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ORIGINAL RESEARCH

Influence of a Training Module on the Knowledge of Midwives Concerning Postpartum Warning Signs at the Primary Health Care Level in Osun State, Nigeria

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Abstract

Background: Postpartum warning signs are essential in preventing postpartum complications in new mothers and can be detected during postpartum visits. The provision of postpartum care in Nigeria is deficient, and many maternal deaths occur during the postpartum period due to missed postpartum warning signs. Therefore, training midwives on postpartum warning signs can improve the quality of health education given to women.

Objective: To evaluate the effectiveness of a training module to improve midwives' knowledge of postpartum warning signs at the level of primary health centres.

Methods: A quasi-experimental design using one group pre- and post-intervention was used to implement a training module on postpartum warning signs among midwives in Primary Health Centres in Osun State, Nigeria. Sixty-four (64) participants were recruited using a maximum variation sampling technique to ensure all cadres of midwives were selected for the study.

Results: The mean age of the participants was 40.5 years, ranging from 31 to 40 years. There was a significant difference between the pre- and post-intervention mean score of knowledge gained on postpartum warning signs (t_{62} = 8.75, p <0.05). Furthermore, multiple factors such as theory-practice gap (91.4%), years of clinical experience (97.1%), exposure to seminar and workshops (87.1%), acquiring of additional qualifications (74.3%), pre-service training (84.3%) and in-service training (88.6%) contributed to the level of knowledge regarding postpartum warning signs among the study participants.

Conclusion: The training module improved midwives' knowledge of postpartum warning signs. Therefore, it was recommended that midwives be exposed to training on postpartum warning signs.

Keywords: Implementation, Midwives, Postpartum care, Postpartum warning signs, Primary Health Centres.

Introduction

Reducing morbidity and mortality in obstetric patients remains a quality-of-care criterion for healthcare centres. [1] The evolution of maternal and child mortality in recent years has led to a marked improvement in this population group. [1] Although mortality rates are very low for developed countries, they are still high in developing countries, and the impact is high regarding both social repercussions. One of the approaches to reducing maternal morbidity and mortality involves the use of tools to rapidly identify the patients that would benefit most from an aggressive intervention or a higher level of care. In December 2007, a review of maternal mortality concluded that 40%-50% of maternal deaths in Nigeria are preventable. However, early warning signs were seldom recognised. [1,2]

Midwives play a critical role in advocating for the overall health of both mother and child during this period. [3] One of their essential responsibilities is knowing about the warning signs that could indicate complications. [4] This knowledge ensures that midwives can provide timely and effective interventions that will reduce morbidity and mortality rates associated with postpartum complications and teach postpartum mothers about the identification of postpartum warning signs. [5] The education midwives provide depends mainly on the depth of their expertise. Postpartum warning signs are a set of symptoms that indicate potential health complications after childbirth. [6] These warning signs include heavy bleeding that does not reduce with time, severe pain or tenderness in the breast, especially accompanied by fever, severe abdominal pain, chest pain, difficulty in breathing or rapid heartbeat, sudden headache accompanied by changes in vision, hearing and seizure, feelings of hurting the baby or self, and fever that lasts for more than 24 hours. These symptoms indicate potentially serious health conditions requiring immediate medical attention. [6]

In developed countries, despite advancements in healthcare, a notable knowledge gap exists among midwives regarding postpartum warning signs. Studies in developed nations such as the United States and the United Kingdom indicate variations in midwives' awareness and recognition of postpartum complications. [7, 8] This gap may be attributed to the dynamic nature of healthcare systems and evolving clinical practices. Similarly, in developing countries, midwives face distinct challenges in their knowledge of postpartum warning signs. Studies in countries such as India and Bangladesh reveal gaps in midwives' understanding of critical postpartum complications, potentially affecting the timely management of maternal health. [9,10] Limited resources, inadequate training, and high patient loads contribute to these knowledge gaps. In the specific context of Nigeria, a country with a mix of developed and developing healthcare infrastructure, midwives encounter unique challenges. Research conducted in Nigeria emphasises the urgent need for targeted training programs to enhance midwives' knowledge and recognition of postpartum complications for good maternal outcomes. [11,12] Factors such as inadequate resources and a high burden of maternal morbidity contribute to the observed knowledge gaps in postpartum care. These findings underscore the global knowledge gap among midwives on postpartum warning signs, emphasising the need for context-specific interventions and continuous education to ensure optimal maternal outcomes.

