

RESEARCH ARTICLE

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Knowledge and utilization of non-pneumatic anti-shock garment for the management of postpartum hemorrhage among Midwives in government hospitals in Ogun State, Nigeria

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Abstract

Objective: To assess the knowledge and determine the level of utilization of Non-Pneumatic Anti-Shock Garment (NASG) for the management of postpartum hemorrhage among Midwives.

Method: The study employed a descriptive cross-sectional study design, using a validated self-administered questionnaire. A total of 198 randomly selected midwives across three health facilities in Ogun State participated in the study. A 10-point knowledge scale was used to assess the knowledge of midwives on NASG. Descriptive statistics were used to determine the level of utilization of NASG among midwives, while Chi-square statistics were used to determine the relationship between the dependent and independent variables of interest at $p < 0.05$ level of significance.

Results: Most (88.9%) of the respondents were female with a mean age of 40.2 ± 5.6 years. Most (48.5%) had a BNS degree. The majority (74.7%) of the respondents were aware of NASG. Close to a half (49.3%) of the respondents had fair knowledge scores, 34.5% had good knowledge scores, while 16.2% had poor knowledge scores. Only 22.7% of the respondents had ever used NASG in the management of postpartum hemorrhage; 77.3% never used it before. Also, 67.2% of the respondents reported NASG was not available in their facilities. There was a significant influence of knowledge of NASG on the utilization among midwives ($X^2 = 37.151$, $P < 0.05$, $df = 2$).

Conclusion: This study demonstrated that midwives in healthcare facilities were aware, but did not have good knowledge of NASG. The utilization of the garment for the management of postpartum hemorrhage was also very poor, probably due to suboptimal knowledge and non-availability of the garment.

Keywords: Anti-shock garment, Haemorrhage, Knowledge, Postpartum Utilization

Plain English Summary: Non-pneumatic anti-shock garment (NASG) is a first-aid, lifesaving, and body pressure-lowering device used in treating blood loss that is associated with childbirth. The device decreases blood loss after delivery and reverses hypovolemic shock, thereby, decreasing maternal disease and deaths due to blood loss. Due to high levels of maternal deaths in Nigeria resulting from blood loss after childbirth, this study was designed to investigate the knowledge and utilization of anti-shock garment for treating post-delivery bleeding among midwives in government hospitals in Abeokuta South Local Government Area of Ogun State, Nigeria.

This study was aimed at documenting the level of knowledge of midwives as well as their usage of the NASG. This study revealed that the midwives did not have good knowledge and the level of use was very low.

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Background

Postpartum hemorrhage (PPH) is commonly defined as blood loss exceeding 500 milliliters (mL) following a vaginal birth and 1000 mL following a caesarean. It is often classified as primary/immediate/early, occurring within 24 hours of birth, or secondary/delayed/late, occurring more than 24 hours post-birth to up to 12 weeks postpartum. Also, PPH may be described as third or fourth stage, depending on whether it occurs before or after delivery of the placenta, respectively (1). Non-pneumatic anti-shock garment (NASG) is a first-aid, lifesaving, and body pressure-lowering device used in the management of postpartum hemorrhage. It is an aid that decreases blood loss after delivery and reverses hypovolemic shock, thereby, lowering the risk of maternal morbidity and mortality due to PPH (2). Studies have shown that postpartum hemorrhage (PPH) is the most common single cause of maternal morbidity and mortality in low-income countries and the primary cause of nearly one-quarter of all maternal deaths globally (2, 3). Most deaths resulting from PPH occur during the first 24 hours after birth, the majority of these could be avoided through the use of prophylactic uterotonics during the third stage of labor and by timely and appropriate management (3).

The maternal mortality rate in Africa is the highest in the world, and it is estimated at 500 deaths per 100, 000 live births (3, 4). Every day about 830 women die in Africa due to complications of pregnancy and childbirth. Most of these complications or diseases, developed during pregnancy, are preventable and treatable. Nigeria's current maternal mortality ratio is 560 per 100,000 live-births, with over 40,000 women dying annually from pregnancy and pregnancy-related complications (5). Non-pneumatic anti-shock garment (NASG) was developed specifically for postpartum haemorrhage (6, 7). It has also been used in many obstetric hemorrhage cases for stabilizing patients' situations before final treatment is reached in developing regions (2). This first-aid device, which reverses hypovolemic shock and decreases obstetric hemorrhage, consists of articulated neoprene segments that close tightly with Velcro, shunting blood from the lower body to the core organs, elevating blood pressure, and increasing preload and cardiac output (8, 9). It has been observed that despite the training and life-saving skills of midwives, there is a persistent increase in the maternal mortality rate in Nigeria (10). Some Midwives in the Northern part of Nigeria have been reported to not be passionate about the understanding and utilization of non-pneumatic anti-shock garment

