Midwives' Knowledge of Non-Pneumatic Anti-Shock Garment and Associated Factors among Midwives Working in Public Hospitals of Jimma Zone, South-West Ethiopia.

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Abstract

Background: The non-pneumatic anti-shock garment is a unique, simple, life-saving first-aid device made of neoprene and velcro. Neoprene is a stretchy material, and Velcro is a “hook and loop” material that closes things tightly . In 2017 every day, approximately 810 women died from preventable causes related to pregnancy and childbirth . From this death about 94% of all maternal deaths occur in low and lower middle-income countries.

Objective: The objective of this study was designed to assess Midwives knowledge of non-pneumatic anti-shock garment and associated factors among Midwives.

Methods: Facility based a quantitative cross-sectional studies design method was employed among 150 Midwives. Data was collected by pretested semi-structured self-administered questionnaire . The collected data were checked, coded and entered into Epi-data version 3.1 by double data enter and exported to SPSS version 23 for analysis. Bivariable and multivariable logistic regression were done to identify factors associated with Midwives’ Knowledge of non-pneumatic anti-shock garment.

Results: Eighty one (54%) of Midwives have good knowledge of non-pneumatic anti-shock garment. Having positive attitude [(AOR= 4.9 , 95% CI :(2.06, 11.65)], attending training [AOR= 3.91 , 95% CI :(1.48, 10.32], presence guideline of non-pneumatic anti-shock garment at their hospitals [AOR= 2.57 , 95% CI :(1.13, 5.82)] were significantly associated with Midwives’ knowledge of non-pneumatic anti-shock garment.

Conclusion and Recommendation: The knowledge Midwives’ on non-pneumatic anti-shock garment was low. The identified factors that significantly associated with Midwives’ knowledge of non-pneumatic anti-shock garment were positive attitude; attend training and presence of guideline of non-pneumatic anti-shock garments. The Midwives that involved in the maternity service should be improving their knowledge on non-pneumatic anti-shock garment.

Introduction

The Non-pneumatic Anti-Shock Garment (NASG) is a unique, simple, life-saving first-aid device made of neoprene and Velcro. Neoprene is a stretchy material, and Velcro is a “hook and loop” material that closes things tightly(1). Currently, it is the only tool first aids in stabilizing pulse and blood pressure after a woman has gone into shock from obstetric hemorrhage(2, 3).

The non-pneumatic anti-shock garments like bottom half suit and consists of three pairs the first of segments, the first segments are placed around the patient’s legs and the second three segments are placed around her pelvis and abdomen during the application for postpartum hemorrhage(4).

Maternal mortality is the death of a woman during pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or provoked by the pregnancy but not from accidental or incidental causes” (5). Globally in 2017 every day, approximately 810 women died from preventable causes related to pregnancy and childbirth. From this death about 94% of all

maternal deaths occur in low and lower middle-income countries. Sub-Saharan Africa and Southern Asia accounted for approximately 86% (254 000) of the estimated global maternal deaths in 2017 (7). According to the study done in eastern part of Ethiopia, about 311 deaths of reproductive aged women during the study period were reported. From this death, 72 (23.2%) died during pregnancy or within 42 days of delivery. The overall estimated maternal mortality ratio was 324 per 100,000 live births (8).

Postpartum hemorrhage is one of the leading causes of maternal mortality and morbidity, accounted for approximately 27% of global maternal deaths, defined depend on amount of blood loss, is vaginal bleeding more than 500 ml after vaginal delivery, blood loss of more than 1000 ml after cesarean delivery and more than 1500 ml after cesarean hysterectomy(9).

The postpartum hemorrhage is not only the direct cause of maternal of mortality, but it has also short and long term impacts like chronic illness, disability, increasing of death, poor growth and development of their children, hepatic dysfunction (10).

