Risk Factors of Periodontitis associated Pregnancy and its Effect on Pregnancy Outcome

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Abstract

Aim of the study: The aim of the study was to assess risk factors of periodontitis associated pregnancy and its effect on pregnancy outcome. **Subjects and Methods:** This was an exploratory descriptive study which was conducted among (91) fulfilled criteria (freedom from any medical, gynecological and obstetrical history) pregnant women attending the antenatal care unit in Alwaleedia Health Centre –Asyut -Egypt from August 2017 to February 2018. Data collection tools were a 'Structured Interviewing questionnaire and an oral examination checklist conducted to a purposive sample and data were analyzed using SPSS software, descriptive statistics and chi-square test. **Result:** The present study showed that various levels of periodontal disease among pregnant women were associated with bio sociodemographic characteristics such as age, economic status and educational level, gestational age, obesity, previous dental history and lack of dental hygienic measures. Meanwhile, there was a significant relationship between periodontal disease and adverse pregnancy outcomes (p<0.001). **Conclusion:** Age, economic status and educational level, gestational age, obesity, previous dental history and lack of dental hygienic measures are risk factors of periodontal diseases during pregnancy. Periodontitis associated pregnancy have adverse effect on pregnancy outcome. **Recommendations:** Activating the role of the maternity health nurse in branches of Obstetrics and antenatal clinics to enhance pregnant women's knowledge &attitude regarding oral health risks during pregnancy to ensure early disease detection and adverse outcomes prevention.

Key words: Pregnancy, periodontal disease, adverse outcome.

Introduction

Periodontitis means "inflammation around the tooth", a serious gum infection that damages the soft tissue and bone that supports the tooth. All periodontal diseases including periodontitis are infections which affect the periodontium. The tissues around a tooth that support the tooth (**Ari et al., 2016**).

During pregnancy, the pregnant mother undergoes significant anatomical and physiological changes in order to nurture and accommodate the developing fetus. These changes begin after conception and affect every organ system in the body and resolve after pregnancy with minimal residual effects (**Soma-Pillay et al., 2016**).

Like any other system, the oral cavity exhibits a number of changes during

pregnancy which need attention by a dental care professional *(***Naseem et al., 2016***)*.

During pregnancy, progesterone levels increase 10-folds and estrogen levels 30-folds compared to those observed on menstrual cycle due to their continuous production **(Vogt et al., 2012).** Such fluctuating female hormone levels can change conditions inside the mouth **(Rattue, 2012).**

Moreover, the fluctuating hormone levels allow bacterial growth as a result of decreased saliva, such bacteria use the eaten sugar to make acid, that acid can destroy the enamel (the protective coating of teeth) causing tooth decay or even tooth loss and progress to cause other diseases **(Jounal of Midwivery and Women Health, 2014).**

Such acidic environment during pregnancy leads to many dental problems as dental caries that caused by the progress of carious pathogens and increased demineralization of tooth. Another problem is gingivitis or bleeding tender gums that is the most common dental problem affecting around 60-70% of pregnant women, such condition is common due to decreased immune response, fluctuating hormones and changes in normal flora. Gingivitis, if untreated, it will progress and cause periodontitis, a condition causes destruction of periodontal ligaments and bone affecting about 30% of pregnant women causing tooth mobility and loss **(Naseem et al., 2016).**

Globally oral conditions affected 3.9 billion people worldwide in 2010, with untreated tooth decay being the most prevalent and severe periodontitis the six most prevalent of all 291 conditions studied. Periodontal disease is one of the commonest diseases of humankind, but it is largely preventable through good oral hygiene and preventive policies by addressing the common risk factors **(World Dental Federation (FDI) 2015).**

Moreover, studies reveal that during pregnancy, there is increase in some types of microorganisms (*Provetella* species) which tend to utilize the steroidal hormones of pregnancy for their growth. Furthermore these microorganisms increase the tendency of the gingiva to bleed and worsen gingival inflammation. As a result, pregnant patients have severe gingival inflammation even with reasonably low plaque levels **(Hashim, 2014).**

Therefore, the enhanced microbial load and bacterial by-products in the gingival sulcus trigger the epithelial cells, and also fibroblasts in the underlying connective tissues, to initiate the proinflammatory cytokine secretion, such as interleukin (IL)-1, -6, -8 and tumor necrosis factor-alpha (TNF-α), growth factors (e.g. epidermal growth factor), proteases (matrix metalloproteinase (MMP) -2, -7, -9, -13), and natural antimicrobial peptides (β-defensin, cathelicidin LL-3, **(Petrini, 2017).**