(10). Considering this, the study is imperative to have empirical facts on the knowledge and level of utilization of midwives about non-pneumatic anti-shock garment in the Southern part of Nigeria. Therefore, the specific objectives of this study are to assess the knowledge and determine the level of utilization of Non-pneumatic Anti-shock Garment (NASG) for the management of postpartum hemorrhage among Midwives.

Methodology

Research design

This study had a descriptive cross-sectional design and used a validated structured questionnaire.

Study Population

The population for the study was midwives at government hospitals in Abeokuta South local government area, namely Ogun State hospital Ijaiye, Oba Ademola maternity hospital Ake, and Federal Medical Centre Idi Aba.

Inclusion and Exclusion Criteria

Trained midwives that work in the selected hospitals who gave informed consent were included in the study. Doctors and other health workers aside from certified midwives and those who did not give informed consent were excluded from the study.

Sample Size and Sampling Technique

Sample Size was calculated using the sample size determination formula by Taro Yamane (11). A total of 198 sample size was calculated. Three healthcare facilities (Federal Medical Centre, Oba Ademola Maternity Hospital, and Ogun State Hospital Abeokuta) were purposively selected for this study. In determining the actual number of respondents per facility based on the sample size, a proportionate sampling procedure was used. A convenient sampling technique was then used in selecting the actual study participants in each facility.

Reliability and validity of the study instrument

Face, content, and construct validity were ensured by subjecting the instrument to peer and expert (in the field of maternal health nursing) review to ascertain that the variables in the instrument could validly measure the objectives of interest. Reliability was ensured by pre-testing the study instrument on 20 Midwives at Iperu General Hospital and a Cronbach Alpha measure of 0.71 was gotten which was accepted to be reliable. However, after the reliability test, the instrument was also

re-structured and ambiguous questions were either reframed or removed.

Method of Data Collection

Formal permission to administer the questionnaire was obtained from the Medical Directors, Directors of Clinical Service, and Directors of Nursing service of selected hospitals. Information about the research and its purpose was explained to the prospective research participants, consent was obtained from them, and the instrument was distributed for the response. The questionnaires were numbered to monitor retrieval. Midwives on duty, covering morning, afternoon, and night shifts were participants for the study. The researchers met the midwives at their respective duty posts, where the instrument was administered. The period for data collection lasted three weeks in February 2020.

Data Analysis Procedure

Retrieved questionnaires were coded, the knowledge section was scored, and the researchers utilized descriptive statistics (frequency, mean, percentages, and standard deviation) to describe the demographic characteristics of respondents, their

knowledge, and utilization of anti-shock garment for management of postpartum hemorrhage. IBM SPSS Statistics Version 22 was used to run the data analysis. The relationship between variables was tested using the Chi-square test.

A 10-point knowledge score was used to assess the knowledge of respondents on NASG. Scores of 7-10 (70% and above) were categorized as good, 4-6 (less than 70% but greater than 40%) was categorized as fair knowledge, and a knowledge score of below 4 points (less than 40%) was categorized as poor knowledge.

Results

Socio-demographic profile of respondents

Table 1 presents the socio-demographic characteristic of respondents. A total of 198 midwives participated in the study. The respondents' mean age was 40.2±5.6 years. About half (41.4%) of the respondents worked in the Obstetrics and Gynaecology unit, 15.7% worked in the medical ward, 11.63% worked in the Accident and emergency unit, while 14.1% and 17.2% worked in the surgical ward and family planning units, respectively.

