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Does Multiparity Affect Periodontitis Associated Adverse Pregnancy Outcomes' Awareness?

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Periodontal disease is a very common, undesirable, and neglected bacterial infection causing destruction of the connective tissue and dental bone support. During pregnancy, the oral bacteria could lead to tissue damage and mediate immune response which can impair the development and fetal growth in the placenta that it may be a risk factor for pre-term birth (before 37 weeks of gestation). The goal of this study to measure the knowledge and awareness of women in Jeddah, Saudi Arabia toward the relation between periodontitis and adverse pregnancy outcome.
Methodology: A cross-sectional study was done in Jeddah, Saudi Arabia from January 2020 until November 2021. based on a validated questionnaire developed by the authors. A convenience sample size of 966 women, aged 20-50 years, with a confidence level of 95%, and a 5% margin of error was selected. The questionnaire was divided into three main sections: demographics, knowledge and attitude.
Results: The study showed a mean score of awareness of 3.801.26 (54.35 ± 17.98%) while the

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mean score of attitudes was 1.60 ± 0.98 (39.91 ± 24.42%). There was no statistically significant relationship to age group, nationality, or parity, however, scores were significant to university education level.

Conclusion: Learning from previous multigravidas did not influence knowledge and awareness towards adverse pregnancy outcomes associated with PD.

Keywords: Periodontitis; pregnant women; adverse pregnancy.

1. INTRODUCTION

Periodontal diseases are a worldwide and common chronic disease in humans, it affects 5%-30%of the population causing pain, discomfort, and tooth loss [1]. It is an infectious disease caused in the tooth-supported tissue by inflammation or infection and it is caused by dental plaque which is a gram-negative anaerobic microorganism's biofilm and micro-aerophilic bacteria. These microorganisms causing long-term local and systemic increases in pro-inflammatory prostaglandins and cytokines [2,3]. The periodontal disease has two classifications which are: gingivitis, a mild and reversible form that is inflammation but does not cause tissue destruction; and periodontitis, which has a more severe form that's known as inflammation with alveolar bone resorption and attachment loss. There are researches that proves that periodontal health can be associated with systemic diseases and conditions such as diabetes, cardiovascular disease, and preterm birth [4]. The active chronic infection involved by gingivitis and periodontitis may increase the risk of adverse pregnancy outcomes for example low birth weight, and preterm birth. In periodontal pockets, if there is large ulcerated epithelium it can cause bacteria and their products to make it to other parts of the body causing lesions. some types of bacteria can cross through cells and tissues directly as prophyromonas gingivalis and aggregatibacter actinomycetemcomitans. In pregnant women with periodontitis, the bacteria may cause the cascade of immune-inflammatory mediators like PGE2, IL-1, IL-6, and TNF- α that may be involved in adverse pregnancy outcome due to the ability of the periodontal pathogens or by-products to reach the placenta and to the circulation and amniotic fluid of the fetus in the womb [5]. in 1995 the world health organization (WHO) has defined the low birth weight (LBW) as infant of fewer than 2500 gms and if less than 1500 gms as very low birth weight and defined preterm birth (PB) as any infant birth at less than 37 weeks of gestation period. Studies show that infants will have more than 30% increase in the mortality and morbidity to congenital, neurological disabilities and developmental defects [6]. The following are risk factors for preterm low birth weight shown by multiple studies: in pregnant women whose age (<17 and >35), low socioeconomic level, drugs use, alcohol, low parental care, smoking, African American race, had multiple pregnancy, genitourinary tract infections, or systemic diseases [7]. From the beginning of time, there has been the conviction that diseases that influence the mouth, for example, periodontal infection, can affect the remainder of the body. In 1996 that specialist initially announced a connection between maternal periodontal disease and preterm birth [1,8]. Statistical analysis to a total of 400 pregnant and non-pregnant women filling a questionnaire regarding their oral hygiene knowledge, attitude, and practice. Reported that the overall 96% Had not got any information about oral health effects on delivery and more information has to be made available for pregnant women (Gupta et al., 2015). In 2017, and for the first time a study for the Role of maternal periodontitis in preterm birth has been published to illustrate four possible models of periodontitis in preterm birth infant where it was an independent risk factor for PTB and the generalized type of periodontitis promotes PTB for preeclampsia, pre-pregnant obesity women and young pregnant or HIV-infected or susceptible genotypes, and Because epidemiological data conflicting keep emerging it also has no significant effect on PTB [9]. Studies have been published on the Increasing of evidence suggests that maternal gingivitis and periodontitis may be a risk factor for preterm birth and other adverse pregnancy outcomes. To assess the relationship between periodontitis and preterm birth. A retrospective study that included 230 pregnant women and the delivery follow up to determine the correlation between periodontitis and preterm birth. The study indicates that periodontal infection can lead to placental-fetal exposure and, when coupled with a fetal inflammatory response, can lead to preterm delivery. Periodontitis is correlated with preterm birth, so early diagnosis and careful treatment are very important issues. Conclusion:

