Original Article

AWARENESS AMONG FEMALES ABOUT ORAL HYGIENE BEFORE, DURING AND AFTER PREGNANCY

[1]Moulishree Ramesh, [2]Dr. Kavalipurapu Venkata Teja*

[1]Undergraduate, Saveetha Dental College and Hospital Saveetha Institute of Medical and Technical Sciences Saveetha University, Chennai-600077

[2]*Senior Lecturer, Department of Conservative Dentistry and Endodontics, Saveetha Dental College and Hospital, Saveetha Institute of Medical and technical sciences (SIMATS), Saveetha University, Chennai-77, Tamilnadu, India.

Abstract

Background: Oral cavity is said to be the main site of entry, an important reservoir for various microorganisms. Oral health is viewed as a window to general health. Proving these statements, there are various studies done showing the relation between oral infections and systemic diseases, several oral manifestations of systemic diseases. Differences in oral hygiene maintenance among different age groups and gender has also been focused in recent decades. Though there are no significant differences noted in the gingival microflora between males and females, it was found that hormonal changes act as a major influence on women's oral health. Women on pregnancy experience the hormonal changes of various hormones released causing diseases like pregnancy gingivitis, dental caries, pregnancy granuloma, periodontitis which brings in the need for additional care over plaque control and oral hygiene maintenance in pregnant women.

Aim: This study aims to determine the awareness about oral hygiene among females before, during and after pregnancy.

Materials and method: The present study involves online study setting done in the year 2021. A set of self-evaluable questionnaires were prepared, approved by the institutional review board, Saveetha dental college, chennai and circulated among females in the South Indian population. After about 150 responses, the data collected was documented, tabulated and analysed using SPSS statistics (Chi square analysis). The results were visually presented as pie charts and bar graphs.

Results and discussion: In the selected populations, 60.7% of the participants belong to 18-25 years of age, 27.3% of the individuals belong to the 25-35 age group followed by 12% of the individuals under 35-45 years of age. About 27% of the participants from 25-35 years, 25% of the participants from 18-25 years of the participants were aware that women are being more susceptible to hormonal changes and need proper care to maintain oral hygiene. Age group between 25-35 years showed maximum awareness (statistically significant). The response seems to help us understand the awareness about various factors like the influence of hormonal changes over one's oral health, susceptibility of women towards hormonal changes, precautionary measures for oral hygiene during pregnancy, importance of consulting gynaecologist before any dental treatment and which trimester is preferred to be the safest period for dental treatments. Chi square test was done to analyse the responses of the questionnaire surveyed to study their statistical significance where $p< 0.05$(statistically significant). The p values were found to be, $p<0.05$ proving statistical significance in this present study.

Conclusion: There exists a significant level of awareness among females about oral hygiene before, during and after pregnancy. Further awareness camps should be conducted to increase awareness about proper guidelines for oral hygiene, specific facts and myths related to oral health during pregnancy should be addressed and spread awareness about the same.

Keywords: Awareness; Females; innovative technique; Oral hygiene; Pregnancy; ecofriendly.

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INTRODUCTION

Oral cavity is said to be the main site of entry, an important reservoir for various microorganisms. Oral health is viewed as a window to general health. Proving these statements, there are various studies done showing the relation between oral infections and systemic diseases, several oral manifestations of systemic diseases. There exists a strong

relation between oral health and general health. Individuals with poor oral health tend to have or more likely to suffer chronic ill conditions like cardiovascular diseases, HIV infection, diabetes, etc. helping us understand the importance of oral hygiene maintenance .People with chronic periodontal infections are more susceptible to disorders like stroke, atherosclerosis, cardiac diseases. Individuals with poor oral health have less glycemic control which may result in diabetes, low- weight preterm babies. These findings show the relation between poor oral health status and incidence of systemic diseases.(Rautemaa *et al.*, 2007). Various systemic manifestations of oral diseases have been brought to focus in recent decades. The incidence of cardiovascular diseases in periodontal disease may be through the bacteria, bacterial products, inflammatory mediators released into the bloodstream and their harmful effects over coronary regions. The occurrence of amniotic infections through bloodstream from oral regions may result in low weight preterm babies. These mechanisms help understand the relation between oral diseases and their manifestations.(Babu en Gomes, 2011). Likewise there are also oral manifestations of various systemic diseases. Various oral manifestations like oral thrush seen in HIV infections, oral ulcers seen in lupus erythematosus, etc. Abnormalities in the oral cavity like cheilitis, gingivitis, plaques, bleeding, inflammations serve as an early indicator of systemic diseases which on avoidance may cause severe complications.(Neville *et al.*, 2019). Understanding the oral manifestations of systemic diseases helps us prevent the onset of various systemic diseases. Severe chronic infections like cancer, leukoplakia have gingival hyperplasia, HIV infected patients have oral thrush, oral candidiasis, oral kaposi's sarcoma as their common oral manifestations. (Parks en Lancaster, 2003; Neville *et al.*, 2019).

