001 indicates Statistically Highly significant results

Characteristics	Pregnant (%)	Non Pregnant (%)
Do you clean your teeth		
Yes	100%	100%
No	0%	0%
Means of cleaning teeth		
Manjan	1.5%	1%
NeemDatun	0.0%	3.5%
Tooth Powder	0.0%	4%
Tooth Paste	98.5 %	91.4%
Frequency of changing toothbrush		
Every month	12.6%	21.8%
Every 3-5 months	26.1%	39.9%
Every 6-12 months	23.6%	16.5%
When bristles lose alignment	37.7%	21.8%
Do you rinse after meals		
Yes	95.5%	91.5%
No	4.5%	8.5%

[Table/Fig-3]: Frequency distribution of the participants according to oral hygiene habits

[Table/Fig-4]: If there is a gap between practice and knowledge, the reason for not using the best method for cleaning the teeth

DISCUSSION

The majority of studied population had quite favourable tooth brushing habits (brushing at least once a day and rinsing after every meal) which are in agreement with the findings of Hullah et al., and Hashim [15,16]. One of the main finding in the present study was that the majority of pregnant women (96%) had not been educated by the gynaecologist about the impact of oral health on pregnancy outcomes. These findings coincide with that of Gunay et al., who conducted a German study and found that 71% had received no information regarding oral hygiene during pregnancy [17]. Similar results were seen in a UK study which reported that only 25% of the women had received specific advice concerning their teeth and pregnancy, mostly related to gingival and periodontal health [18].

Patil et al., in their study on 36 gynaecologists and general dental practitioners in the city of Bangalore, India, reported that 85.7% of
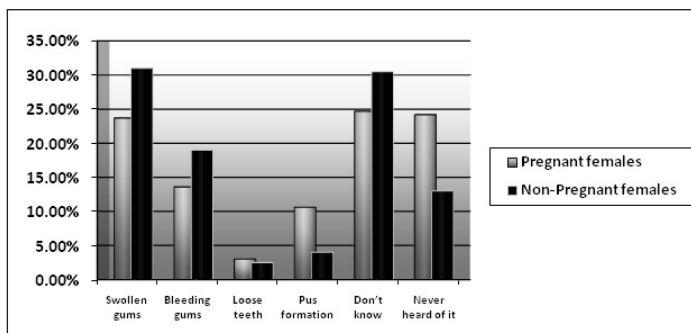
[Table/Fig-5]: Awareness regarding signs and symptoms of gum disease

the gynaecologists never examined the oral cavity of the patient during routine check-up. Lack of knowledge, lack of time for prenatal and health counselling, lack of demand for service and limited access to Oral health care professionals were identified as the barriers among the gynaecologists for inappropriate oral health care of the pregnant patients. A 39% of the dentists had limited knowledge on prenatal oral health care and 92% of the dentists reported need for continuing dental education programmes. They concluded that there was a need for pregnancy specific education to provide appropriate preventive and curative care to the pregnant patient [19].

In our study, pregnancy did little to change future attitudes to dental care. The difference between oral health knowledge, attitude and practices among pregnant and non pregnant female population was statistically non- significant. There was no gain in knowledge by the females after conceiving. The expecting mothers had not been educated regarding the role of periodontal diseases in adverse pregnancy outcomes or regarding the importance of regular dental check-ups. It is a cause of concern that many medical professionals are unfamiliar with the oral cavity and oral health research. We must reach out to the medical community to improve patient care through education & communication. It is our duty as periodontists to educate, motivate and reinforce our medical counterparts and the patients regarding the same.

Another crucial finding was that there was several myths related to dentistry still prevalent in India. A 52.5% opined that teeth should not be brushed after pregnancy, 23.4% were of the opinion that visiting a dentist during pregnancy was not safe and 17.2% were of the opinion that pregnancy is a cause of loosening teeth. A total of 40.9% believed that after delivery teeth should not be brushed, and another 41.9% thought dental treatment to be unsafe during pregnancy.

Majority of studied population feel that there is no need to visit a dentist. These findings are in agreement with the findings of the study among pregnant women in USA [20]. In UK, 39% did not visit a dentist during pregnancy even though dental care is free of charge for pregnant women; reasons for not seeing a dentist were the feeling that it was not necessary, fear or not liking the dentist [18].

