Dental caries severity in relation to selected salivary variables among a group of pregnant women in Baghdad city/Iraq.

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ABSTRACT

Background: During pregnancy many physiological, anatomical and biochemical changes take place that affect almost all body systems. In the oral pregnant women have serious changes such as more sever dental caries.
This study was conducted to measure dental caries severity and selected salivary variables (salivary flow rate, PH and viscosity)and to find the relation of dental caries with these salivary variables.

Subjects, materials and methods: The study group consisted of 60 pregnant women that were divided into three equal groups according to trimester (20 pregnant women in each trimester).They were selected randomly from the Maternal and Child Health Care Centers in Baghdad city, the age range was 20-25 years. In addition to 20 unmarried women as a control group and matched with age. Stimulated salivary samples were collected .Then salivary flow rate, pH and viscosity were measured. Dental caries severity was recorded by using Decay, Missing and Filled index (D_{1-4}MFS) using the criteria described by Manjie et al, (1989). Plaque index system by Silness and Löe, (1964) was used for measuring dental plaque thickness. For measuring dental calculus the calculus index component of the periodontal diseases index (PDI) by Ramfjord (1959) was used.

Results: Results of the current study revealed that dental caries parameter represented by (DMFT ,DMFS,DS and MS) were higher among pregnant than non –pregnant women with significant differences ($p<0.05$) for DMFT,DMFS and DS also all grades of lesion severity(D1-4)were higher among pregnant than non –pregnant women with nonsignificant differences($p>0.05$).Almost all dental caries parameter were higher in the 2nd trimesters with highly significant difference ($p<0.01$) for D1,DS ,DMFS and DMFT among four groups .
Concerning oral cleanliness both plaque and calculus indices recorded higher values among pregnant than non-pregnant with highly significant difference for both ($p<0.01$). Values were higher during 2nd trimester with high significant and non-significant differences among four groups .Regarding the relations of dental caries with oral cleanliness ,it was found that all dental caries parameters recorded positive correlations with both plaque and calculus indices with significant and highly significant relations Regarding salivary variables ,results revealed that salivary flow rate was higher among pregnant (especially in the 2nd trimester)than non-pregnant women but with non-significant difference ($p>0.05$).On the other hand salivary PH value was lower among pregnant than non-pregnant women with highly significant difference ($p<0.01$)among them. Salivary PH was lowest in the 2nd trimester with highly significant difference ($p<0.01$) among four groups .Also Salivary viscosity was higher among pregnant than non-pregnant women with highly significant difference ($p<0.01$) and it recorded higher mean value in the 3rd trimester with highly significant difference among four groups ($p<0.01$). Salivary PH recorded inverse relation with almost all dental caries parameters with significant relations with D_4, MS and highly significant relations with DS,DMFS and DMFT ,while salivary flow rate and salivary viscosity revealed non-significant relations with dental caries parameters ($p>0.05$).

Conclusion: Dental caries severity was higher among pregnant women probably due to the effect of pregnancy itself on oral hygiene (higher plaque and calculus indices) and salivary variables (increased salivary acidity and viscosity).Therefore, intensive education and preventive programs should be directed for pregnant women.

Key words: dental caries, pregnancy, salivary viscosity. **(J Bagh Coll Dentistry 2017; 29(2):115-121)**

INTRODUCTION

Pregnancy is a physiological process that affects even healthy women and involves many physiological, biochemical and anatomical changes [1, 2].

In addition to noticeable oral changes among them is an increase in dental caries severity [3-5]. Dental caries is an infectious transmissible bacterial diseases caused by acid from bacterial metabolism diffusing into enamel and dentine and dissolving the mineral [6]. Several studies recorded an increase in dental caries severity among pregnant women [7-9].

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In Iraq comparison studies had been carried out and recorded an increase in dental caries among pregnant in comparison to non-pregnant [10-13]. A longitudinal study was found that recorded an increase in DMFT and DMFS during pregnancy but a decrease in decay severity DS from initial 2.58 to 1.54 before labor by Papp *et al* [14].

