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**ORIGINAL ARTICLE**

## Knowledge, Perception and Management of Pre-eclampsia among Health Care Providers in a Maternity Hospital

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### ABSTRACT

**Background:** Morbidity and mortality of women and children associated with pre-eclampsia present major global health problems in low and middle income countries. The prevalence of pre-eclampsia in Nigeria ranges from 2% to 16.7%, with approximately 37,000 women dying from preeclampsia annually. This study examines knowledge, perception and management of preeclampsia among healthcare providers in a major maternity hospital in Lagos, southwest Nigeria.

**Methods:** In this descriptive cross-sectional study, 110 health care providers comprising of 75 Nurses, 9 Consultant Physicians, and 26 General Medical Practitioners with varying years of service were selected using purposive sampling technique. Data were collected using a self-administered 36-item semi-structured questionnaire. Data were analysed using the Statistical Package for Social Sciences to generate descriptive and inferential statistics with level of significance set at 0.05.

**Results:** Health care providers in the study had an average knowledge of pre-eclampsia with a mean score of  $16.69 \pm 3.53$ . There was generally a good perception of pre-eclampsia with a mean score of  $28.31 \pm 3.71$ . The most-prevalent clinical management practices were emergency cesarean section (16%), magnesium sulphate infusion (29%), and fluid/electrolyte management (9%). Knowledge of pre-eclampsia and years of practice were significantly associated ( $F=3.31$ ;  $p=0.023$ ).

**Conclusion and Global Health Implications:** Gaps in the knowledge of causes, diagnoses, and treatment of pre-eclampsia may be attributable to lack of refresher trainings and absence of written practice guidelines on pre-eclampsia management. Health care providers at this hospital may benefit from training courses that include current nationally and internationally-approved management of pre-eclampsia.

**Key words:** Pre-eclampsia • Eclampsia • Knowledge • Perception • Management • Health care providers • Nigeria

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## I. Background and Introduction

The morbidity and mortality of women and children associated with pre-eclampsia are major public health problems especially in low and middle income countries.<sup>1</sup> Forty percent of pregnant women experience delivery complications during labor and/or during preconception.<sup>2</sup> Worldwide, 2-10% of women are affected by pre-eclampsia and between 0.03 to 0.05% are affected by eclampsia.<sup>3</sup> Globally, the incidence of preeclampsia ranges between 2% and 10% of pregnancies and the incidence of preeclampsia, the precursor to eclampsia, varies greatly. The incidence of eclampsia in the developed countries of North America and Europe is similar and estimated to be about 5–7 cases per 10,000 deliveries.<sup>4</sup> Pre-eclampsia has remained a public health threat to both developing and developed countries as World Health Organization (WHO) states that the incidence is seven times higher in developing countries (2.8% of live births) than in developed countries (0.4% of live births).<sup>5</sup> The higher incidence of pre-eclampsia in developing countries is due to missed opportunities in preventing hypertension-related disorders due to substandard quality of care delivered in those countries, such as Nigeria, Tanzania, and Ethiopia.<sup>6</sup>

For example, in Nigeria, the prevalence of pre-eclampsia ranges from 2% to 16.7%, with approximately 37,000 women dying from pre-eclampsia annually.<sup>7</sup> In Northern Nigeria, pre-eclampsia accounts for 40% of maternal deaths with significant correlation to poor knowledge of health care providers and poor referral system, while in Southern Nigeria, prevalence rate of pre-eclampsia is between 5.6% and 7.6%.<sup>8</sup> Reports have shown that risk factors for pre-eclampsia may include low-socio economic status, poor diet (diet low in vitamins C and E), poor access to antenatal care, past history of pregnancy induced hypertension, abject poverty, poor reproductive care seeking behavior, lack of access to quality maternal services and low level of knowledge of health care providers.<sup>9</sup> Two prior studies in Osun State and Ogun State examining the knowledge and management of pre-eclampsia by community health workers found that, although community health workers had basic knowledge of pre-eclampsia,

they lacked confidence in detection and appropriate management.<sup>10,11</sup> The studies called for further research on knowledge level and identification of the management practices of community health workers in other states in Nigeria.<sup>10,11</sup> To our knowledge, no prior studies have assessed the knowledge level and management of pre-eclampsia among health care providers in Lagos State. This study will provide viable information to the body of knowledge, and provide potential recommendations to reduce maternal mortality due to preeclampsia in Nigeria.