Periodontitis is one of the main causes of preterm-premature rupture of membranes and proper treatment is the best solution for this pathology Corresponding [10]. To demonstrate the reasons for choosing this topic, the first reason is the insignificant number of studies that are related to our topic in Jeddah, Saudi Arabia. additionally, previous studies that have been done on this topic are limited in the sample size and data collection. Secondly, recent studies show that gynecologists and pregnant women in Saudi Arabia have insufficient awareness and knowledge about maintaining oral health care during pregnancy. Finally, to spread the awareness and avoid bacterial plaque accumulation and its progression to periodontitis which can cause adverse pregnancy outcome in terms of preterm birth (<37 weeks), low birth weight (2500g), and preeclampsia. The objectives of this study to measure the knowledge and awareness of women in Jeddah, Saudi Arabia toward the relation between periodontitis and adverse pregnancy outcome, to measure the awareness and attitude of women in Jeddah, Saudi Arabia in maintaining oral health during pregnancy and to identify the prevalence of periodontitis causing adverse pregnancy outcome in Jeddah, Saudi Arabia.

2. MATERIALS AND METHODS

A cross-sectional study was done in Jeddah, Saudi Arabia. Based on a questionnaire developed by the authors. The participants of our study are women in Jeddah, Saudi Arabia. The inclusion criteria are the following: women living in Jeddah city their ages range from 20 to 50 years old who agreed to participate and had at least one pregnancy experience. The exclusion criteria are participants whose age is less than 20 or older than 50, who did not agree to participate and had never been pregnant. A sample size of 1200 women, with a Confidence level of 95%, and a 5% margin of error. a study tool was used in the English and Arabic languages. This tool was developed after reviewing relevant studies. The final questionnaire consisted 15 questions divided into three main sections regarding adverse pregnancy outcome knowledge. The first section contains General Informational questions and The second section includes the awareness of oral health care. While the last section includes information about the attitude of oral health care such as the frequency of teeth brushing and dental clinic visits.

2.1 Statistical Analysis of the Data

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp). The Kolmogorov-Smirnov was used to verify the normality of distribution of variables, Comparisons between groups for categorical variables were assessed using Chi-square test. Mann Whitney test was used to compare two categories for abnormally distributed quantitative variables. Kruskal Wallis test was used to compare different categories for abnormally distributed quantitative variables. Significance of the obtained results was judged at the 5% level.

3. RESULTS AND DISCUSSION

A total of 966 of respondents were completed the baseline interview. Table 1 clarifies that majority of respondents their age between 41 to 50 years (n= 362, 37.5%), most of them are Saudi (n= 856, 88.6%). And also, it illustrates educational level of most of them have University level (n= 664, 68.7%). Most of them recorded 3 or more times for number of pregnancy (n= 572, 59.2%).

The mean of awareness in total score is high than the, mean of attitude 3.80, 1.60 respectively, and the median is 2.0. The mean of awareness in presence score is high than the, mean of attitude 54.35, 39.91 respectively, and the median is 50.0 (Table 2).

Table 3 showed the relationship between awareness, attitude and Socio demographic (age, Nationality, Educational level, The number of pregnancy time). Results clarified that there was no statistically significant relationship between awareness, attitude and age p= 0.095, 0.661), nationality p= 0.413, 0.785), and the number of pregnancy time, p= 0.820, 0.893). whist there was statistically significant relationship between awareness, attitude and educational level p= 0.001, 0.000).

