Original article

Assessment of Knowledge and Readiness for the Diagnosis and Management of Preeclampsia among Healthcare Workers from Selected Healthcare Facilities in Lusaka, Zambia

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Abstract

Preeclampsia (PE) is the leading cause of maternal and perinatal morbidity/mortality. A study in Lusaka estimated Preeclampsia/Eclampsia prevalence at 18.9%. The aim of the study was to assess knowledge and readiness for the diagnosis and management of Preeclampsia among healthcare workers from selected healthcare facilities in Lusaka, Zambia. An observational cross-sectional study was used to assess healthcare workers knowledge and adherence to diagnosis and management of PE in the selected facilities. Semi-structured interviewer administered questionnaires and an observational checklist were used amongst the respondents. Health facility data was available from a total of 5 public health facilities (PHCs), 1 higher public and 4 Level one facilities. Of all the 41 interviewed health personnel, all (100%) agreed they checked for blood pressure in assessment for preeclampsia. The lowest responses, 1(7%) and 1(4.8) between specialists and nurses was recorded in assessment of consciousness as most did not respond to it. staff nurses had poorer knowledge related to management of preeclampsia and most of the differences were statistically highly significant (p < 0.001). in terms of readiness for PE diagnosis and management, drugs and supplies were found to be good in all health facilities with more than 70% except Chipata clinic (57%) which indicated readiness to be poor. The facility audits revealed gaps in the availability of certain key equipment, drugs and supplies as well as lack of proper infrastructure especially at Chipata clinic. The study revealed that knowledge gaps exist among health workers especially the nurses in the initial assessment for preeclampsia such as checking for consciousness by health personnel. Most drugs were readily available but some equipment and infrastructure were lacking in the facilities. In terms of PE/E management, the correct dosage of magnesium sulphate and maintenance dosage were administered.

Keywords: _Preeclampsia, health facility, healthcare workers, Lusaka_

Introduction

Hypertensive disorders of pregnancy are a leading cause of maternal morbidity and mortality in low and middle-income countries across the world. They contribute up to 14% (approximately 42,000) of all maternal deaths globally with majority of morbidity and mortality being associated with preeclampsia [1-3]. Both preeclampsia and eclampsia are widely known to be associated with adverse maternal and foetal outcomes.

Global figures on case fatality of preeclampsia are less reliable due to dearth of evidence on mortality; whereas individual countries tend to present a risk that varies widely on region and socio-economic status [1]. For example, a recent secondary analysis of a cluster-randomised trial that included several African countries reported eclampsia incidences that ranged from 14 per 10,000 deliveries in Sierra Leone to 19.6 per 10,000 deliveries at one Zambian centre [1]. Within Zambia, the second centre recorded eclampsia rate of almost 30 per 10,000 deliveries.

In Zambia, preeclampsia is a nationally acknowledged public health problem (based on routine health facility-level data) and a maternal health priority in the National Health Strategic Plan 2017-2021. A health facility-based study in Lusaka estimated PE prevalence at 18.9 % [4]. Another study conducted at the University

Teaching Hospital (UTH) in Lusaka reported preeclampsia prevalence at 12 % [5].

According to a recent government assessment of the current 398 maternal deaths per 100,000 live births at national level in Zambia, 18% are directly attributed to PE/E, which is second only to haemorrhage at 28% [6]. Presently, routine facility data at the UTH for Women and New-borns suggests PE contributes to about 30% to maternal mortality within the hospital.

The aim of the study was to assess knowledge and readiness for the diagnosis and management of Preeclampsia among healthcare workers from selected healthcare facilities in Lusaka, Zambia.

Methods

Study Area: This study was conducted in Lusaka district which is the capital and largest city of Zambia. It is one of the fastest developing cities in Southern Africa and it is in the southern part of the central plateau at an elevation of about 1,279 metres (4,196 ft.). As of 2019, the city's population was about 3.3 million.

The most spoken language in Lusaka is Cinyanja, a language that exhibits the melting point of which the country has become. A linga franca which is closer to Chichewa, ChiNsenga and other languages of Eastern Zambia, Cinyanja has incorporated borrowed words from English and other languages due to the massive influx of people from the entire Southern and Central African region.

Lusaka has several numbers of health facilities at different levels, ranging from teaching hospitals, level one, level two, clinics to health centres.

Study Design: An observational cross-sectional study was used to assess healthcare workers knowledge and adherence to diagnosis and management of PE in the selected facilities.