Some pregnant women might experience excessive salivation (i.e. ptyalism) [15, 16] on the other hand xerostomia or hypo-salivation was reported to be a frequent complaint among pregnant women. Al Taie[17] found the flow rate of resting and stimulated saliva were significantly higher in pregnant than control group. While Suliaman[10] showed that stimulated salivary flow rate was significantly reduced among pregnant women and Al-Zaidi [12] reported no statistically

significant difference between pregnant and control group also salivary pH is affected during pregnancy. Kivela *et al*,[18] reported a decrease in salivary PH during pregnancy followed by rapid and significant increase after delivery .While in Iraq AL-Zaidi [12] found statistically non-significant difference of salivary pH, among pregnancy trimesters as compared to control. Laine and Pienihakkinen, [19] reported a decrease in salivary pH during pregnancy. Regarding salivary viscosity fresh mixed human saliva is viscoelastic fluid with distinct surface activity [20]. During pregnancy. However, study in blood viscosity during pregnancy could be fond [21]. These changes in salivary flow rate, PH and salivary viscosity during pregnancy might increase dental caries severity among them [10, 22, 24]. However limited studies could be found regarding changes in salivary flow rate and PH during pregnancy while no studies could be found that measure salivary viscosity among pregnant women. Therefore it was decided to carry out this study to assess dental caries severity in addition to salivary flow rate, pH and viscosity among pregnant women in comparison to un-married women and to evaluate the relation of salivary flow rate, pH and viscosity with dental caries severity.

SUBJECTS, MATERIALS AND METHODS

The study group consisted of (60) pregnant women that were divided according to trimester into three equal groups (20 pregnant women in each trimester). The age range was 20-25 years. In addition to 20 un married women as a control group, these women should be matched with age Both pregnant and control women were selected randomly from the Maternal and Child Health Care centers in Baghdad city.

Stimulated salivary samples were collected according to Tenovuo and Lagerlof [25] instructions. After saliva collection the PH was measured by using digital PH meter. Salivary volume was measured by using measuring cylinder and the rate of secretion was expressed in milliliter per minute (ml/min).Salivary viscosity was determined by using the Ostwald viscometer (U-type viscometer)[26].Then salivary samples were centrifuged and stored at (-20ºC) for subsequent chemical analysis. Plaque index by Silness and Löe, [27] was used for measuring dental plaque thickness. For measuring the amount of dental calculus, calculus index (Cal I) component of the periodontal diseases index (PDI) by Ramfjord, (1959)[28] was used, and all teeth was diagnoses Dental caries experience was recorded by lesion severity according to Decay, Missing and Filled index (D_{1-4} MFS) Index according to criteria described by Manjie *et al.,* (1989)[29]. Statistical analyses were done by using IBM SPSS version 23 computer software (Statistical Package for Social Sciences) in association with Microsoft Excel 2016.

RESULTS

Table (1) showed that dental caries parameters (DMFS), (DS) were higher among pregnant than non-pregnant women (mean 17± 9.5; mean 9± 5.5) respectively with significant differences ($p<0.05$) in the 2nd trimester. While missing surfaces (MS) recorded higher mean rank value among pregnant than non-pregnant with significant difference ($p<0.05$) (MS) was higher in the 1st trimester of pregnancy.

Data showed that all grades of caries severity (D_{1-4}) were higher among pregnant than non-pregnant but with non-significant differences ($p>0.05$). According to trimester all grades (D_1,D_2,D_4) of severity were higher in the 2nd trimester except for D_3 that was higher in the 3rd trimester with highly significant difference among the four groups for D_1 only($p<0.01$). Statistical difference in **MS** between pregnant and non-pregnant (U test=414.0, Z value=-2.293, P value =0.022*) Statistical difference in **DS** between pregnant and non-pregnant (t-test=-2.26, d.f=78, P value =0.027). Statistical difference in **DMFS** between pregnant and non-pregnant (t test=-2.46, d.f =78, P value=0.016).