Table 4 illustrated the relationship between questions that measure awareness and the number of pregnancy time. Results showed that there were statistically significant relationship between the question (Did you know that the presence of gingivitis during pregnancy may lead to premature labor or the birth of a low-weight baby?) and the number of pregnancy time (p= 0.007), whilst there were no statistically significant relationship between the questions (Do you think that visiting the dentist during

pregnancy is safe?) (p= 0.072), (Do you think there is a link between oral health and pregnancy health?) (p= 0.441), (Did you know that bleeding gums is a sign of inflammation?) (p= 0.232), (Do you think that gum bleeding or gum pain is normal during pregnancy?) (p= 0.361) and (Did you know that not brushing your teeth well may lead to gingivitis?) (p= 0.199) and the number of pregnancy time.

Table 5 illustrated that the relationship between questions that measure attitude and the number of pregnancy time. Results showed that there were no statistically significant relationship between the questions (Do you visit the dentist periodically during pregnancy?) (p= 0.715), (How many times a day do you use toothbrush and toothpaste to brush your teeth during pregnancy?) (p= 0.105), (Do you use dental floss during pregnancy?) (p= 0.402) and (How do you act when you feel tooth pain during pregnancy?) (p= 0.097) with the number of pregnancy time.

Table 6 showed the relationship between questions that measure awareness and (age, nationality, educational level). Results showed that there were no statistically significant relationship between the question (Do you think that gum bleeding or gum pain is normal during pregnancy?) and age (p= 0.676), whilst there were statistically significant relationship between the questions (Do you think that visiting the dentist during pregnancy is safe?) (p= 0.026), (Do you think there is a link between oral health and pregnancy health?) (p= 0.003), (Did you know that bleeding gums is a sign of inflammation?) (p= 0.028), (Did you know that not brushing your teeth well may lead to gingivitis?) (p= 0.009) and (Did you know that the presence of gingivitis during pregnancy may lead to premature labor or the birth of a low-weight baby?) (p= 0.028), (Do you think that pregnancy cause gingivitis?) (p= 0.009) and age.

Table 6 also showed there were no statistically significant relationship between the questions (Do you think that visiting the dentist during pregnancy is safe?) (p= 0.272), (Do you think there is a link between oral health and pregnancy health?) (p= 0.946), (Did you know that bleeding gums is a sign of inflammation?) (p= 0.332), Do you think that gum bleeding or gum pain is normal during pregnancy? (p= 0.312), (Did you know that not brushing your teeth well may lead to gingivitis?) (p= 0.747) and (Did you know that the presence of gingivitis during pregnancy may lead to premature labor or the birth of a low-weight baby?) (p= 0.348), (Do you think that pregnancy cause gingivitis?) (p= 0.117) with nationality.

Table 1. Descriptive of the studied sample according to demographic data

Demographic data	(n = 966)	
	No.	%
Age		
20-30 years	300	31.1
31-40 years old	304	31.5
41-50 years	362	37.5
Nationality		
Saudi	856	88.6
Non-Saudi	110	11.4
Educational level		
Less than high school	54	5.6
High school	160	16.6
University	664	68.7
Postgraduate	88	9.1
The number of pregnancy time		
1	220	22.8
2	174	18.0
3 or more	572	59.2

Table 2. Descriptive of the studied sample according to score of awareness and Attitude (n = 966)

	Awareness		Attitude	
	Mean ± SD.	**Median**	**Mean ± SD.**	**Median**
Total score	3.80±1.26	4.0	1.60±0.98	2.0
Percent score	54.35±17.98	57.14	39.91±24.42	50.0

Table 3. Relation between socio demographic data with overall total score of awareness and Attitude (n = 966)

Socio demographic data	Awareness		Attitude	
	Mean ± SD.	**Median**	**Mean ± SD.**	**Median**
Age				
20-30 years	3.81±1.29	4.0	1.60±0.96	2.0
31-40 years old	3.71±1.23	4.0	1.56±0.95	2.0
41-50 years	3.88±1.26	4.0	1.63±1.01	2.0
H(p)	4.702(0.095)		0.827(0.661)	
Nationality				
Saudi	3.82±1.27	4.0	1.59±0.99	2.0
Non-Saudi	3.69±1.17	4.0	1.63±0.91	2.0
U(p)	44895.5 (0.413)		46361.5 (0.785)	
Educational level				
Less than high school	3.54±1.09	4.0	1.28±1.04	1.0
High school	3.54±1.10	4.0	1.41±0.99	1.0
University	3.88±1.30	4.0	1.62±0.96	2.0
Postgraduate	3.90±1.26	4.0	1.92±0.97	2.0
H(p)	15.702*(0.001*)		19.960*(<0.001*)	
The number of pregnancy time				
1	3.83±1.28	4.0	1.63±1.02	2.0
2	3.87±1.20	4.0	1.56±0.93	2.0
3 or more	3.77±1.27	4.0	1.59±0.98	2.0
H(p)	0.397(0.820)		0.226(0.893)	

