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INTRODUCTION

Pregnancy is a unique time in a woman's life, accompanied by a variety of physiologic and hormonal changes.¹ Beside changes in other systems of body, changes occur in oral cavity as well causing increased susceptibility to oral infection.² Mouth serve as a mirror to general health and also as a portal for disease to the rest of the body.³ Oral health during pregnancy has long been a focus of interest.^{3,4} It is well known that hormonal changes during pregnancy are associated with oral mucosal changes, most of which are reversible clinically.³ Among all oral changes, pregnancy gingivitis is mostly acknowledged.^{1,2,5,6,7}

Previous reports have documented a high prevalence 60 to 75% of gingivitis among pregnant

EFFECT OF ORAL HYGIENE EDUCATION ON GINGIVAL HEALTH STATUS AMONG THE PREGNANT WOMEN IN JAMSHORO.

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ABSTRACT... Objectives: The rational of this study was to prevent pregnancy gingivitis through awareness and improvement of oral hygiene practices during pregnancy. This will consequently reduce the prevalence and severity of gum diseases. **Study Design:** Observational study. **Setting:** Outpatients Department of Gynecology, Unit 4, Liaquat University of Medical and Health Sciences, Jamshoro. **Period:** January 2017 to February 2018. **Material & Methods:** The oral examination was done at First visit (First Trimester) and Gingival index was recorded. All these participants were provided awareness regarding best oral hygiene. After 3 months participants were re-examined and gingival index was re-recorded. Gingival status was recorded through Gingival Index (GI) using disposable gloves (Supermax disposable gloves Made in Malaysia) and sterilized dental examination instruments with blunt ended (noninvasive) probe on the same visit. **Results:** The overall mean age of study subjects was 27.80±4.03 years, among 340 study subjects, 129(37.9) females were in first trimester of their pregnancy and 211(62.1%) were in second trimester at first visit. Descriptive statics of gingival index assessment score of gingival index at first visit was 1.95±0.51. **Conclusion:** Oral hygiene education and practices has improved the pregnancy related gum problems and has lessened the severity of gingivitis.

Key words: Gingival Health, Gingival Index, Oral Hygiene, Pregnancy Gingivitis, Pregnant Women.

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women.^{3,8} While in another study of Jordan prevalence of 74% gingivitis found in pregnancy.⁹ Some of these reports have been associated with the occurrence of periodontal diseases.³ Pregnancy alters women's body response to external stimuli. The main cause of gingivitis is dental plaque, a soft creamy film which is adherent to the teeth.¹⁰ The higher concentrations of estrogen and progesterone during pregnancy especially in the presence of plaque has been concerned with the pathophysiology of pregnancy gingivitis.⁶ Plaque (biofilm) starts building up immediately after meal, thus, daily tooth brushing and oral cleansing helps to keep this biofilm under control and enhance good oral hygiene.^{6,10}

The possibility that many women go through their pregnancies without giving consideration to their

oral health while they are facing issues on other aspects of health that's why every ante-natal visit leaves much to be asked/ desired.¹¹ As pregnancy is the time where women does not only have to take care of herself but also responsible for the upcoming child's health therefore as studies have shown that maintaining the proper oral hygiene has direct effect on improvement of gingival status.¹

The rational of this study was to prevent pregnancy gingivitis through awareness and improvement of oral hygiene practices during pregnancy. This will consequently reduce the prevalence and severity of gum diseases.

MATERIAL & METHODS

An Observational study was conducted from January 2017 to February 2018 at Outpatients Department of Gynecology, Unit 4, Liaquat University of Medical and Health Sciences, Jamshoro. Study was approved from ethical review board of university.

The recommended sample size was 280 patients¹² as this study was on follow- up there was risk to loss the number of patients, to compensate the loss we had added 20%, hence sample size is 340. Sampling Technique applied was Non-probability Convenient.

Patient age range from 18 to 40 years, Patients without co-morbid and pregnant female in first trimester and second trimester was included in the study. Patients Using tobacco or smokeless tobacco, medically compromised patient, Missing teeth that involved in GI index, carious teeth, Patients having heavy calculus deposition, patients who do not clean their teeth daily and Non-compliant patients were excluded.