### 1.1. Objective of the study

The objective of this study was to assess the knowledge, perception and management of pre-eclampsia among health care providers in Lagos Island Maternity Hospital. Specifically, we sought to determine the level of knowledge of health workers on pre-eclampsia; and identify how health workers managed pre-eclampsia at the maternity hospital. We hypothesized that there would be a significant association between knowledge of pre-eclampsia and the health care provider years of service. The study independent variables were knowledge and perception, while the dependent variable was management of pre-eclampsia.

## 2. Methods

This was a descriptive cross-sectional study. In all 110 health care providers comprising of 75 Nurses, 9 Consultant Physicians, and 26 General Medical Practitioners with varying years of practice experience were enrolled in the study using purposive sampling technique.

### 2.1. Study setting

Lagos Island General Hospital, also known as the Island Maternity Hospital, is located in Odan, Lagos Island in Lagos State, southwest Nigeria. It is one of the several general hospitals of Lagos State. It is a public health care system on the secondary level of health funded by the federal government of Nigeria. The hospital provides several services such as the general out-patient services, surgery, obstetrics and gynaecology. The hospital performs about 270 deliveries monthly and 3500 deliveries yearly.<sup>12</sup>

## 2.2. Sampling technique

The study population consisted of health care providers in the department of obstetrics and gynaecology. The number of health care providers within the health institution is 140. This population was selected based on their high level of literacy and knowledge in certain reproductive health conditions. All the health care providers in the hospital were invited to participate in the study (Table 1).

## 2.3. Instrumentation

A 36-item semi-structured questionnaire self-administered questionnaire was used to collect the information from the health care providers. This questionnaire contained four sections A, B, C, and D. Section A focused on the demographic data of respondents which include age, sex and medical position. Section B focused on the level of knowledge on pre-eclampsia question such as definition of pre-eclampsia, blood pressure level considered to be hypertension in pregnancy, trimester affected by pre-eclampsia, symptoms of pre-eclampsia, organs affected by pre-eclampsia, and essential nutrients to prevent pre-eclampsia. Section C focused on the perception of health care providers on pre-eclampsia such as eclampsia not being a severe or serious condition; young women were not susceptible to developing pre-eclampsia; convulsion during pregnancy is hereditary to the unborn child; pre-eclampsia being preventable, the prevention of pre-eclampsia as the duty of only the pregnant woman, referral should be based on immediate diagnosis of pre-eclampsia, pregnant women should not be educated on the risk factors of pre-eclampsia, up-to-date trainings will help to improve the knowledge and management practices

**Table 1: Specialty and Categories of Health Care Providers in the Study**

Department/Specialties	Number of Health Providers
Nurses ( includes Registered Nurses and Midwives)	75
Consultants (Medicine)	9
General Practitioners	26
<b>Total</b>	<b>110</b>

of health care providers and pre-eclampsia cannot be managed. Section D focused on the management practices provided by health care providers question such as awareness of the existence of standardized World Health Organisation (WHO) guidelines for the management of pre-eclampsia, three drugs stated by the WHO guidelines for the control of blood pressure in a pregnant woman, the standard dose of magnesium sulphate given for the management of pre-eclampsia, signs of magnesium sulphate toxicity, antidote for magnesium sulphate overdose, and how WHO standard guideline for management of pre-eclampsia was applied in the hospital.<sup>13</sup> The reliability index of the questionnaire was 0.72 Cronbach's Alpha.