U: Mann Whitney test, H: H for Kruskal Wallis test, SD: Standard deviation
**: Statistically significant at p ≤ 0.05*

Table 4. Relation between Awareness and the number of pregnancy time (n = 966)

Awareness	Total sample (n = 966)		The number of pregnancy time						χ^2	p
			1 (n = 220)		2 (n = 174)		3 or more (n = 572)			
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**		
Do you think that visiting the dentist during pregnancy is safe?										
Yes	664	68.7	153	69.5	128	73.6	383	67.0	8.598	0.072
No	165	17.1	36	16.4	33	19.0	96	16.8		
I don't know	137	14.2	31	14.1	13	7.5	93	16.3		
Do you think there is a link between oral health and pregnancy health?										
Yes	634	65.6	134	60.9	117	67.2	383	67.0	3.748	0.441
No	89	9.2	20	9.1	17	9.8	52	9.1		
I've never heard of it before	243	25.2	66	30.0	40	23.0	137	24.0		
Did you know that bleeding gums is a sign of inflammation?										

Awareness	Total sample (n = 966)		The number of pregnancy time						χ^2	p
			1 (n = 220)		2 (n = 174)		3 or more (n = 572)			
	No.	%	No.	%	No.	%	No.	%		
Yes	791	81.9	180	81.8	141	81.0	470	82.2	5.584	0.232
No	102	10.6	28	12.7	22	12.6	52	9.1		
I've never heard of it before	73	7.6	12	5.5	11	6.3	50	8.7		
Do you think that gum bleeding or gum pain is normal during pregnancy?										
Yes	365	37.8	77	35.0	76	43.7	212	37.1	4.344	0.361
No	373	38.6	89	40.5	65	37.4	219	38.3		
I don't know	228	23.6	54	24.5	33	19.0	141	24.7		
Did you know that not brushing your teeth well may lead to gingivitis?										
Yes	859	88.9	201	91.4	147	84.5	511	89.3	6.008	0.199
No	52	5.4	7	3.2	14	8.0	31	5.4		
I've never heard of it before	55	5.7	12	5.5	13	7.5	30	5.2		
Did you know that the presence of gingivitis during pregnancy may lead to premature labor or the birth of a low-weight baby?										
Yes	77	8.0	23	10.5	13	7.5	41	7.2	14.047*	0.007*
No	345	35.7	76	34.5	81	46.6	188	32.9		
I've never heard of it before	544	56.3	121	55.0	80	46.0	343	60.0		
Do you think that pregnancy cause gingivitis?										
Yes	346	35.8	81	36.8	58	33.3	207	36.2	5.722	0.221
No	277	28.7	63	28.6	62	35.6	152	26.6		
I've never heard of it before	343	35.5	76	34.5	54	31.0	213	37.2		

*χ^2: Chi square test, *: Statistically significant at p ≤ 0.05*

Table 5. Relation between the number of pregnancy time with attitude (n = 966)

Attitude	Total sample (n = 966)		The number of pregnancy time						χ^2	p
			1 (n = 220)		2 (n = 174)		3 or more (n = 572)			
	No.	%	No.	%	No.	%	No.	%		
Do you visit the dentist periodically during pregnancy?										
Yes	72	7.5	15	6.8	13	7.5	44	7.7	2.115	0.715
No	434	44.9	99	45.0	86	49.4	249	43.5		
Only when I feel pain	460	47.6	106	48.2	75	43.1	279	48.8		
How many times a day do you use toothbrush and toothpaste to brush your teeth during pregnancy?										
Once a day	219	22.7	60	27.3	44	25.3	115	20.1	10.495	0.105
Twice a day	545	56.4	120	54.5	100	57.5	325	56.8		
3 times a day	186	19.3	37	16.8	30	17.2	119	20.8		
Do not use toothbrush and toothpaste	16	1.7	3	1.4	0	0.0	13	2.3		