Study Population: The study population were physicians, general practitioner doctors and nurses who were available at the time of research team visit and were willing to participate in the study.

Sampling Design: Two staged sampling design was used to select health facilities and the healthcare workers.

Sampling Procedure: The sampling was done at the level of the health facilities and the study participants. At the level of the health facilities, a sampling frame of the health facilities from the facilities with a high burden of pregnancy women attending ante natal care. The facilities were categorized into level and tertiary facilities. Out of the list of primary level facility, four facilities were selected while one facility was selected from the list of the tertiary facilities using a simple random sampling technique.

At the level of the participants, the participants were enrolled into the study using a consecutive sampling technique until the expected sampling sample was completed.

Study Procedures: The study procedure required the used of semi-structured interviewer administered questionnaire and an observational checklist. The participants were identified and administered a consent form to seek his/her willingness to participant in the study. Those who accepted to participate in the study were questions as related to the knowledge of PE. The questions asked were based on the guideline PE diagnosis and management. Questions were based on the assessment of their knowledge on the initial assessment for pre-eclampsia, how to diagnose severe PE and the management of PE. Some procedures were observed to assess the correctness of the processes.

The second procedure looked at facility assessment to determine the facilities adherence and readiness to diagnosed and managed PE, this is done using facility assessment checklist for the assessment of drugs and supply availability, infrastructure, and medical equipment's availability and functionality assessment toward the readiness for PE diagnosis and management.

Data Analysis: Data was entered directly on Microsoft excel on a password protected laptop. The data was verified, cleaned, validated and exported to SPSS for analysis. The knowledge of PE diagnosis and Management was presented in proportion and Percentage and Chi-square was also used to measure for an association. The facilities readiness for PE was measured using a Likert scare of 1 to 5, 1 was considered to very poor, 2 Poor, 3 as good, 4 as very good while 5 as excellence. The scores were combined to form a composite score. This composite score was converted to a percentage. Score <70% was considered poor readiness for PE Diagnosis and Management while above 70% were rated as good readiness for early diagnosis and management of PE [7,8]. Client Flow during the Management of Severe PE and Eclampsia was analysis into proportion and percentage and presented in table.

Ethical Procedure: The study was approved by the National Health Research Authority. Permission for the study was sought from the different health facilities. Consent to be enrolled into the study was sought from the healthcare workers and only those who accepted to participate in the study were enrolled into the study. We sought for permission from the pregnancy women during procedure observation.

Results

Health facility data was available from a total of 5 public health facilities (PHCs), 1 higher public and 4 Level one facilities. Of all the 41 interviewed health personnel, all (100%) agreed they checked for blood pressure in assessment for preeclampsia. The lowest responses, 1(7%) and 1(4.8) between specialists and nurses was recorded in assessment of consciousness as most did not respond to it. Urine assessment was a frequent parameter assessed in preeclampsia checks by health personnel. Out of the three types of providers (doctors, nurses and specialists), the staff nurses had the most severe knowledge gaps as a few agreed having assessed for the initial diagnosis and management of PE (**Table 1**).

In relation to the diagnosis and management of severe pre-eclampsia, staff nurses had poorer knowledge related to management of pre-eclampsia and most of the differences were statistically highly significant (p < 0.001) (**Table 1**).

In the assessment of health facilities readiness for PE diagnosis and management, drugs and supplies were found to be good in all health facilities with more than 70% except Chipata clinic (57%) which indicated readiness to be poor. In terms of infrastructure, Chipata clinic (57%) and Chawama clinic (50%) had score less than 70% indicating readiness for PE diagnosis and management to be poor. Availability of equipment was found to be generally good in all the health facilities with more than 70% score except Chipata clinic (68%) which indicated readiness for PE diagnosis and management to be poor. The facility audits revealed gaps in the availability of certain key equipment, drugs and supplies as well as lack of proper infrastructure especially at Chipata clinic (**Table 2**).

Twenty-eight of 29 women with severe PE/E (18% and 10%) respectively had their BP measured. In one woman, the assessor did not observe BP measurement and could not ascertain from the woman's records whether her BP was checked. Out of the 29 women with severe PE/E, 10 (55.5%) and 7(63.6%) respectively received the correct MgSO4 loading dose. 7 (38.9 %) and 5 (45.5%) of the 29 women with severe PE/E respectively, received the correct maintenance dose of MgSO4. Out of the 29 women with severe PE/E, 13(72.2%) and 7(63.6%) received or were administered hypertensive drugs while 5(27.8 %) and 3(27.3%) respectively did not receive any type of antihypertensive drug (**Table 3**).