After explaining the detail of the study, informed and written consent were taken. The demographic parameters like contact number, name, age was asked and pregnancy status were assessed by taking history (LMP= last menstrual period). The oral examination was done at First visit (First Trimester) and Gingival index¹³ was recorded. All these participants were provided awareness

regarding best oral hygiene. This was both verbal and written in the form of handout pamphlet. After 3 months, during their second trimester, on their antenatal visits these participants were re-examined and gingival index was recorded. Gingival status was recorded through Gingival Index (GI) using disposable gloves (Supermax disposable gloves Made in Malaysia) and sterilized dental examination instruments with blunt ended (noninvasive) probe on the same visit. On both visits, during First and second trimester assessment was recorded on identical questionnaire.^{14,15} All data were recorded on pre-formed proforma.

The Data was analyzed by statistical software package SPSS version 20.0. The gingival index, a categorical variable, for First and second trimester was assessed by using "chi square" Test. Qualitative variables were expressed as frequencies and percentages.

Descriptive statistics including patient's age was calculated. P value of less than 0.05 was considered statistically significant.

RESULTS

The overall mean age of study subjects was 27.80 ± 4.03 years, among 340 study subjects, 129(37.9) females were in first trimester of their pregnancy and 211(62.1%) were in second trimester at first visit. Descriptive statics of gingival index assessment score of gingival index at first visit was 1.95 ± 0.51 . Frequency distribution of gingival index assessment at first visit is presented in Table-I.

At their first visit different questions were asked regarding oral hygiene practices. Detailed results of frequency distribution of these questions regarding oral hygiene practices are presented in Table-II

Clinical pictures of pregnancy gingivitis and pregnancy periodontitis are shown in Figure-1 and 2.

Out of 340 study subjects, 234(68.8%) had gum problems during pregnancy. Among 234 study subjects who had gum problems, 4(1.7%) had

pain, 25(10.7%) had redness, 80(34.2%) had swelling and 125(53.4%) had bleeding and patients who had bleeding, 60(48%) subjects had bleeding while cleaning teeth. The detailed frequency distribution of gum problems at first visit are presented in Table-III.

Proper oral hygiene instructions along with handout pamphlets ¹⁴ of appropriate oral hygiene practices (attached under Annexures) were also provided at their first visit.

After 3 months, at their second visit on follow up only 289 subjects were presented in OPD out of 340.

The descriptive statistics of gingival index assessment score of gingival index at second visit was 1.04 ± 0.29 . Frequency distribution of gingival index assessment at second visit is presented in Table-IV.

At their second visit same questions were asked

regarding oral hygiene practices as were asked at first visit. There was meticulously improvement in their oral hygiene practices. Detailed results of frequency distribution of these questions regarding oral hygiene practices at their second visit are presented in Table-V.

At second visit gum problems were greatly reduced, out of 289 study subjects, 102(35.294%) had gum problems during pregnancy. The detailed frequency distribution of gum problems at second visit are presented in Table-VI.

Chi square test was applied to compare gingival status at first and second visit. There was greatly improvement in gingival index score from severe to moderate, moderate to mild and from mild to no inflammation at second visit. P-value ≤ 0.05 was considered as significant. The results showed that there was significant difference in gingival status between first and second visits ($P=0.01$) as presented in Table-VII.



Figure-1. Clinical picture of pregnancy gingivitis observed in 19 years old female observed in first trimester of her pregnancy



Figure-2. Clinical picture of periodontitis along with gum recession in 19 year old pregnant female

	Frequency	%
Mild Inflammation	57	16.8
Moderate Inflammation	252	74.1
Severe Inflammation	31	9.1
Total	340	100

Table-I. Frequency distribution of gingival index assessment at first visit (n=340)

