

Impact of Health Education Intervention and the Associated Demographic Variables on Knowledge of Oral Health Care among Pregnant Women in Bauchi State, Nigeria

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Abstract

Oral health care is the maintenance of the optimal state of the mouth and normal functioning of its organs, it is essential for maternal health promotion as pregnant women are particularly susceptible to gingival and periodontal diseases which adversely affect their health and that of the foetus. Therefore, the study examined the knowledge of oral health care before and after health education intervention and also ascertained the impact of residential location and educational qualification on knowledge of oral health care after the intervention among pregnant women in Bauchi State. A pre-experimental research design of one group pre-test and post-test design was used for the study. The target population for the study was 2728 pregnant women attending the selected health facilities in Bauchi State. A multi-stage sampling procedure was used to sample 60 respondents from the selected health facilities in Bauchi State. A researcher-developed achievement test which was validated by three experts was used for the study. The reliability of the instrument was determined using the split-half method; a coefficient of .78 was obtained from Cronbach alpha. Inferential statistics of t-test and Analysis of Variance were used to analyse the data at 0.05 alpha level. The findings of the study were that the respondents' pre-test score on knowledge of oral health care significantly differ from that of the post-test ($P=0.02$) and no difference was observed among respondents based on location and educational qualification after the 6-week intervention in the knowledge. It was concluded that health education intervention impacted the knowledge of oral health care among pregnant women in Bauchi State. The study recommended that health education on oral health care should be intensified by health educators to pregnant women on every antenatal visit.

Keywords: Knowledge, Oral Health Care, Intervention, Pregnant Women.

Introduction

The word oral in its common usage refers to the mouth. Oral health is the complete state of physical and social well-being of the oral cavity without evidence of diseases. Good oral health is essential for maintaining the general health of an individual most especially the pregnant woman and that of her unborn child. American Cancer Association (ACA), 2016 pointed out that the oral cavity includes the lips; the lining of the lips, and cheeks (buccal mucosa), the teeth, the gums, the front two-thirds of the tongue, the floor, and the bony roof of the mouth. Oral health has been defined to mean the optimal state of the mouth and normal functioning of the organs of the mouth without evidence of disease (British Dental Association (BDA), 2013). Baker (2012) further defined oral health as the health of the mouth and the surrounding skull structures. Oral health has also been defined as the

condition of being free from chronic mouth and facial pain, oral and throat cancer, oral sores, birth defect, tooth loss, and other diseases and disorders that affect the oral cavity (Epidemiological Concepts of Oral Health, 2016). These are tissues whose functions were often taken for granted, yet they present the very best of humility, they allow people to speak and smile, sight and kiss, touch, chew and swallow, cry out in pain, and convey a word of feelings and emotion through facial expression, it also protects against microbial infections and environmental insult (National Institute of Dental and Craniofacial Research (NIDCR), 2014b).

Gum disease is characterized by red, swollen, and bleeding gums in their mildest form and chronic inflammation, infection, and bone loss in its advanced stages. Plaque build-up along the gum line causes gingivitis and when the plaque formation is significant; bacteria is allowed to thrive, causing chronic inflammation, infection, and irritation, leading to the breaking down of gum tissue, which gradually increases the pocket depth, a gap where gum meet tooth, allowing more bacteria to get nestled into the widening gap and passing into the bloodstream where it can contribute to systemic disease (Sofola, 2010). Bacteria bred in the oral cavity and causing related chronic gingival inflammation, once in the bloodstream, can activate immune response capable of provoking systemic inflammation, arterial blockages, and infection (Sofola, 2010). Research has put forward evidence that people with gum disease are more likely to suffer heart attacks than those with healthy gums, as oral bacteria and related gum inflammation can cause arterial inflammation as well as increase plaque build-up and encourage dangerous clotting (NIDCR, 2014a).

With the growing understanding of the relationship between oral and systemic health, dental patients are seen beyond their mouth by a dentist as pointed out by Sofola (2010) who asserted that, oral health is an integral part of general health. The author further pointed out that, oral health has been treated in isolation from general systemic health but with a growing understanding of the interrelationship between the two, dental patients now are seen beyond their mouth by dentists and beyond their systemic health by doctors. Sofola (2010) further reported that current research works have linked the condition of the oral cavity especially plaque accumulation and periodontal health to several systemic diseases including cardiovascular diseases, diabetes mellitus, preterm and low birth weight as well as myocardial infarction.