Table (2) show that Both Pl I and Cal I values were higher in the second trimester with highly significant difference among four groups for plaque ($p<0.01$) and for calculus index the p-value was close to the confidence limit. Statistical difference in **Plaque index** between pregnant and non-pregnant (U test=238.5, Z value =-4.017, P value<0.001; Statistical difference in **Calculus index** between pregnant and non-pregnant (U test=414, Z value =-2.076, P value<0.001)

In Table (3) Salivary flow rate was higher in pregnant than non-pregnant in the 2nd trimester but with non-significant difference among four groups ($p>0.05$). Salivary pH was lower (more acidic) among pregnant than non-pregnant with highly significant difference ($p<0.01$). Salivary PH was lower in the 2nd trimester with highest significant difference among four groups.

Salivary viscosity was higher among pregnant women than non-pregnant with high significant differences ($p<0.01$). It was higher in the 3rd trimester with highly significant difference among four groups (Statistical difference in **PH** between pregnant and non-pregnant women (F=5.464, d.f

=1, p<0.01) Statistical difference in **Viscosity** between pregnant and non-pregnant women (F= 7.687, d.f =1, p=0.006). Table (4) revealed that statistical significance was significant (p<0.05) and highly significant for both plaque and calculus index with (DMFT, DMFS, DS, MS) of dental caries parameters.

The relation of dental caries parameters with salivary physico-chemical characteristic are shown in Table (5)

It was found that the relation of salivary flow rate with dental caries parameters were weak non-significant correlations (p>0.05).Salivary pH revealed weak inverse relations with dental caries parameters except for (FS) that was weak positive relations statistical significance were significant (p<0.05)for(D_4)-and highly significant (p<0.01) for (DS, MS, DMFS, DMFT). Salivary viscosity revealed weak non-significant (p>0.05) correlations with dental caries parameters.

The effect of pregnancy on oral variables analyzed by using (ROC test) is shown in Table (6) also adverted in Fig. (1,2). Results showed that the most affected oral variables by pregnancy was salivary (PH) with highly significant difference (p<0.05). Followed by Pl I GI (salivary viscosity).

Table 1: Dental caries experience among non- pregnant and pregnant women according to trimester.

Parameters	Non pregnant women			1st trimester			2nd trimester			3rd trimester			Total (Pregnant women)			Statistical differences among four groups (ANOVAs test)		
	No.	Median	Mean rank	No.	Median	Mean rank	NO.	Median	Mean rank	NO.	Median	Mean rank	No.	Median	Mean rank	Chi-square	D.F	P-value
D_1	20	3.5	40.3	20	1.5	26.5	20	7	55.9	20	3.5	39.5	**60**	**3**	**40.6**	16.26	3	0.001**
D_2	20	1.5	33.9	20	3	41.8	20	3	45.9	20	2	40.4	**60**	**3**	**42.7**	2.79	3	0.42
D_3	20	0	36	20	0	40.4	20	0	42.7	20	0	43	**60**	**0**	**42**	2.42	3	O.49
D_4	20	0	38	20	0	42	20	0	42	20	0	40	**60**	**0**	**41.3**	2.32	3	0.51
MS	20	0	31.2	20	5	47.3	20	5	45.9	20	0	37.6	**60**	**4.5**	**43.6**	7.74	3	0.05
FS	20	3	45	20	3	45.4	20	1	39.4	20	0	32.2	**60**	**0.5**	**39**	4.75	3	0.19
	No.	**Mean**	**±SD**		**Mean**	**±SD**		**Mean**	**±SD**		**Mean**	**±SD**	**N0.**	**Mean**	**± SD**	**F**	**d.f**	
DS	20	6	4.4	20	6	4.8	20	12	5.9	20	9	4.1	**60**	**9**	**5.5**	6.9**	3	<0.001
DMFS	20	12	6.3	20	17	10.3	20	21	8.2	20	14	8.9	**60**	**17**	**9.5**	4.3**	3	0.007
DMFT	20	8	2.8	20	9	3.6	20	11	2.6	20	8	2.8	**60**	**9**	**3.2**	4.3**	3	0.007

*significant p<0.05; **High .significant p<0.01.