How often do you clean your teeth?	Once daily 98 (28.8%)	Twice daily 193(56.8%)	Three times 12 (3.5%)	Sometimes 37 (10.9%)
How do you clean your teeth?	Tooth brush 173 (50.9%)	Miswak 133 (39.1%)	Finger 34 (10%)	
Which brush do you use?	Soft 78(45%)	Medium 50(28.9%)	Hard 45(26.1%)	
How long do you clean your teeth?	< one minute 88(25.9%)	One minute 121 (35.6%)	Two minutes 68(20%)	> Two minutes 63(18.5%)
Which technique do you use to brush your teeth?	Vertical 63(36.4%)	Horizontal 49(28.3%)	Circular strokes 61(35.4%)	
Do you clean your gums?	Yes 63 (18.5%)	No 277(81.5%)		
What extra measures do you take to maintain your oral hygiene?	Dental floss 82(24.1%)	Mouthwash 128 (37.6%)	Salt/ water gargles 85(25%)	Tooth picks 45 (13.2%)

Table-II. Frequency distribution of oral hygiene practices at first visit (n=340)

Have you experienced any problem with your gums during pregnancy?		Yes 234 (68.8%)	No 106 (31,2%)	
If yes than; What kind of problem you have experienced??	Pain 4 (1.7%)	Redness 25 (10.7%)	Swelling 80 (34.2%)	Bleeding 125 (53.4%)
If bleeding than; When do your gums bleed?	Spontaneously 25 (20%)	During cleaning teeth 60 (48%)	While eating 40 (32%)	

Table-III. Frequency distribution of gum problems at first visit (n=340)

	Frequency	%
No Inflammation	11	3.8
Mild Inflammation	241	83.4
Moderate Inflammation	35	12.1
Severe Inflammation	2	0.7
Total	289	100

Table-IV. Frequency distribution of gingival index assessment at second visit (n=289)

How often do you clean your teeth?	Once daily 59 (20.41%)	Twice daily 141(48.78%)	Three times 64 (22.14%)	Sometimes 22(7.612%)
How do you clean your teeth?	Tooth brush 173 (50.9%)	Miswak 64 (22.15%)	Finger 53 (17.99%)	
Which brush do you use?	Soft 119(68.76%)	Medium 31(17.95%)	Hard 23(13.29%)	
How long do you clean your teeth?	< one minute 44(15.2%)	One minute 87(30.10%)	Two minutes 121(41.80%)	> Two minutes 37(12.80%)
Which technique do you use to brush your teeth?	Vertical 102(58.95%)	Horizontal 40(23.12%)	Circular strokes 31(17.93%)	
Do you clean your gums?		Yes 253 (87.543%)	No 36(12.45%)	
What extra measures do you take to maintain your oral hygiene?	Dental floss 48 (16.62%)	Mouthwash 79 (27.33%)	Salt/water gargles 92 (31.83%)	Tooth picks 78 (24.22%)

Table-V. Frequency distribution of oral hygiene practices at second visit (n=289)

Have you experienced any problem with your gums during pregnancy?	Yes 102(35.294%)			No 187(64.705%)	
If yes than What kind of problem you have experienced??	Pain 27 (26.47%)	Redness 42 (41.17%)	Swelling 16 (15.68%)	Bleeding 17 (16.66%)	
If bleeding than; When do your gums bleed?	Spontaneously 4(23.52%)		During cleaning teeth 11(64.70%)		While eating 2(11.764%)

Table-VI. Frequency distribution of gum problems at second visit (n=289)

	Gingival Index At 1 st Visit	Gingival Index At 2 nd Visit	P-Value
No Inflammation	0	11	0.01
Mild Inflammation	57	241	
Moderate Inflammation	252	35	
Severe Inflammation	31	2	
Total	320	289	

Table-VII. Comparison of gingival index assessment at first and second visit (n=289)
 Chi Square test was applied. P-value ≤ 0.05 considered as significant. *Significant at 0.05 level.