## 2.4. Measures

### 2.4.1. Knowledge scores

Knowledge scores were computed using 0 for the wrong answer and any other higher number for the correct answer for the knowledge questions on a 26 point scale rating. The maximum score obtainable was 26 while the minimum score was 0. Scores from 0-11 show "low level of knowledge," scores from 12-19 show "average level of knowledge" and scores from 20-26 show "high level of knowledge."

### 2.4.2 Perception scores

Perception scores were computed by awarding 3 marks for each correct answer to 12 statements which assessed respondents' perception of pre-eclampsia on a 36 point scale rating. For each item, there were four responses; Strongly Agree, Agree, Disagree and Strongly Disagree. Scores from 0-8 indicate "low perception;" scores from 9-17 indicate "moderately low perception;" scores from 18-27 indicate "average perception" and scores from 28-36 indicate "high perception."

### 2.4.3 Administration of study Instruments

The researcher administered the questionnaire with the help of two female research assistants over a period of 2 weeks (from February 8 - 21 2018). The 140 questionnaires were shared in the hospital to the respondents who were in their offices during the day of visit. Respondents were approached and informed

consent was obtained from each respondent. After completion, the questionnaires were retrieved from the respondents and returned to the researcher. Of the 140 healthcare providers in the hospital, 110 consented and participated in the study yielding a 78.6% survey response rate for the study.

**2.2. Statistical analysis**

The data collected from the respondents were analysed to determine percentages, mean, standard deviation, F-test (Analysis of Variance), and Chi-square using Statistical Package for Social Sciences (SPSS) version 21.<sup>14</sup> Ethical approval and permission to conduct the study was obtained from the Babcock University Health Research Ethical Committee (BUHREC). The consent process included introduction of the research and explanation of the objectives of the study. The participants were informed of their rights as study participants including the right to privacy to ensure that they were not forced to participate in the study; right to formal consent to ensure that their permission was sought before administering the questionnaires; and right to confidentiality, to ensure that the information provided was treated with utmost respect and confidentiality throughout the study.

**3. Results**

**3.1. Socio demographic characteristics of respondents**

Table 2 presents the socio-demographic characteristics of respondents. Majority 49(44.5%) of the respondents were aged between 30 and 34 years, while five of them were between 55-59 years of age with a mean age of 35.45±7.622. Seventy-eight of the respondents were females. Among the respondents, there were 44 Nursing officers and 9 medical consultants. Few of the respondents 14 (14 %) had practiced between 17 years and above.

**3.2. Knowledge and perception of pre-eclampsia**

Table 3 presents the knowledge levels of pre-eclampsia among the respondents. Sixteen of the respondents (14.5%) had high level of knowledge, while 18(16.4%) had low level knowledge. The

**Table 2: Socio-Demographic Characteristics of Respondents**

Variables	Frequency (110)	Percent (%)
<b>Age</b>		
Mean age-35.45±7.62		
20-29	26	23.6
30-39	49	44.5
40-49	30	27.3
50-59	5	4.5
<b>Sex</b>		
Male	32	29.1
Female	78	70.9
<b>Medical Position</b>		
Nursing officer	44	40
Matron	13	11
Nursing sister	18	16
Consultant	9	8
Medical doctor	26	23
<b>Years of Service</b>		
< 5 years	39	35
5 to 10 years	39	35
11 to 16 years	18	16
17+	14	14

respondents mean score for knowledge of pre-eclampsia was 16.69±3.53. This translates to 64.2% knowledge prevalence among the participants.

Table 4 presents the perception level of pre-eclampsia among the respondents. Seventy-four of the respondents (67.3%) had high perception of pre-eclampsia while 2 had low perception of pre-eclampsia. The mean score for perception was 28.309±3.7114.

