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Investigating the relationship between DMFT index of pregnant women and neonates' low birth weight in Hamadan in 2016

Investigando la relación entre el índice DMFT de mujeres embarazadas y recién nacidos con bajo peso al nacer en Hamadan en 2016

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Abstract

Introduction: Low birth weight (LBW), defined as a weight less than 2500 g, is strongly associated with a neonatal mortality. Many studies show a positive association between periodontal disease of pregnant mothers and LBW, but few studies have been conducted on the relationship between the dental decays and the LBW. Thus, due to the lack of information in this field, the present study was conducted to evaluate the relationship between DMFT index of the pregnant women in Hamadan and neonates' LBW.

Materials and Methods: This case-control study was conducted on the pregnant women of Hamadan in 2016. The experimental group consisted of 114 pregnant mothers who had normal vaginal delivery and their neonates' birth weight was less than 2500 g. The control group consisted of 147 pregnant mothers who had normal vaginal delivery and their neonates' birth weight was over 2500 g. The data were collected based on an interview and examination. The data collection tool was a questionnaire consisting of two sections, including demographic characteristics and dental information. The data were analyzed using descriptive and analytical statistics with SPSS version16 software and P <0.05 was considered as the significance level.

Results: The results showed that the mothers in the experimental and control groups were significantly different in terms of DMFT index (P=0.003). The mean of DMFT index in the experimental and control groups were 13.03 and 10.66, respectively. This difference was statistically significant. The correlation coefficient revealed no significant relationship between DMFT index and the neonatal weight in the control group (p=0.532).

Conclusion: According to the results of the present study, there is a positive relationship between the dental decays of the pregnant women and the neonates' LBW. To prevent neonates' LBW, the public health providers and mass media should provide essential oral hygiene promoting and maintaining programs for pregnant women. Also, due to limited number of studies in this area, further studies in different populations and races seem to be necessary.

Keywords: DMFT Index, pregnancy, LBW, dental decays.

Resumen

Introducción: el bajo peso al nacer (BPN), definido como un peso inferior a 2500 g, está fuertemente asociado con una mortalidad neonatal. Muchos estudios muestran una asociación positiva entre la enfermedad periodontal de las madres embarazadas y el BPN, pero se han realizado pocos estudios sobre la relación entre las caries dentales y el BPN. Por lo tanto, debido a la falta de información en este campo, el presente estudio se realizó para evaluar la relación entre el índice DMFT de las mujeres embarazadas en Hamadan y los LBW de recién nacidos.

Materiales y métodos: este estudio de casos y controles se realizó en las mujeres embarazadas de Hamadan en 2016. El grupo experimental consistió en 114 madres embarazadas que tuvieron un parto vaginal normal y el peso al nacer de sus recién nacidos fue inferior a 2500 g. El grupo de control consistió en 147 madres embarazadas que tuvieron un parto vaginal normal y el peso al nacer de sus recién nacidos fue de más de 2500 g. Los datos fueron recolectados en base a una entrevista y examen. La herramienta de recolección de datos fue un cuestionario

que consta de dos secciones, que incluyen características demográficas e información dental. Los datos se analizaron utilizando estadísticas descriptivas y analíticas con el software SPSS versión 16 y P <0.05 se consideró como el nivel de significancia.

Resultados: Los resultados mostraron que las madres en los grupos experimental y de control fueron significativamente diferentes en términos de índice DMFT (P=0.003). La media del índice DMFT en los grupos experimental y de control fue 13.03 y 10.66, respectivamente. Esta diferencia fue estadísticamente significativa. El coeficiente de correlación no reveló una relación significativa entre el índice DMFT y el peso neonatal en el grupo control (p=0,532).

Conclusión: Según los resultados del presente estudio, existe una relación positiva entre las caries dentales de las mujeres embarazadas y los BPN de los recién nacidos. Para prevenir el bajo peso al nacer de los recién nacidos, los proveedores de salud pública y los medios de comunicación deben proporcionar programas esenciales de promoción y mantenimiento de la higiene bucal para mujeres embarazadas. Además, debido al número limitado de estudios en esta área, parecen ser necesarios más estudios en diferentes poblaciones y razas.

Palabras clave: Índice DMFT, embarazo, BPN, caries dentales.

Introduction

Low birth weight (LBW), defined as a weight less than 2500 g, is strongly associated with mortality. If the weight of a neonate is less than 2500 g, the risk of stillbirth will be 40 times greater than that of the normal neonates, and if the weight of a neonate is less than 1500 g, the risk of stillbirth will be 100 times greater than that of the normal neonates. The studies conducted in this regard have shown that if these neonates survive, they will face many medical problems, such as hypernatremia, hypoglycemia, polycythemia, hypertension and atherosclerosis and long-term developmental and neurological disabilities later in their life[1]. Some mothers believe that a number of their teeth are decayed and missed in each pregnancy and childbirth, since fetus supplies its calcium from the mothers' teeth, but it does not have a scientific basis and the studies have revealed that pregnancy is not directly involved in the dental decays of the mothers. Teeth missing and decay during the pregnancy occur due to non-compliance to oral hygiene[2].

