Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Knowledge, Availability and Utilization of Non-Pneumatic Anti-Shock Garment among Nurses and Midwives Managing Postpartum Hemorrhage in Osun State, Nigeria

Lydia Odesanya

lydia.odesanya@uniosun.edu.ng

Osun State University

Rahmat Oyekale

Osun State University

Olanike Afolabi

Osun State University Teaching Hospital

Adeniyi Fasanu

Osun State University Teaching Hospital

Olayinka Onasoga

University of Ilorin

Sunday Olarewaju

Osun State University

Research Article

Keywords: Non-Pneumatic Anti-Shock Garment, NASG, postpartum haemorrhage, knowledge, nurses, midwives, primary healthcare, Nigeria

Posted Date: October 29th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10962708/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Background

Postpartum haemorrhage (PPH) remains one of the leading causes of maternal morbidity and mortality worldwide, particularly in low- and middle-income countries. The Non-Pneumatic Anti-Shock Garment (NASG) is a low-cost first-aid device used to stabilize women experiencing hypovolemic shock due to obstetric haemorrhage while definitive treatment is being arranged. Adequate knowledge of the NASG among healthcare providers is essential for its appropriate use in maternal healthcare.

Objective

This study assessed the knowledge of the Non-Pneumatic Anti-Shock Garment (NASG) among nurses and midwives working in primary healthcare facilities in Osun State, Nigeria.

Methods

A descriptive cross-sectional study was conducted among 124 registered nurses and midwives working in primary healthcare facilities in Osun State between October and November 2025. Data were collected using a structured, self-administered questionnaire and analyzed using the Statistical Package for the Social Sciences (SPSS) version 20. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the data.

Results

The mean age of the respondents was 41.71 ± 9.75 years. Most respondents were female (87.1%), married (85.5%), and midwives (67.7%). Overall, respondents demonstrated good knowledge of the NASG. The majority correctly identified the primary purpose of the NASG (95.2%), the appropriate timing of its application (95.2%), the correct sequence of application (95.2%), the correct procedure for removal (93.5%), the physiological mechanism of action (98.4%), and congestive heart failure as a contraindication (95.2%). In addition, 95.2% correctly indicated that the NASG does not replace definitive treatment for postpartum haemorrhage.

Conclusion

Nurses and midwives working in primary healthcare facilities in Osun State demonstrated good knowledge of the Non-Pneumatic Anti-Shock Garment. Continuous professional education and regular refresher training are recommended to sustain and further improve healthcare providers' knowledge and promote evidence-based management of postpartum haemorrhage.

Introduction

Postpartum haemorrhage (PPH) remains the leading direct cause of maternal mortality worldwide and is responsible for approximately one-fifth to one-quarter of all maternal deaths, with the highest burden occurring in low- and middle-income countries, particularly in sub-Saharan Africa [1, 2]. Despite substantial advances in maternal healthcare, PPH continues to account for a significant proportion of preventable maternal deaths because of delays in diagnosis, inadequate emergency obstetric care, shortages of skilled birth attendants, and limited access to blood transfusion and surgical interventions [1, 3]. Nigeria contributes substantially to the global maternal mortality burden, and obstetric haemorrhage remains one of the leading causes of maternal deaths in the country [3].

The Non-Pneumatic Anti-Shock Garment (NASG) is a simple, low-cost first-aid compression device developed to stabilize women experiencing hypovolemic shock resulting from obstetric haemorrhage. By applying circumferential pressure to the lower limbs, pelvis, and abdomen, the NASG reduces vascular capacity, improves venous return, and redirects blood flow to vital organs, thereby providing a critical window for definitive treatment such as uterotonic administration, blood transfusion, surgery, or referral [4]. The World Health Organization (WHO) recommends the NASG as an adjunctive intervention for women with severe postpartum haemorrhage, particularly in settings where timely access to comprehensive emergency obstetric care is limited [1].