**3.3. Awareness of WHO Guidelines on management of pre-eclampsia**

Table 5 presents the awareness to globally-approved management of pre-eclampsia among the respondents. Seventy-one of the respondents (64.5%) had high awareness of WHO management guidelines for pre-eclampsia, while 6 (5.5%) had low awareness of management of pre-eclampsia. The respondents mean score for awareness of WHO management guidelines for pre-eclampsia was 10.93±2.45.

**Table 3: Frequency Distribution of Respondent's Knowledge on Pre-eclampsia**

S/N	Variable	Frequency (n=110)	Percent (%)
<b>1</b>	<b>What is Pre-eclampsia?</b>		
	Pregnancy specific disorder with High blood pressure and significant proteinuria and swelling of both feet and face.	86	78.2
<b>2</b>	<b>What population is affected by Pre-eclampsia?</b>		
	Pregnant women	110	100
<b>3</b>	<b>What trimester of pregnancy is affected by Pre-eclampsia?</b>		
	2 <sup>nd</sup> Trimester	57	51.8
	3 <sup>rd</sup> Trimester	50	45.5
<b>4</b>	<b>Blood Pressure considered to be hypertensive</b> 140/90MMHg	82	76
<b>5</b>	<b>Symptoms of Pre-eclampsia</b>		
	Blurry vision	42	38.2
	Headache	95	86.4
	Nausea	62	60.9
	Epigastric Pain	42	38.2
<b>6</b>	<b>What is the Physiological change that can cause Pre-eclampsia?</b>		
	Pregnancy	42	38.2
	Proteinuria	28	25.5
	I Don't know	40	36.4
<b>7</b>	<b>Nutrients Required in Diet to Prevent Pre-eclampsia</b>		
	Vitamin C and Vitamin D	15	13.6
	Vitamin C and Vitamin E	21	19.1
	Vitamin C and Folic Acid	15	13.6
	Vitamin D and Vitamin E	21	19.1
	Vitamin D and Folic Acid	9	8.2
	Vitamin E and Vitamin F	29	26.4
<b>8</b>	<b>What complication of Pre-eclampsia could the pregnant woman face?</b>		
	HELLP Syndrome	48	43.6
	Convulsion	45	40.9
	Cardiovascular Problems	17	15.5
<b>9</b>	<b>How can the fetus suffer from Pre-eclampsia?</b> Placenta Insufficiency and Intra Uterine Growth Retardation	96	87.3
<b>10</b>	<b>What are the screening tests for the prediction of Pre-eclampsia?</b>		
	Urine Analysis	101	91.8
	Blood Test	9	8.2

### 3.4. Relationship between knowledge of pre-eclampsia and years of service

Table 6 presents the result of the analysis of variance. There was a significant association between the respondents' knowledge of pre-eclampsia and years of service ( $p=0.023$ ). The Chi-square test (Table 7) also showed a significant association between years

of service and respondents' knowledge of pre-eclampsia ( $X^2=14.82$ ;  $p=0.022$ ).

## 4. Discussion

This research revealed that majority of the respondents knew about pre-eclampsia. The respondents had average knowledge of pre-eclampsia.

**Table 4: Perceptions of Pre-Eclampsia**

Variable	Strongly Agree (%)	Agree (%)	Disagree (%)	SD (%) mean=28.30
Eclampsia is not a serious or severe condition	4 (3.6)	2 (1.8)	29 (26.4)	75 (68.2)
Young women are not susceptible to Pre-eclampsia.	0 (0)	5 (4.5)	57 (51.8)	48 (43.6)
Convulsion during pregnancy is Hereditary	2 (1.8)	1 (0.9)	47 (42.7)	48 (43.6)
Tetanus toxoid vaccine reduces risk of onset of preeclampsia.	6 (5.5)	4 (3.6)	55 (50)	45 (40.9)
Preeclampsia can be prevented.	32 (29.1)	61 (55.5)	11 (10)	6 (5.5)
It is the duty of only the pregnant women to prevent preeclampsia.	2 (1.8)	11 (10)	51 (46.4)	46 (41.8)
Referral of women from PHC should be based on immediate diagnosis of preeclampsia.	51 (46.4)	35 (31.8)	16 (14.5)	8 (7.3)
Expecting mothers should not be educated on the risk factors of preeclampsia.	8 (7.3)	11 (10)	20 (18.2)	71 (64.5)
Up-to-date trainings will improve the knowledge and management practices of health care providers on preeclampsia.	80 (72.7)	28 (25.5)	1 (0.9)	1 (0.9)
It is the primary duty of the health care provider to prevent Preeclampsia.	25 (22.7)	60 (54.5)	21 (19.1)	4 (3.6)
Preeclampsia has no cure	7 (6.4)	8 (7.3)	43 (39.1)	52 (47.3)
Pre-eclampsia cannot be Managed	7 (6.4)	3 (2.7)	37 (33.6)	63 (57.3)

