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Original Article

Effectiveness of Oral Health Education in Improving Oral Health Related Knowledge in Pregnant Mothers Attending the Ante-natal Clinic at the Divisional Hospital, Kotaligoda

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ABSTRACT

Objective of this study were to assess effectiveness of oral health education in improving oral health related knowledge in pregnant mothers attending ante-natal clinic. A questionnaire was used to assess oral health related knowledge before and following education programs. Post education answers were compared with previous ones. Minitab 18 was utilized for statistical analysis. Following education, knowledge on treatment options for teeth with infected pulp other than extraction, features of gingival diseases, association of diabetes mellitus and periodontal diseases and the change of oral health with ageing process was increased. More participants identified that oral hygiene maintenance is necessary for optimum periodontal health. The results indicated that mean post knowledge was significantly higher than mean pre knowledge ($p< 0.001$). There was a statistically significant association between pre knowledge and monthly income. Education programs significantly improve the knowledge on oral health of the pregnant mothers. However, the increase of knowledge does not vary according to the age, monthly income and education level of them. It is recommended that pregnant mothers should be educated regularly on oral health and oral health practices as the knowledge will be beneficial for long term oral health behavior.

Keywords: Pregnant mother; Effectiveness; Oral health education

1 INTRODUCTION

Dental caries and periodontal diseases are the commonest diseases related to the life style of an individual adversely affecting oral health. Dental caries is caused by gradual demineralization of dental hard tissues by weak acids resulting from the action of cariogenic bacteria on fermentable carbohydrates. Growth of cariogenic bacteria will be enhanced by high frequency and amount of dietary fermentable carbohydrates taken between main meals. Reduction of cariogenic bacterial counts in pregnant women and mothers of preschool children is considered a main goal of early caries preventive programmes in maternal and child care. (Li & Caufield., 1995, Opydo-Szymaczek & Boryzewicz-Lewicka., 2005, Thorild et al., 2002) [1–3]

Dental plaque is considered to be the primary cause for periodontal diseases. It is estimated that about 300 species and sub species of microorganisms are colonized in the oral cavity and as a result of hormonal and immune changes, may infect main organs in the body. (Offenbacher et al., 1996, Boggess et al., 2013) [4,5] Increased permeability of gingival vessels and decline in keratinization of epithelium, associated with lack of oral hygiene measures may lead to gingivitis and periodontitis during pregnancy. Research also continues to reveal an association of periodontitis with adverse pregnancy outcomes. (George et al., 2011, Shub A, Wong et al., 2009) [6,7]

Therefore, proper knowledge about these two disease conditions will aid in the prevention of further progression of these diseases.

Children acquire habits from their parents especially from their mothers. Therefore, oral health habits of the mother will be acquired by the children. In addition, cariogenic pathogens and periodontal pathogens can also be transmitted from the parents to their children. Therefore,

improving the knowledge of pregnant mothers on oral health will undoubtedly result in good oral health of their children.

A study carried out in Australia has shown that the knowledge of pregnant women on potential impact of maternal oral health is inadequate. Moreover, there was some confusion among pregnant mothers on accessing dental care during pregnancy and early childhood. (George et al., 2013)[8] Another study conducted in Poland had revealed that about 40% of the pregnant women do not possess the basic knowledge on dental health. (Gaszynska et al., 2015)[9]

In a recent systematic review, it has been highlighted that oral health education is effective in upgrading the knowledge, attitude and practice of oral hygiene thereby reducing plaque, bleeding on probing of the gingiva and occurrence of dental caries. (Nakre & Harikiran., 2013)[10] Moreover, observations of another study indicate that pregnant women's knowledge (Cardenas & Ross., 2010)[11]and oral health care. (Shamsi& Hidarnia., 2013)[12] improved after dental education guidance programs.

In Sri Lanka, oral health education to pregnant mothers is routinely carried out by the dental surgeons. A recent study carried out in the country has shown that pregnant women have a high burden of dental caries and periodontal diseases. According to the results, mean DMFT among rural and urban antenatal women were 5.4 & 3.69 respectively. Also 60% of the rural pregnant women presented with bleeding gums. (Karunachandra et al., 2012)[13]

Therefore, this study is planned to assess the effectiveness of oral health instructions in improving oral health knowledge of pregnant mothers.