The WHO introduce in 1970 the first major methodological change in the measurement of periodontal disease, the Community Periodontal Index of Treatment Needs (CPITN). The CPITN was developed to overcome many of the recognized limitations of Russells periodontal index and Ramfjords periodontal disease index, and to facilitate performance of population-based surveys under a variety of conditions. The CPITN was endorsed by the World Health Organization which later renamed it the Community Periodontal Index (CPI) **(Dye, 2012).**

As a result, periodontitis was defined as the presence of four or more teeth with one or more sites of PD>4mm and CAL>3mm, and being localized in two or three teeth and generalized into four or more teeth, gingivitis was defined when PD<3mm and CAL< 2mm in two to five teeth or at least one site with bleeding on probing and periodontal healthy when PD<2mm and CAL<2mm with no site of gingival bleeding **(Borgo et al., 2014).**

The degradation of tooth-supporting tissues requires impairment of the multifactorial relationship between the host and periodontal pathogens, with the addition

of several modifiable and non-modifiable risk factors **(Petrini ., 2017).**

During pregnancy, the development of periodontal diseases can be influenced by factors such as human immunodeficiency virus infection, lack of dental care, poor oral hygiene, smoking, low-educational level, low-employment status, increased age and ethnicity. These contribute to worsened periodontal condition during pregnancy. So the identification of risk factors for periodontitis during pregnancy can help guide and establish early treatment, which can lead to the avoidance of the possible adverse effects of this disease on pregnancy *(***Onigbinde et al, 2014).**

Women who have periodontal disease while pregnant—an estimated one in five pregnant women—have been reported to be at increased risk of adverse pregnancy outcomes **(Vanterpool et al., 2016)**. The 1996 study by **Offenbacher** and colleagues suggested that maternal periodontal disease could lead to a seven-fold increased risk of delivering a PLBW infant. In another longitudinal study, **Boggess et al**, **(2003)** found a two-fold increased risk for preeclampsia among women with periodontal disease during pregnancy compared with controls *(***Anil et al, 2015).**

Moreover , periodontal pathogens have been found not only in supra and sub gingival plaque, gingivo-crevicular fluid, and periodontal tissues, but also dispersed systemically in maternal serum and plasma, vagina, placenta, amniotic fluid, and umbilical cord. It is hypothesized that if lipopolysaccharides (i.e. endotoxins) from periodontal pathogens gain access to the placenta, they could stimulate IL-1β and PGE2 production in chorioamniotic and trophoblastic cells, leading to membrane weakening, early rupture of membranes, and uterine contractions leading to preterm labor **(Afshari et al., 2013).**

In addition to that the initiating event in preeclampsia is generally regarded to be placental ischemia-hypoxia. Alternatively, the preeclampsia syndrome may also be evidenced as decreased formation of vasodilators such as nitric oxide and prostacyclin. Moreover, the quantitative importance of the various endothelial and hormonal factors that mediate vasoconstriction and elevation of arterial pressure during preeclampsia *(***Varun Suri et al., 2015).**

As nurses are one of the main providers of antenatal health care services, and play important roles in increasing awareness of oral health and dissemination of information. Furthermore, nurses are in a good position to help deliver key oral health messages to pregnant women. In particular, nurses can provide advice on preventive oral health care, including regular dental visits, and can refer pregnant women to dentists for examinations *(***Sharif et al., 2016).**

As a part of their regular antenatal care, the nurse should provide oral care to pregnant women and provide them with knowledge about oral hygiene, obvious signs of oral disease and about seeking appropriate oral care at optimum timing as periodontitis is a treatable condition **(Bamanikar and Kee, 2013).**

Aim of the Study

This study aims to assess risk factors of periodontitis associated pregnancy and its effect on pregnancy outcome.

This aim was achieved through:

1. Exploring the prevalence of periodontitis during pregnancy.
2. Identifying the different risk factors for periodontitis associated pregnancy.
3. Evaluate the effect of periodontitis on pregnancy outcome.

Research questions

What is the incidence rate of periodontitis among pregnant women in the study setting?

What are the different risk factors for periodontitis?

Is periodontitis associated pregnancy having effect on pregnancy out come?