Knowing the oral manifestations of systemic diseases, systemic manifestations of oral diseases shows the importance of oral hygiene maintenance. The difference in oral hygiene maintenance among different age groups and gender has also been focused in recent decades. Though there are no significant differences noted in the gingival microflora between males and females, it was found that hormonal changes act as a major influence on women's oral health. On the onset of puberty, menstruation causes hormonal changes which leads to microbial, vascular, cellular, immune changes in periodontium. Women on pregnancy experience the hormonal changes of various hormones released causing diseases like pregnancy gingivitis, dental caries, pregnancy granuloma, periodontitis which brings in the need for additional care over plaque control and oral hygiene maintenance in pregnant women. (Amar en Chung, 1994). Women at different stages of life like adolescents, pregnancy, contraception, old age, menopause experience hormonal influence in increasing incidence of oral infections. Our team has extensive knowledge and research experience that has translate into high quality publications(Dinesh *et al.*, 2013; Krishnan en Lakshmi, 2013; Muthukrishnan en Warnakulasuriya, 2018; Sekar *et al.*, 2019; Gomathi *et al.*, 2020) (Sathivel *et al.*, 2008; Panda *et al.*, 2014; Govindaraju, Neelakantan en Gutmann, 2017; Johnson *et al.*, 2020; Saraswathi *et al.*, 2020)There are various strategies like oral hygiene techniques (flossing, brushing, rinsing,etc) professional care, nutrition, stoppage of tobacco, alcohol consumption, physical exercise helps control oral hygiene in women. (Amar en Chung, 1994; Basha, Ganapathy en Venugopalan, 2018)).

Viewing the importance of women's oral health, this study focuses mainly during pregnancy, the hormonal changes, nausea, vomiting, malnutrition during this phase causes negative impact on oral health and foetal health. There are more bacterial indexes in gingiva, transportation of certain gram negative bacteria to uterine tissues shows the necessity for additional aids in oral hygiene maintenance.(Kirca, 2017). There exists guidelines in maintaining pregnant women oral hygiene like complete oral examination, regular check ups, nutrition, additional aids to protect women's and foetal health.(Hajikazemi en Haghdoost, 2012).This study aims to determine the awareness about oral hygiene among females before, during and after pregnancy.

MATERIALS AND METHODS

The present study is an original study (survey) done in an online setting in the year 2021. A set of self evaluable questionnaires were created, evaluated by the faculty members of the institution. The questionnaire consists of 12 close ended questions whose internal and external validity checking were done by principal investigator and guide. The questionnaires were approved by the institutional review board, Saveetha Dental College, Chennai. The questionnaire was then circulated and surveyed among females of the South Indian population whose participants were selected on a randomised sampling method. The data surveyed was collected, analysed in a spreadsheet and transferred to SPSS software to perform chi square tests, as their statistical analysis. Finally the results were tabulated, analysed and figuratively represented as pie charts and bar graphs.

RESULTS

The data surveyed were collected, analysed to study the awareness about oral hygiene among females before, during and after pregnancy. In the selected populations, 60.7% of the participants belong to 18-25 years of age, 27.3% of the individuals belong to the 25-35 age group followed by 12% of the individuals under 35-45 years of age (figure 1). About 58% of the population reported maybe, 20.7% of the individuals reported yes while 12% opted no and remaining 9.3% of the population reported no as their response towards the awareness of the significant role of hormonal influence on oral hygiene. Majority of 52% of the population were unaware while 34.7% of the population were aware and the remaining 13.3% of them reported maybe to the statement- women being more susceptible to hormonal changes needs extra care in maintaining oral hygiene. About 37.3% of the population were unaware while the 58% of the population were unaware of women more susceptible to gingivitis, cavities during menstruation, puberty. Majority of 69.3% of the population were sure vaguely while 25.3% of the population were definitely sure and the remaining participants reported it unnecessary to take proper oral healthcare while taking oral contraceptives.