During pregnancy, the gingival reaction to dental plaque increases due to increased levels of certain hormones, especially progesterone, leading to increased gingival inflammation that is called pregnancy gingivitis[3]. Also, it has been recently indicated that increased cortisol levels in pregnant mothers' saliva increase the dental plaque lev-

els[4]. Hence, oral hygiene, dental plaque removal, and regular teeth cleaning during pregnancy are crucial measures in this regard[1]. Many studies have indicated a positive association between periodontal disease in the pregnant women and LBW[4,5]. It is believed that periodontal bacteria as well as inflammatory mediators created in response to them are passing through the bloodstream and reaches uterine cavity, leading to onset of the inflammatory process that eventually increases LBW[5]. Dental decay (that is usually measured by DMFT index) is a type of bacterial infectious disease that leads to hard dental tissue degradation and can eventually result in the spread of infection to the dental pulp and its consequences. It should be noted that microbial plaque is an agent of both periodontal disease and dental decays. Any type of infection, including dental decays, is considered to be dangerous during pregnancy. It has been proven that a chronic tooth infection can have destructive effects at the points beyond oral decay[4]. Studies have revealed that increased vaginal lactobacilli levels are associated with preterm infants[6] and Lactobacillus casei levels in pregnant mother's saliva can affect LBW[7]. It has been proven that lactobacilli play a major role in the development of the dental decays[8]. A limited number of studies has been conducted on the relationship between dental decays and LBW and they have reported inconsistent results, so that some studies have found no relationship between dental decays and LBW[9,10], but some studies have also provided some evidence on the effect of dental decays on LBW[11]. Therefore, due to the lack of sufficient studies and information in this area, the present study was conducted to evaluate the relationship between DMFT index and LBW in pregnant women.

Materials and methods

This case-control study was conducted at Fatemieh Hospital in Hamadan in 2016. The experimental group consisted of 114 pregnant women whose neonates' birth weight was less than 2500 g. The control group consisted of 147 pregnant women whose neonates' birth weight was over 2500 g. The data collection tool was a questionnaire consisting of two sections, including demographic characteristics and dental information. The data were collected through an interview and an examination. The sample size was determined to be 114 individuals in each group after consulting with a statistical expert and by considering the first type error of 0.05, a test power of 80% and using the following statistical formula:

$$n = \frac{\left(z_1 - \frac{\alpha}{2} + z_1 - \beta\right)^2 (\sigma_1^2 + \sigma_2^2)}{(\mu_{1-} - \mu_2)^2}$$

Accordingly, 114 individuals in the experimental group and 147 individuals in the control group were evaluated.

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The inclusion criteria included the pregnant women with a vaginal delivery and non-elective cesarean section, willingness to cooperate and complete the ethical consent form. The exclusion criteria included the dental treatment during the pregnancy, any clear periodontal disease, need for antibiotic prophylaxis due to systemic diseases (such as heart disease), a history of infertility, autoimmune diseases, a history of abortion, a history of LBW in the parents, a high risk of pregnancy (diabetes, hypertension, etc.), and an elective cesarean delivery. Convenience sampling method was used in this study. The participants were randomly assigned into two groups of experimental and control. It should be noted that the participants in both experimental and control groups were matched in terms of the demographic variables. The data were collected through an interview and an examination. The data collection tool was a questionnaire consisting of two sections. The first section was related to the demographic information and its validity was confirmed after consulting with ten experts in the field and its reliability was determined to be greater than 0.8 based on the Cronbach's alpha. In the second section of the questionnaire, information on the oral status was obtained using WHO standardized questionnaire[12].

The main index in the dental information is related to DMFT, standing for decayed, missing, and filled teeth index. Thus, using this index, the number of decayed, filled and missing teeth was determined. The present study was approved by the Research Ethics Committee in Hamadan University of Medical Sciences under the code of IR.UMSHA.REC.1395.77. The samples were selected by a midwifery researcher based on the inclusion and exclusion criteria in Fatemieh Maternity Hospital in Hamadan. The subjects were examined by a dentistry student between the birth and maternity hospital discharge times and in the case of observing a periodontal disease in any of them, she was excluded from the study. Among the eligible individuals, those who completed the consent form participated in the study. The first section of the questionnaire was completed by a midwifery researcher. Then, the eligible individuals were introduced to a dentistry student in a blind way to complete the second section of the questionnaire. The decayed, restored, and removed teeth were identified and recorded using a dental catheter and mirror and under the flashlight. The descriptive and analytical statistics were used to analyze the data. Chi-squared test was used to compare the qualitative variables in the two groups. An independent t-test was used to compare the quantitative variables in the two groups. P<0.05 was considered as the significance level in all tests. The obtained data were entered into SPSS version16 software and the results were analyzed and reported.

