RESEARCH ARTICLE

A COMPARATIVE STUDY OF SALIVARY PARAMETERS AND CARIES INDEX IN PREGNANT AND NON PREGNANT WOMEN

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ABSTRACT

Introduction: As a systemic condition, pregnancy causes changes in the functioning of the human body as a whole and specifically in the oral cavity; these changes may favour the emergence of diseases, such as dental caries and periodontal disease. The aim of this study was to evaluate specific salivary parameters and caries incidence in pregnant and non-pregnant women population in western part of Maharashtra, India.
Material and methods: A cross-sectional study was conducted among thirty pregnant and thirty non pregnant women aged between 21-30 years to evaluate specific salivary parameters like salivary flow rate, pH, and its co-relation with cares index.
Results: The findings of our study indicate that the there is decrease in salivary flow and pH as well as increase in caries incidence in pregnant women compared to non pregnant women.
Conclusion: Thus, the findings of our can be utilised to target preventive measures in this vulnerable population to improve their oral health and consequently their general well being.

INTRODUCTION

The mouth is obvious portal of entry to the body and oral health reflects and influences general health and well being (Boggess, 2006). Pregnancy represents a particular physiological state, characterized by hormonal and metabolic changes with transient nature, which can influence the oro-dental status with repercussions in terms of increasing the number of caries and their accelerated evolution (Molnar-Varlam, 2011). The value of saliva as a diagnostic tool for oral and systemic diseases has been an area of study for many researchers with the aim of increasing its use as a possible complementary exam.[3]Salivary analysis is a useful tool for disease diagnosis, mainly due to its origin, composition, functions, and interactions with other organ systems. With the addition of modern techniques and chemical instrumentation equipment, there has recently been an observable increase in the use saliva for laboratory investigations (Naveen, 2014).

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According to findings during pregnancy, saliva can be affected by hormone level changes. Calcium, phosphorous and proteins in saliva are important components and any changes can affect teeth or oral health. Although, the effect of changes in sex hormones on dental carries is not completely known, it is thought that pregnancy causes changes in salivary biochemical markers (Laine, 2002). International research studies show that oral health care for pregnant women has been inadequate, especially in relation to the areas of education and health promotion with some evidence of disparities by socioeconomic status and ethnicity (Rahman, 2013). Thus, the aim of this study was to evaluate specific salivary parameters like salivary flow rate, pH, and its co-relation with cares index in pregnant and non-pregnant women population in western part of Maharashtra, India.

MATERIAL AND METHODS

A cross-sectional study was conducted among thirty pregnant and thirty non pregnant women aged between 21-30 years who visited the OPD of Department of Gynaecology and Obstetrics at a health institute in western part of Maharashtra, India.

Ethical clearance was taken from Institutions Ethical Committee before the commencement of study. A written consent was obtained from all the subjects who were involved in the study. First time pregnant women who were willing to participate in the study were included in the study. Subjects with salivary gland disorders, systemic diseases, xerostomia, and smoking habit were excluded from the study. The intraoral examination was conducted by a single examiner under favourable lightening using diagnostic instruments. Dental caries was recorded according to WHO criteria; all tooth surfaces were visually examined. DMFT (Decayed, Missing and Filled teeth) indices were scored in accordance with World Health Organization (WHO) criteria (Oztruk, 2013). Following standard procedures, subjects were asked to wash their mouth and sit passively for 10 min as the saliva accumulated in the floor of the mouth and expectorate in a relaxed position with their heads bent forward, allowing the saliva to drain through the open lips into a sterile graduated collection cup. Immediately after collection, the saliva volume was measured and then the salivary flow rate was calculated in ml/10 min (Oztruk, 2013). To measure the salivary pH the salivary sample collected was diluted using double distilled water to keep the pH constant and Salivary pH was measured electrometrically using pH meter. Salivary pH values were reported as log of the mean hydrogen ion acitivity (Rockenbach, 2006). Data was gathered, categorized and coded. The collected data was then entered into the computer in Microsoft Excel. Basic descriptive statistic was done using the Microsoft Excel. Data were analyzed by SPSS-16 software and the comparison between the pregnant and non pregnant groups were performed using T-test and chi square.

