A study on the knowledge and management practices of hypertension in pregnancy among midwives in the different public health centers of Cebu City*

By Maria Carlyn Rodriguez-De Vera, MD and Geraldine Isabella B. Uyheng, MD, FPOGS

Department of Obstetrics and Gynecology, Chong Hua Hospital

ABSTRACT

Background: The Millennium Development Goal (MDG) for 2015 has a target MMR of 52/100,000 live births but this goal has been difficult to achieve. In the Philippines, 11 mothers die everyday from pregnancy related complications, a bulk contributed by Hypertension. Public health midwives sometimes attend to these obstetrical emergencies often in the absence of a physician. This led to the BEmONC program, which addresses the rising morbidities from far-flung areas where resources are scarce, and helps train midwives in essential obstetrical emergency care. The midwives are our allies in providing the best standard of care every mother and child rightfully deserves. Only thru periodic evaluation can we help strengthen the BEmONC program, making it crucial to evaluate the midwives' knowledge and management practices in hypertension to help identify the setbacks that have impeded our progress in achieving the MDG.

General Objective: To assess the knowledge and management practices of midwives in the management of hypertension in pregnancy in accordance to the BEMONC protocol.

Study Design: Descriptive Study

Study Setting: The 69 public health centers of Cebu City

Study population: Public health midwives

Methodology: This is a descriptive study where a survey questionnaire was used and convenience sampling was done. Chi square and Fischer exact tests were employed to compare proportions. Descriptive statistics was used to summarize the data in proportion.

Result: More than 70% of the midwives were knowledgeable regarding expected competencies, where BEmONC-trained midwives were 5-14x more likely to identify appropriate function. However, only a dismal 22-36% will actually administer Magnesium Sulfate, which shows that knowledge is not translated into practice. Also, more than 70% were knowledgeable on the risk factors and danger signs of hypertension. However, only less than 40% knowledge rate was demonstrated in the diagnosis and classification of hypertension in pregnancy. It also showed that midwives agreed to give antihypertensive medications- where Methyldopa was most commonly given. Among those who agreed to give Methyldopa, majority were BEmONC-trained. A number also agreed to give hydralazine and diazepam in the setting of severe preeclampsia and eclampsia, where more non-BemONC midwives agreed. Alarmingly, only less than 50% will refer to a physician in the management of gestational hypertension and mild preeclampsia, and only 50-60% agreed to facilitate hospital transport in the setting of severe preeclampsia and eclampsia.

Conclusion: The BEmONC manual must be updated to keep up with current guidelines and ensure the conversion of knowledge into practice. The BEmONC coverage of training must also be expanded so that all practicing midwives know the protocol. However, the DOH must further strengthen their role in the active surveillance of public health midwives and review the retention of their skills and regular practice of knowledge. Midwives must also be certified proficient, not merely trained. The midwives must also be consulted to explore their problems in the implementation of current guidelines so we can better understand their situation as to why knowledge is not put into practice. By identifying deficiencies, we can improve and address setbacks that have impeded our progress towards achieving the Millennium Development Goal.

Keywords: BEmONC, CPG, DOH, hypertension in pregnancy, knowledge, practices, public health midwives

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INTRODUCTION

Midwives are the frontline health providers in the provision of maternal care especially in far-flung barangays where doctors are scarce. Midwives in public health centers attend to prenatal care and delivery, at times, unexpected obstetrical emergencies, often in the absence of a readily available physician. According to the health statistics of the Cebu City Health Office for the year 2014, midwives delivered 42.87% of the total live births in the city. For 2015, this number grew to 45.86%.[1] This shows the impact and role that midwives play in the society, especially towards the marginalized.

In the Philippines, maternal mortality rate is still notably high, where 11 mothers die everyday from pregnancy related complications, of which hypertension and hemorrhage together account for more than half of the maternal deaths.[2,3] The Millennium Development Goal (MDG) for 2015 has a target maternal mortality ratio of 52/100,000 live births, and while Philippine maternal mortality rate is slowly improving, from 209/100,000 live births in 1993 to 120/100,000 live births in 2013, the government's effort to reach the MDG has not been met.[3,4]

The Cebu City Epidemiology Surveillance and Statistics Unit reported 19 maternal deaths in Cebu City for the year 2014 and alarmingly, 7 of these deaths were due to preeclampsia. In 2015, 11 out of 19 mothers died from complications of eclampsia. This depicts the impact that hypertension has in contributing to maternal morbidity and morality.

In any developing country, public health midwives play an essential role in the care of pregnant patients. Hence, conducting a study on their knowledge and management practices is crucial to help evaluate whether correct standards are being followed. This is to ensure whether midwives remain within the bounds of their expected competencies.

Lohre and Liljevik in Urban, Tanzania did a similar study on knowledge and management practices of hypertension in pregnancy among health care workers. According to the study, the level of knowledge and management of hypertension was low, at 65% and 21%, respectively.[5] To date, there has been no other published study done in the Philippines that evaluates the knowledge and actual management practices of midwives with regards to hypertension in pregnancy.

Knowledge is evaluated because it is vital to practice. Understanding and remaining within expected competencies will help ensure patient safety. The Midwifery Act of 1992 (R.A. 7392) states that that all emergency drugs need to be prescribed by a doctor. However, this has been modified thru Administrative Order 2010-0014 and Republic Act No. 10354 Section 25 which states that midwives are allowed to administer lifesaving drugs such as magnesium sulfate, in accordance with the guidelines set by the DOH, under emergency conditions, when no physician is available, provided that they are appropriately trained and certified.