Although the effectiveness of the Non-Pneumatic Anti-Shock Garment (NASG) in reducing maternal morbidity and mortality has been demonstrated across low-resource settings, its successful implementation in Africa remains inconsistent. Studies conducted in Ethiopia, Tanzania, and Nigeria have reported that the utilization of NASG is strongly influenced by healthcare providers' knowledge, availability of the device, prior training, institutional support, and adherence to clinical protocols. Recent systematic reviews from Ethiopia found that NASG utilization among obstetric care providers remained low (approximately 40–43%), with healthcare workers who had received formal training, possessed good knowledge, and worked in facilities where NASGs were available being significantly more likely to utilize the device in the management of obstetric haemorrhage [5, 6]. Similar findings have been reported in Nigeria, where studies from Ogun, Bayelsa, Ondo, and Ekiti States showed that although nurses and midwives generally demonstrate moderate-to-good knowledge of NASG, its routine utilization remains suboptimal because of poor device availability, inadequate in-service training, weak institutional policies, and inconsistent supply systems [7–10]. These challenges are particularly evident in resource-constrained health facilities, where delays in referral and limited access to comprehensive emergency obstetric care increase the risk of maternal death from postpartum haemorrhage. Nurses and midwives are usually the first healthcare professionals to identify excessive postpartum bleeding and initiate emergency management. Consequently, their knowledge and confidence in using NASG are essential for ensuring timely stabilization of women before definitive treatment is instituted.

Despite increasing evidence supporting the effectiveness of the Non-Pneumatic Anti-Shock Garment (NASG) in improving maternal outcomes, its adoption into routine obstetric practice remains limited in

many Nigerian health facilities. Previous studies have primarily focused on healthcare providers' knowledge or the clinical effectiveness of the NASG, with relatively few simultaneously assessing its knowledge, availability, and utilization among frontline healthcare providers [7, 8, 10]. Furthermore, considerable variations exist in NASG availability and utilization across healthcare facilities, reflecting disparities in institutional preparedness, training opportunities, and resource allocation. These disparities may compromise timely management of postpartum haemorrhage, particularly in secondary and primary healthcare facilities where referral delays are common.

In Osun State, postpartum haemorrhage continues to pose a significant challenge to maternal health services. Although nurses and midwives constitute the largest cadre of skilled birth attendants responsible for the initial recognition and management of obstetric emergencies, there is limited empirical evidence regarding their knowledge, the availability of NASGs in their facilities, and the extent to which the device is utilized during postpartum haemorrhage management. The paucity of context-specific data limits evidence-based planning for training programmes, procurement of NASGs, and the development of institutional protocols that promote their appropriate use.

Assessing healthcare providers' knowledge, availability, and utilization of the NASG is essential for identifying existing gaps that may hinder effective implementation of this life-saving intervention. Such information will assist policymakers, hospital administrators, and maternal health programme managers in developing targeted interventions to improve emergency obstetric care, strengthen health system preparedness, and ultimately reduce maternal morbidity and mortality associated with postpartum haemorrhage.

Therefore, this study assessed the knowledge of the Non-Pneumatic Anti-Shock Garment (NASG) among nurses and midwives working in primary healthcare facilities in Osun State, Nigeria.

Methodology

Study Design

This study employed a descriptive cross-sectional survey design to assess the knowledge, availability, and utilization of the Non-Pneumatic Anti-Shock Garment (NASG) among nurses and midwives involved in the management of postpartum haemorrhage (PPH) in primary healthcare facilities in Osun State, Nigeria.

Study Area

The study was conducted in primary healthcare (PHC) facilities across Osun State, South-West Nigeria, between October and November 2025. Osun State is one of the six states in the South-West geopolitical zone of Nigeria and comprises 30 Local Government Areas (LGAs) and one Area Office. The state has an extensive network of primary healthcare facilities that provide essential maternal and child health

services, including antenatal care, skilled birth attendance, postnatal care, immunization, family planning, and emergency referral services. These facilities serve as the first point of contact within the healthcare system and play a vital role in the early recognition, stabilization, and referral of women experiencing postpartum haemorrhage.

Study Population

The study population comprised registered nurses and midwives working in primary healthcare facilities across Osun State. Eligible participants were healthcare professionals directly involved in maternal and newborn care, including antenatal, intrapartum, delivery, and postnatal services during the study period.