Subjects and Methods

The methodology followed for achieving this aim was elaborated under the following four main topics namely**:**

I. Technical design
II. Administrative design
III. Operational design
IV. Statistical design
I- Study technical design

The technical design used for the study involved the following items; research design, setting of the study, sample of the study and tools for data collection.

Research design:

An exploratory and descriptive design.

Setting:

The study was conducted at El-Waleedia health center, Asyut, Egypt where complete maternal child health services are provided.

Subjects:

Sampling:

Purposive sample.

Size:

The above mentioned study setting received 318 pregnant women during the four months of data collection period (four months for sample collection and three months for follow up). From them , 91 cases diagnosed with periodontitis in the 2nd and 3rd trimesters and fulfilled the inclusion criteria.

Inclusion criteria:

Normal pregnant women in the 2nd&3rd trimester with different parity and diagnosed with periodontitis.

Exclusion criteria :-

All highrisk pregnancies.

Sample technique:

For data collection all available pregnant women fulfilling inclusion criteria attending Alwaleedia health center , Asyut city. The sample was collected in the predetermined duration that was four months

Tools of data collection

It was adapted by the researcher based on review of literature considering the aim of the study and the data needed to be collected.

A) A structured interview questionnaire include 4 parts:(Appendix I)

➢ **First part**:

Concered with bio-socio demographic data that covered women age, address, education level, occupation and social level.

➢ **Second part:**

Concerned with obstetrical & family history taken (gravidity, parity, abortion, still births, low birth weight, preterm labor complications related to previous pregnancy, data about current pregnancy ….).

➢ **Third part:**

Concerned with assessment of risk factors of periodontitis (bad oral hygiene, bad habits as smoking, bad nutritional habits, medications, economic factors, social factors, ….).

➢ **Fourth part:**

Concerned with assessment of pregnancy outcome (abortion, bleeding, preterm labour, low birth weight, preeclampsia ….).

B) An observational check list for dental assessment (modified from **WHO form, 1997 &Alzoman, 2007)**

Used to evaluate the periodontal status for each pregnant woman during its antenatal visit for once during her pregnancy course by a single periodontologist who recorded clinical indices and the presence of any oral lesions. Measurements of the clinical indices and periodontal recordings were taken at the mesial and distal locations of the *Ramfjord teeth 1959,* (specific teeth frequently used for studies of the epidemiology of periodontal disease) using the following parameters:-

1) Gingival index (GI):-

1st parameter to measure the gingival inflammation and was recorded according scores:

0= Normal gingival
1= mild inflammation, slight change in color, slight edema and no bleeding on probing.
2= Moderate inflammation, redness, edema, and bleeding on probing
3= Severe inflammation, marked redness, edema, and tendency to spontaneous bleeding.

2) Plaque index (PI):-

2nd parameter to measure the plaque accumulation around the gingival margin and was recorded according scores:-

0= No plaque around gingival margin.
1= Thin film of plaque around gingival margin seen by probe on tooth surface.
2= Moderate plaque around gingival margin and or tooth surface seen by naked eye.
3= Abundance accumulation of plaque forming gingival pocket.

3) Probing Pocket Depth (PPD):-

3rd parameter by using William's graduated probe(color coded periodontal probe from 0 to10 mm) as the distance from the free gingiva to base of periodontal at four sites around all teeth to be examined and was recorded according score:-

- Severe [7-10mm]
- Moderate [5-7mm)
- Mild [3-5mm]
- Normal [0-3mm]

4) Clinical attachment level (CAL) or Loss of Attachment (LOA):-

4th parameter measured by the same periodontal probe and represents the distance from the cemento enamel junction (CEJ) to the gingival margin (GM) and was recorded according score:-

- Severe ($\geq$5 mm).
- Moderate (3-4mm).
- Mild (1-2mm).

Periodontal disease severity was graded according to the system adapted from **Offenbacher et al**, **2001** namely:

• Absent: PD < 3 mm and CAL < 2 mm
• Mild: PD $\geq$ 3 mm or CAL $\geq$ 2 mm
• Moderate: two or more sites with PD $\geq$ 5mm and two or more sites with CAL $\geq$ 2mm

• Severe: four or more sites with PD $\geq$ 5mm and four or more sites with CAL $\geq$ 2mm.

5) Pain assessment [by facial expressions according to Huskisson's pain assessment as in visual analog scale by score from 0-10]

0= No pain.
2=Few pain.
4=Mild.
6=Moderate.
8=Severe.
10=Very intense pain.