Knowledge on risk factors for hypertension is evaluated because this helps midwives identify the high-risk population that need closer antenatal surveillance. The need to identify risk factors stems from the 7-fold increase in risk in women with previous preeclampsia, with recurrence rate as high as 50%.[6] Preeclampsia also has a hereditary predisposition where it is identified in 37% of sisters, and 26% in daughters.[7] Women >40 y.o also had twice the risk.[8] Furthermore, the recurrence rate for obese and overweight women are also higher.[9] Likewise, 10% of gestational diabetics will develop preeclampsia, and the likelihood quadruples if the mother is overtly diabetic.[10,11] Primiparity also carries a 2.4 elevated risk of preeclampsia, and this risk triples in women with twins.[12,13]

Furthermore, the BEmONC protocol identifies generalized selling (pitting edema), headache, epigastric pain, vomiting, blurring of vision, dyspnea, and convulsion as danger signs of hypertension.[14-16] Missing a danger sign is a vital opportunity missed to appropriately manage a patient, thus the need for midwives to be adept in this aspect of hypertension.

Correct diagnosis is the foundation for decisions made about treatment. According to a cross sectional study done by Shimkhada et. al on the misdiagnosis of obstetrical cases among urban providers in the Philippines, the prevalence of misdiagnosis was notably high with an overall rate of 29.8%, where the misdiagnosis rate of preeclampsia was 33%.[17]

As first line healthcare providers, it should be a midwife's basic knowledge to know the classification of hypertension in pregnancy so they can correctly diagnose and appropriately refer a patient at the outset. For instance, the BEmONC manual states that mild preeclampsia is diagnosed up to +2 proteinuria; severe preeclampsia +3. However, the Clinical Practice Guidelines (CPG) and the American College of Obstetricians and Gynecologists (ACOG), follows a minimum criteria of +1 for the diagnosis. In fact, it doesn't require proteinuria in the event of symptomatic disease. It is therefore important to evaluate if the BEmONC protocol is at par with current guidelines and whether midwives can correctly diagnose a case to help prevent untoward events.

Furthermore, the BEmONC program has helped train midwives to administer an intramuscular loading dose of Magnesium sulfate. The non-BEmONC midwives are not allowed to give magnesium sulfate without proper training and certification. Because labor and delivery is a more

likely time for convulsions to develop, magnesium sulfate is recommended during labor and 24 hours post partum.[18] The midwives' knowledge on proper administration, side effects and management practices in Magnesium sulfate administration must be evaluated to ensure safe practice.

Lastly, the midwives' actual management practices on hypertension are evaluated to guarantee whether correct standards are being followed. According to the BEmONC protocol - gestational hypertension, mild preeclampsia, should be referred to a physician. Antihypertensive medications should not be started without physician prescription. In the setting of preeclampsia-eclampsia, BEmONC-trained midwives are allowed to administer a 10 gram loading dose of Magnesium sulfate intramuscularly but should immediately refer the patient to a physician and facilitate urgent transport. Investigating actual management practices of midwives in these different clinical situations is crucial because this ultimately affects final maternal and fetal outcome.

RESEARCH QUESTION

What are the knowledge and management practices among public health midwives in the management of hypertension in pregnancy?

OBJECTIVES

General Objective

To assess the knowledge and management practices of public health midwives in Cebu City in the management of hypertension in pregnancy in accordance to the Basic Emergency Obstetrical and Neonatal Care (BEmONC) protocol as set by the Department of Health (DOH).

Specific Objectives

1. To determine the following variables related to the midwives:
    a. Public health midwife population in Cebu City
    b. Mean age of public health midwives
    c. Distribution of public health midwives according to the following variable characteristics.
        c1. BeMONC certification
        c2. Mean years of practice of midwives
        c3. Average number of prenatal consults seen per week
2. To determine the proportion of midwives who, regardless of being certified or not by BEmONC, are considered knowledgeable on the following:
    a. Appropriate functions (based on the BEmONC guideline)
    b. Inappropriate functions (not based on the BEmONC guideline)
3. To determine the proportion between the BEmONC trained and non-BEmONC trained midwives who are considered knowledgeable on the following:
    a. Appropriate functions (based on the BEmONC guideline)
    b. Inappropriate functions (not based on the BEmONC guideline)
4. To determine the proportion of midwives who correctly identified the following knowledge parameters according to their perceived correct answers:
    a. Risk factors for hypertension in pregnancy
    b. Danger signs of hypertension
    c. Proper way of checking the blood pressure
    d. Correct management protocol of a seizure episode
5. To determine the proportion among BEmONC-trained midwives who are knowledgeable on the following parameters:
    a. Proper administration of Magnesium sulfate
    b. Side effects of Magnesium sulfate
6. To determine the proportion of midwives who can identify the correct classification of hypertension in pregnancy based on the case definition as described in the:
    a. BEmONC protocol.
    b. POGS Clinical Practice Guideline.
7. To determine the proportion of non-BEmONC and BEmONC-trained midwives who agreed to a given management practice in dealing with the following diagnosis:
    a. Gestational Hypertension
    b. Mild Preeclampsia
    c. Severe Preeclampsia
    d. Eclampsia

DEFINITION OF TERMS

1. public health midwife
    - in this study, public health midwives are those midwives who serve in the different public health centers in the country.

2. BEmONC
    - The Basic Emergency Obstetric and Essential Newborn Care (BEmONC) is a seven-day training program that strengthens the basic knowledge, skills and attitude of midwives in providing essential emergency obstetric and neonatal care.

3. BEmONC-trained midwife
    - a midwife who claims to have undergone BEmONC training given by the Department of Health

4. Knowledge
    - is subdivided and will be determined based

on the following parameters: midwife function, risk factors and danger signs of hypertension, classification of hypertension, checking the blood pressure, proper administration and side effects of Magnesium Sulfate.

5. Management Practice

- will be determined by the proportion of midwives who correctly answered on the following management protocols of gestational hypertension, mild preeclampsia, severe preeclampsia and eclampsia.

6. Functions of a midwife

- will be determined by giving the respondents the different appropriate and inappropriate functions where they can either answer agree or disagree only, based on their perceived correct answer.