In the present study, the majority of 87.3% of the population were aware while 12.7% of the population were unaware about the pregnancy gingivitis condition during pregnancy. About 59.3% of the population opted for the second trimester followed by 28,7% of the population reported the first trimester while 12% of the population opted the third trimester as the safest trimester to undergo any dental treatment. About 48% of the participants vaguely, 46% of the population surely believed while the remaining population did not believe in the foetal abnormalities which can be caused by radiographic examinations during pregnancy. Majority of 54.7% of the population agreed while 45.3% of the population didn't agree in consulting the gynaecologist before undergoing any dental treatment dur8ng pregnancy. Majority of 67.3% of the population surely believed while 24% of the population believed in the impact of mothers oral health over the infants oral hygiene and the remaining population didn't agree over this impact.

About 68% of the population agreed while the remainder (32%) of the population didn't agree in being precautious in maintaining oral hygiene during pregnancy. Majority of 62.7% of the population believed it's important while the remaining (37.3%) of the population didn't believe it was important regarding the treatment of certain dental diseases like caries before planning pregnancy to avoid pain and other complications during pregnancy. Almost the entire (88%) of the population agreed while the remaining (12%) didn't agree over the statement- if the parents have a high tendency to develop caries, then for hereditary reasons their children will be highly affected by caries.

Certain questions surveyed were chi square analysed studying the association between the age group of the participants and their percentage distribution of response towards the questions. In the present study, about 27% of the participants from 25-35 years, 25% of the participants from 18-25 years of the participants were aware that women are being more susceptible to hormonal changes and need proper care to maintain oral hygiene. Age group between 25-35 years showed maximum awareness(statistically significant). About 48% of the participants from 18-25 years, 35% of the participants from 25-35 years chose the 2nd trimester as the safe trimester for dental treatment.(statistically significant). Majority of 48% of participants, 20% of the participants from 25-35 years agreed to consultation with a gynaecologist before any dental treatment during pregnancy. (statistically significant). About 68% of 18-25 years, 21% of 25-35 years, 12% of 35-45 years of age agreed that mothers' oral hygiene has an impact over infants' oral health.(statistically significant). Nearly 43% of 18-25 years, 41% of 25-35 years were aware about the precautions to be taken for proper oral hygiene during pregnancy. About 86% of the 18-25 years, 28% of the 25-35 years, 18% of the 35-45 years agreed to the myth related to pregnancy and infants oral health.(statistically significant).

Table 1:Showing the questionnaire responses

S. No	QUESTION	OPTIONS	RESPONSE PERCENTAGE
1.	Age	18-25 years	60.67%
		25-35 years	27.33%

		35-45 years	12%
2.	Did you know hormones play a significant role in oral hygiene?	Yes	58%
		No	12%
		Maybe	20.67%
		I don't know	9.33%
3.	Did you know women being more susceptible to hormonal changes have to take extra care in maintaining oral hygiene?	Yes	34.67%
		No	52%
		Maybe	13.33%
4.	Did you know during puberty, menstrual cycle, women are more susceptible to gingivitis, caries?	Yes	37.33%
		Maybe	58%
		I don’t know	4.67%
5.	Do you think it's critical to take proper oral health care while taking birth control pills?	Yes, definitely	25.33%
		Yes, i guess	69.33%
		No, not necessary	5.33%
6.	Have you heard about the condition- “pregnancy gingivitis”- gum swelling, redness, bleeding during pregnancy?	Yes	87.33%
		No	12.67%

7.	Which trimester do you think is safe to undergo any dental treatment?	First trimester	28.67%
		Second trimester	59.33%
		Third trimester	12%
8.	Do you believe that radiographic examinations done during pregnancy can cause foetal abnormalities?	Yes, sure	42%
		Yes, i guess	48%
		No	5.33%
		I don't know	4.67%
9.	Will you consult your gynaecologist before undergoing any dental treatment during gestation?	Yes	54.67%
		No	45.33%
10.	Do you believe that your oral health may have an impact on your infant's oral health?	Yes, sure	67.33%
		Yes	24%
		No	4.00%
		I don't know	4.67%
11.	Do you think you should take more precautions to maintain oral health during pregnancy?	Yes	68%
		No	32%
12.	Do you think it's important to treat certain dental diseases such as deep caries before		

	planning pregnancy to avoid pain and other complications?	Yes	62.67%
		No	37.33%
13.	Do you believe the statement- "if parents have a high tendency to develop caries then for hereditary reasons, their children will be highly affected by caries"?	Agree	88%
		Don't agree	12%

