Assessment of Decayed, Missing, and Filled Teeth Index among Pregnant Women in Mazandaran Province, Northern of Iran in 2016

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ABSTRACT

Some of society groups are more at risk of tooth decay due to their specific physiologic conditions. One of these specific conditions is natural process of pregnancy occurring in accordance with extensive changes in body of mothers so that these changes comprise oral and dental conditions too. The purpose of this study is to examine Decayed, Missing, and Filled Teeth (DMFT) index among pregnant women in Mazandaran province, northern of Iran. This cross-sectional study was done in 2016 (between February - May) on 1842 pregnant women of Mazandaran province, Northern of Iran. The data were collected using a questionnaire including relevant questions to demographic information, healthcare level of oral health as well as relevant question to visiting dentist before pregnancy. DMFT index of pregnant women was recorded by dentist after checkup. The collected data were analyzed by SPSS version 19.0 software with descriptive (mean and standard deviation) and inferential statistics (t-test and Chi-square). The P< 0.05 was considered as significant value. Age range of participated women was between 18 and 32 years old. The mean of DMFT index among pregnant women in Mazandaran Province was equal to 13±6. The results indicated that there is a significant relationship between education and awareness level of oral health as well as a significant relationship between DMFT index and awareness level (P<0.05). According to the obtained results of this study, DMFT index of pregnant women was high based on other similar studies. Oral and dental health of pregnant women is related to their education and awareness level toward required actions to protect it.

Key words: DMFT Index, Pregnant, Iran, Oral Health

INTRODUCTION

From the perspective of many scholars in oral and dental scope and declaration of World Health Organization (WHO), oral and dental health is one of the most important factors of an optimal general health among people (1). Therefore, one of the programs of WHO in field of prevention from chronic diseases and health promotion is paying

attention to oral and dental health (2). Meanwhile, tooth decay is one of the most considerable oral and dental diseases. The four main factors for tooth decay include microorganisms, carbohydrates, individual resistance against bacteria causing decay, and time. Tooth decay is intensely decreasing in advanced communities and developed countries while this disease is an epidemic disease in developing countries (3).

Tooth decay is not just related to a specific gender or age group and influence on all people, but the only difference is in risk rate and good oral and dental hygiene among people (4). However, some of society groups are more at risk of tooth decay due to their specific physiologic conditions (5). One of these specific conditions is natural process of pregnancy occurring in accordance with extensive changes in body of mothers so that these changes comprise oral

and dental conditions too. Hormonal changes during pregnancy are one of the most important changes. High level of two estrogen and particularly progesterone hormones would lead to changes in blood vessels of the gums and increase in reaction to topical factors such as plaque and calculus (6). There are many studies expressing that pregnancy causes periodontal diseases and tooth decay (7). The quantity and quality of saliva would change during pregnancy. On the other hand, the increase in prevalence of gingivitis, gingival hyperplasia, granuloma pyogenic, etc. is observed in the oral cavity of pregnant women (8, 9). One of the main reasons for rapid prevalence of deciduous teeth decay among children is Cariogenic microorganisms' transmission from mother to child (10). This matter itself indicates the importance of study of public awareness level of mothers about oral and dental health as well as examination of dental health rank of pregnant women in every society. Decrease in cariogenic bacteria especially subspecies of Streptococcus Mutans is one of the initial aims of preventive strategies for tooth decay among pregnant women and preschool children (6, 11).

Decayed, Missing, and Filled Teeth (DMFT) indicator is one of the most epidemiologic indexes in dentistry indicating the situation of oral and dental health among people of a society (12-14). In this case, the determining index of tooth decay DMFT is considered as an important index in (regional and national) health planning in Iran. DMFT is an important index of health status of teeth in society so that it is optimal for people who are active in field of health and prevention to reduce this index (15).

It is required to identify and evaluate relevant information to health and disease situation of teeth, oral health status, the number of decayed, filled, or missing teeth of society people in order to plan in hygiene affair, prevent from dental disease, provide optimal dentistry services, and apply up-to-date knowledge and methods. Collection of such data indicates the given situation and therapeutic needs on one hand that is effective in health planning and therapeutic prevention on the other hand. According to the mentioned points, the purpose of this study was to examine the DMFT index among pregnant women.

MATERIALS AND METHODS

This cross-sectional study was done in 2016 (between February - May) on 1842 pregnant women of Mazandaran province, Northern of Iran (Figure 1).