Inclusion Criteria

Participants were eligible for inclusion if they:

- Were registered nurses and/or midwives employed in primary healthcare facilities in Osun State.
- Were directly involved in maternal healthcare service delivery.
- Provided written informed consent to participate in the study.

Exclusion Criteria

The following individuals were excluded from the study:

- Nurses and midwives who were on annual, maternity, sick, or study leave during the period of data collection.
- Eligible healthcare workers who declined participation.
- Healthcare professionals other than nurses and midwives.

Sample Size and Sampling Technique

A total enumeration (census) sampling technique was adopted to ensure maximum participation of eligible respondents. Consequently, all registered nurses and midwives working in the selected primary healthcare facilities during the study period were invited to participate. Of those approached, 124 respondents completed the questionnaire and were included in the final analysis, yielding a response rate of 100%.

Study Instrument

Data were collected using a structured, self-administered questionnaire adapted from previously published studies assessing healthcare providers' knowledge and utilization of the Non-Pneumatic Anti-

Shock Garment (NASG). The questionnaire was modified to reflect the objectives and local context of the present study.

The questionnaire consisted of six sections:

- **Section A**: Socio-demographic characteristics of respondents.
- **Section B**: Knowledge of the Non-Pneumatic Anti-Shock Garment.
- **Section C**: Availability of the NASG within the health facility.
- **Section D**: Utilization of the NASG in the management of postpartum haemorrhage.
- **Section E**: Perceived barriers to NASG utilization.
- **Section F**: Strategies for improving NASG availability and utilization.

Validity of the Instrument

Face and content validity of the questionnaire were established through expert review by specialists in maternal and child health nursing, obstetrics, and research methodology. Their recommendations regarding clarity, relevance, and content coverage were incorporated into the final version of the instrument before data collection.

Reliability of the Instrument

A pilot study was conducted among nurses and midwives working in a primary healthcare facility outside the study area but with similar characteristics to the study population. The internal consistency of the questionnaire was evaluated using Cronbach's alpha coefficient. The instrument demonstrated satisfactory reliability, indicating that it was suitable for data collection.

Data Collection Procedure

Following ethical approval and permission from the relevant health authorities, trained research assistants visited the selected primary healthcare facilities between October and November 2025. The purpose, objectives, and procedures of the study were explained to all eligible participants. Written informed consent was obtained before administration of the questionnaire.

The questionnaire used for data collection was developed specifically for this study based on the study objectives and relevant literature. The English-language version of the questionnaire is provided as Supplementary File 1.

The questionnaire was self-administered to respondents and retrieved immediately after completion or at a mutually agreed time to maximize the response rate and minimize non-response bias. Completed questionnaires were checked for completeness and consistency before data entry.

Data Analysis

Data were coded, entered, cleaned, and analyzed using the Statistical Package for the Social Sciences (SPSS) version 20. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize respondents' socio-demographic characteristics and other study variables.

Knowledge scores were computed by assigning one (1) point for each correct response and zero (0) for each incorrect response. The total knowledge score was converted to percentages and categorized into good knowledge (≥ 70%) and poor knowledge (< 70%).

Associations between socio-demographic characteristics and respondents' knowledge and utilization of the NASG were assessed using Pearson's Chi-square (χ^2) test. Statistical significance was determined at a p-value of less than 0.05.

Ethical Considerations

Ethical approval

for the study was obtained from the Osun State University Ethical Committee before the commencement of the study. Administrative permission was also obtained from the Osun State Primary Health Care Board and the heads of the participating primary healthcare facilities.

Participation in the study was entirely voluntary. Written informed consent was obtained from all respondents after explaining the purpose, procedures, potential benefits, and minimal risks associated with the study. Participants were assured of confidentiality, anonymity, and the right to withdraw from the study at any stage without any consequences. Data collected were securely stored and used solely for research purposes.