Ethical Consideration:

The ethical research considerations in this study include that the research approval was obtained from Scientific Research Ethical committee in Faculty of Nursing at

Ain Shams University before starting the study. Then, the researcher clarified the objective and aim of the study to the participants included in the study. After that, the researcher explained the procedure of periodontal examination to participants.

A verbal consent was obtained from participants after explaining the purpose of study based on that no harmful methodology was used and that each participant had right to withdraw from the study at any time. At the same time all human rights was secured and data was confidential and using coding system form data

Administrative design:

An official approval to conduct this study was obtained from Dean of faculty of nursing Ain Shams University, a letter containing the title and aim was directed to the director of the study setting as approval for data collection .

Operational design:

The operational design includes preparatory phase, Pilot study and field work.

Preparatory phase:

It includes reviewing current and past, local and international related literature and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to develop tools for data collection related to aim of study . The adopted tools were examined by group of three expertise's (specialized university Professors) in field of maternity& Gynecological nursing to measure validity and reliability of tools and necessary according to their opinions and comments modifications were done.

Pilot Study

A pilot study was carried out on 12 participants attended the study setting for one month. The pilot study was aimed to test clarity, arrangement of the items, applicability of the data collection tools and time consuming to fill in the tools. After analyzing the results of the pilot study the items were been rearranged and tools modifications were done based on the findings of the pilot study. Some questions were excluded, rephrased and then the final form was developed.

Field Work

After an approval was taken from the manager of the previously mentioned study setting, the researcher attended the antenatal clinics in the study setting for 2 days per week from 9:00am to 12:00pm for 7 months from the beginning of August 2017 to the end of February 2018.

During the antenatal visits, the researcher started by explaining the purpose of the study briefly to the participants before talking soci-demographic data. At the first in the antenatal clinics the researcher great the participant, introduced herself, explained the purpose of the study to gain her confidence and trust to convince her to participate in the study and obtained oral approval to be involved in the study then started the interview process individually for 20minites by using interviewing questionnaire sheet to collect socio demographic data, obstetrical and dental history and assess oral health habits.

After that the researcher was with the dental supervisor in the dental clinic to perform dental examination to all participants to evaluate their periodontal health during pregnancy and all data was collected in one day during interview and examination for 4 months of data collection duration. Then, the participants were asked about follow up to evaluate pregnancy outcome for 3 months.

Finally the researcher asked the nurses about their opinions in this study and taken it in mind for recommendations of these study.

Statistical design

Data were analyzed using Statistical Program for Social Science (SPSS)version 20.0. Quantitative data were expressed as mean ± standard deviation (SD). Qualitative data were expressed as frequency and percentage.

The following test were done:

-Chi-square (X^2) test of significance was used in order to compare proportions between two qualitative parameters.

Significance of the results:

▪ P-value<0.05 was considered significant.
▪ P-value<0.001 was considered as highly significant.
▪ P-value>0.05 was considered as insignificant

Limitations of the study:

1. It was difficult to come in contact with participant through their phone numbers and the nurses responsible for antenatal care provide their help because they know all people in the region.

2. Most of the participants had the myth that dealing medically with oral condition will harm fetus and decide to postpone oral care after delivery.

3. Taking extra time to convince cases about the importance of oral care during pregnancy.

4. Participant was irregular in their follow up session and it was so difficult to know their pregnancy outcome and nurses provide their help.

Result

Table (1): Distribution of the study sample according their general characteristics (n=91).

General characteristics	No	%
- Age (in years)		
20-	30	32.97
25-	42	46.15
30-	19	20.88
Mean±SD	26.77±3.29	
- Education		
≤12 yrs of education(Basic education)	74	**81.3**
≥12 yrs of education(High education)	17	18.7
- Occupation		
Employed	10	11
House wife	81	**89**
- Income		
Enough	9	9.9
Not enough	47	**51.6**
Bairly enough	35	38.5
- Marital status		
Married	89	**97.8**
Widow	2	2.2
- Body mass index (wt/(ht)2)		
Normal (<25)	2	2.2
Over weight (25- 29.9)	47	**51.6**
Obese ≥30	42	46.2
Mean±SD	30.20±4.53	

Table (1): shows that, (46.15%) of studied sample aged 25-30 years with mean age 26.77±3.29. A (81.3%) of studied sample were less than 12 years duration of education (from

primary to secondary level) and (89%) were housewives . Concerning their income, (51.6%) of them had not enough income. Regarding their marriage status ,(97.8%) of them were married. A (51.6%) of study sample was overweight.