Fig.1: Location of Mazandaran province, Iran

Sample members were gathered using Random Sampling method. For this purpose, nine densely populated cities of province (Sari, Ghaem Shahr, Behshahr, Babolsar, Tonekabon, Rasmsar, Savad Kooh, Galougah, and Noshahr) were chosen and the hospitals with more patients were selected from 2 or 3 maternity wards or clinics using existed information in health network of each city.

Inclusion criteria's
All participants had general physical health without any acute or chronic disease particularly oral disease. Also all of them were educated. Exclusion criteria from study included uncompleted questionnaire, withdraw from referring for checkup and withdraw at the middle or end step of study.

Study procedure
Before giving questionnaire to persons, the research method was explained to them and then they filled out questionnaires after giving verbal satisfaction. After completing questionnaires, participants were freely checked up by dentist in order to examine their DMFT index. Questionnaire consisted of three parts including 1) personal and social questions (age, education, and job), 2) individual report of oral and dental situation (decay, filling, and missed teeth), and oral and dental care level (numbers of brushing during a day, use of dental floss and visiting dentist for complete checkup before pregnancy). When participants filled out questionnaires then each of pregnant women was checked up at that day or another appointment time due to large number of patients at the same day. Then for validity

assessment, the questionnaire was given to 10 experts and professors within and outside the university and revised recommendations were implemented in the tool. After being valid, the tools were tested on a sample consisting of 20 participants. Reliability of questionnaire at oral and dental hygiene care level was measured using Cronbach's alpha that obtained to 0.84. Also participants were checked sitting at a conventional seat on the natural light using disposable mirror and dental explorer by a senior dental student. The obtained information was recorded by research colleague (general dentist that was trained according to aim of this study and expert in this field) in informational form. Hypochlorite solution was used to sterilize instruments (16). At current study, to diagnose decay, the definition of WHO for decay was used. Accordingly, the tooth was diagnosed as decayed tooth, if there were lesions in points and grooves or in the smooth surfaces of teeth where the enamel was empty or surrounding floor was soft. On the other hand, the tooth that were temporarily bandaged by filling substances was considered as decayed tooth and a filled but decayed tooth also diagnosed as decayed tooth. If the tip of dental explorer was entered to a hole at proximal surfaces, the tooth was diagnosed as decayed tooth; otherwise, the tooth was healthy and intact (17).

Ethical Considerations
Ethical approval was obtained from the research ethics committee of the Research deputy of associated University of Medical Sciences (ID number: 160). All the participants received oral and written information about the aims of the study. It was made clear to them that their participation was voluntary, and that all data would remain confidential. Research participants could not be personally identified.

Data analysis
The collected data were analyzed by SPSS version 19.0 software with descriptive statistics (mean and standard deviation). T-test was used for assessing the possible relationship between job and care level of oral and dental hygiene and also the relationship between awareness level and DMFT index. Also for determine the possible relationship between education and care level of oral and dental hygiene Chi-square was uses. The $P< 0.05$ was considered as significant value.

RESULTS

About 1842 members participated in study and there was not any missed data. Age range of participated women was between 18 and 32 years old. 62% of women had academic education level and 38% of them had diploma or lower degrees. About 67% of pregnant women were housewives and 33% were employees. A significant relationship was observed between education level and care level of oral and dental hygiene ($P<0.05$) but there was not any significant relationship between job and care level of oral and dental hygiene ($P>0.05$) (Table 1).

The mean of DMFT index among pregnant women in Mazandaran Province was equal to 13 ± 6 (table 2). Also according to the indicated data in table 3, it can be observed that there is a positive and significant relationship between DMFT index and awareness level of pregnant women about oral and dental health and hygiene.

Table 1. Relationship between education level and job with care level of oral and dental hygiene

Demographic features	Care level	Weak - average	Good	Excellent	*P*
Job	Housewife (67%)	18%	38%	11%	0.63
	Employee (33%)	9%	19%	10%	
Education	Secondary-diploma	64%	28%	8%	<0.001
	Associate degree-BA	12%	52%	36%	
	MA-above	3%	60%	37%	

Table 2. DMFT index of pregnant women in Mazandaran Province

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
DMFT	1786	6.00	13.00	1.80E4	10.0929	1.13773
DT	1842	0.00	5.00	6212.00	3.3724	1.35908
MT	1842	1.00	6.00	8296.00	4.5038	1.47779
FT	1842	0.00	12.00	4071.00	2.2101	2.21516
Valid N (listwise)	1786	-	-	-	-	-