Attitude	Total sample (n = 966)		The number of pregnancy time						χ^2	p
			1 (n = 220)		2 (n = 174)		3 or more (n = 572)			
	No.	%	No.	%	No.	%	No.	%		
Do you use dental floss during pregnancy?										
Yes	380	39.3	97	44.1	60	34.5	223	39.0	4.027	0.402
No	569	58.9	120	54.5	111	63.8	338	59.1		
I've never heard of it before	17	1.8	3	1.4	3	1.7	11	1.9		
How do you act when you feel tooth pain during pregnancy?										
I visit the dentist immediately	545	56.4	126	57.3	99	56.9	320	55.9	7.848	0.097
Wait until the pain is severe	289	29.9	72	32.7	57	32.8	160	28.0		
I take some painkillers without consulting a doctor	132	13.7	22	10.0	18	10.3	92	16.1		

*χ^2: Chi square test, *: Statistically significant at p ≤ 0.05*

Table 6. Relation between the number of pregnancy time with Awareness (n = 966)

Awareness	Total sample (n = 966)		p value (Chi square test)		
	No.	%	Age	Nationality	Educational level
Do you think that visiting the dentist during pregnancy is safe?					
Yes	664	68.7	0.026*	0.272	0.001*
No	165	17.1			
I don't know	137	14.2			
Do you think there is a link between oral health and pregnancy health?					
Yes	634	65.6	0.003*	0.946	0.307
No	89	9.2			
I've never heard of it before	243	25.2			
Did you know that bleeding gums is a sign of inflammation?					
Yes	791	81.9	0.028*	0.312	0.676
No	102	10.6			
I've never heard of it before	73	7.6			
Do you think that gum bleeding or gum pain is normal during pregnancy?					
Yes	365	37.8	0.676	0.332	<0.001*
No	373	38.6			
I don't know	228	23.6			
Did you know that not brushing your teeth well may lead to gingivitis?					
Yes	859	88.9	0.009*	0.747	0.576
No	52	5.4			
I've never heard of it before	55	5.7			
Did you know that the presence of gingivitis during pregnancy may lead to premature labor or the birth of a low-weight baby?					
Yes	77	8.0	0.009*	0.348	0.014*
No	345	35.7			
I've never heard of it before	544	56.3			
Do you think that pregnancy cause					

Awareness	Total sample (n = 966)		p value (Chi square test)		
	No.	%	Age	Nationality	Educational level
gingivitis?					
Yes	346	35.8	0.028*	0.117	0.176
No	277	28.7			
I've never heard of it before	343	35.5			

*χ^2: Chi square test, *: Statistically significant at p ≤ 0.05*

Table 7. Relation between the number of pregnancy time with attitude (n = 966)

Attitude	Total sample (n = 966)		p value (Chi square test)		
	No.	%	Age	Nationality	Educational level
Do you visit the dentist periodically during pregnancy?					
Yes	72	7.5	0.028*	0.207	0.011*
No	434	44.9			
Only when I feel pain	460	47.6			
How many times a day do you use toothbrush and toothpaste to brush your teeth during pregnancy?					
Once a day	219	22.7	0.010*	0.071	0.012*
Twice a day	545	56.4			
3 times a day	186	19.3			
Do not use toothbrush and toothpaste	16	1.7			
Do you use dental floss during pregnancy?					
Yes	380	39.3	0.950	0.111	0.009*
No	569	58.9			
I've never heard of it before	17	1.8			
How do you act when you feel tooth pain during pregnancy?					
I visit the dentist immediately	545	56.4	0.042*	0.671	0.033*
Wait until the pain is severe	289	29.9			
I take some painkillers without consulting a doctor	132	13.7			

*χ^2: Chi square test, *: Statistically significant at p ≤ 0.05*

Table 6 also showed there were statistically significant relationship between the questions (Do you think that visiting the dentist during pregnancy is safe?) (p= 0.001), Do you think that gum bleeding or gum pain is normal during pregnancy? (p= 0.001), (Did you know that the presence of gingivitis during pregnancy may lead to premature labor or the birth of a low-weight baby?) (p= 0.014), and education level. Whilst there were no statistically significant relationship between the questions (Do you think there is a link between oral health and pregnancy health?) (p= 0.307), (Did you know that bleeding gums is a sign of inflammation?) (p= 0.676), Did you know that not brushing your teeth well may lead to gingivitis?) (p= 0.576) and, (Do you think that pregnancy cause gingivitis?) (p= 0.176) with educational level.