Table (2): Relation between general characteristics of the studied sample and types of periodontitis (n=91).

General characteristics	Types of periodontitis						Chi-square test	
	Mild (n=23)		Moderate (n=64)		Severe (n=4)		x^2	p-value
	No.	%	No.	%	No.	%		
-Age (years)								
20-	11	47.8	18	28.1	1	25.0	11.208	0.024*
25-	12	52.2	27	42.2	3	75.0		
30-	0	0.0	19	29.7	0	0.0		
-Education								
<12 yrs of education	18	78.3	52	81.2	4	100.0	1.061	0.588
>12yrs of education	5	21.7	12	18.8	0	0.0		
-Occupation								
Employed	2	8.7	8	12.5	0	0.0	0.767	0.682
House wife	21	91.3	56	87.5	4	100.0		
-Income								
Enough	4	17.4	3	4.7	2	50.0	11.511	0.021*
Not enough	11	47.8	34	53.1	2	50.0		
Bairly enough	8	34.8	27	42.2	0	0.0		
-Marital status								
Married	22	95.7	63	98.4	4	100.0	0.705	0.703
Widow	1	4.3	1	1.6	0	0.0		
-BMI [wt/(ht)2]								
Normal weight	1	4.3	1	1.6	0	0.0	8.743	0.048*
Obese	8	34.8	38	59.4	1	25.0		
Overweight	14	60.9%	25	39.0	3	75.0		

*p-value <0.05 significant; **   p-value <0.001 highly significant

Table (2): shows that, there was statistically significant relation between age , income and body mass index of the participants and degree of periodontitis (p-value =0.024 & 0.021 and 0.048 respectively).

Table (3): Relation between obstetric &family history and types of periodontitis (n=91).

Obstetrical and family history	Types of periodontitis						Chi-square test	
	Mild (n=23)		Moderate (n=64)		Severe (n=4)		x2	p-value
	No.	%	No.	%	No.	%		
-Gravidity							47.988	<0.001**
Prim gravida	3	13.0	1	1.6	0	0.0		
Gravida 2	16	69.6	4	6.3	2	50.0		
Gravida 3-5	4	17.4	59	92.1	2	50.0		
-Parity							38.721	<0.001**
Prim para	16	69.6	4	6.3	2	50.0		
Para 2	2	8.7	23	35.9	1	25.0		
Para 3-5	5	21.7	37	57.8	1	25.0		
-Family history of dental problem							6.258	0.044*
No	7	30.4	15	23.4	0	0.0		
Yes	16	69.6	49	76.6	4	100.0		
- Gingival problems associated with previous pregnancy							28.462	<0.001**
No	11	47.8	8	12.5	1	25.0		
Yes (n=71)								
Bleeding gingiva on brushing	5	21.7	49	76.6	1	25.0		
Buffy gingiva	4	17.4	5	7.8	2	50.0		
Pain with brushing	3	13.1	2	3.1	0	0.0		

*p-value <0.05 significant;   **p-value <0.001 highly significant

Table (3): reveals that, there was highly statistical significant relation between the studied sample times of gravidity and parity and their pregnancy dental history and types of periodontitis (p-value <0.001). Also there was statistical significance with family history of study sample (p-value <0.05).

Table (4): Relation between the current pregnancy risk factors and types of periodontitis (n=91).