7. Appropriate functions

- are functions that are based on the BEmONC guideline such as:

a. Administration of Magnesium Sulfate intramuscularly
b. Administration of Magnesium sulfate in emergency situation

8. Inappropriate functions

- are functions that are not based on the BEmONC guideline such as:

a. Administration Magnesium Sulfate intravenously
b. Administration of Hydralazine in emergency situation when no physician is available
c. Administration of Diazepam in emergency situation when no physician is available.
d. Administer Magnesium sulfate, even if not certified, as long as it is an emergency.

7. Risk factors for hypertension

- will be measured by a given checklist where respondents can check more than one answer based on their perceived identified risk factor.

8. Danger signs of hypertension

- will be measured by a given checklist where respondents can check more than one answer based on their perceived correct danger sign.

9. Checking for hypertension

- is measured by 2 or 3 item checklist covering the following concepts (best position in blood pressure taking, correct arm used, minimum BP requirement for the diagnosis of gestational hypertension, when to repeat blood pressure measurement, minimum amount of proteinuria to diagnose preeclampsia) based on the BEmONC protocol where the respondents can only choose 1 answer.

10. Classification of hypertension in pregnancy

- will be determined by 7 statements where the midwife identifies the correct diagnosis by checking 1 answer only among the given choices.

11. Management of hypertension in pregnancy

- will be determined by 8 management practices where the midwife can identify more than 1 answer on each given diagnosis (Gestational hypertension, Mild Preeclampsia, Severe preeclampsia, Eclampsia)

12. Management during a seizure episode

- will be determined by 10 knowledge parameters where the midwife can either answer agree or disagree only, based on their perceived correct answer.

13. Proper administration of Magnesium sulfate

- will be determined by 7 statements where the midwife can either answer agree or disagree only, based on their perceived correct answer.

14. Side effects of Magnesium sulfate

- will be determined by 10 enlisted side effects that midwives will identify by answering either agree or disagree only, based on their perceived correct answer.

RESEARCH METHODOLOGY

A. Study Design: Descriptive Study

B. Study Setting: The 69 public health centers under the Cebu City Health Office

C. Study Population:

A total of 77 public health midwives currently serve the different health centers in Cebu City. Out of the 77 midwives, 49 (63%) participated in the study.

C1. Inclusion Criteria:

1. All public health midwives who signed the informed consent, either BEmONC or non-BEmONC trained.

C2. Exclusion Criteria:

1. Those midwives not present at the time of survey.
2. Those midwives who refused to be included in the study.
3. Midwives who belong to the private sector who have their own private practice.

D. Sample Size and Sampling Method:

Convenience sampling was used. All public health midwives who were present at the survey were invited to participate in the study.

E. Data Collection Technique:

A survey questionnaire was used to gather the

needed information regarding knowledge and practice. The questionnaire was constructed in English and pretested before final distribution. Informed consent was obtained prior to questionnaire distribution.

F. Data Processing and Analysis

After the questionnaires were returned, it was checked for completeness. Each survey form was assigned its own code number for identification. Answers to each question were assigned a numerical code, and data entry was done using Microsoft Excel. The gathered data were then analyzed using IBM SPSS statistics version 19. Descriptive statistics was used to summarize the data in proportion and means. Chi square and Fischer exact test were employed to compare proportions. Differences between groups were assessed using percentages. Tables were used to present the summarized data.

G. Plan for Utilization of Results

The findings of this study will be presented and submitted to the Cebu- POGS Chapter Annual Residents' Research Presentation and to the DOH Region 7 first annual Research Congress.

RESEARCH

Midwife population and other variables

There are a total of 77 public health midwives serving 69 public health centers in Cebu City where 63% (49 midwives) of the midwives participated in the study. Majority of participants were from the North, East, and South areas (Table 1).

The mean age of midwives was 46 with a SD± 9.98. Among the participants, more than half (53.1%) were BEmONC trained (Table 2.1).

The majority (72.9%) of public health midwives have been in practice for more than 20 years, with only 4.2% having less than 5 years of experience (Table 2.2). The average number of prenatal consults is more than 30 patients per week (Table 2.3).

Table 2. Distribution of public health midwives according to variable characteristics.

Table 2.1	**BEmONC Certification Centers**	
	No.	**Percent**
BEmONC certified	26	26
Non-BEmONC certified	23	23
Total	49	49
Table 2.2	Mean years of practice	
Less than 5 years	2	4.2
5-10 years	6	12.5
> 10 years	5	10.4
> 20 years	35	72.9
Total	48	100
Table 2.3	Average numbers of prenatal consults seen per week.	
5-10	8	17.4
10-20	7	15.2
> 20	12	26.1
> 30	19	41.3
Total	46	100

Functions of a Midwife

In general, majority of the midwives were generally knowledgeable regarding appropriate and inappropriate functions, where more than 70% correctly identified the appropriate function and more than 82% correctly identified inappropriate function. However, the BEmONC-trained midwives were found to be 5 to 14x more likely to correctly identify appropriate function compared to the non-BEmONC trained midwives (Table 3).

The midwives were then categorized according to BEMONC training (Table 4). Results showed that more non-BEMONC trained midwives were able to correctly disagree on inappropriate practices- such as giving of IV Magnesium (92 vs. 77.3%), IV Diazepam (100 vs. 91.3%), and Magnesium sulfate without proper certification (95.8% vs. 91.3%), although no statistical significance was noted between both groups (Table 4.3-4.6).

Table 1. Public health midwife population in Cebu City

Area	No. of Health Centers	No. of midwives/area	No. of participants	% of participants
North	14	17	12	24.5
West	10	10	6	12.2
East	16	19	12	24.5
South	17	17	12	24.5
Central	12	14	17	14.3
TOTAL	**69**	**77**	**49 (63%)**	**100**

Table 3. Knowledge of BEmONC midwives and non-BEmONC midwives in identifying appropriate and inappropriate functions according to the BEmONC guidelines.