Table 1: Assessment of Knowledge on the Diagnosis and Management of PE among Healthcare Workers in Selected Health Facilities in Lusaka Zambia, 2020

Knowledge parameter assessed	Specialists (n=14) %	Doctors (n=6) %	Nurse (n=21) %	P Value*	CI (95%)
Initial assessment for preeclampsia					
Check blood pressure	14 (100)	6(100)	21(100)	P <0.021	
Assess consciousness	1(7)	6(100)	1(4.8)	p < 0.011	16.7-20.9
Measure fetal heart rate	14 (100)	0(0)	21 (100)	p = 0.002	11.8-15.0
Assess urine for protein	14 (100)	6(100)	18 (85.7)	P < 0.023	11.3-13.1
Diagnosis and management of severe preeclampsia					
Diagnose severe preeclampsia	3 (21.4)	4(66.67)	2(9.5)	P <0.001	13.3-16.1
Administer magnesium sulphate	2 (14.28)	3 (50)	1(4.76)	p < 0.001	11.1-17.6
Administer anti-hypertensive drugs if diastolic BP > 110 mm Hg	2 (14.28)	4 (66.67)	1(4.76)	p = 0.001	14.7-21.9
Immediately refer to higher facility	4(28.57)	4 (66.67)	9(42.85)	P <0.033	10.8-17.0

Table 2: Assessment of Health Facilities Readiness for PE Diagnosis and Management in Selected Health Facilities in Lusaka Zambia, 2020

Areas Assessed	Health Facilities	Total Score N (%)	State Of Readiness
Drugs and supplies	Chipata Clinic	20(57)	Poor
	Chawama Clinic	28(80)	Good
	Matero Clinic	27 (77)	Good
	Chelstone clinic	25 (71)	Good
	UTH	29 (83)	Good
Infrastructure	Chipata Clinic	11 (55)	Poor
	Chawama Clinic	10(50)	Poor
	Matero Clinic	14 (70)	Good
	Chelstone Clinic	12 (60)	Poor
	UTH	18 (90)	Good
Equipment	Chipata Clinic	27 (68)	Poor
	Chawama Clinic	32 (80)	Good
	Matero Clinic	37 (93)	Good
	Chelstone Clinic	31 (78)	Good
	UTH	38 (95)	Good

Table 3: Assessment of Client Flow during the Management of Severe Preeclampsia and Eclampsia, 2020

Number	Severe preeclampsia n=18	Eclampsia n=11
Blood pressure checked	18(100)	10(90.9)
Proteinuria checked	17(94)	9(81.82)
MgSO4 loading dose administered correctly	10(55.5)	7(63.6)
MgSO4 loading dose administered incorrectly	5(27.7)	3(27.3)
Insufficient data to determine if loading dose was administered correctly	3(16.7)	1(9.09)
MgSO4 maintenance dose administered correctly	7(38.9)	5(45.45)
MgSO4 maintenance dose administered incorrectly	7(38.9)	4(36.4)
Insufficient data to determine if maintenance dose was administered correctly	4(22.2)	2(18.2)
Antihypertensive drug(s) administered	13(72.2)	7(63.6)
Antihypertensive drug(s) not administered	5(27.8)	3(27.3)

Discussion

Our study revealed that majority of health personnel checked for blood pressure in assessment for preeclampsia and urine assessment was a frequent parameter assessed in preeclampsia checks by health personnel. These findings are different from a study conducted in Afghanistan which found that not all women had their BP and proteinuria checked when needed or danger signs assessed [9]. A majority of maternal deaths due to PE/E could be averted with early detection and timely delivery before reaching severe PE/E [10].

Of the three types of providers (doctors, nurses and specialists), our study revealed that the staff nurses had knowledge gaps as a few assessed for the initial diagnosis and management of PE. These research findings are quite different from a study that was carried out among Community Health Workers' (CHW) in

Nigeria [11,12]; the study reported that the CHWs had an average knowledge of pre-eclampsia. 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 [13]. Similar results were also recorded in a study carried out in Northern Karnataka in India [14] that found out that majority of respondents had high knowledge on pre-eclampsia. Another study done in Kinshasa revealed that although all provider groups had significant knowledge gaps about pre-eclampsia, health providers in hospitals demonstrated slightly more knowledge compared to those in PHCs [15]. This finding is not surprising given that physicians are more plentiful in hospitals than in PHCs and they tend to be more knowledgeable than other health specialists. Health providers in higher health settings may have more exposure to patients with pre-eclampsia, and thus more experience than those in lower health settings hence more knowledgeable.