Current pregnancy and risk factors	Types of periodontitis						Chi-square test	
	Mild (n=23)		Moderate (n=64)		Severe (n=4)		x2	p-value
	No.	%	No.	%	No.	%		
Gestational age								
2nd trimester	2	8.7	10	15.6	0	0.0	5.916	0.038*
3rd trimester	21	91.3	54	84.4	4	100.0		
Dental factors								
Ignoring brushing teeth: Yes No	2 21	8.7 91.3	53 11	82.8 17.2	3 1	75.0 25.0	40.442	<0.001**
Visiting dentists during follow up visits: Yes No	6 17	26.1 73.9	14 50	21.9 78.1	0 4	0.0 100.0	6.186	0.045*
- Use of dental floss Yes No	12 11	52.2 47.8	7 57	10.9 89.1	0 4	0.0 100.0	18.520	<0.001**
Local dental factors(oral deformity): Yes No	16 7	69.6 30.4	41 23	64.1 35.1	1 3	25.0 75.0	6.124	0.047*
Behavioral factors								
- *Nutrition* - Consuming a lot of drinking beverages and sweaty food Yes No	9 14	39.1 60.9	40 24	62.5 37.5	1 3	25.0 75.5	7.928	0.019*
- Craving unusual food that may harm teeth(PICA) Yes No	2 21	8.7 91.3	3 61	4.7 95.3	2 2	50.0 50.0	10.930	0.004*
- Nature of diet during pregnancy Healthy(containing essential elements mainly(Ca) Unhealthy	13 10	56.5 43.5	37 27	57.8 42.2	1 3	25.0 75.0	8.085	0.018*
-*Stress* Having familial or occupational stressors in your life cannot cope with:- Yes No	7 16	65.2 34.8	53 11	70.3 29.7	4 0	100 0	24.099	<0.001**

*p-value <0.05 significant; **p-value <0.001 highly significant

Table (4): shows that, there was highly statistical significant relation between the studied sample oral factors(lack of dental hygiene& flossing) and their coping strategies regarding stressful situation and types of periodontitis(p-value <0.001). In addition to, there were statistical significance between gestational age, visiting dentist, local anatomical factors, nutritional habits and types of periodontitis (p-value<0.05).

Table (5): Relation between types of periodontitis and pregnancy outcome (n=91).

Pregnancy Outcome	Types of periodontitis						Chi-square test	
	Mild (N=23)		Moderate (N=64)		Severe (N=4)		x2	p-value
Maternal								
Normal (n=85)	22	95.7	62	96.9	1	25.0	49.697	<0.001**
Prolonged labor (n=4)	1	4.3	2	3.1	1	25.0		
Preeclampsia (n=2)	0	0.0	0	0.0	2	50.0		
Neonatal								
Full term fetus (n=87)	22	95.7	64	100.0	1	25.0	57.068	<0.001**
Preterm (n=2)	0	0.0	0	0.0	2	50.0		
LBW (n=2)	1	4.3	0	0.0	1	25.0		

**p-value <0.001 highly significant

Table (5): shows that, there was highly statistically significant relation between types of periodontitis (mild, moderate &severe and maternal& neonatal outcome (maternal&neonatal) (p-value <0.001).

Discussion

Poor oral well being is a noteworthy public health concern (**Reigle & Holm., 2016**). Oral health inequities exist in many parts of the world, particularly in low resource countries. (**Williams et al., 2015**). Research on dental and or oral health in Africa is relatively rare due to low prioritization (**Naidoo et al., 2015**).

Different studies show poor maternal and oral health and unfortunatlly oral hygiene in pregnant women faces different other barriers to achieve maximum oral health. These barriers include lack of knowledge, negative oral health experience and negative attitude of dental staff toward pregnant women (**Mishra et al ., 2014**).

Concerning general characteristics of the studied sample; nearly half of them were between age 20-30 years with mean age 26.77±3.29 that may be due to high marriage age in urban study setting. While more than two thirds (81.3%) had less education (before university education) as in the study setting there was little concern with education, also more than two thirds of them (89%) were house wives. This may have attributed to most of the women in Upper Egypt either prefer or forced to sit at home and become housewives to care their houses and not allowed exiting to outside work, which leads to a lack of financial resources resulting in follow-up their pregnancy or health problem in public hospitals like study setting. On the contrary, in Lower Egypt, there is more freedom that allows women to work, which raises their economic status and therefore they can follow-up their pregnancy or health problem in private clinics. Furthermore, slightly more than half of them (51.%) had not enough income and were overweight respectively (**table 1**).

The finding of this study came in congruent with those of **Silveira et al., (2017)** in a study of Periodontal Health Status and Associated Factors: findings of a Prenatal Oral Health Program in South Brazil who stated that most participants were aged 20–34 years (70.4%), the major occupation (55.2%) of participants was housewife. Also this result was in agreement with **Abd El Moaty et al., (2018)** who studied Association between Pre-pregnant Overweight and Obesity and Periodontal Disease during Pregnancy in Al-Fayoum university and revealed that more than three fourths of the study participants were low income and also slightly more than half were obese before getting pregnant. Also revealed that the minority (only 4.0%) of the study sample in El-Fayoum city compared to 25.0% of the study sample in El-Mansoura city had university educational level.