1.1 Justification

There is no known study conducted in Sri Lanka to assess the effectiveness of the oral health education. The knowledge acquired by this would support in planning programs to improve oral health awareness and also to decide whether it is required to change the method of conveying the information to make it more effective in reducing the burden of dental diseases among pregnant mothers.

Therefore, our general objective was to assess the effectiveness of oral health education in improving oral health related knowledge in pregnant mothers attending the ante-natal clinic and specific objectives were to assess the knowledge of pregnant mothers on aetiology, clinical features, methods of prevention, treatment of Dental caries and periodontal disease and to ascertain the effectiveness of the oral health education in improving knowledge of pregnant mothers on aetiology, clinical features, preventive methods, treatment methods of dental caries and periodontal disease

2 METHODS AND MATERIALS

This was a quasi-experimental study using a self-administered questionnaire at the ante-natal clinic, Divisional Hospital, Kotaligoda in 2016 and 2017. In order to avoid the problems of nonattendance for the review appointment, pregnant mothers of 1st and 2nd trimester regularly attending the ante-natal clinic, Divisional Hospital, Kotaligoda were considered for the study.

Our Inclusion criteria was pregnant mothers of 1st and 2nd trimester attending the ante-natal clinic, Divisional Hospital, Kotaligoda and pregnant mothers of 3rd trimester were excluded.

A pilot study was planned prior to the main interventional one in order to generate an expected effect size d (difference in the mean score) and the variability (relevant standard deviations) as appropriate values could not be extracted from the previous studies for our population.

The following formula was utilized for the calculation of sample size after the pilot study.

$$x = Z^2 \frac{Q^2}{d^2}$$

We used 5% one-sided test with 80% power, i. e. $z_\alpha = 1.96$ and $z_\beta = 0.84$. (Kasiulevičius et al., 2006)[14]

Thus the pilot study was conducted among subjects (Steven AJ., 2005)at ante-natal clinic in Divisional hospital, Kadugannawa. Every consecutive patient who fulfilled the inclusion and exclusion criteria were selected to the study until the sample size is completed. Questionnaire was pre tested, modified and validated by carrying out a pilot study. The permission was obtained from the medical officer in charge and the medical officers in the relevant clinics.

Minitab 18 software was utilized for statistical analysis.

Participants were interviewed with the questionnaire to assess the existing knowledge at first. Then they were provided with health education programs. Oral health education leaflets published by the Ministry of Health, Sri Lanka were provided to the patients and the video on oral health education published by the ministry of Health were also shown. All patients were also provided with lectures with similar power point presentations on all aspects of oral health education (etiology, prevention and management of dental caries, periodontal diseases, relationship of periodontal health and smoking and diabetes and other local and systemic factors associated with periodontal and overall oral health) with giving answers for all the questions in the questionnaire. All health education programmes were provided as a group for the purpose of standardization.

These pregnant mothers were given oral health education on tooth brushing technique (Bass method) twice a day with use of a medium adult brush. They were educated on etiology of plaque associated periodontal diseases and effectiveness of tooth brushing in controlling periodontal diseases. They were also provided with education on association of diabetes

and smoking with periodontal disease. Information on dental caries were provided in the area of etiology, effect of quantity and frequency of sugar intake on caries, actions which can be taken to minimize dental caries and need of regular dental visits.

Same questionnaire was given to the same group of participants after 3 months and those answers were compared with previous answers to assess the long term effectiveness of oral health education.

2.1 Data analysis

Minitab software was utilized for statistical analysis with the use of appropriate parametric and non-parametric tests. The knowledge was measured as a mean score; therefore, the effect size was given as the difference in mean scores. Data were analyzed at p=0.05 significance level. Patients' level of education, age and monthly income were considered in the analysis.

Permission was obtained from the District Medical Officer, Divisional Hospital, Kotaligoda and the medical officers of the relevant clinics.