Area	Correct answer	% Correct	p value	Odds ratio [a]
APPROPRIATE FUNCTION				
3.1 Administration of Magnesium Sulfate intramuscularly	Agree	34 **(70.9%)**	.027	*5.238 (95% C.I 1.231- 22.282)*
3.2. Administration of Magnesium sulfate in emergency situation provided they are properly trained and certified.	Agree	37 **(77.1%)**	.005	*14.667 (95% C.I 1.695- 126.903)*
INAPPROPRIATE FUNCTION				
3.3. Administration of Magnesium Sulfate INTRAVENOUSLY.	Disagree	40 **(85.1%)**	.228	*.296 (95% C.I .052-2.711)*
3.4 Administration of intravenous Hydralazine in emergency situation when no physician is available.	Disagree	38 **(82.6%)**	.699	*1.852 (95% C.I .387- 8.871)*
3.5 Administration of intravenous Diazepam in emergency situation when no physician is available.	Disagree	45 **(95.7%)**	.234	*1.095 (95% C.I .965- 1.242)*
3.6 Administer Magnesium sulfate, even if not certified, as long as it is an emergency.	Disagree	44 **(93.6%)**	.609	*.457 (95% C.I .039-5.409)*

a. Odds ratio comparing BeMONC to non-BEmONC

Table 4. The proportion of BEmONC and non-BEmONC trained midwives who are considered knowledgeable regarding appropriate and inappropriate functions.

APPROPRIATE FUNCTION	Correct answer	% Knowledgeable
4.1. Administration of Magnesium Sulfate intramuscularly		
Non-BEmONC certified BEmONC certified	Disagree Agree	56 87
4.2. Administration of Magnesium sulfate in emergency situation provided they are properly trained and certified.		
Non-BEmONC certified BEmONC certified	Agree Agree	60 95.7
INAPPROPRIATE FUNCTION	Correct answer	% Knowledgeable
4.3. Administration of anticonvulsant like Magnesium Sulfate intravenously.		
Non-BEmONC certified BEmONC certified	Disagree Disagree	92 77.3
4.4. Administration of intravenous anti-hypertensive like Hydralazine in emergency situation when no physician is available.		
Non-BEmONC certified BEmONC certified	Disagree Disagree	78.3 87
4.5. Administration of intravenous anticonvulsant like Diazepam in emergency situation when no physician is available.		
Non-BEmONC certified BEmONC certified	Disagree Disagree	100 91.3
4.6. Administer Magnesium sulfate, even if not certified, as long as it is an emergency.		
Non-BEmONC certified BEmONC certified	Disagree Disagree	95.8 91.3

Risk factors for hypertension in pregnancy

Among the risk factors strongly identified by midwives were history of previous preeclampsia (93.8%), family history of preeclampsia (87.5%), and advanced maternal age (81.3%). Likewise, as much 70-75% of midwives correctly identified obesity and pre-pregnancy diabetes mellitus to be risk factors as well. The least identified risk factors were nulliparity (46%) and multifetal gestation (67%) (Table 5).

Danger signs of hypertension

The most frequent danger sign that the midwives identified were blurring of vision (93.8%), convulsion (85.4%), and headache (82.3%). Furthermore, 79.2% correctly identified vomiting and loss of consciousness, while only 70.8% identified dyspnea as a danger sign (Table 6). Notably, only few identified right upper quadrant pain (37.5%) and tea colored urine (33.3%) to be danger signs.

Checking the blood pressure

Overall, less than 70% of the midwives showed knowledge in this aspect of hypertension. Among the respondents, only 69% correctly identified sitting as the best position, 68% correctly answered using the same arm for BP taking, while only 6% correctly answered to repeat the BP after one hour of rest (Table 7). Moreover, only 57% were knowledgeable of the minimum blood pressure requirement needed for diagnosis while only 49% were knowledgeable on the new minimum cut-off of proteinuria needed to diagnose preeclampsia (Table 7).

Table 5. Distribution of midwives according to their perceived risk factors for hypertension in pregnancy.

Risk Factors	No.	Percent
Nulliparity	22	45.8
History of previous preeclampsia	45	93.8
Advanced Maternal Age	39	81.3
Multiple previous pregnancies *	40	83.3
Obesity/BMI >30	34	70.8
Smoking *	31	64.6
Multifetal gestation	32	66.7
Family history of Preeclampsia	42	87.5
Pregestational Diabetes Mellitus	36	75

** NOT a risk factor for hypertension*

Table 6. Distribution of midwives according to their perceived danger signs of hypertension.

Danger signs	No.	%
Headache	40	83.3
Right upper quadrant pain	18	37.5
Difficulty breathing	34	70.8
Blurring of vision	45	93.8
Convulsion/Upward rolling of eyeball	41	85.4
Edema *	38	79.2
Vomiting	38	79.2
Loss of consciousness	38	79.2
Tea-colored urine	16	33.3

** NOT a danger sign for hypertension*

Table 7. Proportion of midwives who correctly answered the proper way of checking the blood pressure

	Correct answer	% knowledgeable
7.1 Best position	Sitting	69.4
7.2 Arm used	Same arm	68.1
7.3 When to repeat BP measurement	After 1 hour of rest	6.1
7.4. Minimum blood pressure requirement for diagnosis	140/90 mmHg	57.2
7.5. Ask for warning signs if diastolic BP persistently >90 mmHG	YES	100
7.6. Minimum amount of protein needed for the diagnosis	+1	49.0

Management of a seizure episode

Overall, the midwives were generally knowledgeable on the supportive care aspect of a seizure episode, where majority correctly agreed to a given appropriate management, where more than 90% will call for medical help and position the woman to the left and 85% agreed on clearing the airway, administering oxygen and referring the patient to a hospital.

Furthermore, among the inappropriate practices given, only a few respondents correctly disagreed about giving Diazepam (59.6%), about giving a maintenance dose of Magnesium sulfate and observing the patient in the health center (43.5%), and to the use soft restraints (19.1%) (Table 8).