Midwives are the first point of contact for most women during pregnancy and labour and all women are at risk of postpartum hemorrhage, therefore midwives' knowledge of the non-pneumatic anti-shock garment which is very important for providing a quick and adequate way of emergency obstetric care during postpartum hemorrhage. In Ethiopia there is still lack of information about the knowledge Midwives to be specific about it use. Therefore this study seeks to assess the Midwives' knowledge of non-pneumatic anti-shock garment and associated factors in the management of post partum hemorrhage in Public Hospitals of Jimma Zone South West Ethiopia.

Methods And Material

Study Area and Period

The study was conducted in public hospitals of Jimma zone, Oromia regional state south-West Ethiopia. Jimma Zone located within latitude: 7°44'59.99"N and longitude: 37° 00' 0.00" E. Jimma zone far 346 Km from Addis Abbaba. Jimma is bordered on the South by the [Southern Nations, Nationalities and Peoples Region](#), the Northwest by [IlluAaba-bor](#) Zone, on the north by [East Walaga](#) zone, and on the northeast by [west Shewa](#) zone; part of the boundary with EastShewa is defined by the [Gibe River](#). The zone has a total area of 119,316 Square kilo meters. It has 21 woreda and 1 town administration with a total of 555 kebeles of which 515 of them are rural and 30 are urban. The population projection of 2014/15 of the zone is 3090112 with total reproductive age groups of 616380.

In this zone there were seven public hospitals namely Jimma medical center, Shanan Gibe hospital, Agaro Hospital, Limmu Hospital, Seka Hospital, Omo Nada Hospital and Satama Hospital. The study was conducted from August 01 - 20, 20 2019.

Study design

Facility based a quantitative cross-sectional study design method was employed.

Source and study population

All Midwives who were working the seven public hospitals of Jimma Zone were source of populations. And all Midwives who were working public hospitals of Jimma Zone and fulfilled the selection criteria were study population.

Selection criterion

Inclusion criterion

All certified Midwives working in the labour and delivery wards by shift, regular bases and in night duty and at least worked in labour and delivery unit for 6 months and willing to participate were included.

Exclusion criterion

Midwives who were on annual leave during the study period were excluded.

Sampling size and sampling procedure

A total of 150 Midwives were included in the study by census sampling technique from all public hospitals of Jimma zone.

Sr.No	Name hospitals	No of Midwives
1.	JMC	61
2.	Shenen Gibe hospital	20
3.	Seka Hospital	11
4.	Omo Nada Hospital	13
5.	Limmu Hospital	15
6.	Agaro Hospital	18
7.	Satama Hospital	12
Total		150

Table 1
The Total numbers of Midwives in each hospital

Operational Definitions

Knowledge scale: A total of five questions (questions 3, 4, 5, 6, 7) were used to assess the respondents' knowledge. The maximum score was 16 and the minimum score was zero. The respondents score of total knowledge questions those who scored eight and above out of 16 or the percentage score were 50% and above have good knowledge and below 50.0% graded as having poor knowledge of non-pneumatic anti-shock garment (14).

Measurements and Data Collection Procedure

A self-administered structured questionnaire was used to collect data from study participants. The instrument was adapted and developed from different literatures [12-16]. It was prepared in English version and the questionnaire contains four parts which include socio demographic characteristics, knowledge of non-pneumatic anti-shock garment, attitude regarding non-pneumatic anti-shock garment the responses consist five likert scales which were strongly agree, agree, neutral, disagree and strongly disagree. The five likert scale for analysis was become three likert scale. Strongly agree and agree became agree and disagree and strongly disagree became disagree and neutral and hospitals(organization) related questions. Before the actual data collection, the questionnaire was pre-tested on 10% of the total samples that was on 16 Midwives and appropriate corrections were made of some questions like logical order. The Experts were given for face validation and reliability was determined through internal consistency and reliable with Cronbach's alpha value 0.872.

