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Research Article

Implementation of Oral Health Education Program for Undergraduate Midwives at Omdurman Midwifery School, Sudan

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ABSTRACT

Background: Oral health care during pregnancy is important for the health of the mother and child. However, pregnant women have limited knowledge about maternal oral health and rarely ask for dental care. Midwives may play an important role in oral health promotion of pregnant women, as they are in close contact with them.

Objective: To improve midwives oral health knowledge, confidence and skills and to prepare them to assess the oral health and refer when required.

Design: Pre-test post-test design involving 50 final year midwives purposively recruited from Omdurman Midwifery School- Sudan. The questionnaire contained 24 knowledge items as well as items exploring confidence of midwives in promoting oral health.

Findings: The result showed improvement in the oral health knowledge of the midwives after completion of the program. The majority also reported being confident in introducing oral health in an antenatal care (88%) and referring women to dental services (80%) after undertaking the education program.

Conclusion: This education module is useful to equip midwives with necessary knowledge and skills to promote oral health during pregnancy and consequently they can transfer their knowledge to the pregnant women.

KEYWORDS

Maternal oral health, Midwives, Oral health education, Pregnancy.

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Introduction

Pregnant women are particularly susceptible to poor oral health due to hormonal fluctuations, nutritional modifications, alterations in the oral flora, and symptoms associated with morning sickness such as nausea and vomiting [1]. There is substantial evidence linking poor maternal oral health to adverse pregnancy outcomes. For

example, periodontitis (gum disease) has been associated with an increased risk of preeclampsia, premature birth, low birth weight, and prenatal mortality [2] and studies such as that of Agueda et al. have confirmed a link between periodontitis and preterm birth [3]. Furthermore, women's oral health during pregnancy is associated with infant health consequences, such as the transmission of *Streptococcus mutans* to their infants, increasing the risk of early childhood caries (ECC), the most common chronic childhood disease worldwide. ECC can have significant and long-lasting impacts on a child's nutritional, social, and emotional well-being [4].

There are common misconceptions among pregnant women, such as the belief that poor oral health is a natural and unavoidable part of pregnancy and that receiving dental care could pose risks to the developing fetus. These beliefs, combined with a general lack of oral health awareness, have contributed to low dental service utilization during pregnancy [3]. Even in countries with developed healthcare systems, up to 68% of pregnant women had not visited a dentist in the previous year, and only one-third reported seeing a dental practitioner during their most recent pregnancy [4].

Oral diseases are largely preventable through adequate oral hygiene knowledge, skills, and practices. Prevention and early detection of oral disease in pregnancy can help manage significant bacterial and inflammatory conditions such as periodontitis and decrease the risk of infants developing early childhood caries [6]. Educating pregnant women about the importance of dental care and reassuring them about the safety of dental treatments during pregnancy is therefore crucial [7].

Alternative pathways must be established to educate women about the significance of oral health during pregnancy while encouraging the use of dental services. Guidelines from the WHO and the American Academy of Pediatric Dentistry strongly advocate the involvement of non-dental professionals, such as nurses and midwives, in promoting oral health during pregnancy. Evidence shows that midwives who receive oral health training demonstrate improved knowledge of maternal oral health, greater awareness of its implications for infant health, and increased confidence in advising and referring pregnant women [3]. This global recommendation is particularly relevant in countries where midwives serve as the main providers of antenatal care.

Maternal oral health education is a crucial aspect of prenatal care worldwide. Various studies have highlighted the importance of addressing oral health during pregnancy due to its impact on both maternal and infant outcomes. In Sudan, the situation is similar, with limited emphasis on maternal oral health education for pregnant women. Midwives, who play a key role in antenatal care, often lack formal education on maternal oral health, creating challenges in providing comprehensive oral health advice to pregnant women. In response to this gap, an educational program was developed at Omdurman Midwifery School to enhance midwives' knowledge and skills in promoting oral health during pregnancy. The present study aims to improve the oral and dental health knowledge, skills, and confidence of midwives and prepare them to assess oral health and refer women when required.

Intervention

An oral health educational module was implemented for final-year undergraduate midwives at Omdurman Midwifery School. The intervention was developed and implemented using Kern's six-step curriculum development model. This model included:

- Needs assessment: A pre-assessment questionnaire was used to determine midwives' current knowledge and attitudes toward oral health.
- Target needs assessment (Step 2)
- Goals and objectives
- Educational strategies
- Implementation
- Evaluation and feedback: A post-test was administered to evaluate the outcomes.

Methodology

Study design: A quasi-experimental pre–post test design was used."

Study area: Omdurman Midwifery School, Sudan.

Sampling method: A purposive sampling technique was utilized to recruit all final year undergraduate midwifery students. A total of 50 students were enrolled in the course and no exclusion criteria were specified for this study

Measurement and Data collection method

A validated self-administered questionnaire, adopted from a previous study [3], was used in this program. It consisted of two main sections evaluating knowledge and confidence, in addition to demographic data. The knowledge section included 24 items (10 true/false and 14 multiple-choice questions). The questions focused on the area of definition, signs and symptoms of oral diseases , general oral health attitude (tooth protection, prevention of oral diseases especially during pregnancy), attitude regarding the oral health of pregnant women (dental treatment during pregnancy, importance of oral health during pregnancy, common misconceptions regarding oral health during pregnancy, early childhood caries (risk factors and prevention) and role of midwives in promotion of oral health.