Proper Administration of Magnesium Sulfate

Overall, majority of the BEmONC-trained midwives were generally knowledgeable on the correct route, dosage, and technique of Magnesium sulfate administration (Table

Table 8. The proportion of midwives who correctly answered the proper management of a seizure episode.

	Correct answer	% knowledgeable
1. Call for medical help	Agree	97.9
2. Clear airway and or give oxygen at 4-6L/ min	Agree	85.4
3. Position woman on her LEFT side	Agree	95.9
4. Apply soft restraints to avoid undue injuries to the woman	Disagree	19.1
5. Give loading dose of Magnesium Sulfate	Agree	72.3
6. Give anticonvulsant-Diazepam IVTT	Disagree	59.6
7. Monitor vital signs and level of consciousness	Agree	91.8
8. Insert a urinary catheter to monitor urine output	Agree	53.2
9. Once woman is stable, observe closely and monitor VS every 15 minutes in the health center until woman delivers. Continue Magnesium Sulfate.	Disagree	43.5
10. Refer and arrange for transport to a hospital once stable.	Agree	85.4

9). However, only 42.9% were knowledgeable that a maintenance dose of Magnesium sulfate should not be continued after a loading dose has been given. (Table 9).

Side effects of Magnesium Sulfate

Overall, the midwives were generally knowledgeable of the expected side effects of an intramuscular injection, except for bleeding at site where only 40% correctly

Table 9. The proportion of BEmONC-trained midwives who correctly answered the proper administration of Magnesium Sulfate.

	Correct answer	% knowledgeable
1. Magnesium sulfate is given intramuscularly as 10 grams (5 grams each buttock), 50% solution as an initial loading dose	Agree	100
2. Continue giving maintenance dose of Magnesium sulfate of 5 grams intramuscularly, alternating buttocks, every 4 hours.	Disagree	42.9
3. The preferred area for injecting magnesium sulfate is in the upper outer quadrant of the buttock, using the Z track technique.	Agree	95.2
4. Magnesium sulfate may also be given in the deltoid area if patient requests.	Disagree	86.4
5. Insert the needle into the muscle. Hold the syringe barrel tightly and inject the needle through the skin and into the muscle at a 90 degree angle.	Agree	80
6. Before injecting, pull on the plunger a little to make sure you did not hit a blood vessel.	Agree	95.5
7. If blood comes back after pulling on the plunger, withdraw the needle a little before injecting the medicine.	Disagree	63.6

Table 10. The proportion of BEmONC-trained midwives who correctly identified the side effects of Magnesium Sulfate.

	Correct answer	% knowledgeable
AN INTRAMUSCULAR INJECTION CAN CAUSE:		
1. Infection	Agree	75
2. Bleeding at site	Agree	40
3. Numbness	Agree	81
4. Pain	Agree	90
SIDE EFFECTS TO BE REFERRED TO A DOCTOR:		
5. Rash or itching may develop	Agree	Agree
6. Shortness of breath	Agree	Agree
7. Mouth, lips or face swells (anaphylactic reaction)	Agree	Agree
8. Decrease in urine output	Agree	Agree
9. Decrease in DTR (Deep Tendon Reflexes)	Agree	Agree
10. Feeling of warmth in the body	Disagree	Disagree

Table 11. Proportion of midwives who answered the correct case definition in the diagnosis of hypertension in pregnancy as defined in the BEmONC protocol.

Case Definition	Correct answer	% knowledgeable
11.1. Elevated blood pressure > 140/90 mmHg on two separate occasions after 20 weeks AOG, in the ABSENCE of proteinuria	Gestational Hypertension	43.5
11.2. Elevated blood pressure > 140/90 mmHg on two separate occasions after 20 weeks AOG, in the PRESENCE of proteinuria	Preeclampsia	30.4
11.3. In a pregnant woman with elevated blood pressure and tonic clonic seizures, the diagnosis is:	Eclampsia	46.9

identified it (Table 10). Furthermore, majority of the side effects that needs to be referred to a doctor were all correctly identified by the midwives such as shortness of breath (100%), anaphylaxis (85.7%), decrease in urine output (85.7%), rashes (81%), and decreased DTR (76.2%) (Table 10).

Diagnosis and Classification of Hypertension

In the classification of hypertension that is based on the BEmONC protocol, majority of the midwives were unable to identify the correct diagnosis based on the given case definition, where only 43.5% identified gestational hypertension, 30.4% identified preeclampsia, and 46.9% identified eclampsia (Table 11).

In the classification of hypertension that is based on the POGS Clinical Practice Guidelines, the majority of midwives were also unable to identify the correct diagnosis – where only 20% correctly diagnosed preeclampsia, and 38.8% correctly diagnosed eclampsia. Furthermore, only 8.9% got a correct diagnosis of superimposed preeclampsia, and only 6.4% got a correct diagnosis of chronic hypertension (Table 12).

Table 12. Proportion of midwives who answered the correct case definition in the diagnosis of hypertension in pregnancy as defined in the Clinical Practice Guidelines

Case Definition	Correct answer	% knowledgeable
12.1. Elevated BP >160/110 with headache, blurring of vision, and epigastric pain, after 20 weeks AOG, without proteinuria	Preeclampsia	20
12.2. Patient is a known hypertensive prior to pregnancy, and presents with worsening blood pressure during current pregnancy, accompanied by new onset proteinuria	Superimposed Preeclampsia	8.9
12.3. Elevated BP of >140/90 on two separate occasions before 20 weeks AOG	Chronic Hypertension	6.4
12.4. Elevated BP, with history of upward rolling of eyeball and loss of consciousness	Eclampsia	38.8

Management Practices

a. Gestational Hypertension

In the management of gestational hypertension, only 48.9% of the respondents correctly answered to refer to a physician for further management with no statistical significance noted between both groups of midwives (Table 13.7).