Data process and Analysis

Following data collection the completeness of the data was checked, data were coded, and entered to a computer using Epidata version 3.1 by double data enter and exported to SPSS version 23.0 for analysis. All independent variables were entered into bivariate analysis and those independent variables with a p-value < 0.25 in bivariate analysis were used for multivariable analysis and finally variables with a p value < 0.05 in multivariable analysis were considered as statically significant of non-pneumatic anti-shock garment knowledge. Multi-collinearity was checked to see the linear correlation among the independent variables by using the variance inflation factor and standard error. None of the variables yield inflation factor >10 and standard error >2 and they were not dropped from multivariable analyses. Hosmer and Lemeshow's test was found to be insignificant and Omnibus test was significant which indicate that the model was fitted. Finally, the result of the analysis was presented in texts and tables as appropriate.

Ethical considerations

Before data collection, ethical clearance was obtained from the institutional review board of Jimma University, Institute of health and submitted to each hospital. The written consent was obtained from each participant that participation was voluntary and they have the right to withdraw at any time from the study.

The informed consent was comprised the study purpose and procedures, potential risks and benefits, voluntary participation and right of withdrawal, the information provided by each respondent was kept strictly confidential.

Results

Socio demographic characteristics

A total of 160 questionnaires were distributed to the participants but only 150 were replied; the rest 10 did not fill the questionnaire correctly and excluded from the data analysis with response rate of 93.8%.

Among the respondents, about 73 (48.7%) were in the age group of 25–29. More than half of the respondents were male in sex (55.3%) and not married (53.3%). Majority of them were Oromo by ethnicity. Eighty six (41.0%) were Muslim by religion and among the respondents one hundred eight (72%) were bachelor degree holders in education status. One hundred forty eight (70.5%) had 1 –5 years of work experiences (Table 1).

	Frequency	Percent
Age in years		
20-24	31	20.7
25-29	73	48.7
30-34	29	19.3
35-39	17	11.3
Sex	83	55.3
Male		
Female	67	44.7
Marital status	70	46.7
Married		
Single	80	53.3
Ethnicity	105	70.0
Oromo	25	16.7
Amhara	8	5.3
Tigrai	4	2.7
Gurage		
Others	8	5.3
Religion status	52	34.7
Muslim	62	41.3
Orthodox	32	21.3
Protestant		
Others	4	2.7
Educational level	42	28.0
Bachelor degree	108	72.0
Years of experience	97	64.7
1-5 years	46	30.7
6-10 years		
11 years and above	7	4.7

Table 1

Respondents' Knowledge of Non-pneumatic Anti-Shock Garment:

This study indicated that, one hundred twenty five (82.7%) of respondents had the awareness of non-pneumatic anti-shock garment. Only forty four (29.3%) of the respondents correctly mentioned that non-pneumatic anti-shock looks like bottom half of suit and less than (48%) correctly mentioned that non-pneumatic anti-shock garment has six parts. concerning the function of non-pneumatic anti-shock garment, 59.3% said that non-pneumatic anti-shock garment increases blood flow to vital organs and 54.7% said that non-pneumatic anti-shock garment stabilized women when she was already in shock. Relating to the knowledge criteria of the application of non-pneumatic anti-shock garment for women with postpartum hemorrhage about 50.7% said non-pneumatic anti-shock garment was applied when blood loss was greater than 750ml and said that non-pneumatic anti-shock garment removed from women when blood loss < 50 ml and Systolic blood pressure >100 mmhg(42.7%). The overall knowledge of Midwives, 81(54%) of Midwives had good knowledge of non-pneumatic anti-shock garment (Table 2).