Table 2: Oral cleanliness among pregnant and non-pregnant women according to trimesters.

Parameters	Non-pregnant			1st trimester			2nd trimester			3rd trimester			Total pregnant			Statistical differences between trimester and non-pregnant		
	No.	Median	Mean rank	No.	Median	Mean rank	No.	Median	Mean rank	No.	Median	Mean rank	No.	Median	Mean rank	Chi-square	d.f	P value
Plaque index	20	0.142	22.4	20	0.321	35.7	20	0.6155	52.7	20	0.589	51.2	60	0.463	46.5	22.6	3	<0.001**
Calculus index	20	0.0089	31.2	20	0.01875	37.6	20	0.0285	49.4	20	0.0175	43.9	60	0.o191	43.6	6.92	3	0.07

*significant p<0.05; Highly significant value<0.01

Table 3: Salivary physico chemical characteristic among non- pregnant and pregnant women according to trimesters.

Parameters	Non-pregnant women			1st trimester			2nd trimester			3rd trimester			Total pregnant women			Statistic al differences among four groups		
	No.	Mean	± SD	No.	Mean	± SD	No.	Mean	±SD	No.	Mean	±SD	No.	Mean	±SD	F	d.f	P -value
Salivary flow rate	20	1.07	1.21	20	1.11	0.29	20	1.36	0.72	20	1.16	0.42	60	1.21	0.51	1.470	3	0.23
Salivary PH	20	7.9	0.3	20	7.5	0.4	20	7.1	0.3	20	7.4	0.4	60	7.4	0.4	17.811	3	<0.001**
VISCOSITY	20	0.0104	0.0033	20	0.0117	0.0018	20	0.0122	0.0043	20	0.0154	0.0038	60	0.0131	0.0038	7.687	3	<0.001**

*significant p<0.05; Highly significant value<0.01

Table 4: Relation of dental caries with oral cleanliness for pregnant women.

Parameter	P LI		Cal I	
	r	P	r	P
D1	0.062	0.58	0.201	0.07
D2	0.298	0.007	0.195	0.08
D3	0.44	<0.001**	0.164	0.15
D4	0.225	0.045	0.204	0.07
DS	0.432	<0.001**	0.331	0.003**
MS	0.373	<0.001**	0.4	<0.001**
FS	-0.11	0.33	-0.086	0.45
DMFS	0.401	<0.001**	0.363	<0.001**
DMFT	0.28	0.012*	0.25	0.025*

*significant p<0.05; highly significant value<0.01

Table 5: Relation of dental caries with salivary physicochemical characteristic for pregnant women.

Parameters	D_1		D_2		D_3		D_4		DS		MS		FS		DMFS		DMFT	
	r	P	R	P	R	P	R	P	r	P	R	P	r	P	r	P	r	P
S.F.R	-0.044	0.7	0.064	0.58	-0.146	0.2	0.031	0.78	-0.053	0.64	0.113	0.32	0.103	0.36	0.106	0.35	-0.013	0.91
PH	-0.189	0.09	-0.173	0.12	-0.198	0.08	-0.228	0.042*	-0.424	<0.001**	-0.293	*0.008	0.067	0.55	-0.43	<0.001**	-0.364	**<0.001
VISCOSITY	-0.094	0.41	-0.081	0.48	0.022	0.85	0.136	0.23	0.053	0.76	0.067	0.55	-0.199	0.08	-0.054	0.64	-0.136	0.23

Table 6: Effect of pregnancy on oral variables (ROC test).

Variables	ROC area	P-value
Salivary PH	0.907	<0.001**
Plaque index	0.801	<0.001**
Salivary viscosity	0.757	<0.001**
DMFS	0.673	0.021*
Ds	0.668	0.025*
Calculus index	0.655	0.039*
Ms	0.655	0.039*
D_2	0.610	0.14
DMFT	0.605	0.16
D_3	0.576	0.31
Fs	0.575	0.32
D_4	0.542	0.58
Salivary flow rate	0.538	0.61
D_1	0.504	0.96

*significant p-value<0.05;**Highly .significant p-value<0.01.