DISCUSSION

It is advisable for pregnant woman to seek dental care during second trimester of her pregnancy, as most of the tissues of embryo are at the formative stage in the first trimester and there is risk of vena cava compression, postural hypotension and positional discomfort in pregnant women in the third trimester, so the dental treatment should be avoided in first and third trimesters.¹

There is no refute with the reality of healthy oral environment in pregnant women is central, recent studies advocate that poor oral health might linked inauspicious pregnancy results. This is imperative in India as there is elevated maternal mortality rate. Regular brushing of teeth, dental flossing, use of mouth washes can prevent periodontal problems during pregnancy, however such positive behavior would be influenced by the individual’s oral health knowledge and attitudes which in turn is influenced by the awareness of an individual.¹⁶

Past studies have reported the prevalence of pregnancy gingivitis ranging from 35% to 100%.^{17,18} A study from Turkey reported a prevalence of gingivitis during pregnancy in almost all of its participants which were 61 in total.¹⁹ In this study, the prevalence of pregnancy gingivitis at first visit was mostly moderate with

74.1% and mean gingivitis score 1.95 ± 0.51 . the plasma concentration of estrogen and progesterone is 100mg/ml and 6mg/ml In the second and third trimesters, that is approximately 10 to 30 folds superior than observed during the menstrual cycle.²⁰ raised progesterone levels causing dilation of capillaries in gums, increased permeability that results in gingival exudates which is followed by clinical signs of pain, redness, swelling, increased bleeding tendency etc.²¹ In this study, the prevalence of pregnancy gingivitis at second visit was mostly mild with 83.4% and mean gingivitis score 1.04 ± 0.29 .

A study was conducted in Spain by Carrillo-de-Alborno et al. to recognize estimate variables involved in aggravating inflammation of gingiva in pregnant women.²² In the study the GI was recorded at all locations at four sites on each tooth with a CPC-12 periodontal probe. Out of the 42 pregnant women, the GI score in the first trimester was 0.75 (0.00-1.50) while in the second trimester the expecting mothers had the score of 1.00 (0.50-2.00). The difference between the two groups was found to be statistically significant. In comparison to the above-mentioned study, this study had the GI scores of 1.95 ± 0.51 and 1.04 ± 0.29 at first visit and second visit respectively.

Kinnby et al. found a significant increased reactivity

to plaque in pregnant women after comparing the location of gingivitis with plaque (G/P-ratio). This study modulates that presence of plaque in first and second trimesters induce gingivitis. This highlights the direct relationship among existing of plaque and gingivitis, as GI during pregnancy could be predicted on the basis of presence of plaque.²³

A study from Nigeria reported that the oral hygiene status of the women progressively worsened as parity increased²⁴, a finding which differed from a Spanish report who found no significant relationship between oral hygiene and parity.²⁵ The results of this study had similar findings as that of the Nigerian study.²⁴ The above finding may be a result of the stress of running the home, taking care of children and business, compounded by the stress of pregnancy, with attendant neglect of proper personal and oral hygiene measures.²⁵

Tillakaratne et al. reported that the raised level of hormones characteristic of pregnancy affects only the gingival tissues and not the periodontal attachment.²⁶ One more study observed changes in the gum tissues increasingly along with the pregnancy and were marked than the periodontal changes.²⁷ HA Alwaeli, who concluded that pregnant population has lacking of awareness and knowledge about the health of gingiva. This population needs precise comprehension regarding their oral health. This could be enlightened by facilitating preventive programs on oral self-care and prevention of problems prior to and during pregnancy.²⁸

Another similar kind of study was conducted by Kim et al.²⁹ concluded that pregnant women have some oral health knowledge, which varied according to maternal race or ethnicity. Their beliefs varied according to their education levels. Including oral health education as a part of prenatal care may improve knowledge regarding the importance of oral health among vulnerable pregnant women, thereby, improving their oral health and that of their children.

CONCLUSION

Oral hygiene education and practices has

improved the pregnancy related gum problems and has lessened the severity of gingivitis.

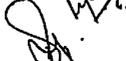
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2	Munir Ahmed Banglani	Concept & Discussion writing.	
3	Shazia Parveen Rajpar	Results & Conclusion writing.	
4	Suneel Kumar Punjabi	Literature review.	
5	Muhammad Ishaque	Critical analysis.	