Risks, Diagnosis and Treatment of Preeclampsia In Western Uganda: Do Health Workers Know What To Do?

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Abstract

Preeclampsia is one of the leading causes of maternal and perinatal morbidity and mortality Worldwide. The risk of maternal death is much more common in developing countries than developed countries. Therefore it is necessary to recognize the signs and symptoms to predict the disease before it threatens the survival of both mother and fetus since it complicates about 3% of all pregnancies. Health workers like midwives, clinicians and doctors are the primary care givers in treating, understanding and explaining preeclampsia, its diagnosis, risk factors and complications as delay in diagnosis and prompt initiation of treatment could result in disastrous consequences for both the mother and the baby. The risk of maternal death is very high in lower health centers where there no enough trained doctors and other HWs. There is also inadequate supply of drugs used in management of preeclampsia. The study seeks to ascertain whether there are gaps in knowledge and practices by health workers in Bushenyi district contributing to the nationally high mortality rate in rural areas due to pre-eclampsia.36 health workers handling preeclampsia mothers in Bushenyi district were randomly selected and administered a questionnaire to assess their skills and knowledge. Study found that most health workers knew about preeclampsia, its risks but 46% knew less about HELLP syndrome. This study also finds that 52% of the health workers could not adequately prescribe magnesium sulphate and 46% could not signs of magnesium toxicity.

The researchers recommend more refresher course for health workers in Bushenyi and Uganda at large as well as emphasizing use of preeclampsia phone applications and strengthening hands on training for students in health training institutions.

Keywords: Hypertension • Preeclampsia • Eclampsia • Premature baby • Maternity clinic

Introduction

Preeclampsia is a life threatening hypertensive disorder of pregnancy that usually starts after 20 weeks of gestation, with increased blood pressure (Bp ≥ 140/90 mmHg) and proteinuria (urinary albumin ≥ 300 mg/24 hrs). It is the second common among the leading causes of maternal mortality and morbidity amongst pregnant women in the Uganda. Maternal mortality and morbidity are significant public health threat in developing countries.

Despite many attempts towards understanding the possible causes of preeclampsia and contributing associated factors, the etiology of preeclampsia remains obscure. Studies have suggested several risk factors for preeclampsia including null parity, family or own history of hypertension, diabetes, Body Mass Index (BMI) higher than normal, multiple pregnancy, maternal age (less than 20 and greater than 35 years), renal disease, hydatidifom mole, hydrops fetalis, oocyte donation or donor insemination, chronic hypertension, chronic autoimmune disease.

According to the World Health Organization (2008), postpartum hemorrhage is the leading cause of maternal deaths in developing countries, accounting for 27% of deaths, followed by hypertensive disorders of pregnancy(primarily preeclampsia and eclampsia) and sepsis, which each account for 12% of deaths, and obstructed labor (6% of deaths).

About 10 million women develop preeclampsia every year with the estimated maternal mortality of about 630,000 women each year and about 500,000 fetal deaths. The mortality is due to limited availability of services, poor access to care, and lack of knowledge by community members and HWs.

In Sub-Saharan Africa more than 270,000 women die from maternal deaths, worldwide approximately 76,000 women and 500,000 babies die yearly due to preeclampsia. In Sub-Saharan Africa, maternal mortality is abnormally very high with >400 deaths/100,000 births compared to <10/100,000 in Europe.

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In Nigeria about 55,000 women die due to preeclampsia per year and this account for around 10.0% of the world total maternal mortality rate. In Nigeria the burden of maternal morbidity and mortality is still on the increase with the country contributing about 15% to global maternal deaths at ratio of 554 per 100,000 live births to 630 per 100,000 live births. In Sudan it accounts for 4.2% among the obstetric complications of pregnancy and about 18.1% of maternal death. The mortality is high because not all health facilities are equipped with skilled professionals and technology to assess and address preeclampsia [1].

In Uganda, preeclampsia remains a significant public health threat among the five obstetric emergences, which includes postpartum hemorrhage, obstructed labor, unsafe abortion, puerperal sepsis. The risk factors for preeclampsia have not been well documented in Uganda. The incidence of preeclampsia/eclampsia in Uganda are very high, in a research done in Mulago national referral hospital, it contributed 17.6% of maternal morbidity and 21.4% of maternal deaths among women referred to the emergency obstetric unit. No much research has been on knowledge and practices of HWs in relation to preeclampsia in AIH and Uganda at large.