Midwives stationed at primary health centres serve as frontline healthcare providers, especially in resource-constrained settings like Osun State, Nigeria, where access to secondary or tertiary health facilities may be limited. [11, 12] Existing literature highlights a significant knowledge gap among midwives regarding postpartum warning signs in Nigeria, particularly in primary health centres, leading to delays in timely intervention. [11] Focusing on

primary health centres is essential as they cater to a substantial proportion of the population and are often the first point of contact for maternal care in rural and underserved areas. [12] By concentrating on primary health centres, the research aims to implement and evaluate the effectiveness of a training module targeted at midwives, ultimately improving their awareness and recognition of postpartum warning signs. This approach is strategic for enhancing maternal healthcare in a part of Nigeria, aligning with the broader goal of achieving comprehensive and equitable healthcare delivery. This study evaluated the effectiveness of implementing a training module to improve midwives' knowledge of postpartum warning signs at the level of primary health centres.

Methods

Study area

Osun State is located in southwest Nigeria. Osun State was created in 1991 from a part of the old Oyo State. The state comprises 30 local government areas, about 335 wards with over 200 towns, villages and other settlements. The state has a considerable number of highly urbanised settlements. The major sub-ethnic groups in Osun State are Ife, Ijesha, Oyo, Ibolo and Igbomina. Yoruba and English are the official languages. The people of the state are mainly traders, artisans and farmers. The state is bounded in the west by Oyo State, Ondo and Ekiti States in the east, Kwara State in the north and Ogun State in the south. Osun State has 332 primary health facilities and nine comprehensive health centres managed by the Osun State Primary Health Care Development Board.

Study design

The study adopted a quasi-experimental design using one group pre- and post-intervention to implement a training module on postpartum warning signs.

Study population

These comprise midwives currently working at the primary health care (PHC) centres in all the local government areas of Osun State.

Ethical consideration

The Babcock University Health Research Ethics Committee (BUHREC 662/22) and the Ministry of Health, Osun State, Nigeria (OSHREC/PRS/569T/313) approved the study.

Sampling size determination

The sample size was determined using the Taro Yamane Formula: n = N/1+N(e). Sixty-four midwives participated in the module testing, and data were collected at the pre-intervention and post-intervention stages.

Sampling technique

Four local governments were randomly selected, each by assigning numbers 1 to 12 to the LGA in each of the three senatorial districts, and only the local government with the multiples of 3 (i.e. 3, 6, 9, 12) were picked from each senatorial district, making twelve local government areas in all. Three PHCs were randomly selected in each local government area of Osogbo, Olorunda, Odo Otin., Ife North, Ife Central, Ilesa East, Ede North, Ede South and Iwo Local Government Areas, making a total of thirty-six (36) using simple random technique. All the PHCs were numbered from 1 to 12, and only the numbers with multiples of 3 were picked. A purposive selection of sixty-four (64) midwives was made from the thirty-six PHC.

Study instrument

A self-developed, validated questionnaire was used to capture data on the demographic characteristics of midwives and test the knowledge of postpartum warning signs at the pre-intervention and post-intervention stages. Cronbach's alpha coefficient for the questionnaire ranged from 0.73 to 0.81. A standardised module on postpartum warning signs was also used.

Method of data collection

The teaching of the module and data collection spanned four weeks, and data were collected over this period. The participants were pre-tested with a baseline questionnaire and then received training on postpartum warning signs. After the intervention, they were again given the same questionnaire to ensure consistency as a post-test. Knowledge scores below 30% were classified as low, between 30% and 70% were classified as moderate, and above 70% were classified as high.

Method of data analysis

The data in this study were analysed using the Statistical Package for Social Science (SPSS) version 25, using descriptive statistics in the form of frequency, distribution tables, and percentages. A paired t-test was used to compare mean values and significance level was defined by values of p less than 0.05.

Results

Most respondents were aged 31-40 years (n = 28). The oldest midwife was 59 years of age, while the youngest was 22 years old. The mean age was 40.5 years, and the mean years of experience in midwifery care were about 12.5 years. Three-quarters (53; 75.7%) of the respondents were females, and only 24.3 per cent (n = 17) were males. The majority (82.9%) of the respondents were Yoruba, followed by Igbo (14.3%) and Hausa (2.9%).