Furthermore, 45.8% of the respondents answered to observe and closely follow up the patient only. Moreover, 41.7% of the respondents agreed to give Methyldopa, while 6.3% agreed to give Nifedipine. Among those who agreed to give Methyldopa, 45.4% of the BEmONC trained midwives will give it, while only 38.4% of the non-BEmONC midwives do (Table 13.2). No statistical significance was noted between both groups.

b. Mild Preeclampsia

In the management of Mild Preeclampsia, only 46.8% will correctly refer to a physician for further management, where 52% of the non-BEmONC midwives will refer and only 40.9% of the BEmONC midwives do (Table 14.7).

Furthermore, results showed that midwives agreed to give antihypertensive medications like Methyldopa (53.1%) and Nifedipine (4.3%). Among those who agreed to give Methyldopa, 68.1% of the BEmONC midwives will give it while only 40% of the non-BEmONC midwives do (Table 14.2).

Moreover, the rest will only observe (38%), will refer the patient to the hospital (12.8%), and will give a loading dose of Magnesium sulfate (2.1%) (Table 14).

c. Severe Preeclampsia

In the management of severe preeclampsia, result showed that only 59.6% of the midwives correctly agreed to refer to a physician, where BEmONC trained midwives were 4x more likely to refer to a physician for further management (Table 15.7). Moreover, only 55.3% agreed to refer and transport the patient to a hospital. Strikingly, only 36% of the BEmONC trained midwives agreed to give a loading dose of Magnesium sulfate. (Table 15.6).

Furthermore, results have shown that a number of midwives agreed to administer Methyldopa (21.3%), Nifedipine (2.1%), Hydralazine (6.4%), and Diazepam (2.1%) (Table 16.2-16.5). Among those who agreed to give Methyldopa and Hydralazine, majority was non-BEmONC trained, although no statistical significance was noted. Moreover, 12.8% of the total midwife population will do observation alone.

d. Eclampsia

In the management of eclampsia, only 61.7% correctly agreed to refer to a physician while 51% agreed

Table 13. Proportion of non-BEmONC and BEmONC trained midwives who agreed on the following different management practices in Gestational hypertension.

Management Practice	% non-BEmONC who agreed	% BEmONC who agreed	% Total Midwives who agreed	p value	Odds ratio[a]
13.1. Observe only. Close follow up	46.15	45.5	45.8	1.000	.972 (95% C.I .311-3.039)
13.2. Give Methyldopa	38.4	45.4	41.7	.770	1.3 (95% C.I .421-4.222)
13.3. Give Nifedipine	3.8	9.09	6.3	.587	2.5 (95% C.I .211-29.598)
13.4. Give Hydralazine	0	0	0	NA	NA
13.5. Give Diazepam	0	0	0	NA	NA
13.6. Give loading dose of Magnesium sulfate	0	0	0	NA	NA
13.7. Refer to a physician for further management *	46.1	52.3	48.9	.772	1.4 (95% C.I .448-4.376)
13.8. Refer to a physician and transport urgently to a hospital	11.5	4.54	8.3	.614	.365 (95%C.I .035-3.787)

** correct answer*

a. Odds ratio comparing BeMONC to non-BEmONC

Table 14. Proportion of non-BEmONC and BEmONC trained midwives who agreed on the following management practices in Mild Preeclampsia

Management Practice	% non-BEmONC who agreed	% BEmONC who agreed	% Total Midwives who agreed	p value	Odds ratio[a]
14.1. Observe only. Close follow up	36	40.9	38.2	.771	1.231 (95% C.I. .379-4.000)
14.2. Give Methyldopa	40	68.1	53.1	.080	3.214 (95% C.I .996-10.695)
14.3. Give Nifedipine	8	0	4.3	.491	.511 (95% C.I .384-.680)
14.4. Give Hydralazine	0	0	0	NA	NA
14.5. Give Diazepam	0	0	0	NA	NA
14.6. Give loading dose of Magnesium sulfate	0	4.5	2.1	.468	457 (95% C.I .333-.626)
14.7. Refer to a physician for further management *	52	40.9	46.8	.561	.639 (95% C.I .201-2.032)
14.8. Refer to a physician and transport urgently to a hospital	16	9.09	12.8	.670	525 (95% C.I .086-3.190)

** correct answer*

a. Odds ratio comparing BeMONC to non-BEmONC

Table 15. Proportion of non-BEmONC and BEmONC trained midwives who agreed on the following management practices in Severe Preeclampsia

Management Practice	% non-BEmONC who agreed	% BEmONC who agreed	% Total Midwives who agreed	p value	Odds ratio[a]
15.1. Observe only. Close follow up	12	13.6	12.8	1.000	1.158 (95% C.I. .209-6.428)
15.2. Give Methyldopa	28	13.6	21.3	.297	.406 (95% C.I .091-1.817)
15.3. Give Nifedipine	0	4.5	2.1	.457	.511 (95% C.I .333-.626)
15.4. Give Hydralazine	8	4.5	6.4	1.000	.548 (95% C.I .046-6.489)
15.5. Give Diazepam	4	0	2.1	1.000	.522(95% C.I .396-.688)
15.6. Give loading dose of Magnesium sulfate *	4	36.3	19.1	.008	13.714 (95% C.I 1.549-121.424)
15.7. Refer to a physician for further management *	44	77.2	59.6	.036	4.327 (95% C.I 1.213-15.439)
15.8. Refer to a physician and transport urgently to a hospital *	56	54.5	55.3	1.000	.943 (95% C.I .298-2.985)

** correct answer*

a. Odds ratio comparing BeMONC to non-BEmONC

to transport the patient to a hospital (Table 16.7-16.8). Moreover, results also showed that only 22.7% of the BEmONC-trained midwives agreed to give loading dose of Magnesium sulfate (Table 16.6).