**Table 5: Distribution of Management Practices for Pre-Eclampsia**

Variables	Frequency (n=110)	Percentage
<b>Are you aware of the existence of WHO guidelines on the management of Pre-eclampsia?</b>		
Yes	96	87.3
No	14	12.7
<b>What are the drugs used for the control of Blood pressure?</b>		
Methyldopa and Nifedine	30	27.3
Methyldopa and Hydralazine	8	7.3
Methyldopa and Diazepam	4	3.6
Nifedine and Hydralazine	22	20
Hydralazine and Diazepam	3	2.7
Methyldopa, Nifedine and Diazepam	13	11.8
Methyldopa, Nifedine and Hydralazine	30	27.3
<b>What is the dose of injection of Magnesium Sulphate given?</b>		
4 g Intravenously and 10g Intramuscularly	84	76.4
4 g Intravenously and 5g Intravenously	7	6.4
10 g Intramuscularly and 5g Intravenously	14	12.7
5 g Intravenously and 13g Intravenously	5	4.5
<b>What are the signs of Magnesium Sulphate Toxicity?</b>		
Respiratory Depression and Loss of tendon reflexes	77	70
Respiratory depression and convulsion	10	9.1
Loss of tendon reflexes and bleeding	11	10
Convulsion and Bleeding	12	10.9

**Table 6: Relationship between Respondent's Knowledge and Years of Service**

Source of variation	Sum of Square	df	Mean square	F	P value
Between groups	116.6	3	38.8	3.31	0.023
Within groups	1244.8	106	11.74		
Total	1361.4	109			

**Table 7: Association between Respondent's Level of Knowledge and Years of Service**

Years of Service	Knowledge of Pre-eclampsia				X <sup>2</sup>	P value
	Fair	Good	Excellence	Total		
< 5	13	20	6	39	14.82	0.022
5-10	2	31	6	39		
11-16	2	12	3	17		
17 & above	1	13	1	15		
Total	18	76	16	110		

This study is in line with a research carried out on Community Health Workers' (CHW) knowledge and practice in relation to pre-eclampsia in Ogun State, Nigeria and Calabar.<sup>11,15</sup> The study reported that the CHWs had an average knowledge of pre-eclampsia. These results were similar to the findings of the present study probably because the Ogun State and Lagos State are within the same Southwest region in Nigeria. However, these results are at variance with a study on skilled birth attendant competencies in four developed countries, which reported that 80% of skilled birth attendants had high knowledge of pre-eclampsia.<sup>16</sup> Similar result was recorded in a study carried out in Northern Karnataka, India, on the assessment of facility readiness and provider preparedness for dealing with postpartum hemorrhage and pre-eclampsia/eclampsia in public and private health facilities.<sup>17</sup> That study found out that majority of respondents had high knowledge on pre-eclampsia. There was a significant association between respondent knowledge of pre-eclampsia and years of experience. This may be because expertise improves with years of experience.