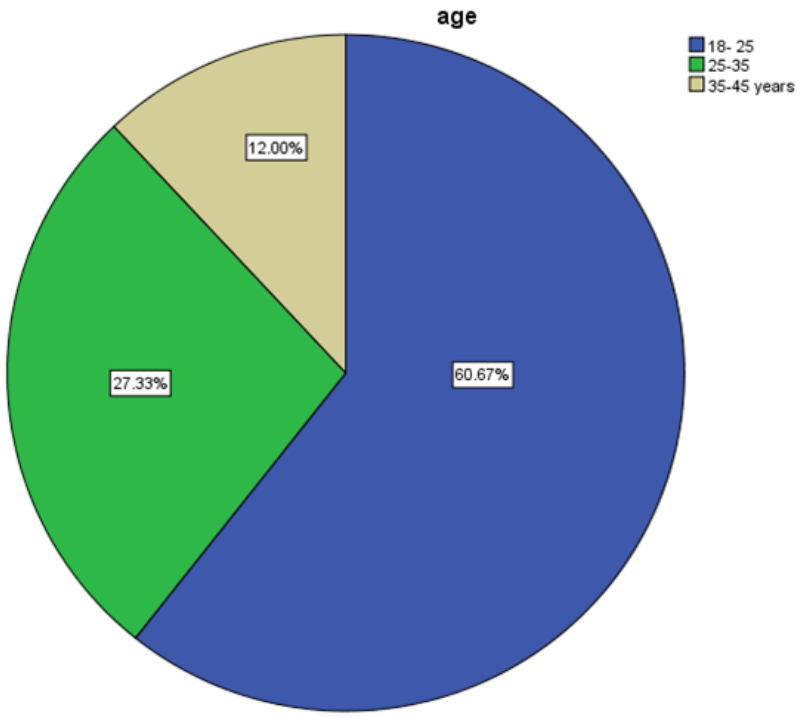

Figure1- Pie chart representing the percentage distribution of the population based on age. About 60.7% of the respondents belonged to the age group 18-25 years(blue), 27.3% of the population were 25-35 years of age(green), 12% of the respondents were 35-45 years of age(beige).

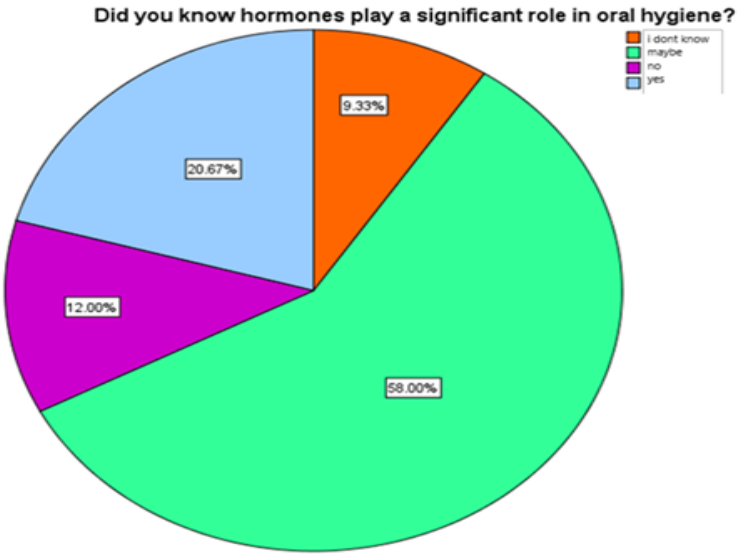

Figure2 - Pie chart representing the percentage distribution of the population based on awareness about hormonal influence in oral hygiene. About 58% of the respondents reported maybe (light green), 20.7% of respondents reported yes (light blue), 12% of the participants reported no (purple) while 9.3% reported I don't know (orange) as their response for awareness towards the hormonal influence in oral hygiene.