Table 3. Relationship between awareness level and DMFT index among pregnant women

					95% Confidence Interval	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
DMFT	374.902	1785	<0.001	10.09295	10.0401	10.1457

Test value = 0

DISCUSSION

According to the obtained results from this study, there is a positive and significant relationship between education and awareness level of pregnant women about oral and dental health. On the other hand, there was a significant relation between DMFT index and awareness level. Physical changes occurred during pregnancy might increase women's sensitivity to oral infections such as Periodontal disease or might reduce child's ability in terms of maintenance of soft tissues in the mouth (18). Dental erosion might be due to contact with gastric acids during morning that occur in pregnancy. Moreover, it can play a role in general health of women and might affect birth results (19). Pregnant women with low health awareness show low relevant knowledge to health and weak behavior. High hormonal and metabolic changes are related to fluctuations at estrogen and progesterone levels leading to increase in impressibility of arteries, decrease in host immunity and high sensitivity to oral and dental infections (20). Therefore, the promoted oral and dental health of pregnant women would prevent from relevant problems to dental disease and reduce initial childhood decay in addition to low-weigh problems (21).

Pentapati et al. in study on women in southern area of India indicated that DT mean was higher among pregnant women and mothers whose PH of saliva and buffering capacity was changed due to change in their diet. These changes in pregnancy were observed among mothers with higher DT. MT mean among mothers was more than pregnant mothers and non-pregnant women. This situation might be due to other factors of some disease such as periodontitis that make the situation worsen in accordance with pregnancy, age, and other systematic and local factors. High increase in DT and MT is reflected in total DMFT index. It was determined in the study that there was a direct and significant relation between pregnancy and change in DMFT index of pregnant women (22). Karunachandra et al. indicated that women suffer and cure a large number of dental diseases before pregnancy in Sri Lanka in accordance with periodontal decay and disease and age is an independent predictor during both conditions while situation (city or village) is another important predictor for decay experience. Moreover, urban women more use dental care services during the year. The difference between urban and rural situations in terms of available dental care services has been an effective factor (23). Urban women have more prevalence of 405mm periodontal pockets despite accessibility to dental care; so, it is related to their hormonal changes during pregnancy as well as increased sensitivity to periodontal disease (24). Age was an important relevant factor to periodontal situation among all samples in Seri Lanka so that age and situation have been related to dental decays among women in multiple logistic analyses. Consideration of age is an important factor besides created risk by relevant issue to pregnancy including hormonal changes, changes in diet and oral health methods. It is not surprising that older pregnant women need more oral healthcare compared to younger women (25).

The conducted similar studies in some developed countries such as USA have revealed that majority of women have no access to oral heath cares during pregnancy while weak oral health can negatively impact on health of pregnant women and infants (26). A new research has reported low-level use of dental care services among Malaysian women and undesirable results in accordance with use level of healthcare services (27). Although the relation between age and DMFT index was not studied in present paper, the difference between urban and rural women can be related to education level of considered women in this study because rural women have less access to health information and education is a way to gain such awareness; therefore, the results of present study properly indicated a direct and positive relation between education and awareness level about oral and dental healthcare method.

Bressane et al. in study on pregnant women and mother in a healthcare center in Manaus City (Amazonas Province, Brazil) concluded that Decay prevalence among studied population was equal

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to 100%, mean value above DMFT index scores was equal to 10, and mean score of decayed tooth (D) was equal to 2.52 (28). A similar score has been found in Aracaju City, Brazil so that pregnant women with low socio-economic situation have had the mean of DMFT index equal to 10.43 and D variable equal to 1.43 (26). However, some lower indices among pregnant women have been observed in two basic health units of municipality in Porto alegre City, Brazil in which mean of DMFT index has been equal to 6 (27). The highest value of DMFT index among studied population was equal to M (4.28). This finding might be related to effect of social class on clinical reasons for not missing tooth (29). It should be mentioned that in study of Bressane, prevailing social classes have been ordinary and extraordinary active classes in which, people without academic educations have given their work power in exchange of salaries (28). The role of education in protection of oral and dental health of pregnant women has been recognized as an effective factor in mentioned study like the present paper.