Oral hygiene is paramount in the prevention of oral and dental diseases. Centre for Disease Control and Prevention (CDC) (2010) pointed out that, cavities, which are holes in the teeth, can be prevented by routine brushing and flossing. The dental cavities can cause pain, lack of concentration, and absences from school and work, in addition to these issues, dental decay affects physical appearance and quality of life. Gum disease is an infection caused by bacteria that get under the gums and slowly destroy the gums and the surrounding bones. As a result, the teeth become loose and have to be removed. Gum disease may also be linked to other diseases in the body like diabetes, heart disease, stroke, premature births, and low-birth weights (Baker, 2012).

In a woman's life, major physiological and hormonal changes occur during pregnancy, the most significant hormonal changes in pregnancy are the increased levels of oestrogen and progesterone (NICDR, 2014b; Gupta & Acharya, 2016). Similarly, the oestrogen level in plasma is reported to increased up to 30 times higher than those found during a reproductive cycle; progesterone affects the permeability of the microvascular (Yaghobi & Haghighati, 2011). Oral tissues are known to be affected by pregnancy with the greatest changes occurring in the gingival tissue (Leine, 2002). Pregnant women are more susceptible to periodontal disease since higher concentrations of oestrogen and progesterone can induce hyperaemia, oedema, and bleeding in periodontal tissues increasing the risk of bacterial infections (Natalie, et al., 2008). It is this hormonal alteration during pregnancy that tends to increase the incidence of dental diseases like gingivitis and may even contribute to the low salivary pH, thus in turn leading to the increased incidence of dental caries. Furthermore, gingival changes usually occur in association with poor oral hygiene and local irritants such as calculus, plaque, and food debris. The bacterial flora of the dental plaque is noted to be the main etiological factor in the causation of gingival and periodontal disease (Gupta & Acharya, 2016).

Even though pregnancy increases the risk of certain oral diseases, there appear to be gaps in women's knowledge about the risk. Research revealed that there is a possible link between poor maternal oral health and adverse pregnancy outcomes such as low birth weight and premature birth (Sofola, 2010). It was found in a study that 43 percent of women surveyed reported having heard about the possible connection between health in pregnancy and oral health and 39 percent thought that tooth and gums problems could affect pregnancy (Saskatchewan Prevention Institute (SPI), 2014). It was also found that many women seem to be aware of the relationship between sugar intake and dental carries (George, et al., 2011). Furthermore, the frequent vomiting associated with pregnancy in some women is also known to predispose to the development of dental erosion, and poor dental health is associated with adverse pregnancy outcomes such as premature birth, low birth weight, and pre-eclampsia (Abiola et al., 2011).

Knowledge of pregnant women about oral health was further revealed by various research as reported in the study of Chacko, et al. (2013) who reported that the respondents did not see the importance of dental check-ups during pregnancy. It was also found that reasons for not seeking dental care during pregnancy were "I was not having a problem", and "I choose to delay until after delivery". Others think that they should not go to the dentist while pregnant (SPI, 2014). The researcher observed that maternal and child morbidity and mortality is persisting in Bauchi state. The maternal mortality ratio in Bauchi state is 1,732 per 100,000 live births, 81 percent of the deaths occurred in unbooked mothers giving a maternal mortality ratio of 5,146 per 100,000 live births for unbooked mothers, this ratio is eleven times higher than is obtained for booked mothers. The high rate of maternal mortality is a source of concern to all and sundry. The causes are eclampsia 31.9 percent, pre-term and low birth weight 15 percent, blood pressure and haemorrhage 19.2 percent,

and Sepsis 10.4 percent as the direct causes among others (Mairiga & Sale, 2020) which the causes are all associated with risk poor oral health care.

There appear to be gaps in women's knowledge about these risks. In a study conducted by Sajjam, et al. (2015) the result revealed that the majority of the respondents 89percent were not aware that gum diseases are common during pregnancy, around 35.25 percent did not brush when they experienced bleeding, instead cleared their mouth with a finger. George et al. (2011) pointed out that, pregnant women often have misconceptions about oral health during pregnancy that prevent them from seeking and utilizing dental care services, these include believing that poor oral health is normal and accepted during pregnancy and that dental treatment can harm the unborn. It is against this background this study determined the impact of oral health education on knowledge of oral health care and find out differences in the knowledge after the intervention among the respondents based on residential location and educational qualification in Bauchi State, Nigeria.

The following hypotheses were postulated and tested in this study:

- i. In Bauchi State, Nigeria, pregnant women will not significantly differ in their knowledge of oral health care before and after oral health education intervention.
- ii. Location of pregnant women will not significantly influence their knowledge of oral health care after health education intervention in Bauchi State, Nigeria.
- iii. Educational level of pregnant women will not significantly influence their knowledge of oral health care after the oral health education intervention in Bauchi State, Nigeria.