RESULTS

Comparison between mean Salivary Flow, Mean pH and DMFT Index among Pregnant and Non Pregnant Women

Table 1. Mean Salivary Flow, Mean pH and DMFT Index among Pregnant and Non Pregnant Women

Factor	Pregnant		Non Pregnant		Unpaired t test		
	Mean	SD	Mean	SD	t value	p value	Significance
Salivary Flow	2.93	0.50	3.48	0.78	3.29	0.00	S
Salivary pH	7.39	0.27	8.19	0.36	9.98	0.00	S
DMFT Index	3.97	2.33	1.71	1.29	5.12	0.00	S

P<0.05, S – Significant, NS – Non Significant

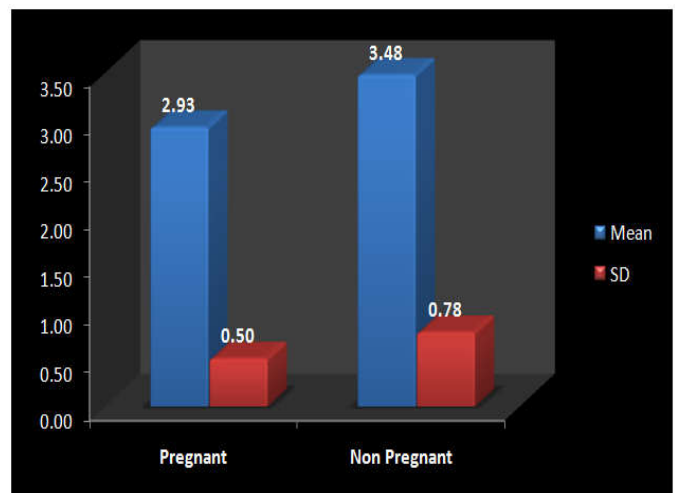### Salivary flow rate of pregnant and non-pregnant women

The comparison of the mean salivary flow rate that was calculated in pregnant women and non pregnant women is shown in Graph 1. The mean salivary flow rate in the non pregnant women was 3.48±0.78 ml/10 mins and that of the pregnant women was 2.93±0.50 ml/10 mins respectively indicating a significant decrease in the salivary flow rate in the pregnant women. An Unpaired Student t test was used which revealed that there was statistically significant difference between the two groups (p<0.05).
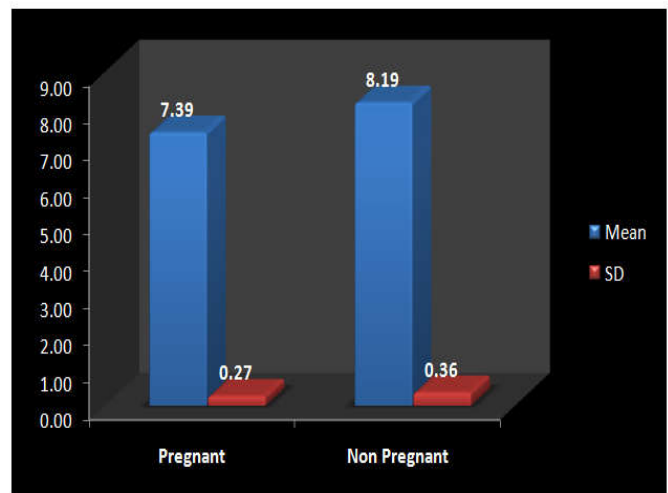
Mean Salivary pH of pregnant and non-pregnant women

The comparison of the mean salivary pH in pregnant women and non pregnant women is shown in Graph 2. There was a reduction in the pH in the pregnant women with a mean pH
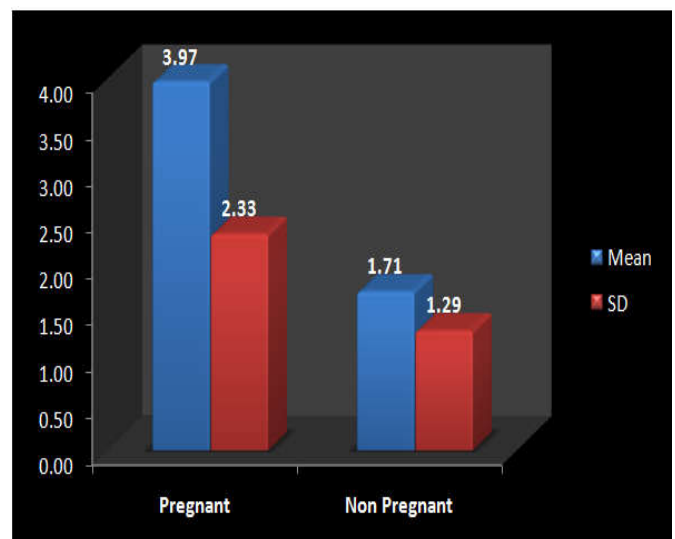
7.39. The non pregnant women had a mean pH of 8.19. Statistically significant difference was found between the two groups when Unpaired Student t test was used (p<0.001)