In a study on 750 pregnant women visiting the maternity hospitals in United Arab Emirates, Hashim R reported that although a large proportion of the pregnant women in his study had oral health problems, more than 40% had not visited a dentist during their pregnancy, and the majority only utilized dental services when they had dental pain [16].

In a study on 95 pregnant women of Darussalem, Bamaniker and Kee reported that although 96.8% of the respondents agreed that women should have a dental check-up during pregnancy, only 55.9% actually practiced this. This raises serious concern since pregnant women may need extra oral and dental care due to susceptibility to gum diseases during pregnancy, which may contribute to low birth weight babies and premature births [21].

Questions asked	Options given	Pregnant	Non Pregnant	p-values
Oral health has any role in overall health	Yes	77.4%	56.0%	0.010
	No	3.5%	22.5%	0.001**
	Do not know	14.6%	15.0%	0.896
	Never heard of it	4.5%	6.5%%	0.394
Did your physician tell you about the impact of oral health on systemic health	Yes	4.0%	4.0%	0.003
	No	96.0%	96.0%	0.959
If yes, What diseases are related to oral health	Diabetes	29.2%	0%	0.673
	Heart attack	4.2%	18.8%	0.317
	Pregnancy outcome	4.2%	37.5%	.059
	All of the above.	62.5%	43.8%	0.088
How important is oral health	Very important	71.9%	76.5%	0.673
	Not important	1.5%	1.5%	0.317
	Doesnot matter	0%	1.0%	0.059
	Somewhat important	26.6%	21.0%	0.088
Are you suffering from any systemic disease	Yes, heart disease	0%	5.6%	0.655
	Yes, diabetes	1.0%	2.5%	0.876
	Yes, both	0%	0.5%	_
	None	98.5%	88.9%	0.349
	Suffering from disease and isn't under medication	0.5%	2.5%	0.102
Do you go for regular medical check-up	Yes	20.1%	21.5%	0.742
	No	79.9%	78.5%	0.955
Do you for regular dental check up	Yes	6.1%	10.5%	0.117
	No	93.9%	89.5%	0.714
When did you last visit dentist	Last week	0%	2.5%	0.564
	Last month	2.5%	11.6%	0.001**
	Last 3-6 months	1.5%	11.6%	0.001**.
	6 months-1 year	15.2%	11.1%	0.267
	More than 1 year	22.2%	23.1%	0.833
	Never	58.6%	40.2%	0.010**
What influences the frequency of your visit to dentist	Fear	1%	6.95	0.005**
	Cost	0.5%	3.2%	0.059
	Lack of time	5.7%	10.6%	0.106
	No need	91.7%	79.4%	0.150
If you are told that improving health can possibly help you in improving your overall health, would you be more careful in maintaining good health	Yes	97.5%	94.0%	0.798
	No	0%	0.5%	_
	Do not know	2.5%	5.5%	.134

[Table/Fig-6]: Assessment of awareness of both the groups regarding oral and systemic inter-relationship (Chi-square test applied)
p ≥ 0.05 indicates Not significant results, p < 0.05 indicates Statistically significant results, p <0.001 indicates Statistically Highly significant results as marked by (**)

The results of our study are in accordance with those of Avula H et al., who conducted a KAP assessment of oral health and adverse pregnancy outcomes among 359 pregnant women visiting three maternity care centres in Hyderabad, India, 87.2% of their respondents were not aware of the importance of oral hygiene and its probable association with adverse pregnancy outcomes. None of the respondents ever used dental floss and only a few (1.4%) had heard about it. Avula H et al., identified poor knowledge regarding

Parameter	Variable	Percentage
History of pregnancy	First pregnancy	38.4%
	Twice	11.6%
	Thrice	49.0%
	More than thrice	.5%
Any history of abortion	Yes	25.8%
	No	70.7%
Weight of your previous child at the time of birth	≤1.5 kg	5.0%
	1.6-2.0 kg	11.3%
	2.1-2.5 kg	27.5%
	2.6-3 kg	36.3%
	≥3.1 kg	20%
Was your child born prematurely	Yes	14.7%
	No	85.3%
Are you diabetic	Yes before pregnancy	3%
	Yes after pregnancy	5.6%
	No	88.9%
	Do not know	1.0%
Do you think there is a correlation between oral health and pregnancy outcome	Yes	18.2%
	No	22.2%
	Never heard of this	58.6%
History of gum enlargement during pregnancy	Yes	7.6%
	No	87.9%
	Don't know	4.0%
Do your gums bleed	Yes	23.2%
	No	74.2%
	Don't know	2.0%
Have you consulted a dentist for your bleeding gums	Yes	4.5%
	No	94.4%
Is pain in gums or bleeding from gums normal during pregnancy	Yes	6.6%
	No	66.2%
	Do not know	26.8%
Do you think visiting a dentist during pregnancy is safe	Yes	76.3%
	No	23.2%
Do you think pregnancy is a cause of loosing teeth	Yes	17.2%
	No	82.3%
Do you believe that after delivery teeth shouldn't be brushed	Yes	40.9%
	No	52.5%
	Don't know	6.1%
Do you think that treatment of dental related problems during pregnancy is safe	Yes	57.1%
	No	41.9%