Variables	Frequency	Percentage
Known NASG as it used for pph complication mgt		
Yes	125	82.7
No	25	17.3
NASG look like		
Gown	27	18
Trousers	79	52.7
Bottom half of suit	44	29.3
How many parts have the NASG		
Four	32	21.3
Six	72	48
Eight	25	16.7
Nine	21	14
What is the advantage NASG? *		
Prevent Shock	82	54.7
Stabilize the women in shock	82	54.7
Reverse shock	43	28.7
Decrease blood loss	65	43.3
Compress blood vessels	71	47.3
Increase blood flow to vital organs	89	59.3
Know proper use of NASG		
Yes	91	60.7
No	59	39.3
Non-pneumatic anti-shock garment applied for women with PPH when.*		
Bleeding >750ml		
systolic blood pressure<90 mm	76	50.7
Pulse >110 bpm.	57	38
	64	42.7
NASG removed when		

Blood loss < 50 ml/hr,	64	42.7
Pulse <100 bpm	55	36.7
Systolic blood pressure >100 mmhg	64	42.7
Normal shock index	42	28
Types of knowledge		
Good knowledge	81	54
Poor knowledge	69	46
* Multiple responses are possible		

Table 2

Knowledge NASG among Midwives who were working in Jimma Zone Public Hospitals South West Ethiopia, August 2019.

Attitudes of Midwives towards non-pneumatic anti Shock Garment

Concerning the attitudes of the respondents towards non-pneumatic anti-shock garment, about one hundred five (70%) of the respondents agreed that non-pneumatic anti-shock garment is necessary for the management of postpartum hemorrhage in all settings of health facilities and 7.3% disagree. One hundred one (67.3%) respondents agreed that non-pneumatic anti-shock garment can be used along with standard treatment protocols of postpartum hemorrhage treatment and 9(6%) disagreed. Regarding the total attitude of respondents, about 88(58.7%) had positive attitudes towards non-pneumatic anti-shock garment (Table 3)

Variables	Agree	neutral	Disagree
	No(%)	No(%)	No(%)
The use of non-pneumatic anti shock garment is necessary for the management of postpartum hemorrhage in all settings.	105(70)	34(22.7)	11(7.3)
NASG can used along with standard treatment protocols of postpartum hemorrhage.	101(67.3)	40(26.7)	9(6)
NASG can be applied with minimum procedures in short period of time.	77(51.3)	38(25.3)	35(23.3)
Removal NASG requires a lot of procedures that takes time.	89(59.3)	21(14)	40(26.7)
Anti shock garment is only beneficial to people in the rural areas/primary care settings	19(12.7)	41(27.3)	90(60)
Manual removal of placenta is possible with NASG in place	103(68.7)	23(15.3)	24(16)
Anti-shock garment is effective in patients with cervical lacerations	71(47.3)	55(36.7)	24(16)
The garment should be a must in every health care facility that has maternity service	100(66.6)	19(12.7)	31(20.7)
Types of attitude	Positive	88	58.7
	Negative	62	41.3

Table 3

Attitudes of Midwives towards Non-pneumatic anti-shock garment among Midwives who were working in Jimma Zone Public Hospitals South West Ethiopia, August 2019

Organizational related factors of the Midwives

Concerning to training status of the respondents on non-pneumatic anti-shock garment forty five (30%) of the respondents trained on the use of non-pneumatic anti-shock garment. From the totals about 60(40%) Midwives were working at general hospitals, 86(57.33%) of the respondents said that their hospitals have two and above number of non-pneumatic anti-shock garment and 70(42.7%) participants have NASG guideline in their hospitals (Table 4).

Characteristics	Frequency	Percent
What is the level of your hospital?		21.3
Primary hospital	32	40
General hospital	60	38.7
Tertiary hospital	58	
Training received staffs		
Yes	45	30
No	155	65
How many numbers NASG available at your hospital?	64	42.67
One	86	57.33
Two and above		
Have NASG guideline		
Yes	70	46.7
No	80	53.3

Table 4

Distribution of participants in their organizational among Midwives who were working in Jimma Zone Public Hospitals South West Ethiopia, August 2019

5.5 Factors associated with Midwives knowledge of Non-pneumatic anti-shock garment.

Bivariate logistic regression was carried out to assess possible relationship between knowledge non-pneumatic anti-shock garment and factors associated with it among the Midwives who were working Public hospitals of Jimma Zone.