Table I presents midwives' pre- and post-intervention knowledge on postpartum warning signs. At the pre-intervention stage, 40 (62.8%) participants had low knowledge, while 6 (10.8%) and 18 (26.4%) had average and high knowledge, respectively. At the post-intervention stage, 3 (4.6%) had average knowledge, while 61 (95.4%) had good knowledge. Thus, knowledge of postpartum warning signs pre-intervention was very low. After the intervention, the study revealed that the knowledge mean score was 15.92, which was 93.6% at the post-intervention level. Table II presents midwives' pre- and post-intervention knowledge on the benefits of recognising postpartum warning signs. At the pre-intervention stage, 11 (17.6%) participants had low knowledge of the benefits of recognising postpartum warning signs, while 45 (69.9%) and 8 (12.5%) had average and high expertise, respectively. At the post-intervention stage, 64 (100.0%) knew the benefits of recognising postpartum warning signs. The level of knowledge of the benefits of recognising postpartum warning signs at the pre-intervention stage was 4.61, equivalent to 51.2%. Thus, the knowledge level of the benefits of recognising postpartum warning signs before intervention was moderate. This is because their mean score was roughly 51%. After the intervention, the mean score of knowledge of the benefits of recognising postpartum warning signs was 9.0 (100.0%).

Table III shows a significant difference in the pre-and post-intervention mean score knowledge of postpartum warning signs (knowledge gained = 7.54, t62 = 8.745, $p < 0.001$). This mean score (15.92) at the post-intervention stage was significantly higher than the pre-intervention mean score of 8.38. Hence, the set hypothesis in the null form was rejected. Table IV shows a significant difference in the pre-and post-intervention mean score of knowledge of the benefits of recognising postpartum warning signs (knowledge gained = 4.39, t = 11.033, $p < 0.001$). The mean score (9.00) at the post-intervention stage was significantly higher than the mean score of 4.61 at the pre-intervention stage. Therefore, the null hypothesis was rejected. It could be deduced from these findings that the difference observed between pre- and post-intervention mean score knowledge of midwives on postpartum warning signs could not have been by chance, but as a result of the educational intervention, the participants were exposed to.

Table I: Pre- and post-intervention categorisation of mean score level of participants on knowledge of postpartum warning signs

Participants' knowledge of postpartum warning signs	*Category of scores*	*Pre-intervention*		*Post-intervention*	
		Frequency	**Percentage**	**Frequency**	**Percentage**
Low	1 - 4	40	62.8	-	-
Average	5 - 8	6	10.8	3	4.6
High	8-11	18	26.4	61	95.4
Total		64	100.0	64	100.0
Mean		8.38 (49.3%)		15.92(93.6%)	
Standard deviation		3.139		1.682	
Mean difference		7.54			

Table II: Pre- and post-intervention categorisation of mean score level of participants on knowledge of benefits of recognising postpartum warning signs

Participants' knowledge of the benefits of recognising postpartum warning signs	*Category of scores*	*Pre-intervention*		*Post-intervention*	
		Frequency	**Percentage**	**Frequency**	**Percentage**
Low	1	11	17.6	-	-
Average	2	45	69.9	-	-
High	3-4	8	12.5	64	100.0
Total		64	100.0	64	100.0
Mean		4.61 (51.2%)		9.0 (100.0%)	
Standard deviation		1.06		.93	
Mean difference		4.39			

Table III: Pre- and post-intervention mean score knowledge of midwives on postpartum warning signs

	N	*Mean*	*Std. Deviation*	*Std. Error Mean*	*df*	*T*	*Mean diff*	*p-value*
Pre	64	8.38	3.139	1.10				
Post	64	15.92	1.682	0.97	62	8.745	7.54	.000

Table IV: Differences in the pre-and post-intervention mean score knowledge of midwives on benefits of recognising postpartum warning signs

N		*Mean*	*Std. Deviation*	*Std. Error Mean*	*df*	*T*	*Mean diff*	*p-value*
Pre	64	4.61	1.06	0.89				
Post	64	9.00	0.93	0.93	38	11.033	4.39	.000

The factors affecting the level of knowledge regarding postpartum warning signs are depicted in Table V. Regarding the theory–practice gap as one of the factors for consideration, 51.4% of the midwives strongly agreed. In comparison, 40.0% of them also indicated their agreement. Only 7.1% disagreed, and 1.4% strongly disagreed. More than half (52.9%) of the respondents strongly agreed that years of clinical experience mattered, as supported by another 44.3%.