Written/verbal (if there are illiterate proxy respondents) informed consent were obtained from participants. Patients were provided with contact details of the investigators. They were also made aware that they can refrain from answering the questionnaires as well as they are free to decline participation in the study at any time and will not be deprived from any type of health care they need. Maximum opportunity was given to participants to ask questions regarding the research and their questions were answered to the best of the ability. Ethical approval for the study was obtained from Ethics Review Committee, Faculty of Dental Sciences, University of Peradeniya, Sri Lanka.

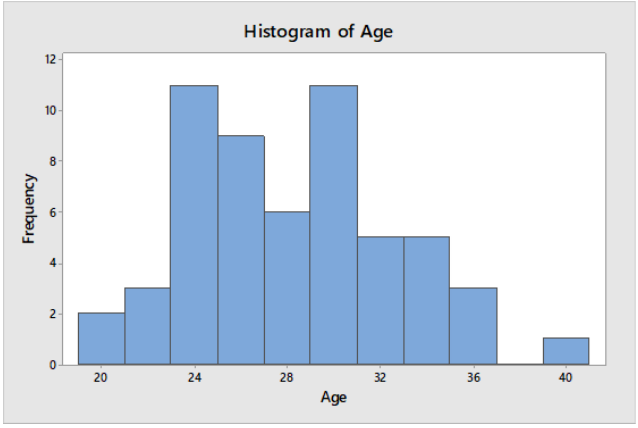

Fig. 1: Histogram showing distribution of age of the study participants

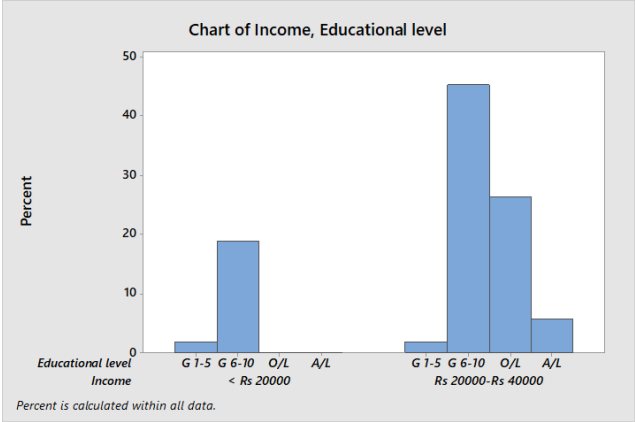

Fig. 2: Bar chart showing the monthly income and educational levels of study participants

3 RESULTS

Total study sample was 56 with mean age of participants was 27.7 where the youngest mother was 20 years old and the highest age was 39 years.

The distribution of the ages is approximately symmetric. (Figure 1)

The following graph shows the percentage of individuals based on their education level and the Income. The graph shows that there most if the individuals (about 80%) in the sample has a monthly income in between 20000 and 40000 rupees. There was no individual without formal education and Only grade 6-10 (G 6-10) education as well as with a postgraduate degree. Moreover, there were about 18.8% individuals with O/L education who earned less than 20000 rupees per month. (Figure 2)

During analysis of the pre and post test results, mean score for all answers in the questionnaire were assessed. Knowledge on identification features of dental caries, methods of reducing prevalence and incidence of dental caries were increased with the education. Following education, ore participants had the idea that more treatment options are available for teeth with infected pulp other than extraction. Number of participants with knowledge of features of gingival diseases, association of diabetes mellitus and periodontal diseases and the change of oral health with ageing process was increased with oral health education program. Following three months' time period, more participants identified that oral hygiene maintenance is necessary for optimum periodontal health. Similar number of participants at pre and post education session had identified bacteria as causative pathogen for dental caries, brushing twice a day is important, proper oral hygiene minimizes periodontal diseases and more importantly, dental treatment during pregnancy is safe.

The summary statistics indicate that the deviation of the pre and post test scores are approximately similar. The mean Pre-knowledge of the sample is about 4 points less than that of the Post-knowledge. (Table 1)

To find out the statistical significance of the difference between the Pre and Post knowledge a two sample test is

Table 1: Summary statistics for the before and after the health education session

Variable	Mean±SD	Minimum	Median	Maximum
Pre Knowledge	8.694 ±1.383	5.033	9.033	10.533
Post Knowledge	12.442 ± 1.180	10.533	12.208	15.000

performed at 0.05 significance level. The result indicated that the mean post knowledge of the individuals significantly higher than the mean Pre knowledge of the individuals (t = -15.89, p-value < 0.001). The 95% lower bound for the difference (Pre Knowledge - Post Knowledge) is -3.353.