Furthermore, results have also shown that a number of midwives agreed to give Methyldopa (23.4%), Nifedipine (8.5%), and Hydralazine (4.25%) (Table 15.2-15.4). Among those who agreed to give Methyldopa and Hydralazine, majority were non-BEmONC trained, although no statistical significance was noted between both groups. Strikingly, 14.9% of the total midwife population will dangerously do observation alone.

DISCUSSION

Functions of a Midwife

Knowledge is evaluated because it is vital to practice. Understanding expected competencies will help ensure patient safety. In general, majority was knowledgeable regarding their expected functions, where BEmONC-trained midwives were 5 to 14x more likely to identify appropriate function compared to their non-BEMONC counterparts. This finding supports the importance of undergoing a BEmONC training.

However, although majority was able to correctly identify inappropriate practice, there were still a number of midwives, albeit a small percentage, which agreed to it. Although only a few midwives deviated from correct practice, the number is real. Statistically, this may be insignificant, but clinically it counts, because even if only 1 or 2 midwives adhered to wrong practice, this may have an impact on patient safety. This may also contribute to additional morbidity if complications arise in the absence of a physician.

Risk factors for Hypertension

Overall, it is good to know that majority was able to identify the risk factors for hypertension despite its lack of emphasis in the BEmONC protocol. This probably reflects good midwifery training and background. However, it should be stressed that the risk factors for hypertension should be more emphasized in their current protocol to help midwives identify the high-risk population that need closer antenatal surveillance.

Danger signs of Hypertension

Majority of the midwives were knowledgeable regarding the danger signs of hypertension that was mentioned in the BEmONC protocol. However, there are other danger signs that warrant attention. Notably, only 33-37% of midwives identified right upper quadrant pain and tea colored urine to be danger signs. However, the former and latter were not included in the BEmONC manual, which might explain the poor scores.

Perhaps, significant to the interpretation of these results are the number of midwives who missed a danger

Table 16. Proportion of non-BEmONC and BEmONC trained midwives who agreed on the following management practices in Eclampsia.

Management Practice	% non-BEmONC who agreed	% BEmONC who agreed	% Total Midwives who agreed	p value	Odds ratio[a]
16.1. Observe only. Close follow up	12	18.6	14.9	.690	1.630 (95% C.I. .322-8.246)
16.2. Give Methyldopa	24	22.7	23.4	1.000	.931 (95% C.I .240-3.612)
16.3. Give Nifedipine	12	4.5	8.5	.611	.349 (95% C.I .034-3.628)
16.4. Give Hydralazine	4	4.5	4.25	1.000	1.143 (95% C.I .067-19.424)
16.5. Give Diazepam	0	0	0	NA	NA
16.6. Give loading dose of Magnesium sulfate *	12	22.7	17.02	.446	2.157 (95% C.I .451-10.316)
16.7. Refer to a physician for further management *	52	72.7	61.7	.229	2.462 (95% C.I .724-8.364)
16.8. Refer to a physician and transport urgently to a hospital *	48	54.5	51.06	.772	1.300 (95% C.I .412-4.101)

** correct answer*

a. Odds ratio comparing BeMONC to non-BEmONC

sign. This may have a clinical impact because such failure may result in delayed diagnosis that will likely result in poor outcome. It must be stressed that failure to detect a danger sign is a vital opportunity missed, thus the need to be adept in this aspect of hypertension.

Checking the Blood Pressure

Overall, less than 70% of the midwives were knowledgeable on the basic tenet of the proper way of blood pressure measurement. Clearly, basic knowledge on BP taking needs to be reinforced. The poor scores might also be due to heavy patient load that pushes midwives to adhere to incorrect practice to help save time.

Furthermore, the midwives also showed poor knowledge on the minimum blood pressure requirement and proteinuria needed to make a diagnosis. According to the current guidelines in preeclampsia followed by obstetricians, it only requires +1 proteinuria for the diagnosis. If we follow the outdated criteria of BEmONC that requires +3 proteinuria, it may be an avenue for delayed diagnosis and treatment. In fact, current guidelines do not require proteinuria in the event of symptomatic disease. This reflects the growing understanding that preeclampsia affects multiple organ systems and that renal involvement is not necessarily required. Results clearly show that some aspects of the BEmONC protocol, especially on the diagnosis of preeclampsia, clearly needs to be redefined.

Management of a seizure episode

Although midwives were generally knowledgeable on the supportive aspect of a seizure episode, incorrect knowledge on some aspects of management was uncovered. Results showed that only 59.6% correctly disagreed to give diazepam and only 19.1% correctly disagreed to use soft restraints. Furthermore, only 43.5% were knowledgeable that it is incorrect to give a maintenance dose of Magnesium sulfate and further observe a woman in the health center after a seizure episode. Even if only a few midwives agreed to incorrect practice, this may still pose a threat to patient safety.

Proper administration and side effects of Magnesium Sulfate.

Results showed that majority of the BEmONC midwives were generally knowledgeable on the proper administration and side effects of Magnesium sulfate, which is a sign of good practice.

However, results have also shown that only 42% of the BeMONC-trained midwives correctly disagreed in giving a maintenance dose of Magnesium sulfate. Factors as to why some midwives agree to continue Magnesium sulfate, instead of referring these patients to the hospital, should be explored because it is clearly dangerous to keep a preeclamptic woman in the health center. Perhaps, the lack of knowledge or the lack of resources to immediately transport patients to the hospital may contribute to this practice.

Diagnosis and Classification of Hypertension

Overall, the midwives showed poor knowledge in the diagnosis and classification of hypertension based on the BEmONC protocol and CPG guidelines. This proves that the BEmONC manual clearly needs to be updated and should be based on current knowledge principles that guide the present obstetrical practice.

The poor results are understandable because the new classification of hypertension in pregnancy is not yet incorporated into their current BEmONC manual. This is also consistent with the study of Shimkhada et al. about the misdiagnosis of obstetrical cases among urban providers in the Philippines, where the prevalence of misdiagnosis was notably high. However, critical to any treatment outcome is, first and foremost, a correct diagnosis. It is important that midwives are able to classify these patients correctly so they can appropriately refer them. A wrong diagnosis is worrisome because of the high maternal and fetal sequealae of preeclampsia and eclampsia.