The confidence section contained three questions focusing on introducing oral health education to expecting mothers, referring pregnant women to dental services, and conducting visual oral examinations. Each question had three response options: confident, somewhat confident, and not confident. The educational module was delivered through lectures and video presentations.

Data Analysis

Data from the pre- and post-questionnaires were analyzed using IBM SPSS Statistics for Windows, version 25.0 (IBM Corp., USA). The total number of correct answers on the knowledge scale was calculated twice: before and after completion of the educational

program. The Wilcoxon signed-rank test was used to determine the differences between the pre- and post-test scores.

Ethical consideration

The study protocol was approved by the Ethics Committee of the Academy of Health Science, Khartoum, Sudan. To protect participants' privacy, all students used a unique code instead of their names when completing the questionnaires.

Results

Demographic

A total of 53 final-year undergraduate midwives participated in the baseline pre-test, of whom 50 completed the post-test.

Knowledge Assessment

The educational program led to a significant increase in total oral health knowledge, with mean scores rising from 49.1% (SD = 10.5) pre-intervention to 68% (SD = 12.3) post-intervention ($p < 0.001$, Wilcoxon signed-rank test, n = 50). Improvement was observed in 21 of the 24 individual knowledge questions. Of these, 11 questions demonstrated marked improvement, while 10 questions showed limited improvement. Marked improvement was particularly noted in topics such as the potential impact of poor maternal oral health on birth and infant outcomes, early childhood caries, and the safety of dental treatment during pregnancy. No improvement was observed in three questions, which focused on the consequences of untreated dental disease on general health and the prevalence of oral diseases among pregnant women.

Confidence Assessment

Following the educational program, more than two-thirds of midwives reported confidence in introducing oral health topics during antenatal sessions, increasing from 62% at pre-test to 88% at post-test. Confidence in referring pregnant women to dental services improved from 60% to 80% after the intervention. However, only 72% of participants reported confidence in conducting a visual oral examination of pregnant women.

Discussion

The main focus of this project was to implement an oral health education program for undergraduate midwives and evaluate its effectiveness in improving their knowledge and confidence. It is well known that, internationally, midwives have limited knowledge and involvement in oral health care, despite various national policies highlighting the need for antenatal care providers to promote maternal oral health [4,5]. The World Health Organization has strongly recommended that oral health should be integrated into comprehensive general health promotion strategies and practices. The lack of basic oral health education in undergraduate programs for newly graduated midwives contributes to this problem [6].

Regarding oral health knowledge, the results of this study showed that the module was effective in increasing the midwives' knowledge. The students had a low pre-test knowledge score of 49.1%, which improved to over 68% after the intervention. Similar improvements have been reported among midwifery students in Iran following the provision of an oral health module [7]. Furthermore, in Australia, Ajesh George and colleagues played a key role in raising oral health awareness among midwifery students through workshops, lectures, and simulations [8-10]. In the United States, the national interprofessional initiative on oral health has contributed significantly to improving the oral health knowledge and confidence of midwives [11]. While American and Iranian studies introduced the program to first-year midwifery students, in this study it was delivered to final-year students.

A key point to note is that the greatest improvement in knowledge among students was observed in areas highly relevant to promoting maternal and infant oral health, including the transmission of early childhood caries from mother to infant, the safety of dental treatment during pregnancy, oral health during pregnancy, the effects of morning sickness on oral health, and good oral hygiene practices for expectant mothers and children. This preliminary knowledge can help graduating midwives to better understand the importance of discussing oral health care during pregnancy with expecting mothers, particularly given that pregnant women worldwide often have limited knowledge and low prioritization of oral health care [12].

Midwives showed moderate improvement in knowledge regarding the nature and prevalence of dental diseases (dental caries and periodontitis) among pregnant women. This indicates that further emphasis is needed in future revisions of the module. Other areas that require additional focus include the consequences of untreated dental disease and its effects on general health.

In addition to improving oral health knowledge, it is important that midwives gain the confidence to translate this knowledge into practice to benefit pregnant women. The results of this study suggest that the oral health module has the potential to achieve this, with more than 88% of participants reporting confidence in introducing oral health topics during antenatal sessions, and 80% reporting confidence in referring pregnant women to dental services. These findings are encouraging for the continuation and improvement of the education program, especially since participants reported low confidence in the pre-test regarding introducing oral health to expecting mothers and referring them to dental services (62% and 60%, respectively).

By improving oral health knowledge and confidence, it is hoped that midwives will be able to raise awareness among pregnant women about the importance of oral health and increase their uptake of dental services. Currently, very few pregnant sudanese women seek dental care, and it is suggested that they are more likely to see a dentist if they receive information about oral health care early in their pregnancy [13].

Conclusion

Midwives can play a key role in promoting maternal oral health; yet, very few currently undertake this role due to limited knowledge

in this area. This study suggests that an oral health module for undergraduate midwifery students is effective in improving and sustaining their knowledge and confidence to promote oral health. The module also has the potential to be adapted for other healthcare providers, such as nursing students, to ensure consistency in the oral health care provided to pregnant women.

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