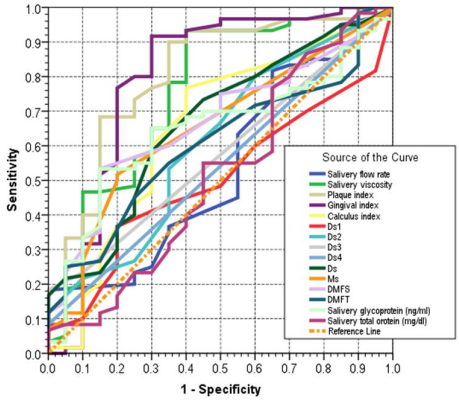

Figure 1: Roc curves for oral variables.

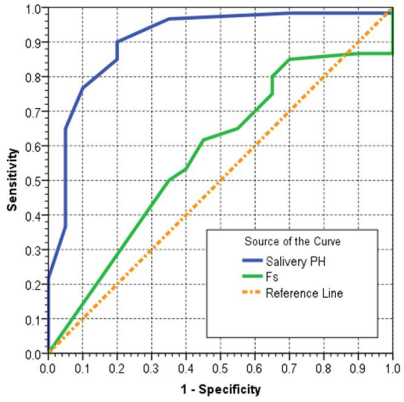

Figure 2: Roc curves for selected oral variables (salivary PH and FS).

DISCUSSION

Physiologic changes during pregnancy may result in noticeable changes in the oral cavity these changes may include dental caries, pregnancy gingivitis, periodontitis, and other oral diseases [3-5]. The same results found in the current study pregnant women experienced an increase in dental caries severity represented by significant higher (DMFS, DS and MS values) ,all grades of caries lesion severity (D_{1-4}) were higher among pregnant women than non-pregnant but with non-significant differences .This is probably due to increased consumption of carbohydrates, and reduced salivary production and/or increased acidity of saliva, increased acid in the mouth from vomiting. [30-32]. In addition the number of certain salivary cariogenic microorganisms as *streptococcus mutants* and *lactobacilli* found to be increased [10, 33]. The same result was also found by other studies [9-12]. While the result reached was in opposite with Papp *et al*., [14] who found a decrease in decay teeth surfaces during pregnancy. Regarding trimesters, dental caries experience (DMFT, DMFS, and DS) was higher in the second trimester. , as well the grades of caries severity (D_1, D_2, D_4) were this probably due to hormonal changes that reached to peak level in the second trimester [34].That was reported to affect oral health [4]this this finding in accordance with previous Iraqi study by AL-Zaidi, [13] that revealed the mean values of dental caries were higher in pregnant women especially in the first and second trimesters than the control group but the differences were statistically non-significant. Regarding oral cleanliness, results of the current study revealed that both plaque and calculus accumulation were higher among pregnant women than non-pregnant with significant difference for both. This finding may further explain higher caries severity during pregnancy since). Dental plaque is the main etiologic factor for dental caries [35]. Also dental calculus act as retentive factor for dental plaque [36]. This is further supported by the positive correlations of plaque and calculus indices with dental caries parameters that were significant and highly significant with most of the dental caries parameters for pregnant women. Also by using the ROC test it has been found that plaque index is the second oral variable after salivary PH to be affected or changed during pregnancy with highly significant differences. This is probably because pregnant women might become anxious, restless and exhausted, in addition to nausea and vomiting during pregnancy that made the routine oral hygiene practices more difficult [36]. Poor oral hygiene was also reported by. Tilakaratne *et al* [37]. But contraindicated with other study by Yas (2004) [11] who found low values of plaque in pregnant than non-pregnant while calculus index was similar, also results revealed that both plaque and calculus indices were higher in the second trimester with higher significant differences for plaque .That is further explained higher caries severity during the 2nd trimester. This is consistent with previous studies Suliaman [10]. While Al-zaidi,[12] revealed higher plaque in the first trimester followed by 3rd trimester. Saliva play an important role in maintaining oral health through its flow rate, buffer capacity and organic and in organic constituent [38, 39]. In the current study results revealed that salivary flow rate was higher during pregnancy than non-pregnant women but with non-significant differences. This might be attributed to the sensitivity of the salivary glands by the nausea and vomiting that are usually linked with pregnancy [16-18]. The same result was added by Al-Taie [17] but the result was in opposite with Suliaman [10]. While Al-zaidi[12] reported no statistically significant difference. Regarding salivary PH in the current study. Salivary PH was lower (more acidic) among pregnant women than non-pregnant with highly significant difference. This may give another explanation for higher caries severity during pregnancy. Since lower salivary PH means more acidic saliva that enhance or exaggerated the demineralization of dental enamel also most of the chemical reactions occurs in the oral cavity affected by hydrogen ion. [40]. This is further supported by the inverse correlations of salivary PH with dental caries parameters .By using ROC test results revealed that salivary pH was the first and the mostly affected oral variable during pregnancy with highly significant difference and ROC area that was 0.907. Saliva during pregnancy may become more acidic because serum concentration of estrogens is elevated IgA increases, whereas sialic acid and buffer capacity decreased in saliva [41]. Lower salivary PH was also reported by another studies Kivela *et al*, [18] and Al-Zaidi [12]. Results also revealed that salivary PH was lowest in the 2nd trimester with highly significant difference among four groups this give another explanation for higher caries severity during 2nd trimester. Finally, salivary viscosity revealed higher mean value among pregnant than non-pregnant women with high significant difference especially in the 3rd trimester with high significant differences among the four groups this viscosity of saliva depended greatly on the method of stimulation (acid or mechanical)[42], and progesterone hormone will rise especially during the first two months of the