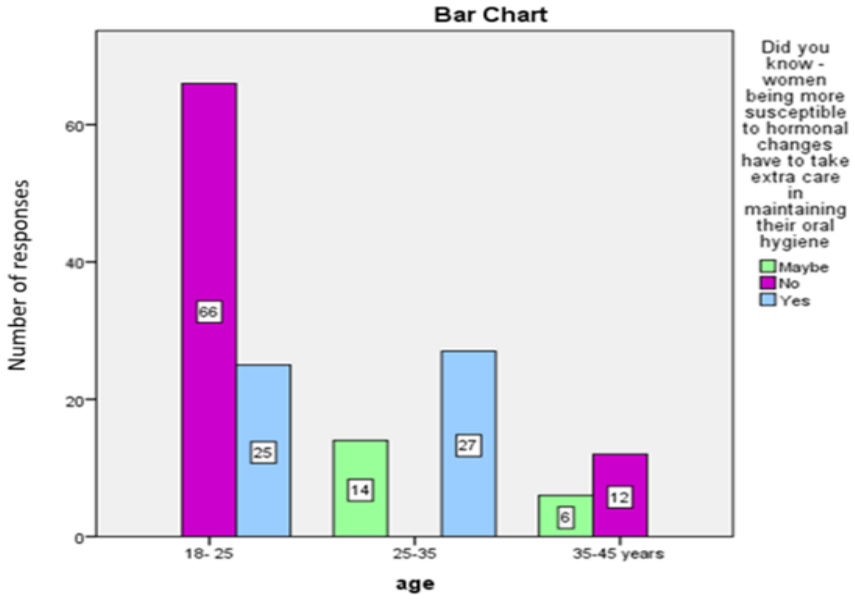

Figure 3- Bar graph showing association between age group and awareness about women being susceptible to hormonal changes and need for extra care for maintaining oral hygiene. X axis represents the age group of the participants. Y axis represents the number of responses who reported yes(light blue), no(purple), maybe(light green), I don't know(orange). 27 of the 25-35years age group responded that women are more susceptible to hormonal changes where they need to take extra care in maintaining oral hygiene. The association is statistically significant, chi square test, p value= 0.00($p<0.05$)

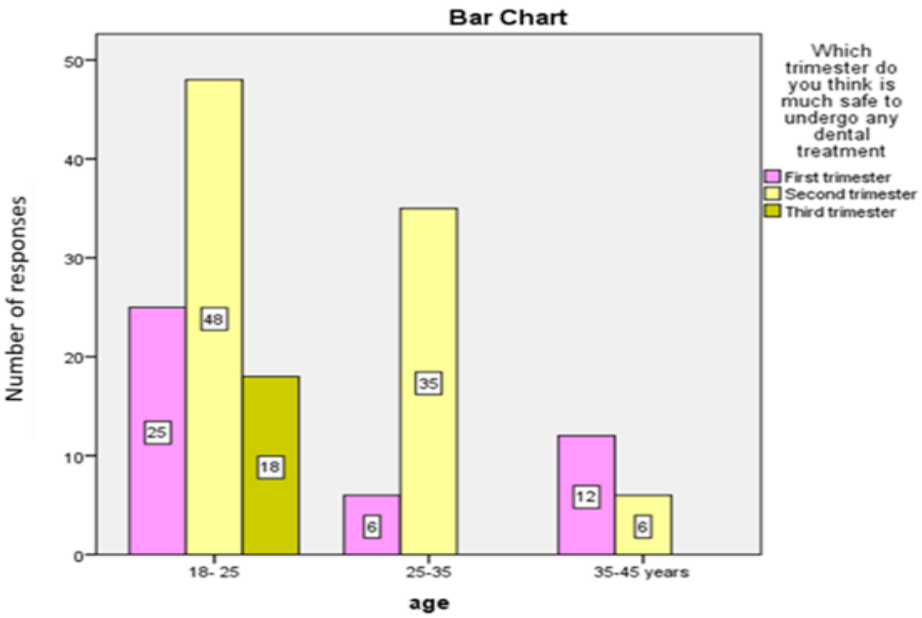

Figure 4- Bar graph showing association between age groups and their response to the safer trimester to undergo dental treatment during pregnancy. X axis represents the age group of the participants. Y axis represents the number of responses by the participants as first trimester(pink), second trimester(light yellow), third trimester(olive green). 25 of them responded as first trimester, 48 of them responded second trimester from the group of 18-25 years regarding the safest trimester for undergoing any dental treatment. The association is statistically significant, chi square test, p value= 0.00($p<0.05$)