These findings were in contrast to the study done by **Murthy et al., 2012** on primgravida in Belgaum, India where majority (85.0%) of

the pregnant women belonged to upper class and no pregnant women were reported from poor and below poverty line classes.

Concerning the relation between the general characteristics of study sample and periodontitis, the study findings revealed that there was a statistically significant relation between age & income and body mass index of the studied sample and degree of periodontitis (p-value =0.024 & 0.021 and 0.048 respectively)

An increased prevalence of periodontitis among older women may be due to the consequences of years of untreated disease or to the natural loss of periodontal tissue (**Piscoya et al ., 2012).** Regarding income when people are equated with a higher economic status, they are more able to afford preventative and curative dental care (**Ogunbodede et al., 2015).** In regard to relation btween obesity and periodontitis this may be due to that the obesity influences periodontitis through changes in pro-inflammatory cytokines, gene expression, immune function, oral pathogens and indirectly via insulin resistance (**D'Aiuto & Suvan ., (2012)** (**Table 2**).

The findings of the present study were congruent with those of **Abo El Moaty et al. (2018)** whose study revealed that, the periodontal diseases are more prevalent among older age in both El-Fayoum and El-Mansoura city. The results illustrated that the mean age of the studied subject complained from periodontal diseases in El-Fayoum and El-Mansoura city (29.1 ±5.6) years and (30.6 ±6.6) years, respectively, while mean age of the studied subject not complained from periodontal diseases in El-Fayoum and El-Mansoura city was (25.5 ±6.2) years and (27.6 ±6.1) respectively.

Furthermore, **Hershenfield., (2014)** in a previous study, no Association between Periodontitis and Obesity in A Nationally Representative Sample of Canadian adults reported that there was Statistical significance association between periodontal disease & income adequacy. In addition to

that **Hershenfield., (2014***)* reported that, the higher prevalence of periodontitis observed in obese participants as compared to those who were not obese.

Also, this result was in agreement with **Vogt et al. (2012***),* who found that 47% of low-income &low education Brazilian pregnant women exhibited poor periodontal conditions.

On contrast, our findings were not in accordance with the finding of **Xie., (2014)** who reported that there was no statistically significant relation between almost socio-demographic characteristics or health variables and periodontitis.

Concerning the relation between obstetric &family history and types of periodontitis, the study revealed that, there was highly statistical significant relation between the studied sample times of gravidity and parity and their pregnancy dental history and types of periodontitis (p-value <0.001). Also there was statistical significance with family history of study sample. (p-value<0.05) (**Table 3**).

At the same line the findings of **Rosanna (2017),** which concluded that history of previous oral/dental problems was a predictor of the severity of periodontal disease (P <.001). Despite that the study reported that gravida and parity were not statistically associated with PD. Meanwhile this findings were in agreement with **Genco & Borgnakke (2013)** in their review of the literature that reported that aggressive periodontitis is often very high among certain families, with the percentage of affected siblings and affected pedigree members reaching 40–50%, suggesting that genetic factors may be important in susceptibility to aggressive periodontitis.

Concerning the relation between current pregnancy & risk factors and types of periodontitis, the study showed that there was highly statistical significant relation between the studied sample habit(lack of dental hygiene &flossing and their coping strategies regarding stressful situation and

progress of periodontitis) (p-value <0.001). In addition to, there were statistical significance between gestational age, visiting dentist, local dental factors and nutritional habits and types of periodontitis (p-value<0.05) **(Table 4)**.

This point of view was in agreement with **Vogt et al. (2012)**, they concluded that it a significantly associated of periodontal diseases with higher gestational age. The results were in the same line with finding of **Wu et al. (2015),** who was mentioned that pregnant women had a significantly higher gingival index and periodontal pocket depth (PPD) with similar plaque index (PI) compared with non-pregnant women and increased in parallel with the increase in the stage of pregnancy, which reached the maximum at the 8th month.

As well as, this findings were similarly with **Abd-Elmoaty et al. (2018)** in a previous study findings, that reported that a significant correlation was observed between diet and periodontal disease (p = 0.008).

In the same line the results agreed with **Abd-Elmoaty et al. (2018)** in a previous study that portrayed highly statistical significant relation between periodontal disease with tooth brush (p < 0.0001), flossing habits (p < 0.0001) and dental care visits (p < 0.0001). The better oral hygiene and dental care, the lower the incidence of periodontal diseases. On the contrary, **Merchant et al. (2002)** examined oral hygiene practices and periodontitis in 553 health care professionals. They mentioned that the frequency of tooth brushing & flossing did not relate to periodontitis.