Table 7 illustrated that the relationship between questions that measure attitude and (age, nationality, educational level). Results showed that there was no statistically significant relationship between the question (Do you use dental floss during pregnancy?) (p= 0.950). Whilst there were statistically significant relationship between the questions (Do you visit the dentist periodically during pregnancy?) (p= 0.028), (How many times a day do you use toothbrush and toothpaste to brush your teeth

during pregnancy?) (p= 0.010), and (How do you act when you feel tooth pain during pregnancy?) (p= 0.042) with age.

Results showed that there were no statistically significant relationship between the questions (Do you visit the dentist periodically during pregnancy?) (p= 0.207), (How many times a day do you use toothbrush and toothpaste to brush your teeth during pregnancy?) (p= 0.071), (Do you use dental floss during pregnancy?) (p= 0.111) and (How do you act when you feel tooth pain during pregnancy?) (p= 0.671) with nationality (Table 7). There were statistically significant relationship between the questions (Do you visit the dentist periodically during pregnancy?) (p= 0.011), (How many times a day do you use toothbrush and toothpaste to brush your teeth during pregnancy?) (p= 0.021), (Do you use dental floss during pregnancy?) (p= (0.009) and (How do you act when you feel tooth pain during pregnancy?) (p= (0.003) with educational level (Table 7).

4. DISCUSSION

Infected periodontium can act as an endocrine-like source of potentially harmful cytokines and lipid mediators, increasing the likelihood of adverse pregnancy outcomes. Gingival health can be affected by pregnancy. Changes in hormone levels during pregnancy promote an inflammation known as pregnancy gingivitis. This type of gingivitis can occur without any changes in plaque levels. Furthermore, pregnancy accelerates the onset of new periodontal disease. If the pre-existing periodontal disease becomes active during the pregnancy, it may pose a significant concomitant infectious or inflammatory exposure and may result in preterm delivery of low-birth-weight babies [11].
Oral health maintenance during pregnancy has been identified as a critical public health issue around the world. Several statements and guidelines have been issued emphasizing the importance of improved oral health care during pregnancy. Pregnancy hormone changes, combined with poor oral hygiene, tend to increase the prevalence of oral diseases such as gingivitis [12].

Many previous studies have found the correlation between periodontitis, preterm births, and low weight births. Also, maternal periodontitis has been associated with poor oral health of child. Though the association of pregnancy gingivitis/periodontitis with adverse outcomes such as preterm births is still under research, it is better to maintain good oral health by pregnant women to avoid any associated complications as prevention has always been proven to be better than cure [11].

According to our results, the mean of awareness in total score is high than the, mean of attitude 3.80, 1.60 respectively, and the median is 2.0. Of all participants, 6506% think there is a link between oral health and pregnancy health, only 8% of all studied sample know that the presence of gingivitis during pregnancy may lead to premature labor or the birth of a low-weight baby, and 35.8% think that pregnancy cause gingivitis. Comparable results were reported in previous literature, [13] reported that all the study participants (100%) in both the groups were aware of the importance of the oral health in overall general health during pregnancy. The results were comparable to a study by [14], in which 81.50% of the study individuals felt that importance should be given for oral health as a part of general health during pregnancy. [15] reported that majority (42.62%) of the pregnant women said that they had only heard about developing pregnancy gingivitis and were not fully aware about it; other 31.47% of the respondents had not even heard about it, while 25.89% of them were aware about the same. [16] conducted a study on 599 participants, the results showed that pregnant women have little knowledge on oral health association with pregnancy, which varied according to maternal race or ethnicity. A study done by [17] stated that the level of awareness is very low (60%) irrespective of education and age. Another study done by [18] showed similar results, wherein 75% of the individuals had no knowledge regarding the periodontal complications. [19] reported that (24.04%) of the pregnant women reported that maternal oral disease could cause the birth of babies with low birth weight and prematurity. [15] reported that around 55.37% of the respondents were unaware about the adverse pregnancy outcome of pregnancy gingivitis and 21.91% believed that it had no such adverse effect, while 13.54% of them reported preterm births as the adverse pregnancy outcome of pregnancy gingivitis.