Research Methodology

The research design adopted for this study was a pre-experimental research design of one group pre-test and post-test. The target population of this study was all the pregnant women in Bauchi State, Nigeria with a population of 359,551 based on a 5.5 fertility rate (National Population Commission (NPC) 2006). The target population of the study was all pregnant women attending the state government-owned selected health facilities in Bauchi State with an average monthly attendance of 2728 as of December 2021 (Bauchi State Primary Health Care Development Agency, 2022).

The sample for the study was 60 purposively selected pregnant women in Bauchi State. The sample was selected through a multi-stage sampling procedure of purposive sampling technique and systematic sampling technique in four stages as follows:

Stage I: Purposive sampling technique was used to select the six (3) health facilities providing safe motherhood services in the three senatorial zones of Bauchi State, one from each zone.

Stage II: Purposive sampling technique was used to select all pregnant women who are in their first and second trimesters attending the selected state government-owned health facilities providing safe motherhood services in the three senatorial zones of Bauchi State.

Stage III: systematic sampling procedure was used to select the respondents during antenatal visits where 1 was selected after every 10 until the required number of samples was met.

The instrument for data collection was a researcher-developed achievement test on knowledge of oral health care, options were provided to the respondents to select the correct one. The achievement test was validated by three experts in the field of Health Education for face and content validity. Their corrections and observations were incorporated into the final draft of the instrument. The reliability of the instrument was established by conducting the one-shot pilot test in Akkoyel PHC Gombe State which was not part of the study area, split-half method was adopted, fifteen (15) copies of the instrument was administered, the result obtained was subjected to Cronbach alpha for its reliability, a reliability coefficient of .78 was obtained. Pre-test was administered to the respondents before the intervention and so also 2 weeks after the intervention to ascertain the difference between the baseline and post-test knowledge. Ethical clearance was obtained from the Bauchi State Ministry of Health for permission to carry out the data collection. The consent of the respondents was sought before they participated in the study.

Data collected were analysed using inferential statistics of paired sample t-test, independent sample t-test, and One-Way ANOVA to test the postulated hypotheses at 0.05 level of significance using Statistical Package for Social Science (SPSS) version 26.0.

Results

The results were presented as follows:

Hypothesis 1: There is no significant difference between pre-test and post-test scores of pregnant women on the knowledge of oral health care during pregnancy.

Table 1: Summary of Paired Sample t-test on the Knowledge of Oral Health Care among Pregnant Women before and after Health Education Intervention

Variables	Mean	N	Std. Deviation	Std. Error Mean	t-cal	Sig	Dec.
Pre-Test	6.5088	57	2.58514	.34241	3.338	.002	OH Rejected
Post-Test	7.7544	57	1.13831	.15077			

Table 1 revealed the summary of paired sample t-test on the knowledge of oral health care among pregnant women in Bauchi State before and after health education intervention. The table shows that the calculated t-test value was 3.338, with a calculated p-value of .002 which indicates a significant difference in the scores; therefore, the null hypothesis was

rejected. This implies that the health education intervention significantly impacts the knowledge of oral health among the study respondents.

Hypothesis 2: There is no significant difference between rural and urban pregnant women in the knowledge of oral health care after health education intervention Bauchi State.

Table 2: Summary of independent Sample t-test on the Difference between Rural and Urban Pregnant Women in the Knowledge of Oral Health after the Health Education Intervention

Location	N	Mean	Std. Deviation	Std. Error Mean	t-cal	Sig.	Dec.
Rural	13	7.3846	2.21880	.61538	-.761	.461	HO Accepted
Urban	42	7.8571	.52132	.08044			

Table 2 revealed the summary of the independent sample t-test on the difference between rural and urban pregnant women's knowledge of oral health care in Bauchi State after the health education intervention. The table shows that the calculated t-test value was .761, with the calculated p-value of .461 greater than the alpha value of .05, this indicates a non-significant difference in the scores; therefore, the null hypothesis was accepted. This implies that the health education intervention significantly impacted the knowledge of oral health among the study respondents as there was a difference among the respondents based on where they came from.

Hypothesis 3: There is no significant difference among pregnant women in the knowledge of oral health care after health education intervention in Bauchi State based on educational qualification.