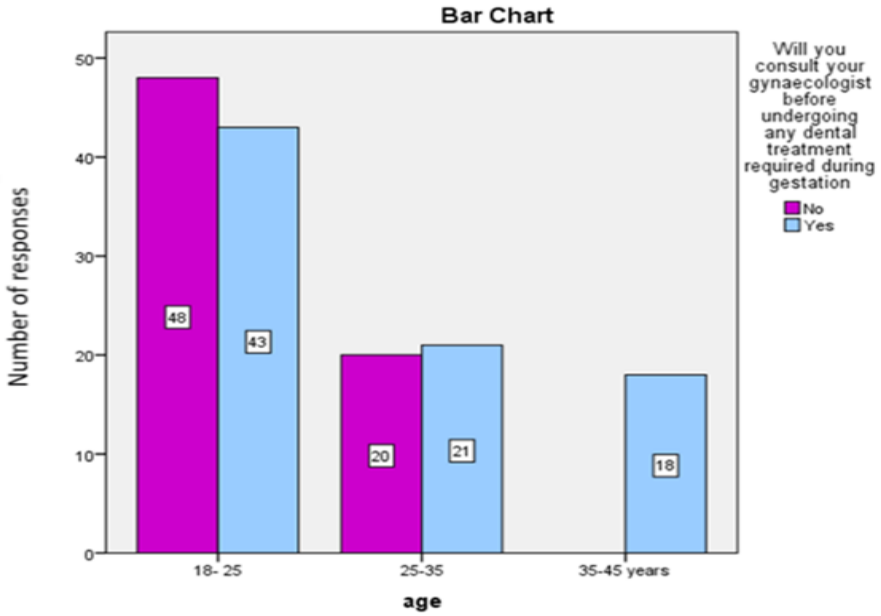

Figure 5- Bar graph showing association between age group and their response towards consulting gynaecologist before any dental treatment during pregnancy. X axis represents the age group of the individuals. Y axis represents the number of responses where the respondents opted yes(light blue), no(purple). 43 of the women from the age

group 18-25 years agreed on consulting gynaecologist before undergoing any dental treatment.The association is statistically significant, chi square test, p value= 0.00($p<0.05$)

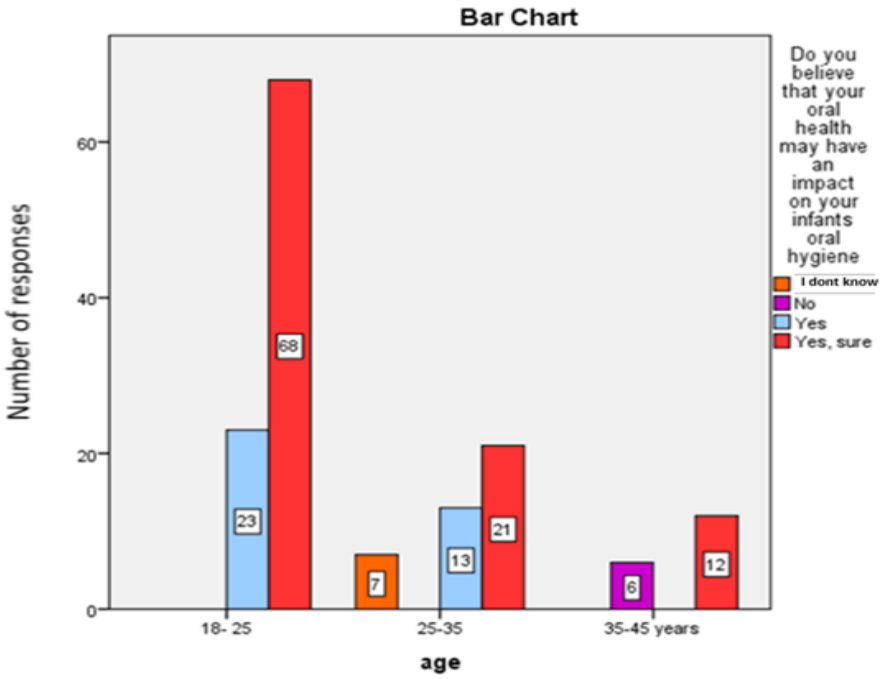

Figure 6- Bar graph showing the association between age group and their response towards their belief in impact of mothers oral hygiene over infants oral health. X axis represents the age group of the individuals. Y axis represents the number of responses by the respondents who reported as I don't know(orange), no(purple), yes(light blue), yes, sure(red) . 68 of the women from the age group 18-25 years were sure about the impact of their oral care over their infants oral hygiene. The association is statistically significant, chi square test, p value= 0.00($p<0.05$)

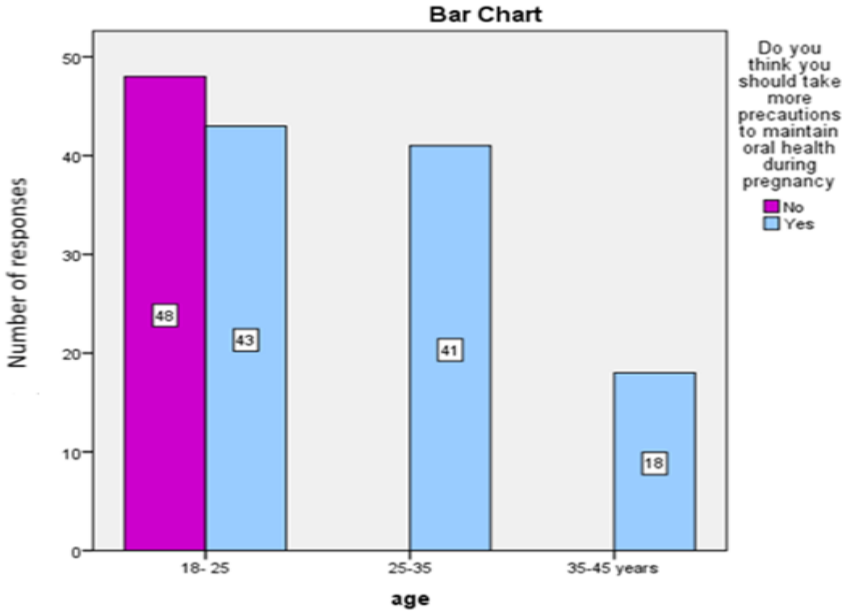

Figure 7- Bar graph showing the association between age group and the importance of precautions to maintain oral hygiene during pregnancy. X axis represents the age group of the individuals. Y axis represents the number of responses by the respondents who reported as yes (light blue) and no (pink) 43 of the women from the age group 18-