Problem statement

Preeclampsia is one of the leading causes of maternal and perinatal morbidity and mortality Worldwide. The risk of maternal death is much more common in developing countries than developed countries. Therefore it is necessary to recognize the signs and symptoms to predict the disease before it threatens the survival of both mother and fetus.

Preeclampsia complicates about 3% of all pregnancies, and all hypertensive disorders affect about 5-10% of pregnant women who have elevated blood pressure during pregnancy. Recognized complication of hypertension in pregnancy includes severe preeclampsia, eclampsia, acute renal failure, HELLP syndrome and hepatic failure. Others could include cerebral oedema and hemorrhage, retinal hemorrhage and detachment, pulmonary oedema, Disseminated Intravascular Coagulopathy (DIC). And it is the number one reason physicians decide to deliver a baby prematurely [2].

Delay in diagnosis and prompt initiation of treatment could result in disastrous consequences for both the mother and the baby. So, firstly, it is quite important to determine how vast the problem is in our hospital, identify risk/predisposing factors so as to prevent the preventable causes. Similarly, early detection of the diseases process and formulation of an effective and efficient management protocols and strategies is also crucial. The risk of maternal death is very high in lower health centers where there no enough trained doctors and other HWs. There is also inadequate supply of drugs used in management of pre-eclampsia.

Justification

Preeclampsia is a common obstetric emergency in Uganda (WHO, 2010). In March 2010 it was among the first two major causes of maternal death in Mulago national referral hospital Uganda together with obstructed labor. In October 2010 about 3-4 patients of preeclampsia were seen per day constituting of around 8% of maternal admission in Mulago labor ward. In IAH no research has

been done yet concerning knowledge and practices of HWs in relation to preeclampsia. The significance of this is to establishment of new public health policy that will lead to improved health care service delivery and hence reduction of both maternal and child morbidity and mortality.

Literature Review

Knowledge of HWs in relation to preeclampsia

Preeclampsia is a pregnancy-specific syndrome characterized by the onset of hypertension and proteinuria after 20th week of gestation in women who previously were previously normotensive. It affects approximately 3-8% of all pregnancies and if not treated it can progress to Eclampsia. Preeclampsia and eclampsia are the second leading cause of maternal mortality worldwide. The association between preeclampsia and maternal mortality has been noted in medical literature for over one hundred fifty years [3]. In a research carried out to determine the frequency and quality of interventions that address the direct causes of maternal and newborn deaths, it was found out that the primary outcome measures were quality of Antenatal Care (ANC), quality of Labor and Delivery (L and D), infection control, client communication, management of complications of labor and delivery (PPH, severe PE/E, obstructed labor), essential newborn care, newborn resuscitation, harmful health practices, and health worker knowledge. Maternal death is particularly relevant to clinical task shifting to cadres of health workers with insufficient training to make autonomous clinical management decisions in treatment of preeclampsia. Several studies have suggested that antenatal care can protect mothers from complications of pregnancy including preeclampsia. When Preeclampsia is diagnosed in its early stages, bed rest is usually advised for the mother and her blood pressure should be monitored closely. Some facilities routinely screen all patients who arrive for evaluation in triage with a chemstick dip while others send a sample for urinalysis to the laboratory for evaluation.

Classification of preeclampsia

The Uganda clinical Guideline classifies preeclampsia from mild to severe PE as follows:

- Mild preeclampsia; as a diastolic BP of (90-109) mmHg and/or a systolic BP of (140-159) mmHg, with ≥ 1+ proteinuria; and no organ dysfunction.
- Severe preeclampsia; as acute severe hypertension (160/110 mmHg) and ≥ 1+ proteinuria OR any degree of hypertension with evidence of organ dysfunction (e.g., renal dysfunction, raised liver enzymes (UCG, 2016) [4].

Signs and symptoms of preeclampsia

Women with severe preeclampsia may have very high blood pressure usually ≥ 160/110 mmHg with clinical features/symptoms like headache, blurring of vision of new on set, Epigastric or right upper quadrant pain, vomiting, dyspnea, weakness of generalized malaise, oedema, oliguria, excessive weight gain, urinary protein++, but those with moderate/mild pre-eclampsia generally shows no symptoms (UCG., 2016).

Complications of preeclampsia

Severe preeclampsia is associated with complications like HEELP syndrome, placenta abruption, and eclampsia. Death is due to cerebral hemorrhage, disseminated intravascular coagulopathy, and aspiration pneumonia, rupture of capsule of the liver and status epilipticus all of which are due to eclampsia. Eclampsia occurs in 90% of the time in a pregnant woman who have pre-eclampsia.