Tonello et al. (30) concluded that the mean of DMFT with standard deviation was equal to 11.08. According to the conducted study by Thomas et al. (31), decay have had prevalence than periodontal disease among pregnant women and 52.4% of participants have indicated new decays during pregnancy. It is determined in present study that 57% of pregnant women have had DMFT index above 10 indicating that majority of them have had high decay experience. This index is a little more than the relevant cases to conducted studied on pregnant women in France (32) while in study conducted by Trindade (33), women with Cardiopathy in Sao Paulo have had mean of 14.54 that is higher than mentioned cases. Since a high DMFT is considered for non-pregnant employees in study of Tonello et al, brittle teeth problem during pregnancy is not a correct assumption (34 & 35).

Limitations and Future Recommendations
Self-reports warrant some caution in interpreting those data. However, data collection and entry protocols were well documented and quality control guidelines were implemented during the oral health screening process. Due to confidentiality issues, pregnant could not be tracked over time preventing longitudinal data collection, therefore to help strengthen the data; analysis of cross sectional data across all years is necessary.

CONCLUSION

According to the obtained results of this study and similar researches, DMFT index of pregnant women was high based on other similar studies. Oral and dental health of pregnant women is related to education and awareness level about required actions for its protection. It is obvious that women with higher education levels who live in cities would access to higher awareness level and have better situation than unaware individuals have. As it was indicated in this study, educated people sometimes had low information about the issue and it is the task of Health Care Ministry of every country to consider comprehensive programs in order to improve oral and dental situation of mothers, babies, and future population of country, and to increase awareness level of them. This might reduce future heavy costs for society and it will be possible to have healthier mothers and children in society.

REFERENCES

1. Halvari AE, Halvari H, Bjørnebekk G, Deci EL. Oral health and dental well-being: testing a self-determination theory model. Journal of Applied Social Psychology. 2013;43(2):275-92.
2. Lehl G, Bansal K, Sekhon R. Relationship between cariogenic diet and dental caries as evaluated from a 5-day diet diary in 4-12 year-old children. Journal of the Indian Society of Pedodontics and Preventive Dentistry. 1999;17(4):119-21.
3. Shaffer JR, Polk DE, Feingold E, Wang X, Cuenco KT, Weeks DE, et al. Demographic, socioeconomic, and behavioral factors affecting patterns of tooth decay in the permanent dentition: principal components and factor analyses. Community dentistry and oral epidemiology. 2013;41(4):364-73.
4. Esa R, Ong AL, Humphris G, Freeman R. The relationship of dental caries and dental fear in Malaysian adolescents: a latent variable approach. BMC oral health. 2014;14(1):19.

5. Foxman B, Srinivasan U, Wen A, Zhang L, Marrs CF, Goldberg D, et al. Exploring the effect of dentition, dental decay and familiality on oral health using metabolomics. Infection, Genetics and Evolution. 2014;22:201-7.

6. Gaszyńska E, Klepacz-Szewczyk J, Trafalska E, Garus-Pakowska A, Szatko F. Dental awareness and oral health of pregnant women in Poland. International journal of occupational medicine and environmental health. 2015;28(3):603-11.

7. Vamos CA, Thompson EL, Avendano M, Daley EM, Quinonez RB, Boggess K. Oral health promotion interventions during pregnancy: a systematic review. Community dentistry and oral epidemiology. 2015;43(5):385-96.

8. Bakhshi M, Sabet MS, Hashemi ES, Bakhtiari S, Tofangchiha M, Marhabi SA, et al. Evaluation of biochemical changes in unstimulated salivary, calcium, phosphorous and total protein during pregnancy. African Journal of Biotechnology. 2012;11(8):2078-83.

9. Silk H, Douglass AB, Douglass JM, Silk L. Oral health during pregnancy. American Family Physician. 2008;77(8).

10. Laine MA. Effect of pregnancy on periodontal and dental health. Acta Odontologica Scandinavica. 2002;60(5):257-64.

11. Thorild I, Lindau-jonson B, Twetman S. Prevalence of salivary Streptococcus mutans in mothers and in their preschool children. International Journal of Paediatric Dentistry. 2002;12(1):2-7.

12. Aggeryd T. Goals for oral health in the year 2000: cooperation between WHO, FDI and the national dental associations. International dental journal. 1983;33(1):55-9.