Table 3: Summary of One-way ANOVA on the Difference among Pregnant Women in the Knowledge of Oral Health after the Health Education Intervention based on Educational Qualification

Source	Variance	Sum of Squares	df	Mean Square	F	Sig.
Between Groups		.881	2	.440	.326	.723
Within Groups		71.619	53	1.351		
Total		72.500	55			

Table 3 revealed the result of the Analysis of Variance (ANOVA) on the difference among pregnant women in the knowledge of oral health care after 6 weeks of health education intervention. The table shows that the calculated f-value was .326, with the calculated p-

value of .723 greater than the alpha value of .05, this indicates a non-significant difference among the respondents based on educational qualification. This implies that the improvement in knowledge was only due to the oral health education intervention.

Discussion of Findings

The finding of the tested hypothesis revealed that the respondents' pre-test score on knowledge of oral health care significantly differ from that of the post-test. This finding correlates with the finding of the study of Mohsen, et al. (2013) who found no significant differences between the mean grades score in knowledge, in the experimental and control groups before the intervention, this indicates that the two groups were similar in the knowledge of oral health care before the health education intervention. Furthermore, the finding was corroborated by the finding of the study of Riedy et al. (2015) who reported a non-significant finding between experimental and control groups in the knowledge of oral health care before the health education intervention, where it was reported that before the health education intervention, the two groups were similar in the knowledge of oral health care. Similarly, research revealed that there was no significant difference between the control and experimental group in the knowledge of oral health care before health education intervention as reported by Jeihoni, et al. (2017) who revealed that, there was no significant difference between the experimental and the control group before the health education intervention in all the construct of health belief model about knowledge of oral health care. The finding was further supported by that of El-Sayed and Said (2018) who revealed that the majority of both groups had poor knowledge regarding oral health care, the finding further revealed that there was no significant difference in the health behaviours scores between both groups ($p < 0.05$), before the health education intervention. The result was in line with the finding of Tai et al. (2001) who reported that health education was reported to be effective through a change in knowledge of oral health care. The health education intervention was in the form of instructions, written literature, demonstrations, and the use of video to educate the participants, the study further revealed that the intervention was found to be very effective in improving knowledge of oral health care among the subjects. Similarly, the finding of this study was further supported by that of Friel et al. (2002) who reported that, a significant change in knowledge attitude, and practice of oral health care as a result of oral health education intervention. Therefore, this shows that health education intervention was very effective in improving oral health care knowledge among pregnant women. The finding was further supported by the finding of the study of Ranasinghe et al. (2016) who reported a significant impact of a health education intervention on knowledge of oral health care among mothers.

The tested hypothesis further revealed that the location of the respondents does not influence their knowledge of oral health care after 6 weeks of health education intervention. This finding contradicts the finding of the study by Avula, et al. (2013) who found that there is a statistically significant difference in the relationship between

education status and oral health knowledge. Furthermore, the finding also contradicts the finding of the study of Bamanikar and Kee (2013) who reported that, on oral and dental treatment, those with higher education and employment expressed better knowledge. On the other hand, the finding of Ifesanya et al. (2010) was similar to the finding of this study where it was reported that women with no education had good oral hygiene knowledge than comparatively better-educated women.

The tested hypothesis also shows that the educational qualification of the respondents does not influence their knowledge of oral health care after 6 weeks of health education intervention. The finding is similar to that of Ibrahim, Mudawi, and Ghandur, (2018) who reported that most of the women 69.5 percent believed that the main cause of tooth decay was sugar and 31.9 percent thought that the cause was bacteria, over half 52.4 percent of the women thought that tooth decay could be prevented by tooth cleaning and brushing, while 22.1 percent thought it could be prevented by avoidance of sweets and sugar, majority of the women 58.3 percent thought that the cause of gum disease was unclean teeth and food debris and 71.7 percent thought that gum disease could be prevented by tooth cleaning and brushing while 17.9 percent did not know, the knowledge is statistically associated with the location. The finding contradicts the finding of Sohail and Muhammad (2014) who reported that urban and rural area participants have the same score in knowledge and attitude toward oral health care, however, in practice, the participants from urban scored higher than the participants from the rural areas, this implies that location is not a significant determinant of knowledge as revealed by that study.

Conclusion

Based on the findings of the study, it was concluded that the respondents' pre-test score on knowledge of oral health care significantly differ from that of the post-test after 6 weeks of health education intervention, the result of the post-test was not influenced by either the location or educational qualification of the respondents as there was no difference and that basis among the respondents.

Recommendation

Based on the conclusion drawn from the findings of the study it was recommended that an oral health care education package should be included in the antenatal health care service, as education intervention was found to be very effective in promoting the knowledge of oral health care among the pregnant women; this was also found to be effective regardless of educational qualification and location of the respondents.

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