Table 1: Socio-demographic Profiles of respondents (N = 198)

Variables	Responses	Frequency	Percentage
Age of respondents*	20-29	31	15.7
	30-39	68	34.3
	40-49	69	34.8
	50-59	30	15.2
Sex	Female	176	88.9
	Male	22	11.1
Highest Professional qualification	Registered Midwives	93	47.0
	Bachelor of Nursing science	96	48.5
	Master of Nursing science	9	4.5
Professional cadre	Nursing Officer II	28	14.1
	Nursing Officer I	36	18.2
	Senior nursing officer	36	18.2
	Principal nursing officer	24	12.1
	Assistant chief nursing officer	27	13.6
	Chief nursing officer	47	23.7
Current clinical area	Medical ward	31	15.7
	Surgical ward	28	14.1
	Accident and emergency	23	11.6
	Obstetrics and gynecology	82	41.4
	Family planning	34	17.2
Years of experience	0-5	36	18.2
	6-10	38	19.2
	11-15	49	24.7
	16-20	23	11.6
	21-25	18	9.1
	26-30	19	9.6
	31-35	15	7.6

*Mean age of respondents= 40.2±5.6 years

Respondent Awareness on Non-Pneumatic Anti-Shock Garment (NASG)

A total of 148 (74.7%) of the respondent out of the total 198 were aware of Non-pneumatic anti-shock garment, while a quarter (25.3%) were unaware. The source of information of awareness included; Hospital (42.5%), School (42.5%), and Seminars (15.0%)

Respondent knowledge on Non-Pneumatic Anti-Shock Garment (NASG)

Table 2 presents the knowledge of respondents on Non-pneumatic anti-shock garment. From

the total knowledge score of 10-points obtainable by the respondent, about half (49.3%) of the respondents had a fair knowledge score, 34.5% had a good score, while 16.2% had poor knowledge scores. The majority (70.9%) of the respondents had seen NASG and 61.0% knew that it was made of Neoprene. Also, 75.6% reported they knew what it is used for, but only 38.5% knew that it has six parts. Most (52.7%) of the respondents did not know that NASG is washable and inexpensive.

Table 2: Respondent knowledge of Non-Pneumatic Anti-Shock Garment (n = 148)

Variables	Responses	Frequency	Percentage
Ever seen NASG	Yes	105	70.9
	No	43	29.1
If yes, what is it made of (n=105)	Rubber	41	39.0
	Neoprene	64	61.0
Do you know what NASG is used for	Yes	109	73.6
	No	39	26.4
If yes, what is it used for (n=109)	Prevention of Hemorrhage	68	62.4
	Prevention of shock	39	35.8
	Prevention of cardiac arrest	2	1.8
How many parts does NASG have?	Four	33	22.3
	Six	57	38.5
	Eight	14	9.5
	I don't know	44	29.7
Can NASG be used in managing postpartum hemorrhage?	Yes	129	87.2
	No	4	2.7
	Don't know	15	10.1
Can NASG be used when a woman is already in shock	Yes	94	63.5
	No	33	22.3
	Don't know	21	14.2
The NASG works by forcing blood from the lower part of body vital organ	Yes	114	77.0
	No	10	6.8
	Don't know	21	14.2
Is NASG washable and inexpensive	Yes	70	47.3
	No	78	52.7
++Total Knowledge Score (KS)	Good (KS =7-10)	51	34.5
	Fair (KS=4-6)	73	49.3
	Poor (KS=0-3)	24	16.2

*n=148 (Those who were aware of NASG)

++Mean knowledge score= 4.1±1.6

Utilization of Non-pneumatic Anti-Shock Garment (NASG)

Table 3 presents the level of utilization of Non-pneumatic Anti-Shock Garment (NASG) among the respondents. From the results, 40.4% of the respondents reported they could use NASG, while 59.6% did not know how to use it. Only 22.7% of the respondents had ever used NASG in the management of postpartum hemorrhage,

and 77.3% never used it before. The majority (91.9%) of the respondents reported that they will use NASG if they know how to use it, while 90.4% reported they will use it if it is available for use. Also, the majority (67.2%) of the respondents reported NASG was not available in their hospital, 31.8% reported that it was available, while 1.0% did not know if it was available.