Regarding attitude, in our study 7.5% of all participants visit the dentist periodically during pregnancy, 56.4% use toothbrush and toothpaste to brush their teeth during pregnancy, while 39.3% use dental floss during pregnancy. In Saudi Arabia, [20]. Reported that half the

participants reported brushing their teeth twice daily, although another half of them never flossed. These findings were similar to other studies that assessed oral health practices [12,21]. Having children was negatively associated with performing oral hygiene procedures; most probably because mothers' time was taken up by tending to their children.

In [20] study, only 18.1% visited the dentist before and after pregnancy and 33% stopped their dental visits during pregnancy. This agrees with previous studies that found that women may decrease or stop attending dental check-ups during pregnancy [12,21]. [15] reported that (41.03%) of respondents did not get their dental checkup done during or before pregnancy. This finding is similar with the previous studies in which it was reported that women decrease or stop visiting the dentists for dental checkups during pregnancy [22,23].

Our study indicated that there was no statistically significant relationship between awareness, attitude and age p= 0.095, 0.661), nationality p= 0.413, 0.785), and the number of pregnancy time, p= 0.820, 0.893). whist there was statistically significant relationship between awareness, attitude and educational level p= 0.001, 0.000). [15] found that majority of the women who were fully aware about pregnancy gingivitis were graduates/postgraduates in sync with their educational level, depicting a statistically significant difference between the responses of educated and uneducated respond dents. These findings indicate that education has a diverse set of impact on the oral health awareness during pregnancy as is mentioned in previous study conducted by Sunita Bamanikar and Liew KokKee wherein they found vivid difference in good oral health knowledge in educated pregnant women in comparison of those having a little or no education; the reason thereof might be their better social communication with others and hence sharing of views and ideas leading to increase in their level of oral health-related knowledge [12]. [19] statistically significant association was found between: educational level and knowledge about prenatal dental care (p = 0.012).

5. CONCLUSION

The majority of participants have good general oral health knowledge and information. They do, however, have limited knowledge and awareness of periodontal disease and its impact on pregnancy and adverse pregnancy outcomes. Most pregnant women require more information about oral health and the prevention of gingivitis and periodontitis. Investigations are necessary to assess the long-term impact of oral health education programmers in maternity care centers on pregnant women's dental health knowledge and behavior. Long-term research is needed to determine whether there is a strong link between periodontal disease and premature labor. Furthermore, more research is needed to determine whether periodontal therapy or prevention can reduce the risk of premature labor.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT

Informed consent was obtained from all participants included in the study.

ETHICAL APPROVAL

The research proposal was approved by the Regional Research and Ethics committee of Batterjee Medical College with Ethical approval number (UB-RES-2020-0067).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Mansi Bansal, MDS 1, Manish Khatri, MDS 1, Ashish Kumar, MDS 1, Gouri Bhatia M. Relationship Between Maternal Periodontal Status and Preterm Low Birth