Results

A total of 261 subjects, including 147 in the control group and 114 in the experimental group were investigated. The mean age of the mothers in the experimental and control groups was 28.22±5.88 and 28.23±6.69, respectively. 96.2% of the subjects were housewives, 46.7% had a high school level of education, 99.2% had a monthly income of less than 30 million Rials, 98.1% received the pregnancy cares, 96.2% referred to the dentist only when they felt toothache, and 46% used toothbrush only once a day. Chi-squared test results did not show a significant difference between the mean variables such as age (0.988), job status (P=0.8), education level (P=0.256), monthly income level (P=0.8), and receiving pre-pregnancy cares (P=0.1), pattern of mothers' referring to dentist (P=0.92) and oral hygiene status (P=0.47) in the experimental and control groups. The results of the independent t-test showed that there was a significant difference between the two groups in terms of the number of healthy teeth (P=0.001). The mean number of the healthy teeth in the control group was more than that of the experimental group. There was also a significant difference between the two groups in terms of the mean number of the decayed teeth (P=0.020). The women in the case group had more decayed teeth than the women of the control group. According to the results, the subjects of the experimental and control groups were significantly different in terms of the mean number of missing teeth (P=0.032). The number of teeth missed due to decay was significantly higher in the experimental group than that of the control group. The results also showed that there was a significant difference between the two groups in terms of DMFT index (P=0.03) and the number of cases in the experimental was significantly higher than that of the control group. The correlation coefficient showed no significant relationship between DMFT index and the neonates' birth weight in the control group (r=0.052, p=0.532).

Discussion

In the present study, the mean of DMFT index in the experimental and control groups was 13.03 and 10.66, respectively. This difference was statistically significant. The pregnant women in two groups had a significant difference in the number of the decayed teeth. 87.1% of the control group subjects and 92.1% of the control group subjects had decayed teeth. Also, the experimental and control groups differed in the number

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of missing teeth. The mean number of missing teeth was significantly higher in the experimental group than that in the control group. In line with the results of the present study, the study conducted by Al Habashneh et al.[11] showed that the mean number of missing teeth due to decay was higher in mothers whose neonates had LBW and preterm compared to the mothers who had normal weight neonates. However, the researchers did not find a statistically significant difference between two groups in the mean number of the decayed and filled teeth. The differences between the results of the mentioned study and those of the present study could be due to the differences in demographic characteristics of the subjects and the inclusion and exclusion criteria as well as the data collection tools in these two studies.

The statistical methods used in these studies are also very different. In a study, researchers investigated the oral hygiene of 47 women with LBW neonates and 58 women with normal birth weight neonates using DMFT index. The mean of decayed teeth in the experimental and control groups were 3.89 and 4.10, respectively, and the mean of decayed teeth were 1.13 and 1.09, respectively, and the mean of filled teeth was 1.23 and 1.52, respectively. The mean of DMFT index in the experimental and control groups were reported 6.26 and 6.71, respectively. Women of both groups in this study had a better DMFT index compared to the present study. The results of this study showed a significant relationship between the LBW and the DMFT index[9]. The cause of the difference between this study and our study can be attributed to the fact that that the sample size in the mentioned study was much smaller than that of our study and the subjects of this study had significantly lower rates of dental decays and DMFT compared to our study. In a case-control study, Dasanayake et al.[10] reported that DMFT level in the mothers of the experimental and control groups was 4.8 and 3.4, respectively. The oral hygiene status was associated with LBW of the mothers, but the researchers did not find any relationship between the oral hygiene status and the DMFT index. There were differences between this study and the present study in terms of sample size, population, the variables studied, and the statistical methods. In a study conducted by Bica et al.[13], the researchers used DMFT index to assess the oral hygiene status of 653 Portuguese mothers. Majority of the mothers (84.1%) were under the gynecological care during the pregnancy, 72.8% of the mothers received dental cares at least six times or more, 18.5 reported decay injuries and 15.9 reported gingivitis. In four systematic review and meta-analysis studies conducted by Corbella et al.[14] in 2012, Khader et al.[15] in 2005, Ide et al.[16] in 2013, and Xiong et al.[17] in 2006, the researchers reported that the oral hygiene status of the mothers was directly associated with the pregnancy outcomes. However, it was recommended to conduct prospective studies and randomized trials in different demographic and population samples to examine the relationship between the dental decays or the periodontal diseases and LBW and preterm birth. Based on the studies conducted so far and the systematic review and meta-analysis studies, the results of most studies suggest a positive relationship between the periodontal disease and the LBW. However, limited number of studies has been conducted on the relationship between the dental decays and the LBW. Hence, further studies in different populations and with different methodologies are needed to clarify the relationship between these two variables.

Conclusions

The results of this study indicate a positive relationship between the dental decays of the pregnant women and the neonates' LBW. According to the results of this study, to prevent LBW in neonates, the public health providers and mass media should provide essential oral hygiene promoting and maintaining programs for pregnant women. Also, due to a limited number of studies on the relationship between the dental decays and LBW, further studies in different populations and races seem to be necessary.

Conflict of interest. The authors declare that they have no conflicts of interest.

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