Results

Table 1
Socio-demographic Characteristics of Respondents (N = 124)

Variable	Frequency	Percentage (%)
Age		
21–30 years	26	21.0
31–40 years	34	27.4
41–50 years	32	25.8
Above 50 years	32	25.8
Mean ± SD	41.71 ± 9.75	
Male	16	12.9
Female	108	87.1
Religion		
Christianity	78	62.9
Islam	46	37.1
Marital Status		
Single	18	14.5
Married	106	85.5
Educational Attainment		
Registered Nurse/Midwife	50	40.3
BSc	52	41.9
MSc	20	16.1
PhD	2	1.6
Duration of Service		
1–5 years	30	24.2
6–10 years	22	17.7
11–15 years	20	16.1
Above 15 years	52	41.9
Professional Cadre		
Midwife	84	67.7
Nurse	40	32.3

Table 1 shows that the mean age of the respondents was 41.71 ± 9.75 years. Respondents aged 31–40 years constituted the largest age group (34, 27.4%), while those aged 41–50 years and above 50 years each accounted for 32 (25.8%). Females constituted 108 (87.1%) of the respondents, whereas 16 (12.9%) were males. Christianity was the predominant religion (78, 62.9%), while 46 (37.1%) practiced Islam. Most respondents were married (106, 85.5%). Regarding educational attainment, 52 (41.9%) had a Bachelor of Nursing degree, 50 (40.3%) were Registered Nurses/Midwives, 20 (16.1%) had a Master's degree, and 2 (1.6%) had a PhD. In terms of years of service, 52 (41.9%) had worked for more than 15 years, while 84 (67.7%) were midwives and 40 (32.3%) were nurses.

Table 2
Knowledge of the Non-Pneumatic Anti-Shock Garment (NASG)

Variable	Frequency	Percentage
What is the primary purpose of NASG		
To prevent infection in obstetric patients	2	1.6
To reverse hypovolemic shock by redirecting blood flow	118	95.2
To induce uterine contractions in PPH	4	3.2
When should the NASG be applied in relation to other interventions		
Only after 2 units of blood have been transfused	2	1.6
After all medications have been administered	4	3.2
It can be applied before or while initiating IV fluids	118	95.2
What is the correct procedure for NASG removal		
Remove rapidly to assess bleeding status	6	4.8
Remove segment by segment from top to bottom	2	1.6
Remove segment by segment from bottom to top	116	93.5
How does the NASG physiologically work to treat shock		
By compressing the lower body and decreasing circulatory space	122	98.4
By cooling the body to reduce metabolic demands	2	1.6
Which of the following is a contraindication for NASG use		
Congestive heart failure	118	95.2
Pregnancy under 24 weeks	6	4.8
What is the maximum recommended duration for NASG application		
24hours	32	25.8
Up to 72 hours if necessary	92	74.2
What is the correct sequence for applying the NASG		
Ankle segments first, then upward	118	95.2
The sequence doesn't matter as long as all segments are secured	2	1.6
Starting with the abdominal segment	2	1.6
When can NASG removal begin		

Variable	Frequency	Percentage
What is the primary purpose of NASG		
Immediately after bleeding stops	10	8.1
When the patient is stable for at least 2 hours with normal vital signs	112	90.3
After blood transfusion is complete	2	1.6
Which vital sign is most important to monitor during NASG removal		
Body temperature	6	4.8
Blood pressure	118	95.2
What should be done if blood pressure drops during NASG removal		
Continue removal but administer additional IV fluids	6	4.8
Stop removal and reapply the segment	118	95.2
What type of bleeding can NASG help manage		
Only postpartum hemorrhage	106	85.5
Only traumatic external bleeding	8	6.5
Obstetric hemorrhage and other hypovolemic shock causes	10	8.1
Who can safely apply the NASG with proper training		
Only Physician	4	3.2
Hospital setting specialist	116	93.5
Community health workers	4	3.2
Does NASG replace the need for other interventions like IV fluids and blood transfusions in severe postpartum hemorrhage		
Yes	6	4.8
No	118	95.2
Is NASG application a recommended first-line intervention for postpartum hemorrhage in resource-limited settings		
Yes	120	96.8
No	4	3.2
Can NASG be used in all cases of postpartum hemorrhage		
Yes	-	-
No	124	100.0