Weight. Rev Obstet Gynecol. 2013;6(3/4):135–40.
2. da Silva HEC, Stefani CM, de Santos Melo N, de Almeida de Lima A, Rösing CK, Porporatti AL, et al. Effect of intra-pregnancy nonsurgical periodontal therapy on inflammatory biomarkers and adverse pregnancy outcomes: A systematic review with meta-analysis. Syst Rev. 2017;6(1): 1–12.
3. Baseer M, Rahman G, Asa′ad F. Periodontal health awareness among gynecologists in Riyadh, Saudi Arabia. J Int Soc Prev Community Dent. 2015;5(3):211.
4. Han YW. Oral health and adverse pregnancy outcomes - What's next? Journal of Dental Research. 2011;90: 289–93.
5. Gesase N, Miranda-Rius J, Brunet-Llobet L, Lahor-Soler E, Mahande MJ, Masenga G. The association between periodontal disease and adverse pregnancy outcomes in Northern Tanzania: A cross-sectional study. Afr Health Sci. 2018;18(3): 601–11.
6. Lohana MH, Suragimath G, Patange RP, Varma S, Zope SA. A Prospective Cohort Study to Assess and Correlate the Maternal Periodontal Status with Their Pregnancy Outcome. J Obstet Gynecol India. 2017;67(1):27–32.
7. Meqa K, Dragidella F, Disha M, Sllamniku-Dalipi Z. Povezanost izmedu parodontne bolesti i prijevremenog porodaja iniske porodajne težine djeteta na Kosovu. Acta Stomatol Croat. 2017;51(1): 33–40.
8. Baskaradoss JK, Geevarghese A, Al Dosari AAF. Causes of Adverse Pregnancy Outcomes and the Role of Maternal Periodontal Status – A Review of the Literature. Open Dent J. 2012;6(1): 79–84.
9. Ren H, Du M. Role of maternal periodontitis in preterm birth. Front Immunol. 2017;8(FEB):1–10.
10. Lauren M, Minire A, Maldi X, Mirton M, Aferdita M. The Impact of Periodontitis in the Preterm Birth and Body Size of Newborns. Mater Socio Medica. 2012; 24(1):44.
11. Ramamurthy J, Irfana F. Assessment of Knowledge and Awareness about Periodontal Oral Health among Pregnant Women-a Questionnaire Study. Int J Cur Res Rev. 2017;9(1):9–12.
12. Bamanikar S, Kok Kee L. Knowledge, attitude and practice of oral and dental healthcare in pregnant women. Oman Med J. 2013;28(4):288–91.
13. Penmetsa G, Meghana K, Bhavana P, Venkatalakshmi M, Bypalli V, Lakshmi B. Awareness, attitude and knowledge regarding oral health among pregnant women: A comparative study. Niger Med J. 2018;59(6):70.
14. Sajjan P, Pattanshetti JI, Padmini C, Nagathan VM, Sajjanar M, Siddiqui T. Oral Health Related Awareness and Practices among Pregnant Women in Bagalkot District, Karnataka, India. J Int oral Heal JIOH. 2015 Feb;7(2):1–5.
15. Togoo RA, Al-Almai B, Al-Hamdi F, Huaylah SH, Althobati M, Alqarni S. Knowledge of Pregnant Women about Pregnancy Gingivitis and Children Oral Health. Eur J Dent. 2019 May;13(2):261–70.
16. Boggess KA, Urlaub DM, Moos M-K, Polinkovsky M, El-Khorazaty J, Lorenz C. Knowledge and beliefs regarding oral health among pregnant women. J Am Dent Assoc. 2011 Nov;142(11):1275–82.
17. Gupta S, Jain A, Mohan S, Bhaskar N, Walia PK. Comparative Evaluation of Oral Health Knowledge, Practices and Attitude of Pregnant and Non-Pregnant Women, and Their Awareness Regarding Adverse Pregnancy Outcomes. J Clin Diagn Res. 2015 Nov;9(11): ZC26-32.
18. Nagi R, Sahu S, Nagaraju R. Oral health, nutritional knowledge, and practices among pregnant women and their awareness relating to adverse pregnancy outcomes. J Indian Acad Oral Med Radiol. 2016;28(4):396–402.
19. Catão CD de S, Gomes T de A, Rodrigues RQF, Soares R de SC. Evaluation of the knowledge of pregnant women about the relationship between oral diseases and pregnancy complications. Rev Odontol da UNESP. 2015;44(1):59–65.
20. Gaffar BO, El Tantawi M, Al-Ansari A, AlAgl AS. Association between oral health knowledge and practices of Saudi pregnant women in Dammam, Saudi Arabia. East Mediterr Heal J = La Rev sante la Mediterr Orient = al-Majallah al-sihhiyah li-sharq al-mutawassit. 2016 Sep;22(6):411–6.
21. George A, Johnson M, Blinkhorn A, Ajwani S, Bhole S, Yeo AE, et al. The oral health

status, practices and knowledge of pregnant women in south-weste Sydney. Aust Dent J. 2013 Mar;58(1):26–33.

22. Moawed S, Hawsawi A, Alahmed SS, Al-Atawi N, Awadien AZ. Knowledge and oral health care practices among Saudi pregnant women. Life Sci J.2014;11: 32–41.

23. Al-Swuailem AS, Al-Jamal FS, Helmi MF. Treatment perception and utilization of dental services during pregnancy among sampled women in Riyadh, Saudi Arabia. Saudi J Dent Res [Internet]. 2014; 5(2):123–9. Availablef:http://dx.doi.org/10.1016/j.ksujds .2013.11.002

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