third trimester after that it declined during the last month prior to child birth [43], also by using ROC test, it was found that salivary viscosity was the third oral variable affected by pregnancy with highly significant differences (ROC area= 0.757). An increasing salivary viscosity during pregnancy might contributed to increasing caries severity during pregnancy since increasing salivary viscosity means a reduction in water content and more thick saliva in turn affect the clearance action of saliva [44]. However no studies could be found regarding the change in salivary viscosity during pregnancy to compare the result of the current study with them.

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المستخلص

خلفية: خلال فترة الحمل العديد تجري من التغيرات الفسيولوجية، التشريحية والكيميائية الحيوية التي تؤثر تقريبا على كل نظام الجسم. كما في تجويف الفم النساء الحوامل يعانين من العديد من التغييرات فيما بينها، وهناك زيادة في شدة تسوس الأسنان.

أهداف الدراسة: لقياس شدة تسوس الأسنان والمتغيرات اللعابية مختارة (معدل تدفق اللعاب، ودرجة الحموضة واللزوجة). وللعثور على العلاقة بين تسوس الأسنان مع هذه المتغيرات.

المواضيع والمواد والطرق: تكونت مجموعة الدراسة من60 امرأة حاملا التي تم تقسيمها إلى ثلاث مجموعات متساوية وفق للاشهرالثلاثه من الحمل (20 امرأة حاملا في كل ثلاثة أشهر). و اختيرت عشوائيا من مراكز صحة الأم ورعاية الطفل في مدينة بغداد، كان العمرالمحدد من(20-25) سنة بالإضافة إلى 20 امرأة غير متزوجة كمجموعة مقارنه مع المطابقه في العمر . وقد تم قياس معدل تدفق عينة اللعاب المحفزه .ثم درجة الحموضة واللزوجة. وسجلت شدة تسوس الأسنان باستخدام مؤشر تسوس، والمفقود والسطوح المعالجه بحشوات ($D_{1-4}MFS$)باستخدام المعايير التي وصفها Manjie وآخرون (1989), نظام مؤشر البلاك اعتمدها (Silness and Löe1964) تستخدم لقياس سمك البلاك على الأسنان. ومؤشر حساب التفاضل والتكامل من مؤشر أمراض اللثة(PDI) لمعايير (Ramffjord 1959).