Table 2 presents respondents' knowledge of the Non-Pneumatic Anti-Shock Garment (NASG). Most respondents identified the primary purpose of the NASG as reversing hypovolemic shock by redirecting blood flow to vital organs (118, 95.2%). A total of 118 (95.2%) reported that the NASG can be applied before or while initiating intravenous fluids, while 116 (93.5%) identified the correct removal sequence as segment-by-segment from the bottom upward. The majority (122, 98.4%) stated that the NASG works by compressing the lower body and reducing circulatory space, and 118 (95.2%) identified congestive heart failure as a contraindication. Regarding duration of application, 92 (74.2%) selected up to 72 hours, whereas 32 (25.8%) selected 24 hours. Most respondents (118, 95.2%) identified the correct application sequence as beginning from the ankle segments upward, while 112 (90.3%) stated that removal should begin after the patient has remained stable for at least two hours. Blood pressure was identified by 118 (95.2%) as the most important parameter to monitor during removal, and an equal proportion indicated that the appropriate response to a fall in blood pressure is to stop removal and reapply the segment. Furthermore, 106 (85.5%) indicated postpartum haemorrhage only as the type of bleeding managed by the NASG, while 116 (93.5%) selected hospital-based providers as those who can safely apply the device. A total of 118 (95.2%) reported that the NASG does not replace definitive interventions, 120 (96.8%) indicated that it is recommended in resource-limited settings, and all respondents (124, 100.0%) stated that it cannot be used in every case of postpartum haemorrhage.

Discussion

This study assessed the knowledge of the Non-Pneumatic Anti-Shock Garment (NASG) among nurses and midwives working in primary healthcare facilities in Osun State, Nigeria. The discussion focuses on the socio-demographic characteristics of the respondents and their knowledge of the NASG.

The socio-demographic findings showed that the majority of the respondents were female, married, and within the 31–40-year age group. This finding is consistent with the composition of the nursing workforce in Nigeria, where women constitute the majority of healthcare providers involved in maternal and newborn care [11]. In addition, a substantial proportion of the respondents had more than 15 years of professional experience, indicating that many had considerable exposure to maternal healthcare services and the management of obstetric emergencies. Most respondents also possessed a Bachelor of Nursing degree or were Registered Nurses/Midwives, reflecting the professional qualifications required to provide skilled maternal healthcare services in primary healthcare settings.

The findings further demonstrated that respondents generally had good knowledge of the Non-Pneumatic Anti-Shock Garment. Most respondents correctly identified that the primary purpose of the NASG is to reverse hypovolemic shock by redirecting blood flow to vital organs. This finding is consistent with previous studies conducted among healthcare providers in Nigeria and other low- and middle-income countries, which reported high levels of knowledge of the NASG following training and increased awareness of evidence-based interventions for the management of postpartum haemorrhage [12, 13].

The majority of respondents also correctly identified that the NASG should be applied before or while initiating intravenous fluid resuscitation and other emergency interventions. This finding is in agreement with the recommendations of the World Health Organization (WHO) and the International Federation of Gynecology and Obstetrics (FIGO), which recommend early application of the NASG as a temporary stabilization measure while definitive treatment is being arranged [14, 15]. Similarly, most respondents correctly identified the recommended sequence for NASG application and removal and demonstrated an understanding of the physiological mechanism through which the garment improves circulation by compressing the lower body and redirecting blood flow to vital organs. These findings indicate a good understanding of the principles guiding the appropriate use of the NASG.

Furthermore, the majority of respondents correctly identified congestive heart failure as a contraindication to NASG use and recognized that the NASG does not replace definitive interventions such as intravenous fluid resuscitation, blood transfusion, uterotonic administration, or other appropriate obstetric interventions. These findings are consistent with current clinical recommendations, which describe the NASG as a first-aid stabilization device that should be used alongside standard emergency obstetric care rather than as a substitute for definitive treatment [14, 15].

Despite the overall good level of knowledge observed, the study identified an important knowledge gap regarding the scope of NASG use. Most respondents indicated that the NASG is used only for postpartum haemorrhage, whereas current evidence supports its use in stabilizing women experiencing hypovolemic shock resulting from other causes of obstetric haemorrhage, provided there are no contraindications. This finding suggests that although respondents were familiar with the role of the NASG in postpartum haemorrhage management, further education is needed to improve understanding of its broader clinical applications.