Regarding the relation between types of periodontitis and pregnancy outcome **(Table 5)**: shows that, there was a highly statistical significant relation between types of periodontitis and maternal & neonatal pregnancy outcome. (p-value <0.001).

Similarly, these findings were in agreement with **Edessy et al. (2014),** who stated in a study that the incidence of preeclampsia was higher in patient group compared to control group (9.3% vs. 6%). Furthermore, it was stated that the incidence of preterm labor and low birth weight were significantly higher in patient group compared to control group (12.7% vs. 5.3% and 6.7% vs. 0.0% for PTL and LBW respectively). On the other hand , the finding of this study was in congruent with **Sindhu. et al , 2012** in a study of periodontal disease and pregnancy outcome: time to move on? Who reported that in 311 women with periodontal disease and 475 without that , there was no association between periodontal disease and preterm birth , preeclampsia, fetal growth restriction or perinatal death.

The majority of studies all over the world showed nearly the same results. So , from this study we emphasize that periodontal examination and early treatment in antenatal care units and good counseling of pregnant women about the benefit of oral hygiene is a way for healthy pregnancy and healthy outcome.

The researcher point of view regarding the prevalence of periodontitis in the study setting is that the participant's perception associated with oral health and oral care during pregnancy is accompanied with many myths. Regarding such high prevalence of periodontitis among the pregnant ,this may be associated with many risk factors such as age relating to the dental anatomical and physiological changes associated with periodontal diseases occurring during pregnancy in older age. Also income and social level that to my mind related to high costs of dental procedures and interventions.

Furthermore, the association of such disease with body mass index that may be related to that fact that increased fat content in bodies cause physiological changes in gingival bleeding tendency, in addition to, this also may be related to low dietary content of vitamins and minerals in obese diet. The other factors in the study as times of gravida , parity and family history , this in fact may be related to the previous dental condition that is worsen when neglected in the next times . Meanwhile,

the dental hygienic factors during pregnancy that eventually may be associated with stress of pregnancy period and negligence of oral hygiene that must be obligatory durind pregnancy especially with the presence of vomiting . Lastly ,the researcher opinion associated with the relation between periodontitis and pregnancy outcome is that such issue is a controversial one and need further searching.

Conclusion

In the bright of the study findings , it was concluded that the prevalence of periodontitis in Alwaleedia region-Asyut – Egypt was 28.6% among the pregnant attending the study setting during data collection period and fulfilling the inclusion criteria with consideration of all the study limitations. Also pregnancy was found to a trigger of the periodontal condition among the study sample. Furthermore, periodontitis was appeared to be associated with socioeconomic, demographic status, poor oral hygiene, over weight and gestational age. In addition, the current study findings indicated that, there was a highly statistical significant relation between periodontitis and PLBW& preeclampsia. The majority of studies all over the world showed such positive association between periodontitis in pregnancy and adverse pregnancy outcomes. So further studies must be done regarding such issue.

Recommendation

1-Because so few pregnant women seek regular preventive dental treatment, they must be educated in settings other than the dental office by activating the role of the maternity and community nurse in antenatal clinics and centers and all branches of obstetrics to enhance their knowledge and took care of well.

2. Oral health education opportunities within and among disciplines. Developing of a core set of oral health competencies and curricula for non-dental healthcare

professionals to enhance their role in oral health promotion and disease prevention.

3. Most importantly, maternity and community nurses should be able to identify signs and symptoms of periodontal disease and be able to effectively teach these signs and symptoms to expectant mothers. This way, if a woman discovers that she is experiencing these signs and symptoms, she will be able to associate them with possible periodontal infection and seek early professional treatment before she begins experiencing systemic effects.

4. Nursing programs and curriculum need to change to prepare and train nursing graduates with core competencies of oral health access to care issues as they are the main oral health educators and providers.

5- Any decrease of adverse pregnancy outcomes means decrease of the morbidity and mortality which means decrease in the cost of health care programs, as periodontal disease is a treatable condition. And so we can prevent it. And decrease this risk

6- More researches is needed to show the exact relation between periodontal disease and adverse pregnancy outcomes, and the proper treatment and the optimum timing of this treatment which can decrease the adverse pregnancy outcomes.

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