Management Practice

There is a trend, although not statistically significant, that more BEmONC-trained midwives will give Methyldopa, while more non-BemONC trained midwives will correctly refer to a physician in the management of gestational hypertension and mild preeclampsia. Perhaps the BEmONC-trained midwives were more aggressive in starting antihypertensive medications, while the non-BEmONC midwives remained conservative and fearful in their management.

Furthermore, in the management of severe preeclampsia and eclampsia, results showed that only 51-55% agreed to refer and transport patients to the hospital. This is clinically significant because of the anticipated morbidity of severe preeclampsia and eclampsia if these patients are further managed only at the health center.

Strikingly, only 22-36% of the BEmONC-trained midwives agreed to administer a loading dose of Magnesium Sulfate in the setting of Severe Preeclampsia and Eclampsia. The importance of magnesium sulfate cannot be overemphasized especially in the event of symptomatic disease. Omitting magnesium sulfate in these clinical circumstances is dangerous practice. Factors such as drug availability, personal confidence, fear of side effects, or the lack of knowledge must be explored as to why these BEmONC-trained midwives will disagree to give Magnesium sulfate despite being trained for that purpose.

Furthermore, more non-BEmONC midwives agreed

to give Hydralazine in the setting of severe preeclampsia and eclampsia, but not in gestational hypertension and mild preeclampsia. This may probably be attributed to fact that non-BEmONC midwives lack the competency to administer Magnesium sulfate, therefore pushing these midwives to give another drug alternative, like Hydralazine, especially in the event of symptomatic disease. Again this emphasizes the importance and need of proper BEmONC training.

CONCLUSION

In general, majority of the midwives were generally knowledgeable regarding their expected functions, where BEmONC-trained midwives were 5-14x more likely to identify appropriate function. The BEmONC midwives were also 4x more likely to refer to a physician for further management in the setting of severe preeclampsia. These findings support the importance and advantage of a BEmONC training.

Furthermore, the midwives were also generally knowledgeable on the risk factors (70-90%), danger signs (70-90%), proper administration and side effects of Magnesium sulfate (75-100%), and the supportive management of a seizure episode (85-97%). However only few had knowledge regarding unacceptable practices - such as the use of soft restraints (19%), use of diazepam (59%), and the danger of observing a woman in the health center after a seizure attack (43%).

Moreover, several aspects on knowledge clearly need reinforcement and emphasis, such as the importance of giving a loading dose of Magnesium sulfate especially among the BEmONC-trained midwives. Furthermore, the midwives also showed poor knowledge on the minimum blood pressure and proteinuria requirement needed for the diagnosis of preeclampsia. Midwives also showed poor knowledge on the definition and classification of hypertension in pregnancy based on their own BEmONC protocol (only 30-46% knowledge) and that based on the Clinical Practice Guidelines (only 6-38% knowledge).

In actual management practice, the most common antihypertensive used by midwives was Methydopa – where more BEmONC trained midwives agreed to give it in gestational hypertension and mild preeclampsia, while more non-BeMONC midwives agreed to give it in severe preeclampsia and eclampsia. Likewise, the midwives also agreed to give Hydralazine (4-6%) in the setting of severe preeclampsia and eclampsia, but not in gestational hypertension and mild preeclampsia.

Strikingly, only 36% of BeMONC-trained midwives agreed to administer a loading dose of Magnesium Sulfate in the management of severe preeclampsia and only 22% agreed to give it in eclampsia. This is clinically relevant since the importance of Magnesium should not be overemphasized.

Finally, the midwives are our allies in bringing the best standard of care to women in the management of hypertension in pregnancy. By identifying deficiencies, we can improve and address the setbacks that might have impeded our progress towards achieving the Millennium Development Goal.

LIMITATIONS OF THE STUDY

I intended to sample all 77 public health midwives, but because of the difficulty of locating these midwives, especially the ones assigned in far-flung barangays, only a 63% participation rate was obtained.

Furthermore, since this is a pilot study on knowledge and management practice of midwives, those midwives belonging in the private sector were not yet included in this study to maintain a more homogenous population.

Lastly, since some inappropriate practices were explored in this survey, there might be a chance that midwives might not provide an honest response of their actual management practice due to fear investigation or reprimand.

RECOMMENDATIONS

First, the BEMONC manual should be updated, to keep up with current knowledge at par with the prevailing obstetrical guidelines in the management of hypertension. More emphasis on risk factors must be placed and other danger signs of hypertension must be expanded and emphasized – such as change in mental status, tea colored urine and right upper quadrant pain. Likewise, the current classification of hypertension in pregnancy must be introduced to the midwives thru revision of their BEmONC protocol manual.

Furthermore, midwives serve as frontline health care providers and play a role in referring high-risk pregnancies at a primary care level. Correct diagnosis is tantamount to a good outcome. Therefore, it is paramount that their knowledge be supplemented thru workshops and conferences to introduce new updates in the management of hypertension.

Secondly, BEmONC training must be encouraged, but we must re-evaluate why knowledge is not translated into actual practice among the BEmONC trained midwives. Administration of Magnesium sulfate is lifesaving and its importance should be emphasized among these midwives.

Third, The DOH must play a vital role in the active surveillance of public health midwives to ensure that they stay within the bounds of their expected competencies.

Measures should be taken to ensure that midwives are certified-proficient, not just trained, so they can take full advantage of the benefits of BEmONC training.

Lastly, it should be stressed, that high-risk pregnancies must be referred at all cost. Factors that hinder these referrals and ways to address this may be recommended in other future studies alike. Furthermore, to get an even better yield of knowledge and management practice, the number of respondents should be increased to include the midwives who belong in the private sector. ■

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