Overall, the findings indicate that nurses and midwives working in primary healthcare facilities in Osun State possess good knowledge of the Non-Pneumatic Anti-Shock Garment. Continuous professional development, regular refresher training, and access to updated evidence-based clinical guidelines may further strengthen healthcare providers' knowledge and support the appropriate use of the NASG in maternal healthcare practice.

Conclusion

This study assessed the knowledge, availability, and utilization of the Non-Pneumatic Anti-Shock Garment (NASG) among nurses and midwives working in primary healthcare facilities in Osun State, Nigeria. The findings demonstrated that respondents generally had good knowledge of the purpose, application, and removal of the NASG, as well as its role as a temporary stabilization device in the management of postpartum haemorrhage. However, some gaps in knowledge regarding the broader indications and appropriate use of the NASG were identified.

The study underscores the importance of ensuring that healthcare providers at the primary healthcare level possess adequate knowledge and practical skills in the use of the NASG. Strengthening the

capacity of nurses and midwives through continuous professional education and ensuring access to essential obstetric emergency equipment will contribute to improved management of postpartum haemorrhage and support ongoing efforts to reduce maternal morbidity and mortality in Nigeria.

Limitations of the Study

This study has some limitations that should be considered when interpreting the findings. First, the cross-sectional design limits the ability to establish causal relationships between respondents' characteristics and their knowledge or utilization of the NASG. Second, the study relied on self-administered questionnaires, which may be subject to recall bias and social desirability bias. Third, the study was conducted among nurses and midwives in primary healthcare facilities in Osun State; therefore, the findings may not be generalizable to secondary and tertiary healthcare facilities or to other states in Nigeria. Finally, respondents' reported knowledge and utilization were not validated through direct observation of clinical practice.

Recommendation

Based on the findings of this study, regular in-service training and continuing professional development programmes should be organized for nurses and midwives to enhance their knowledge and practical skills in the appropriate use of the Non-Pneumatic Anti-Shock Garment (NASG) for the management of postpartum haemorrhage. Primary healthcare facilities should be adequately equipped with functional NASGs and other essential emergency obstetric care commodities to ensure prompt stabilization of women experiencing postpartum haemorrhage before referral or definitive treatment.

In addition, standardized clinical guidelines and protocols on the application, monitoring, and removal of the NASG should be readily available and routinely implemented in all primary healthcare facilities. Regular supportive supervision, mentorship, and competency-based assessments should also be instituted to reinforce adherence to evidence-based practices and sustain healthcare providers' proficiency in the use of the device.

Furthermore, policymakers and health administrators should strengthen maternal health programmes through improved procurement, equitable distribution, and routine monitoring of NASG availability and utilization across primary healthcare facilities. Future research should incorporate observational methods to assess actual clinical practice and include healthcare providers from primary, secondary, and tertiary healthcare facilities to provide a more comprehensive understanding of the factors influencing the availability and utilization of the NASG in the management of postpartum haemorrhage in Nigeria.

Declarations

Ethics approval and consent to participate

Ethical approval for the study was obtained from the appropriate Health Research Ethics Committee before commencement of the study. Administrative permission was also obtained from the Osun State

Primary Health Care Board and the heads of the participating primary healthcare facilities. All procedures were conducted in accordance with applicable ethical standards and regulations. Informed consent was obtained from participants prior to their participation in the study.

Availability of data and materials

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request, subject to applicable ethical and institutional restrictions**.**

Competing interests

The authors declare that they have no competing interests.

Funding

The authors received no specific funding for this study.

Authors' contributions

All authors contributed to the conception and design of the study, data collection and/or analysis, interpretation of the findings, and preparation and revision of the manuscript. All authors read and approved the final manuscript.

Acknowledgements

The authors acknowledge the support and contributions of all individuals and institutions who assisted with the conduct of this study.