HEELP syndrome involves Hemolysis elevated liver enzymes, low platelets/thrombocytopenia. This is a life threatening condition that is normally diagnosed basing on lab findings. A liver function test signifies increased liver enzymes like lactate dehydrogenase. A complete blood count also shows low platelets levels. Other tests can be kidney function tests (serum uric acid above 6 mg/l is abnormal in pregnancy). Clotting studies like bleeding time, prothrombine time, thromboplastine time and fibrinogen time can be done in advanced hospitals. According to a research done on incidences and predictors of severe obstetric morbidity it found out that disease specific morbidity per 1000 were 3.9 (3.3 to 4.5) for severe preeclampsia, 0.2 (0.1 to 0.4) for eclampsia, 0.5 (0.3 to 0.8) for HELLP syndrome [5].

Pathogenesis of preeclampsia

Pathogenesis of preeclampsia is not clear although placental factors and maternal risk factors attribute to its progress. However abnormally implanted placenta is considered to be the main predisposing factor. This is believed to result into poor uterine and placenta perfusion which leads to a state of hypoxia and increased oxidative stress and release of anti-angiogenic proteins into the maternal plasma along with inflammatory mediators.

The destruction of endothelial cells as result of the damage of the endothelial cells, it loses its functions and in addition also produces proagulants, vasoconstrictions and mitogens. The increased pressure sensitivity of the maternal vessels leads to profound vasospasm and reduced organ perfusion which are characteristic of this disorder.

Practices concerning diagnosis and treatment of preeclampsia

The only known definitive treatment of preeclampsia is delivery of the fetus and the placenta. This is the number one reason why physicians decide to deliver the baby prematurely. In a meta-analysis from Elsevier revealed that the only interventions shown to prevent preeclampsia are antiplatelet agents, primarily low dose aspirin, and calcium supplementation. Magnesium sulfate can prevent and control eclamptic seizures. For preeclampsia, it more than halves the risk for eclampsia (number needed to treat 100, 95% confidence interval 50-100) and probably reduces the risk for maternal death. Several drugs are used in management of preeclampsia; these include anticonvulsants and antihypertensive [6].

Anticonvulsants

Magnesium sulphate: This is a drug of choice. Women with severe preeclampsia should be given $MgSO_4$ to prevent development of eclampsia. The therapy should be continued 24 hours after delivery or after the last seizure if it occurred in postpartum period.

Dose: Given as 4 g of $MgSO_4$ (20 ml of 20% solution). Draw 8 mL of a 50% $MgSO_4$ and add 12 mL of water for injection or Normal saline. Give the solution as a slow IV bolus over 20 minutes (the 20-20-20 rule) (UCG, 2016). Then give 5 g $MgSO_4$ (10 mL of $MgSO_4$ 50%, undiluted) in each buttock deep IM (total 10 g) IM deep in upper outer quadrant of each buttock with 1 ml of 2% lignocaine in the same syringe. High doses of $MgSO_4$ can cause toxicity therefore do not give the next dose if any of these signs appears: knee jerk absent, urine output <100 ml/4 hrs. Respiratory rate<16 b/min. In case of toxicity give the antidote: calcium gluconate IV 1 g (10 ml of 10% solution) over 10 minutes (WHO, 2006)

Diazepam: It is used only when $MgSO_4$ is not available to stop convulsions (UCG, 2016). It should also be used if magnesium toxicity occurs or if seizures happen in early pregnancy (WHO, 2006).

Dose: 10 mg slow IV over 2 minutes loading dose, (repeat once if convulsions recur). Then give diazepam 40 mg in 500 ml IV fluids (normal saline or Ringer's lactate) titrated over 6-8 hours to keep the woman sedated but reusable (WHO, 2006) [7].

Antihypertensive drugs used in management of preeclampsia

Methyldopa: It's a Pro-drug converted to α-methyl-norepinephrine, which activates presynaptic alpha 2 adrenoreceptors in the medulla to reduce vasomotor outflow (cardiac output and heart rate), mainly it lowers peripheral vascular resistance. Used in mild to moderate HTN. Decreases Left Ventricular (LV) hypertrophy. It also decreases renal vascular disease (BNF, 2017). Therapeutic dosage is 1-2 grams once daily, beyond 2 grams, no further BP lowering is seen.