The perception of respondents to pre-eclampsia was positive. More than half of the respondents disagreed that young women were not susceptible

to pre-eclampsia. This result is similar to those from a prior study which found that majority of the women with severe pre-eclampsia were between the ages 15-34 years, thus demonstrating that young women were most affected by severe pre-eclampsia.<sup>18</sup> Majority of the respondents disagreed that tetanus toxoid vaccine would help in reducing risk of pre-eclampsia; this is at variance with a study conducted on CHW knowledge and management of pre-eclampsia in rural Karnataka State, India, which stated that the onset of pre-eclampsia was majorly based on the lack of tetanus toxoid vaccine in pregnancy.<sup>19</sup> This variance may be as a result of misunderstanding of the underlying causes of pre-eclampsia.

#### 4.1. Awareness of the existence of WHO Guidelines

Majority of the respondents or 81.3% were aware of the guidelines. This is contradicted by a research on evaluation of knowledge and management practices of hypertension in pregnancy among health care workers in Moshi urban, Tanzania, which reported that few of participants were aware of management practices according to WHO.<sup>20</sup> The variance in findings could be as a result of lack of information and education of health care providers. According to WHO, the standard drugs for the control of blood pressure include Methyldopa, Nifedine, and Hydralazine;<sup>13</sup> however, fewer than half of the respondents in the present study were able to correctly state the standard drugs. This is similar to the study conducted in Tanzania where less than a quarter of the respondents were able to identify the recommended drugs.<sup>20</sup> This poor result may be caused by the lack of information and also poor training of health care providers.

#### 4.2. Dosage of magnesium sulphate injection

The WHO guideline recommends the use of magnesium sulphate 4g intravenously and 10g intramuscularly.<sup>13</sup> Majority of respondents selected the correct dosage of the recommended dosage of magnesium sulphate. This result is at variance with the findings of a study in Mozambique of CHW knowledge and management of pre-eclampsia which showed that a much lower proportion

(14%) reported confidence in specifically providing oral antihypertensives.<sup>21</sup> The result also differs with study conducted on CHW knowledge and practice in relation to pre-eclampsia in Ogun State, Nigeria which reported that although health care professionals were familiar with magnesium sulphate, most were not confident in its use and Diazepam was stated repeatedly by the health care providers as the choice drug for treatment of pre-eclampsia with poor knowledge on its associated risks to pregnancy.<sup>11</sup> This variance may be due to the introduction of newly inducted medical doctors with knowledge on the recent changes made to the management of pre-eclampsia.

#### 4.3. Limitations

This study has some limitations. It was conducted in just one hospital in Lagos State as a result of limited of resource. Thus, the findings can neither be generalized across the state nor across Nigeria. Similarly, this is a cross-sectional study and thus we cannot infer causality in the associations found in the study.

### 5. Conclusion and Global Health Implications

This study shows that the health care providers had average level of knowledge of the etiology of pre-eclampsia. They had high perception concerning the seriousness of pre-eclampsia. Years of service was associated with health care provider knowledge of pre-eclampsia. The respondents in the study had poor management practices on the appropriate medication, route and dosage of medication for pre-eclampsia. These findings provide information that demonstrating the need for training on the presentations and clinical management of pre-eclampsia for health care workers regardless of years of practice.

#### Compliance with Ethical Standards

**Conflicts of Interest:** The authors declare no conflict of interest. **Funding/Support:** None. **Ethics Approval:** The study was approved by Babcock University Health Research Ethical Committee. Informed written consent was obtained from all the participants of the study and confidentiality was assured and ensured.

### Key Messages

- Regular training should be conducted to improve knowledge of health care providers on recent changes on the management of pre-eclampsia.
- Inclusion of pre-eclampsia education during ante-natal visits of expecting mothers.
- Management should implement a hospital-wide application of WHO standard guidelines to improve managements of pre-eclampsia.
- There is need for advocacy on the use of magnesium sulphate as emergency treatment at secondary health facilities for the best maternal and fetal outcomes.
- Further studies are needed evaluating of the impact of training on the knowledge and management practices of pre-eclampsia among health care providers.

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