References

1. Consolidated guidelines for. the prevention, diagnosis and treatment of postpartum haemorrhage [Internet]. Geneva: World Health Organization; 2025. p. 41264754.
2. World Health Organization. A roadmap to combat postpartum haemorrhage between 2023 and 2030. World Health Organization; 2023. Oct 11.
3. World Health Organization. Trends in maternal mortality 2000 to 2023: estimates by WHO, UNICEF, UNFPA, World Bank Group and UNDESA/Population Division.
4. Penn AW, Beam NK, Azman H. Non-pneumatic anti-shock garment (NASG) as a first aid for preventing or reversing hypovolemic shock secondary to obstetric hemorrhage. Cochrane Database Syst Rev. 2018;2018(2):CD011700. 10.1002/14651858.CD011700.pub2. PMCID: PMC6491192.
5. Addisu D, Gebeyehu NA, Belachew YY, Mekie M. Utilization of non-pneumatic anti-shock garment for treating obstetric hemorrhage and associated factors among obstetric care providers in Ethiopia: A systematic review and meta-analysis. PLoS ONE. 2023;18(11):e0294052. 10.1371/journal.pone.0294052. . PMID: 37972081; PMCID: PMC10653477.

6. Azeze GA, Kassie GA, Lombebo AA, Efa AG, Asgedom YS, Negash BT, Woldegeorgis BZ, Haile KE, Adema BG, Gebrekidan AY. Non-pneumatic anti-shock garment utilization and associated factors in Ethiopia: a systematic review and meta-analysis. BMC Pregnancy Childbirth. 2025;25(1):187. 10.1186/s12884-025-07299-4. . PMID: 39979826; PMCID: PMC11844103.
7. Aina F, Oyedele M, Dada S, Aina D. Knowledge and utilization of non-pneumatic anti-shock garment for the management of postpartum hemorrhage among Midwives in government hospitals in Ogun State, Nigeria. Babcock Univ Med J. 2020;3(1):59–66.
8. Onasoga O, Duke E, Danide IU, Jack-Ide IO. Midwives' knowledge and utilization of non-pneumatic anti shock garments in reducing complications of postpartum haemorrhage in selected health care facilities in Bayelsa state Nigeria. Int J Reprod Contracept Obstet Gynecol. 2015;4(4):977–81.
9. Sowunmi CO, Iwaola OM, Ogbeye GB. Midwives' skills in the application of non-pneumatic anti-shock garment for the management of postpartum haemorrhage in Ondo State, Nigeria. Int J Reprod Contracept Obstet Gynecol. 2019;8(1):210.
10. Akinyemi OO, Abiodun-Ojo OE, Owolabi BA. Factors influencing utilisation of non-pneumatic anti-shock garment in the management of Postpartum Haemorrhage among midwives in Ekiti State. Int J Public Health Pharm Pharmacol. 2022;10(2):22–30.
11. Ajala DE, Ishola RO, Dosumu TO, Awotunde TA, Ogunmodede EO. Nursing Workforce Shortages in Nigeria: A Looming Threat to Women's Health. SAGE Open Nurs. 2025;11:23779608251393752. 10.1177/23779608251393752. . PMID: 41179243; PMCID: PMC12576080.
12. Angell B, Sanuade O, Adetifa IM, Okeke IN, Adamu AL, Aliyu MH, Ameh EA, Kyari F, Gadanya MA, Mabayoje DA, Yinka-Ogunleye A. Population health outcomes in Nigeria compared with other west African countries, 1998–2019: a systematic analysis for the Global Burden of Disease Study. Lancet. 2022;399(10330):1117–29.
13. Emelonye A, Pitkäaho T, Aregbesola A, Vehviläinen-Julkunen K. Revisiting nursing research in Nigeria. Int J Med Biomedical Res. 2016;5(2):78–85.
14. Samatha NV, Dixit H. Role of NASG (Non-pneumatic Anti-Shock Garment) in Managing Hemorrhagic Shock in Postpartum Hemorrhage: A Systematic Review. Eur J Cardiovasc Med. 2025;15:458–62.
15. Taye BT, Silesh Zerihun M, Moltot Kitaw T, Amogne FK, Kindie Behulu G, Lemma Demisse T, Chekole MS, Fitie GW, Worku SA, Kibiret DM, Ferede AA. Utilization of non-pneumatic anti-shock garment for the management of obstetric hemorrhage among healthcare providers in north Shewa zone, Ethiopia. Front Public Health. 2023;11:1052885.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- EditedNASGquestionaireelisha.docx