25 years agreed on taking more precautions to maintain oral hygiene during pregnancy. The association is statistically significant, chi square test, p value= 0.00($p<0.05$)

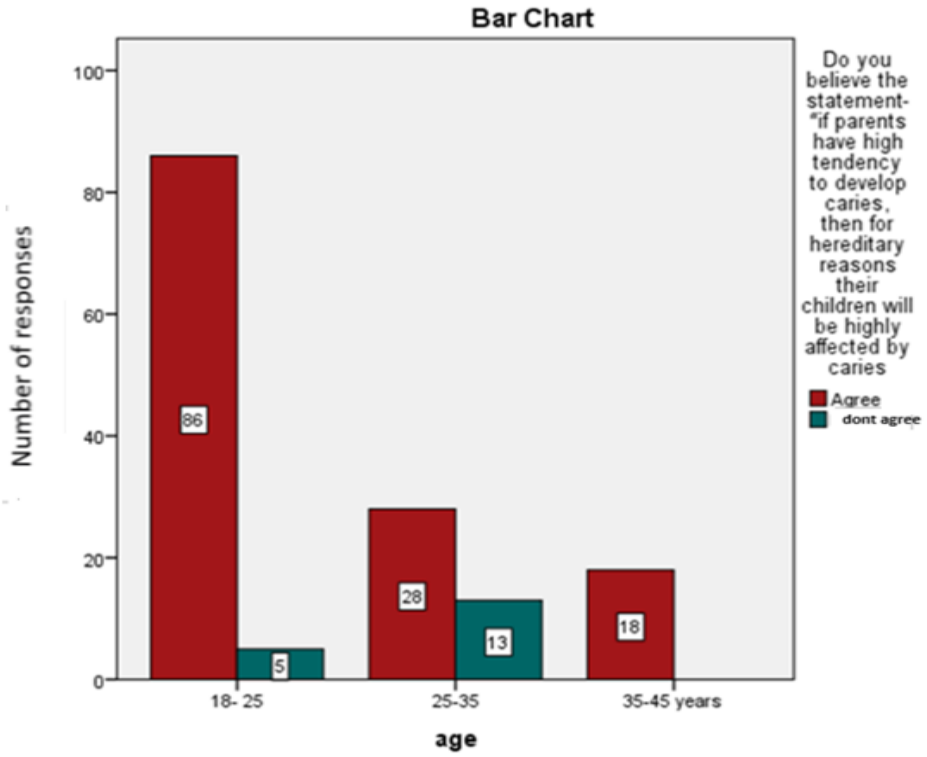

Figure 8- Bar graph showing the association between age groups and the response towards the statement ' parents with high risk of dental caries, due to hereditary reasons their children's oral health will be affected'. X axis represents the age group of the individuals. Y axis represents the number of responses where the respondents responded that they agree(maroon) or don't agree(ash). About 13 women from the age group 25-35 years did not agree with the fact that parents with high prevalence of dental caries may increase the risk of caries incidence in infants' oral health due to hereditary reasons. The association is statistically significant, chi square test, p value= 0.00($p<0.05$).

DISCUSSION

In the present study, about 20.7% of the population (table 1) were sure while 58% of the population were vaguely sure that hormonal changes influence over womens oral hygiene. Large percent of the population were aware about pregnancy gingivitis, vaguely agreeing to the importance of proper oral health while taking oral contraceptives. Almost the entire population believed that radiographic examination done during pregnancy causes foetal abnormalities. In the present study, the population majorly agreed over consultation of gynaecologists before dental treatment during pregnancy, the impact of women's health over their infant oral hygiene. They also agreed on being more precautious in maintaining oral hygiene during pregnancy, and the importance of treating certain dental diseases before pregnancy to avoid pain and other complications during pregnancy. Majority of the population correctly answered the second trimester as the safer trimester for dental treatment during pregnancy. But they weren't aware about the hormonal influence in oral hygiene of females and their importance in taking proper oral care. They also believed in myths like parents with high risk of caries can affect the infants oral health due to hereditary reasons. These responses proves that there exists a significant level of awareness among women about the importance of oral hygiene during and after pregnancy though further awareness camps should be conducted to create awareness about specific facts and guidelines in maintaining oral hygiene at different phases of life(puberty, menstruation, oral contraceptives, pregnancy,menopause, osteoporosis).