In this study Midwives who had positive attitude toward the non-pneumatic anti-shock garment were 4.9times more likely to have good knowledge of non-pneumatic anti-shock garment as compared to those who had negative attitude towards non-pneumatic anti-shock garment [AOR = 4.9, 95% CI:(2.06, 11.65)].

The other independent factor that statically associated with Midwives knowledge of non-pneumatic anti-shock garment was training. Midwives who have training on non-pneumatic anti-shock garment were 3.91

times more likely have good knowledge about non-pneumatic anti-shock garment as compared to Midwives who have no training on non-pneumatic anti-shock garment (AOR: 3.91, 95% CI:(1.48, 10.32)].

Midwives' whose hospital had guideline of non-pneumatic anti-shock garment, were 2.57 times more likely have good knowledge of non-pneumatic anti-hock garment than with those Midwives' hospital had no guideline of non-pneumatic anti-shock garment. (AOR: 2.57, 95% CI: (1.13, 5.82)](Table 5).

Characteristics	Categories	Knowledge of NASG		AOR 95%
		Good N (%)	Poor N(%)	
Age respondents in years	20-24	18(12)	13(8.67)	1.00
	25- 29	34(22.7)	39 (26)	0.65(0.23, 1.82)
	30-34	21(14)	8 (5.33)	4.03
	35-39	8(5.33)	9 (6.0)	(0.93,17.4)
				0.36(.83,1.60)
Attitude	positive attitude	65(43.33)	23(15.33)	4.9(2.06, 11.65)
	Negative attitude	16(10.66)	46 (30.66)	1.00
Training on NASG	Yes	43(28.67)	10((6.67)	3.91 (1.48, 10.32)
	No	38(25.33)	59(39.33)	1.00
Educational status Guideline presence	Diploma	18(12.0)	24(16.0)	1.00
	BSc degree	63(42.0)	45(30.0)	2.58(0.91, 7.32)
	Yes	49(32.67)	21(14.0)	2.57 (1.13, 5.82)
	No	32(21.33)	48(32.0)	1.00

Table 5

Multivariable logistic regression showing independent factors of Midwives' knowledge of non-pneumatic anti-shock garment among Midwives working in Jimma Zone Public Hospitals South West Ethiopia, August 2019

Discussion

Non-pneumatic anti-shock garment (NASG) can prevent the postpartum hemorrhage complication by decreasing blood flow to the lower extremities and increasing blood flow to vital organs like brain, heart and lung.

The study revealed that 82.7% of the respondents have heard of the non-pneumatic anti – shock garment and majority of them first heard from the hospitals (54.2%). More than half of the respondents had good knowledge (54%) on non-pneumatic anti-shock garment about the description, its function, criteria for applying and removing and uses of non-pneumatic anti-shock garment. When this finding is compared with other study findings the awareness and the knowledge of the respondents was higher from Ondo state Nigeria in 2015 on 177 Midwives in which 66.67% of the respondents had awareness of non-pneumatic anti-shock garment and 45.80% have good knowledge about non-pneumatic anti-shock (12). However, this finding was lower when compared with the study finding in Bayelsa State Nigeria that all (100%) and Ibadan Nigeria(96%) of the study respondents have heard NASG and 65.18% had good knowledge on non-pneumatic anti-shock garment Bayelsa State and in Sokoto state about 64% respondents had good knowledge respectively(16,13,14). The difference may be due sample size, also may be due to variation in sampling technique used.

Good knowledge of Midwives non-pneumatic anti-shock garment was seen among Midwives who had positive attitude. This implies that Midwives who had positive attitude toward the Non-pneumatic anti-shock garment were 4.9 times more likely to have good knowledge on non-pneumatic anti-shock garment as compared to those who had negative attitude towards Non-pneumatic anti-shock garment. This may be due the fact that Midwives who have positive attitude here is a big tendency to acquire to the knowledge of Non-pneumatic anti-shock garment to utilize to manage postpartum hemorrhage complication as one method because of non-pneumatic anti-shock garment is the best management postpartum hemorrhage complication. [AOR = 4.9, 95% CI:(2.06, 11.65)].