Half (51.4%) of the respondents strongly agreed that exposure to seminars and workshops may

affect the level of knowledge, while another 35.7% also agreed. Just 7.1% disagreed, while 5.7% strongly disagreed that exposure to seminars and workshops may affect the level of knowledge. The acquisition of additional qualifications was strongly agreed to influence the level of knowledge by 34.3%. This was supported by another 40% who also agreed. Regarding the role of pre-service training, 38.6% indicated strong agreement, while 45.7% merely agreed. Lastly, 42.9% strongly agreed, supported by 45.7%, who also agreed that in-service training was a factor affecting the knowledge level of midwives regarding postpartum warning signs.

Table V: Factors affecting the level of knowledge regarding postpartum warning signs

Statement	*Strongly Agreed*	*Agreed*	*Disagreed*	*Strongly Disagreed*
The theory-practice gap	51.4%	40.0%	7.1%	1.4%
Years of clinical experience	52.9%	44.3%	1.4%	1.4%
Exposure to seminars and workshops	51.4%	35.7%	7.1%	5.7%
Acquiring additional qualifications	34.3%	40.0%	20.0%	5.7%
Pre-service training	38.6%	45.7%	7.1%	8.6%
In-service training	42.9%	45.7%	5.7%	5.7%

Discussion

The obvious difference in pre- and post-intervention mean scores among participants in this study suggests that the intervention had a measurable impact on the participants' knowledge levels. This observation aligns with the broader literature on the effectiveness of educational interventions in healthcare settings. Studies have demonstrated the positive influence of targeted interventions, such as training modules, workshops, or academic programs, on healthcare professionals' knowledge and skills. For example, a study by Tella [13] focused on the impact of a training intervention on midwives' knowledge and practices in maternal and newborn care. The findings revealed a significant improvement in midwives' knowledge after the intervention, supporting the idea that well-designed educational programs can enhance healthcare professionals' capabilities. Additionally, research by Lai [14] highlighted the effectiveness of educational interventions in improving healthcare workers' knowledge and practices in preventing and managing specific health issues. The study reported a significant difference in knowledge scores between pre- and post-intervention assessments, reinforcing that targeted educational interventions can lead to positive outcomes. However, it is essential to acknowledge that the effectiveness of interventions can vary based on the specific content, delivery method, and participant characteristics. Some interventions may show immediate improvements, while others require longer follow-up to assess sustained impacts. [15]

The present study also revealed that multiple factors contribute to the level of knowledge regarding postpartum warning signs among midwives in Primary Health Centres (PHCs). The identified factors included the theory-practice gap, years of clinical experience, exposure to seminars and workshops, acquiring additional qualifications, pre-service training, and in-service training. The acknowledgement of the theory-practice gap by over 90% of midwives suggests a recognised challenge in translating theoretical knowledge

into practical application. This finding is consistent with existing literature highlighting the persistent gap between theoretical knowledge acquired during education and its application in clinical practice. [16] The complexity of healthcare environments often makes it challenging for practitioners to integrate theoretical knowledge into their daily clinical routines seamlessly. The recognition of the years of clinical experience as a significant factor influencing knowledge aligns with studies emphasising the positive correlation between experience and clinical competence. [17] Experienced healthcare professionals are often better equipped to recognise and respond to clinical situations, contributing to improved patient outcomes. The positive attitudes towards exposure to seminars and workshops and acquiring additional qualifications align with reports that continuous professional development is crucial for enhancing healthcare professionals' knowledge and skills. [18] Studies have shown that participation in educational activities contributes to improved clinical decision-making and patient care. The endorsement of pre-service and in-service training as factors affecting knowledge levels aligns with the broader understanding that structured training programs significantly impact healthcare professionals' knowledge and performance. [19] Whether integrated into pre-service education or provided during service, well-designed training initiatives have been shown to enhance clinical practice.

Conclusions

Knowledge of postpartum warning signs is very important in the prevention of postpartum complications by midwives. This will also enhance the teaching of mothers on the identification and detection of postpartum warning signs in a country where the provision of postpartum care is very low. In the present study, training of the midwives improved their knowledge of postpartum warning signs. Therefore, periodic training of midwives on postpartum warning signs may be recommended.

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Authors' Contribution: AOO and ARA conceived the study, while AOO, SJO, and ARA designed it. AOO, OCA, and FOO analysed the data and interpreted it by SJO, FOO, AOO, and AAS. AOO and SJO drafted the manuscript and revised it for sound intellectual content.
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