Furthermore, to find out whether this Pre and Post knowledge levels of the individuals have any association between the demographic factors such as age, income and educational level.

The correlation coefficients are calculated for the pairs of variables and the results are given in the Table 2.

Table 2: Association of participants' age with oral health knowledge before and 3 months after the education session

Variables	Correlation coefficient	p-value
Age vs. PreKnowledge	0.450	0.001
Age vs. PostKnowledge	0.141	0.301

The table shows that there is a significant moderate positive correlation between the age and the PreKnowledge of the individuals. In other words, older the individual, better the knowledge that the individual bears about the dental education. But, when a proper oral health education is introduced to the individuals, the association between the age and knowledge has become insignificant (p-value = 0.301).

To find out the association between the other two demographic variables, the knowledge level of the individual has been classified into four levels based on the following criteria.

Knowledge score < 4 => Very poor Knowledge

4 < = Knowledge score < 8 => Poor Knowledge

8 < = Knowledge score < 12 => Good Knowledge

Knowledge score > = 12 => Very Good Knowledge

A chi-square association test is performed to find out whether there is an association between the Pre Knowledge level and the Income level. It was evident that there is a statistically significant association between the two variables (p-value = 0.033). But when the individuals were given the oral health education the association has become insignificant. (p-value = 0.696).

4 DISCUSSION

Pregnant mother seeking dental treatment or dental awareness programs have been continued at a lower rate around the world. (George et al., 2010, Keirse & Plutzer K., 2010) This lower rate can be attributed to the high cost of dental treatment, time consumption, lower knowledge on dental health and less priority for the oral health. Therefore, it is important to assess their knowledge on oral health and to encourage them to improve awareness and seek treatment for dental diseases. It will not only improve pregnant mothers' oral health, but also helps in their children's oral health too. In achieving that, assessment of pregnant mothers' knowledge on oral and health and attempt to improve by proving oral health education becomes utmost important for the society and a country. The results of the study reveals that when relevant education is provided, their knowledge on oral health is improved from 80% to 94 5 after the study period. We could not identify any association of education level and knowledge on oral health of the individuals. However, Boggess et al in 2011 have identified that knowledge on oral health is higher in pregnant women with higher educational status. (Boggess et al., 2011) [15]

Mean percentage of total correct responses at the initial appointment for the 17 knowledge items was 80.2%. It is comparable to the study findings in South Western Sydney in Australia. (George et al., 2013) [8] Higher level of knowledge could be attributed to the high literacy level in the population and the availability of health education programs conducted free of charge by health institutions and mass media. However, the figures were very low as 60% in some communities. (Gaszynska et al., 2015) [9] We identified that very less number of participants were aware of the safety of routine dental treatment during pregnancy. It is a commonly cited barrier for pregnant women seeking dental treatment. (George et al., 2010) [16] They have highlighted that some dentists and doctors too are confused regarding this aspect. George et al in 2013 had also reported that low awareness of the safety of dental procedures could be due to some confusion among the general public. (George et al., 2013) [8]

Post test knowledge on oral health related information was increased up to about 94% in the study population which was statistically significant. It has shown the need of continuous education programs to the pregnant mothers in the country. Some other research reports have formed a general message that pregnant women should be categorized as a vulnerable group regarding oral health and that the range of prevention activities should be expanded. (Thomas et al., 2008) [17]

5 CONCLUSION

Hence it can be concluded that the education programs significantly improve the knowledge on oral health of the pregnant mothers. However, the increase of knowledge does

not vary according to the age and education level of them.

6 RECOMMENDATIONS

Therefore, it is recommended that pregnant mothers should be educated on oral health and oral health practices as the knowledge persisting for a long time and will be beneficial for long term oral health behavior. Findings could be disseminated to health authorities and policy-makers to advocate perinatal oral health services in the country.

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