This study showed that good knowledge of Midwives non-pneumatic anti-shock garment was seen among Midwives who took training on non-pneumatic anti-shock garment as compared to those who have no training. Midwives who have training on the non-pneumatic anti-shock garment were 4.9 times more likely have good knowledge about non-pneumatic anti-shock garment than who have no training on non-pneumatic anti-shock garment. This may be due to the fact that attending training can help Midwives to get more knowledge about non-pneumatic anti-shock garment that who never know non-pneumatic anti-shock garment can get the knowledge of it and those who have information before training of NASG can more improve their knowledge of non-pneumatic anti-shock garment[AOR = 4.9, 95% CI:(2.06, 11.65)].

In this study other factor that statically associated with Midwives' knowledge of non-pneumatic was guideline of Non-pneumatic anti-shock garment. Midwives' whose hospital had guideline of non-pneumatic anti-shock garment were 2.57 times more likely have good knowledge of non-pneumatic anti-shock garment as compared to those Midwives' hospital had no guideline of non-pneumatic anti-shock garment. This may be due to the fact that the guideline of the non-pneumatic anti-shock garment contains the knowledge of non-pneumatic anti-shock garment in details. The Midwives that read the guideline can get the knowledge about its functions, criteria of application and removal and parts of NASG (AOR: 2.57, 95% CI: (1.13, 5.82)].

In this study the study participants were only Midwives that incorporated and factors that affecting the knowledge of non-pneumatic anti-shock garment were identified. These factors may not independently influence the knowledge of non-pneumatic anti-shock garment. So to improve these factors are

independently influence the knowledge of NASG, future study should be focus on identifying factors associated with knowledge of the NASG and also included all health care professionals that provide maternity services.

Strength and limitations

The study involved that included all Midwives. The questionnaire was prone to social desirability bias; hence it assesses self-reported regarding utilization of NASG, there might be over-reporting of a behavior. Lack of literature in Ethiopia adequate studies done out of Ethiopia on this topic make discussion difficult and failure to measure statistical significance on factor associated with knowledge of Midwives on Non-pneumatic anti-shock garment

Conclusion

This study showed that of the respondents' Knowledge of non-pneumatic anti shock garment for was low. The study also identified factors statically associated with Midwives knowledge of non-pneumatic anti-shock garment. The factors associated with Knowledge of Midwives about non-pneumatic anti-shock garment were having positive attitude toward NASG; attend training on non-pneumatic anti-shock garment and guideline of non-pneumatic anti-shock garment. Periodic training for health professionals on the use of non-pneumonic anti-shock garment for management of obstetric hemorrhage.

Declaration

Availability of Data and Materials

The spreadsheet data supporting the findings of this work is available at the hands of the corresponding authors

Ethics Statement

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the declaration and its later amendments or comparable ethical standards. Before the commencement of the study, ethical approval was secured from the Jimma University Ethical Review Board. Written informed consent was obtained from all individual participants included in the study.

Consent for publication

The purpose of the study was explained to the study participants at the time of data collection and verbal consent was secured from each participant before the start of data collection. Confidentiality was ensured

by not including names or other identifiers in the data collection tool. The right of the participants to refuse participation or not to answer any of the questions was respected.

Conflict of Interests

All authors declared that they have no conflict of interests.

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Authors' Contribution

Gemechu Terefe and Gadisa Bekele conceived and designed the protocol. Gemechu Terefe, contributed on developing proposal, data analysis, and checked the draft. Gemechu Terefe and Gadisa Bekele prepared manuscript. Both authors read and approved the final paper.

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Abbreviations

ATSM: Active third stage management; NASG: Non-pneumatic Anti-shock Garment; PPH: postpartum hemorrhage; AOR: Adjusted Odd Ratio; JMC: Jimma Medical Center EAO: Extreme adverse outcome:

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