This study assessed various areas in the health facilities in terms of readiness for PE diagnosis and management, it revealed that drugs and supplies were found to be good in all health facilities except Chipata clinic which indicated readiness to be poor. The facility audits also revealed gaps in the availability of certain key equipment, drugs and supplies as well as lack of proper infrastructure especially at Chipata clinic. Similar findings were discovered in a study that was done in Kinshasa which revealed poor availability of health commodities to manage pre-eclampsia, as half of facilities had a readiness score lower than 53.8% and no facility had all the nominated commodities at the time of the study. This poor availability was attributed to inconsistent supply chain as only a few facilities mainly hospitals and public facilities received these commodities from government or NGOs and as a result health facilities usually asked patients or their relatives to purchase drugs from outside pharmacies [15]. The implication of poor availability of drugs and supplies in the management of PE in health facilities is that there may be a lag of time till the drug is made available, depending on affordability and proximity to the pharmacies where they are purchased by patients and this delay may worsen the pregnancy outcome which can contribute to high maternal mortality deaths. The tendency by health facilities to ask patients or their relatives to buy drugs from outside the health facilities has also been also reported in other sub-Saharan African countries [16,17].

Similar findings were also obtained in a study in South Africa which revealed a shortage of basic essential equipment such as blood pressure machines and though most midwives indicated that they were provided with enough knowledge to manage pre-eclampsia, without a blood pressure machine, management will be poor [18]. These results were supported by various authors, who indicated that a shortage of equipment may impede the management offered by midwives [19,20]. There will also be a delay in the diagnosis of hypertension, which might lead to increased maternal mortality rate. The same study also found that delayed ambulance services, when called to transfer pregnant women to the hospital lead to a delay in the initiation of treatment at the next level. Various authors have found that a shortage of transport in the form of ambulances and poor roads, as well as remote areas where patients lived, hindered health care workers from implementing the maternal health care guidelines successfully [21,22].

Our study revealed that majority of the women with severe PE/E received the correct MgSO4 loading dose as well as the maintenance dose. The WHO guideline recommends the use of magnesium sulphate 4g intravenously and 10g intramuscularly [23]. 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 [24]. 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 [11]. In another study done in Pakistan, no other drugs apart from MgSO4 were preferred for treating eclampsia by the providers interviewed. The preference for MgSO4 is very encouraging as use of diazepam in eclampsia is harmful for both mother and baby. The reason why other drugs like Diazepam and not MgSO4 are administered to PE patients is due to lack of knowledge on the harmful effects of these drugs on both the mother and child by health care providers. Other reasons could be due to lack of written treatment and referral protocols. The lack of clear guidelines to manage pre-eclampsia has been reported earlier as a barrier to health care provision at first and secondary level [25].

Conclusion

In conclusion, this study revealed that knowledge gaps exist among health workers especially the nurses in the initial assessment for preeclampsia such as checking for consciousness by health personnel. Most drugs were readily available but some equipment and infrastructure were lacking in the facilities. In terms of PE/E management, the correct dosage of magnesium sulphate and maintenance dosage were administered.

Therefore, there is need to offer refresher training on the presentations and clinical management of pre-eclampsia for health care workers regardless of years of practice. There is also a need to establish written guidelines and policies in the diagnosis and management of preeclampsia. Government, donors and other NGOs/organizations dealing with maternal health to financially support and fund health facilities with the appropriate facilities, equipment and drugs in the early diagnosis, treatment and management of PE/E.

Ethics approval and consent to participate

The Study was approved by the University of Lusaka School of Medicine Ethics committee and the National Health Research Authority.

Approval to conduct the study was obtained from the five health facilities and consent was given by all participants after receiving detailed information about the study. Confidentiality was maintained by avoiding specific personal identifiers in the study instrument.

Consent for publication

Not applicable

Availability of data and materials

All the data associated with this work is available from the corresponding author on reasonable request.

Authors' contributions

PM conceived and designed the study, collected data and analysed it. UAO reviewed and supervised the methodology HM discussed the results. EOD and UAO reviewed the whole Manuscript. All authors read and approved the final version for submission.

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