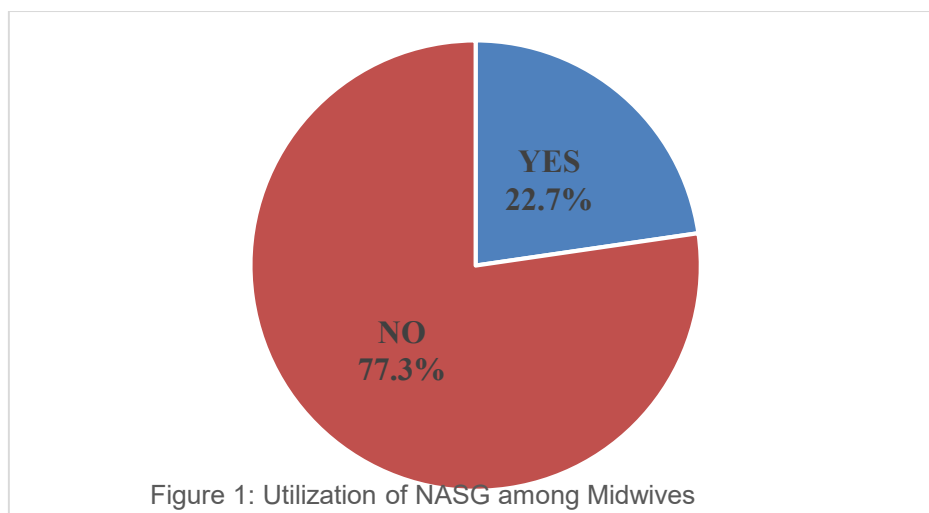


Figure 1: Utilization of NASG among Midwives

Table 3: Utilization of Non-pneumatic Anti-Shock Garment (N= 198)

Statement	Responses	Frequency	Percentage
Do you know how to use NASG?	Yes	80	40.4
	No	118	59.6
Ever used NASG in the management of PPH	Yes	45	22.7
	No	153	77.3
NASG is part of your health care protocol for PPH before referral	Yes	109	55.1
	No	89	44.9
Do you use it, when the need arises in your health center?	Yes	73	36.9
	No	125	63.1
If No, when do you use it	Severe PPH	36	18.2
	When other methods fail	17	8.6
	Never use	145	73.2
Do you use NASG every time there is PPH	Yes	51	25.8
	No	147	74.2
If No, why	It is difficult to assemble	10	5.1
	Not available	73	36.9
	I do not know much about it	115	58.0
If you know how to use it will you use it	Yes	182	91.9
	No	16	8.1
If it is available will you use it	Yes	179	90.4
	No	19	9.6
Is NASG available in your hospital	Yes	63	31.8
	No	133	67.2
	Don't know	2	1.0

Influence of midwives' knowledge and professional rank on the utilization of Non-pneumatic Anti-Shock Garment (NASG)

Table 4 presents the relationship between midwives' knowledge and the utilization of Non-pneumatic Anti-Shock Garment (NASG) as well as the relationship between professional rank and utilization. The Chi-square statistic was used to test for the relationship between the knowledge and usage of NASG, and it was found to be statistically significant ($X^2=37.151, P=0.000, df=2$). Therefore, it can be suggested

that knowledge influences the utilization of Non-pneumatic Anti-Shock Garment among midwives.

The Chi-square statistic was also used to test for the relationship between the cadre of midwives and the usage of NASG, and it was found to be not statistically significant ($X^2=0.875, P=0.975, df=5$). Therefore, it can be concluded that the professional cadre of the midwives did not influence their utilization of Non-pneumatic Anti-Shock Garment.

Table 4: Cross-tabulation of Utilization of NASG on respondents' knowledge and rank

Variables	Utilization		p-value
	Yes	No	
Knowledge			
Poor	2(2.7)	71(97.3)	$X^2=37.151$; $p<0.001$
Fair	4(12.9)	27(87.1)	
Good	39(41.5)	55(58.5)	
Rank			
Nursing Officer II	6(21.4)	22(78.6)	$X^2=0.875$; $p=0.975$
Nursing Officer I	8(22.2)	28(77.8)	
Senior nursing officer	8(22.2)	28(77.8)	
Principal nursing officer	5(20.8)	19(79.2)	
Assistant chief nursing officer	8(29.6)	19(70.4)	
Chief nursing officer	10(21.3)	37(78.7)	

The chi-square test was used.

Discussion

The study revealed the level of knowledge of midwives concerning Non-pneumatic Anti-shock Garment. About a half (49.3%) of the respondents had fair knowledge, while the awareness about NASG was high (74.7% of the respondents were aware). A quarter (25.3%) of the respondents were unaware of NASG, this is a serious concern in a country where the maternal mortality rate is high. Better awareness is, therefore, needed. The fair knowledge about NASG is in discordance with the study carried out in Sokoto State, Nigeria (12), where very good knowledge was documented. This disparity may be a result of differences in the study site, and the availability of NASG at the Sokoto study site, because the more available for use the NASG is in a facility, the more likely for health workers to have increase knowledge about its use. This study showed that though awareness was high, it did not translate to good knowledge. The findings did not also support the report by another author (13), who reported that the majority (96.0%) of midwives were knowledgeable about NASG. Results from this study have also revealed that the majority of the respondents, regardless of their educational level and professional rank, had a fair knowledge of the description, mechanism of action, and uses of NASG, and this aligns with what was reported earlier by other authors (14). The suboptimal level of knowledge may be the result of some deficiency in the medical training of midwives in school. This fact is strengthened by the submission by respondents who were aware of NASG, in which 42.5% reported they heard it first at the hospital; another 42.5% heard it at school, while 15.0% heard it from seminars.