13. Murray Thomson W. Epidemiology of oral health conditions in older people. Gerodontology. 2014;31(s1):9-16.

14. Bratthall D. Estimation of global DMFT for 12-year-olds in 2004. International dental journal. 2005;55(6):370-2.

15. Shamsi M, Hidarnia A, Niknami S. A survey of oral health care behavior in pregnant women of Arak: Application of health belief model. Journal of Mazandaran University of Medical Sciences. 2012;22(89):104-15.

16. Toomarian L, Souri S, Farhadi H. Epidemiological evaluation of DMFT index in 12–year–old students of Qom city in 138. J Dent Sch Shahid Beheshti Univ Med Sci. 2005;22(3):467-74.

17. World Health Organization. Oral health surveys: basic methods: World Health Organization; 2013.

18. Ressler-Maerlender J, Krishna R, Robison V. Oral health during pregnancy: current research. Journal of women's health. 2005;14(10):880-2.

19. Gajendra S, Kumar JV. Oral health and pregnancy: a review. The New York state dental journal. 2004;70(1):40-4.

20. Hullah E, Turok Y, Nauta M, Yoong W. Self-reported oral hygiene habits, dental attendance and attitudes to dentistry during pregnancy in a sample of immigrant women in North London. Archives of gynecology and obstetrics. 2008;277(5):405-9.

21. Amin R, Shetty P. Oral health status during pregnancy in mangalore. Nitte University Journal of Health Science. 2014;4(2):114.

22. Pentapati KC, Acharya S, Bhat M, Rao SVK, Singh S. Oral health among women–A cross-sectional study from South India. International Journal of Dental Sciences and Research. 2015;3(1):17-9.

23. Karunachandra NN, Perera IR, Fernando G. Oral health status during pregnancy: rural–urban comparisons of oral disease burden among antenatal women in Sri Lanka. Rural Remote Health. 2012;12:1902.

24. Baelum V, Papapanou PN. CPITN and the epidemiology of periodontal disease Commentary. Community dentistry and oral epidemiology. 1996;24(6):367-8.

25. Le M, Riedy C, Weinstein P, Milgrom P. Barriers to utilization of dental services during pregnancy: a qualitative analysis. Journal of Dentistry for Children. 2009;76(1):46-52.

26. Bassani DG, Silva CMd, Oppermann RV. Validity of the Community Periodontal Index of Treatment Needs'(CPITN) for population periodontitis screening. Cadernos de saude publica. 2006;22(2):277-83.

27. Ramos TM, Almeida Junior AAd, Ramos TM, Novais SMA, Grinfeld S, Pereira MAS, et al. Condições bucais e hábitos de

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higiene oral de gestantes de baixo nível sócio-econômico no município de Aracaju-SE. Pesqui bras odontopediatria clín integr. 2006:229-35.

28. Bressane LB, Costa LNBdS, Vieira JMR, Rebelo MAB. Oral health conditions among pregnant women attended to at a health care center in Manaus, Amazonas, Brazil. Revista Odonto Ciência. 2011;26(4):291-6.

29. Cimões R, Caldas Júnior AdF, Souza EHAd, Gusmão ES. Influência da classe social nas razões clínicas das perdas dentárias. Cien Saude Colet. 2007;12(6):1691-6.

30. Tonello AS, Zuchieri MABO, Pardi V. Assessment of oral health status of pregnant women participating in a family health program in the city of Lucas do Rio Verde-MT-Brazil. Brazilian Journal of Oral Sciences. 2007.

31. Thomas NJ, Middleton PF, Crowther CA. Oral and dental health care practices in pregnant women in Australia: a postnatal survey. BMC pregnancy and childbirth. 2008;8(1):13.

32. Vergnes J-N, Kaminski M, Lelong N, Musset A-M, Sixou M, Nabet C. Frequency and risk indicators of tooth decay among pregnant women in France: a cross-sectional analysis. PloS one. 2012;7(5):e33296.

33. Mills LW, Moses DT. Oral health during pregnancy. MCN: The American Journal of Maternal/Child Nursing. 2002;27(5):275-80.

34. Scheutz F, Baelum V, Matee M, Mwangosi I. Motherhood and dental disease. Community dental health. 2002;19(2):67-72.

35. Zahmati AH, Alipoor R, Shahmirzadi AR, Khori V, Abolhasani MM. Chemical Decellularization Methods and Its Effects on Extracellular Matrix. Internal Medicine and Medical Investigation Journal. 2017 Sep 11;2(3):76-83.