In the present study, the awareness about oral hygiene before, during and after pregnancy among females were studied. There are previous studies which support and oppose our findings enhancing the value of this study findings. In the

present study, about 28% of the population (figure 2)were aware while 58% of the population guessed that hormones play an important role in oral hygiene. Similarly, studies show that 70% of the population believed hormonal fluctuations have a role in oral hygiene(Patil *et al.*, 2012)supporting our finding. In the present study, only 34.7% of the population (tablet 1) were aware of women's susceptibility to hormonal changes and to take proper oral health care while mostly 37.3% of the population were awareamd 58% of them were vaguely sure that women are more susceptible to gingivitis, cavities during puberty, menstruation. Likewise, almost the entire population (95-100%) agreed that women's oral health gets affected by hormones during the reproductive phase of life(sonali et al, 2011).

In the present study, about 54.7% of the population (table 1) agreed on consulting gynaecologists before undergoing dental treatment during pregnancy. Previously, only 9% of the population believed physicians provide proper guidelines about oral hygiene during pregnancy while 85.6% of the population agreed that women are more likely to attend dental treatment on gynaecologist recommendation(Da Costa *et al.*, 2010). About 42% of the population believed the harmful effect of radiographic examination during pregnancy on infants' health. Similarly, 56.7% (Geist, 2009; Da Costa *et al.*, 2010) , only 18,4% of the population(da costa et al, 2010) believe that radiographic exam affects infant health during pregnancy.

In the present study, 67.3% of the population (table 1) believed in the impact of women's oral health over their infant oral hygiene. Previously, only 14% of the population agreed that mothers' poor health negatively affects the child's health (Geist, 2009; Da Costa *et al.*, 2010; Agarwal *et al.*, 2020). In this study, the majority of 68% of the population (table 1) agreed on being more precautious in maintaining oral hygiene during pregnancy, while only 24% of the population (Boggess *et al.*, 2010)underwent routine dental check up during pregnancy opposing our finding. About 59.3% agreed the second trimester as the safe time for dental treatment during pregnancy supported by the study where 97.9% of the population believed the second trimester the ideal time for dental treatments.(da costa et al, 2010). In the present study, 62.7% of the population agreed that it's important for dental checkups and treatment before planning pregnancy which was supported by studies like 91.7%(da costa et al, 2010) , 97% (Strafford, Shellhaas en Hade, 2008; Boggess *et al.*, 2010) of the population agreed on dental care before pregnancy.

On chi square analysis, the association between age groups of the individuals and percentage distribution of their responses towards the questions were analysed. In the present study, the association between age groups and awareness about women's susceptibility to hormonal changes and the need to take extra care in maintaining oral hygiene was found to be statistically significant (figure 3). The age group between 25-35 years showed maximum awareness. On studying the awareness about the safer trimester for dental treatments during pregnancy(figure 4), the association was found to be statistically significant with participants of the age group 18-25 years showing maximum awareness. On viewing the relation between age groups and the need to consult gynaecologist before any dental treatment during pregnancy (figure 5), showed statistical significance with age groups between 18-25 years to have maximum awareness. Maximum awareness about the impact of mothers oral hygiene over infants oral health (figure 6) were by the participants of the age group between 25-35 years showing statistical significance. In this study, the association between age groups and their awareness about precautions to be taken for proper oral hygiene during pregnancy was focused (figure 7). There exists a maximum level of awareness among participants of age group between 18-25 years of age which was proved to be statistically significant. There was an association between the age group of the individuals and their belief on myths about pregnancy and oral health(figure 8). Participants of age group between 25-35 years showed maximum awareness which is statistically significant.

The present study holds certain limitations like small sample size selected from concised homogenous populations restricted to a specific geographic location. Further, many inclusion criterias should be added to enhance the quality of the study. In future studies, the knowledge and attitude along with the awareness about oral hygiene among females of a wide range of age groups should be studied and analysed.

CONCLUSION

There exists a significant level of awareness among females about oral hygiene before, during and after pregnancy. Further awareness camps should be conducted to increase awareness about proper guidelines for oral hygiene, specific facts and myths related to oral health during pregnancy should be addressed and spread awareness about the same.

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CONFLICT OF INTEREST: The author declares that there was no conflict of interest in the present study.

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