Graph 1. Mean Salivary Flow in ml/10mins among Pregnant and Non Pregnant Women

Graph 2. Mean Salivary pH among Pregnant and Non Pregnant Women

Graph 3. Mean DMFT Index among Pregnant and Non Pregnant Women

A.Mean DMFT Index of pregnant and non-pregnant women: The comparison of the mean DMFT Index in pregnant women and non pregnant women is shown in Graph 3. Mean DMFT

Index was 1.71±1.29and 3.97±2.33 in the non pregnant and pregnant women respectively. Statistically significant difference was found between the two groups when Unpaired Student t test was used (p<0.001)

DISCUSSION

Saliva is versatile and complex fluid and is necessary for various physiological functions in the oral cavity. A healthy adult individual produces about 500-1500ml of saliva per day with an average rate of about 0.5ml/min (Naveen, 2014). Gonzalez M et al. (2001) and Widerstrom L & Bratthall D (1984) through their studies found lower salivary flow rates in pregnant women compared with non-pregnant women (Rockenbach, 2006). Our study showed similar results as the mean salivary flow rate in the non pregnant women was 3.48±0.78 ml/10 mins and that of the pregnant women was 2.93±0.50 ml/10 mins respectively. However, these values are in contrast to the findings of a study by Naveen S. et al. in 2013 where on comparing the unstimulated salivary flow rates in 30 pregnant and non-pregnant women, they found that there was significant increase in the salivary flow rate in the study group. The mean unstimulated flow rate salivary flow rate in pregnant women was 4.82 ml/5 min as compared to non-pregnant women which was 3.47 ml/5 min (Naveen, 2014). Pregnant patients are uncomfortable and distressed due to nausea in pregnancy and certain hormones contribute to this relationship (morning sickness).Pregnancy induces decreased gastroesophageal sphincter tone and prolonged gastric emptying times. These changes along with decreased esophageal tone lead to changes in the saliva flow (Naveen, 2014 and Bakhshi, 2012).

Salivary pH and buffering capacity are among the main factors affecting the stability of enamel and these factors play a pivotal role in cariogenesis (Oztruk, 2013). There was a reduction in the pH in the pregnant women in our study with a mean pH 7.39 compared to the non pregnant women who had a mean pH of 8.19. These findings are similar to those reported by González et al. for stimulated saliva in pregnant (pH 6.6) and nonpregnant Mexicans (pH 7.1) (González, 2001). Dental caries is the second most important disease of the oral cavity in pregnancy. The DMF index indicates the status of the oral cavity with regard to the number of teeth with decay, fillings and extracted for caries (Merglova, 2012). In our study we found that the mean DMFT Index was 1.71±1.29and 3.97±2.33 in the non pregnant and pregnant women respectively. Similar findings were noted by Mital P et al. in 2013 when they carried out a study on occurrence of dental caries among pregnant women and compared it with those in non pregnant women. It was noted that pregnant women were 1.97 times more likely to suffer from dental caries compared to non-pregnant women.[11]
Thus the findings of this study indicate the various changes in saliva and dental health status during pregnancy and these have many repercussions in terms of increasing the number of the caries incidence and their accelerated evolution. It is important to note that many women do not seek dental care during pregnancy and those that do often confront unwillingness of dentists to provide care. Many expectant mothers are unaware of the implications of poor oral health for themselves, their pregnancy and/or their unborn child (Ravindran, 2013). Based on our findings, pregnant women deserve additional attention during preventive dental examinations, and it is necessary to motivate them to take particularly good dental care of their oral health (Merglova, 2012). The findings indicate that it is necessary to take measures to improve the oral health of women during pregnancy with the aim of preventing the development of caries in them.

Conclusion

Thus, the findings of our study indicate that the there is decrease in salivary flow and pH as well as increase in caries incidence in pregnant women compared to non pregnant women. These findings can be utilised to target preventive measures in this vulnerable population to improve their oral health and consequently their general well being. It is important to educate the pregnant women and the health care givers to ensure optimum oral hygiene practices, timely intervention and dental treatment to ensure good oral health of the mother and the child (Vibhute, 2016). Future research should continue to evaluate the specific association between the particular period of pregnancy and development of dental caries. This knowledge may form the basis for targeting preventive and therapeutic measures for pregnant women who are at greatest risk for dental caries (Kamate, 2014).

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