[Table/Fig-7]: Assessment of knowledge regarding correlation of oral health to adverse pregnancy outcomes in pregnant females

various parameters, brushing only once daily and infrequent visits to the dentist as the probable risk indicators for gingival bleeding during pregnancy in their study group [22].

Amit et al., in their study on 400 pregnant women attending the Antenatal clinic at the SMS Medical College, Jaipur, India, also reported important gaps in dental knowledge and practices related to oral health care amongst them. Only 22% of the women believed that pregnancy predisposes to dental or gum problems. Tooth ache was the driving factor for 27.7% of the women. A 54% cleaned their teeth only once daily. An 88.2% had not consulted a dentist in the previous 12 months, and only 7% had visited the dentist in their most recent pregnancy. A 40.5% were of the opinion that every painful tooth should be removed. And although most of the women

displayed a reasonable level of oral health knowledge and positive attitude to oral health, it was not reflected in their oral hygiene practices [23].

Mothers play a crucial role in transferring and demonstrating health habits to their children (Rayner, Blinkhorn), so pregnant women should be a target group for oral health education especially in a country like India where population growth is very high [24,25]. Patient education is a priority. Acceptable oral hygiene techniques need to be taught, reinforced and monitored throughout pregnancy. Expecting mothers should be made aware that periodontal treatment during pregnancy is safe for both mother and child.

In order to promote health, it is necessary for the would-be -mothers to be aware of disease symptoms and to be encouraged to adopt appropriate health behaviour. Pregnant women are more likely to seek dental care if their gynecologist/antenatal care giver recommends. They are better than the dentists to counsel and convince the patients regarding oral health care during the prenatal and postnatal period. This should involve all health agencies, Midwives and gynecologists involved in antenatal care to influence, educate and promote well-being in mothers. We would also like to recommend that periodic dental checkups be incorporated in the antenatal health cards, and routine dental checkups be clubbed with their visits to the Gynecologist in each trimester. This is a doable exercise, which would ensure that even the most ignorant of the expecting mothers, would be visiting the dentist for a checkup, thereby giving the dentist the opportunity to further stress upon the importance of good oral hygiene on a one-to-one basis.

LIMITATIONS

This being a questionnaire study has certain limitations of its own. It had a relatively small sample size, hence the results should be interpreted with caution. The relationship between the level of oral health knowledge and various maternal factors such as spacing between children, care during pregnancy, and maternal nutritional status was not evaluated.

CONCLUSION

There was no gain in knowledge by the females after conceiving. An oral health history, oral health education, dental screening, and dental referral, if needed, should be a routine part of prenatal care and annual examinations.

ACKNOWLEDGEMENT

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ANNEXURE 1

QUESTIONNAIRE

ORAL HEALTH INFORMATION

1.   **What is dental caries/ decay of teeth?**

   1) A cavity in tooth   3) Don't know

   2) Black discoloration of tooth

2.   **Which food can lead to dental caries?**

   1) Sugars   3) Non-vegetarian food

   2) Salty   4) Fruits and vegetables

   5) Don't know

3.   **Do you know how many times one can safely eat or drink anything sweet in a day and still not have dental caries?**