The level of utilization of Non-pneumatic Anti-Shock Garment (NASG) among the respondents was low. Only 22.7% of the respondents had utilized NASG in their

midwifery services. This low level of utilization is in line with a study carried out among a midwife population in Nepal (15), where only about 15% of the midwives utilized the anti-shock garment for the management of postpartum hemorrhage. The identified reasons for low utilization of NASG as reported by the respondents include; inadequate knowledge on the usage of the Non-pneumatic anti-shock garment, non-availability of NASG, and the difficulty encountered in assembling it. Another study that corroborated the results of this finding is a cross-sectional study in the Niger Delta region of Nigeria (14), which revealed poor utilization of NASG among midwives for the management of postpartum hemorrhage. According to an author (16), Post-partum hemorrhage is the most common cause of obstetric hemorrhage, and one of the five leading causes of maternal mortality in the world, Nigeria inclusive. If NASG is not available for use among the midwives, it may be a serious setback to achieving the safe motherhood initiative.

However, a piece of very interesting evidence from this study is that more than 90% of the respondents were willing to utilize the Non-pneumatic Anti-shock Garment for the prevention of postpartum hemorrhage, if it is available.

On the influence of midwives' knowledge and professional rank on the utilization of NASG, this study has shown that there is a relationship between knowledge and utilization of Non-pneumatic Anti-shock Garment for the prevention of postpartum hemorrhage. The poor utilization in this study may be the result of suboptimal knowledge. The nonavailability of the NASG (reported by 67.2% of respondents) could also have contributed the poor utilization. This however could suggest, once NASG is available, there is a likelihood of improved utilization, and this can also bring about

knowledge increase. The study also showed that professional rank did not influence the utilization of NASG.

Based on the findings of this study, the government should, therefore, as a matter of public good and national importance, make the garment available in all health institutions offering maternity service. Midwives and other health practitioners involved in the rendering of maternity service should be trained on how to use this important garment in the management of postpartum hemorrhage. Adequate knowledge, availability, and utilization of NASG are indispensable for all midwives since they are the first point of call in the health care center in the case of maternal health. The Non-pneumatic anti-shock garment (NASG) is a low-technology device that offers a possible solution to counteract the effect of the delay in gaining access or providing obstetric care in a timely fashion, thus reducing maternal morbidity and mortality due to postpartum hemorrhage.

Conclusion

This study demonstrates that midwives in healthcare facilities were aware of Non-pneumatic anti-shock Garment. Knowledge is suboptimal among those who were aware, and the utilization of the garment for the management of postpartum hemorrhage was poor. Poor utilization of NASG could be the result of suboptimal knowledge and nonavailability of the garment

List of abbreviations

BUHREC:	Babcock University Health Research Ethics Committee
DF:	Degree of freedom
KS:	Knowledge Score
NASG:	Non-pneumatic Anti-Shock Garment
PPH:	Post-Partum Hemorrhage
SPSS:	Statistical Package for Social Science
UNFPA:	United Nation Population Fund
WHO:	World Health Organization

Declarations

Ethical Consideration

Ethical clearance was obtained from Babcock University Health Research Ethics Committee (IRB NO: BUHREC/207/20). Verbal informed consent was sought from the participant, and participation was entirely voluntary. Anonymity and confidentiality of participants' responses were guaranteed, as no individual coding or method of individual identification was used. There was no direct harm to those who chose

to participate in the study. The study will be beneficial in the sense that, the results will inform policy and government actions to make NASG available for use.

Consent for Publication

The authors hereby transfer all copyright ownership exclusively to the journal, if this work is published by the journal.

Conflicts of Interest

The authors have declared no conflict of interest.

Funding

The authors received no research funding

Authors Contributions

AFO and OA conceived the idea and formulated the study design, objective, methodology and data collection. DSO did data analysis, discussion of findings and drafted the Manuscript. ADA reviewed all sections and provided feedback. All authors read and approved the final manuscript

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