النتائج: كشفت نتائج الدراسة الحالية أن تسوس الأسنان التي يمثلها (الاسنان والاسطح المتاكله والمفقوده والمعالجه بحشوات والاسطح المتاكله والاسطح المفقوده) كانت أعلى بين الحوامل من النساء غير الحوامل مع اختلاف معنوي في القيمة الاحتمالية ($p < 0.05$) ل (الاسنان والاسطح المتاكله والمفقوده والمعالجه بحشوات والاسطح المتاكله والاسطح المفقوده) , كما كانت كانت قريبة من حد القيمة الاحتمالية ($p = 0.05$) وشدة جميع المستويات من (التاكل اوالنخرمن الدرجه الاولى للرابعه)أعلى بين الحوامل من غير الحوامل مع وجود اختلافات غير ملحوظة . ($P > 0.05$) وكان تسوس جميع الأسنان المفحوصه أعلى في(الثلث الثاني من فتره الحمل)مع وجود اختلافات معنوية ($P < 0.01$) ل(الاسنان والاسطح المتاكله والمفقوده والمعالجه بحشوات والاسطح المتاكله وتنخر الاسنان من الدرجه الاولى) بين ألاربع مجموعات.

وفيما يتعلق بالمتغيرات اللعابية كشفت النتائج أن معدل تدفق اللعاب كان أعلى بين الحوامل (وخصوصا في الأشهر الثلاثةالوسطى من فتره الحمل) من النساء غير الحوامل ولكن مع وجود اختلافات غير ملحوظة من قيمة($P > 0.05$). ودرجة الحموضة اللعابية كان أقل لدى النساء الحوامل من النساء غير الحوامل مع وجود اختلافات معنوية عالية بينهم ($P < 0.01$) كانت درجة الحموضة اللعابية الأقل في (الأشهر الثلاثة الوسطى من فتره الحمل)مع وجود اختلافات معنوية عالية بين المجموعات ألاربع ($P < 0.01$) ,اماللزوجة اللعابيه كانت أعلى بين الحوامل من النساء غير الحوامل مع وجود اختلافات معنوية($P < 0.01$) ، وسجلت أعلى قيمه في (الثلث الاخيرمن الحمل) مع وجود اختلافات معنوية عالية بين ألاربع مجموعات.($P < 0.01$) امامن ناحيه نظافة الفم سجلت كل من مؤشر البلاك والقلح قيم أعلى بين الحوامل من غير الحوامل مع ارتفاع معنوي ($p < 0.01$) وغير معنوي ($P > 0.05$) على التوالي بين ألاربع مجموعات وقد سجلت درجه حموضه اللعاب علاقة عكسية تقريبا مع مقاييس تسوس الأسنان المفحوصه مع علاقات وفرق احصائي ملحوظ ($p<0.05$) ل(للتاكل اوالنخرمن الدرجه الرابعه والاسطح المفقوده) و العلاقات بدلالات احصائيه عاليه مع(السطوح المتاكله و الاسنان والاسطح المتاكله والمفقوده والمعالجه بحشوات) بينما اللزوجه ومعدل تدفق اللعاب اظهر علاقات احصائيه غير ملحوظه مع مقاييس التسوس اي ($p>0.05$).

الاستنتاج: كانت شدة تسوس الأسنان أعلى بين النساء الحوامل ربما يرجع إلى تأثير الحمل نفسه على نظافة الفم (أعلى مستوى للبلاك والقلح) والمتغيرات اللعابية (زيادة الحموضة اللعابية واللزوجة). لذلك، التعليم المكثف والبرامج الوقائية يجب أن توجه للنساء الحوامل

الكلمات الرئيسية: تسوس الأسنان، الحمل، اللزوجة اللعابيه.