   1) Once   5) Five times

   2) Twice   6) Six times

   3) Thrice   7) Don't know

   4) Four times   8) Any number of times one feels like eating

4.   **In your opinion when teeth start to decay, what is the treatment?**

   1) Don't know

   2) There is no treatment once it starts, it keeps progressing

   3) Extraction is the only treatment 4) Decaying teeth can be filled

5.   **Do you clean your teeth?**

1)   Yes   2) No

6.   **How?** _____

   1) Do not use any toothpaste/powder/solution 4) Neem dantum

   2) Salt and oil   5) Tooth powder

   3) Manjan   6) Toothpaste

7.   **How often do you brush your teeth?**

   1) After every meal   3) Once daily

   2) Twice daily   4) Do not brush

8.   **How often do you think teeth should be brushed?**

   1) After every meal   3) Twice daily

   2) Once daily   4) Teeth should not be brushed

9.   **In your opinion, which is the best method of cleaning the teeth?**

   1) Brush only   4) With plain water

   2) Use of datun   5) Brush and toothpaste

   3) With finger   6) Don't know

10. **Why don't you use the best method (if there is a gap between practice & knowledge)?**

   1) Habit   4) expensive

   2) Lack of time   5) Would not make any difference

   3) Inconvenient   6) Any other, specify _____

11. **How often do you change your toothbrush?**

   1) Every month   4) 6-12 months

   2) Every 3-5 months   5) When the bristles loose alignment

12. **Are you in a habit of rinsing mouth after meals?**

   1) Yes   2) No

13. **Are you in a habit of using any tobacco products?**

   1) Yes   3) no

   2) I used to but I have quit   4) occasionally

14. **What is calculus?**

   1) Hard deposits on teeth   3) Accumulation of food

   2) Yellowish discoloration of teeth 4) Don't know

15. **What are the signs/symptoms of gum diseases?**

   1) Swollen gums   4) Pus formation in teeth

   2) Bleeding gums   5) Don't know

   3) Loose teeth   6) Never heard of it

16. **Do you think oral health has any role in overall health?**

   1) Yes   3) Don't know

   2) No   4) Never heard of this

17. **Did your physician tell you about the impact of oral health on systemic health?**

   1) Yes   2) No

18. **If yes, what diseases are related to oral health?**

   1) Diabetes (sugar)   3) Pregnancy outcome

   2) Heart attack   4) All of the above

19. **What do you think how important is oral health?**

   1) Very important   3) Doesn't matter

   2) Not important   4) Somewhat important

20. **Are you suffering from heart disease/diabetes/both for which you are taking medications?**

   1) Yes, heart disease   4) None

2) Yes, diabetes   5) I have heart disease/diabetes,

3) Yes, both but not taking any medication

21. Do you go for regular medical check up? How often?_____

1) Yes   2) No

22. Do you go for regular dental check up?

1) Yes   2) No

23. When did you last visit a dentist?

1) Last week   4) 6 months to 1 year

2) Last month   5) More than 1 year

3) Last 3 to 6 months   6) Never

24. What influences the frequency of your visit to dentist?

1) Fear   3) Lack of time

2) Cost   4) No need

25. If you are told that improving oral health can possibly help you in improving your overall health, would you be more careful in maintaining a good oral health?

1) Yes   3) don't know

2) No

FOR PREGNANT FEMALES

1. How many times have you been pregnant?

1) Once   3) Thrice

2) Twice   4) More than thrice

3) My first

2. Any history of abortions?

1) Yes   2) No

3. What was the weight of your previous child?

1) ≤ 1.5kg   4) 2.6-3 kg

2) 1.6 - 2.0 kg   5) ≥ 3.1 kg

3) 2.1- 2.5 kg

4. Was your child born prematurely?

1) Yes   2) No

5. Are you a diabetic/hypertensive?

1) Yes, before pregnancy   3) No

2) Yes, after pregnancy   4) Don't know

6. Do you think there is any correlation between oral health and pregnancy outcome?

1) Yes   3) Never heard of this

2) No

7. Have you ever experienced any enlargement of gums during pregnancy?

1) Yes   3) Don't know

2) No

8. Do your gums bleed? Since when _____

1) Yes   3) Don't know

2) No

9. Have you consulted a dentist for your bleeding gums?

1) Yes   2) No

10. Do you think visiting a dentist during pregnancy is safe?

1) Yes   2) No

11. Do you think that pregnancy is a cause of loosing teeth?

1) Yes   2) No

12. Do you believe that taking antibiotics is safe during pregnancy?

1) Yes   2) No   3) Don't know

13. Do you believe that after delivery, teeth should not be brushed?

1) Yes   2) No   3) Don't know

14. Do you think treatment of dental related problems during pregnancy is safe?

1) Yes   2) No

15. Is pain in gums or bleeding from gums normal during pregnancy?

1) Yes   3) Don't know

2) No

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