Hydralazine: It is hydrazine derivative that dilates arterioles and thus decreases peripheral vascular resistance increases cerebral and renal blood flow. Hydralazine is used more effectively, particularly in 10 severe HTN (BP ≥ 160/110) mmHg in combination therapy with other drugs(BNF, 2017). It is contraindicated in cardiac disease because of side effects of tachycardia increasing cardiac output and oxygen consumption. Therapeutic dose is Initially 25 mg twice daily, increased if necessary up to 50 mg twice daily [8]

Labetalol: The mode of action of beta-blockers in HTN is not well understood, but labetalol reduces cardiac output, alter baroceptor reflex sensitivity, block peripheral adrenoceptors and an arteriolar vasodilatation action thus decreasing peripheral vascular resistance. Women with a blood pressure of ≥ 160/110 mmHg who require critical care during pregnancy or after birth should receive immediate treatment with either oral/IV labetalol or IV hydralazine or oral modified release nifedipine to achieve a target BP ≥ 150/100 mmHg (BNF, 2017). Therapeutic dose is 20 mg/hour, doubled every 30 minutes; usual maximum dose is 160 mg/day [9].

Nifedipine: It is a calcium channel blocker that relaxes vascular smooth muscle and dilates coronary and peripheral arteries, thus decreasing peripheral vascular resistance. It has less effect on myocardium contractility. It is also used as maintenance antihypertensive therapy after use of labetalol or other drugs to control BP (BNF, 2017) [10].

Study objectives

General objective: To assess the health worker's knowledge and practices in relation to preeclampsia among health workers in Bushenyi district

Specific objective:

• To access health workers knowledge concerning preeclampsia in Bushenyi district.

• To access the practices of health workers concerning diagnosis and treatment of preeclampsia in Bushenyi district [11].

Research Questions

• Is there adequate or inadequate knowledge concerning preeclampsia among health workers at Bushenyi distritc?

• Are the health workers doing correct practices concerning diagnosis and treatment of preeclampsia in Bushenyi district? [12].

Materials and Methods

Study design

The study was a cross sectional descriptive that was conducted among health workers in Bushenyi district [13].

Study area

The study was conducted at major health centres in Bushenyi District including Kampala International University, Ishaka Adventist Hospital and Bushenyi Medical Centre. Bushenyi District Ishaka Centre geographical coordinates are 00 32 S, 30 11 E

Study population

Health personnel (Clinicians, nurses, midwives and doctors) working at antenatal, labor ward, maternity theatre outpatient department and postnatal clinics in the 3 major facilities in Bushenyi district [14].

Sampling techniques

The study employed random sampling techniques.

The sample size determination

The sample size was determined by using Krejcie and Morgan table formula that gives 36 HWs

Inclusion criteria

Doctors, Clinical officers, nurses, midwives working at antenatal clinic, post-natal, maternity ward, maternity theatre and other clinics or wards

Exclusion criteria

Students, HWs working in other departments; like eye clinic, dental clinic, orthopedics among others [15].

Data collection and tools

Data was collected by using a structured questionnaire prepared in English and made of closed ended questions.

Data analysis

Data analysis was done using statistical package SPSS 16.

Data presentation

The results of this study were reported, analyzed and presented in table form, graphs and Pie-charts [16].

Data quality control, validity and reliability

Data reliability control was assured done by using of SOPs (positive and negative controls) for any clinical finding that was conducted.

Data collection process was supervised daily and checked for completeness of data was done by the end of the day and therefore the incomplete work was compiled before leaving the station to ensure its completion [17].

Ethical considerations

Ethical approval was sought from Kampala International University. The health workers were given right to decide/consent for the test by signing on the consent form. The HWs were given right to withdraw at any time of the interview without any penalty. They were also given freedom to ask questions. HWs were also assured of confidentiality (phone numbers and signatures were used instead of names).

Results

Most participants were females (70%). Mode age of the participants was 29 years and an average of 29.5 years. 65% of the participants were certificate education holders. The study interviewed 16 midwives, 6 degree doctors and 14 diploma clinicians [18]. The mean experience in maternity practice was 2.5 years. 47% (17) of the health workers had above average knowledge about the definition and risk factors for preeclampsia whereas 27% had good knowledge and 26% had poor knowledge. 31% (18) could adequately classify preeclampsia, 35% had could averagely do and 19% could not classify the condition (Table 1) [19].

Causes of preeclampsia	Frequency	Percentage
Very good	28	0.78
Good	3	0.08
Poor	5	0.14
Total	36	1

Table 1: knowledge of study sample about causes of preeclampsia.

The study found that 29 (80%) could effectively identify risk factors for preeclampsia, 5 (14%) could try but 2 (6%) were unable. About the signs and symptoms, severe pre-eclamptic disease, 20 (56%) could effectively list them, (5%) had good knowledge above them whereas 14 (39%) had poor knowledge (Figure 1) [20].
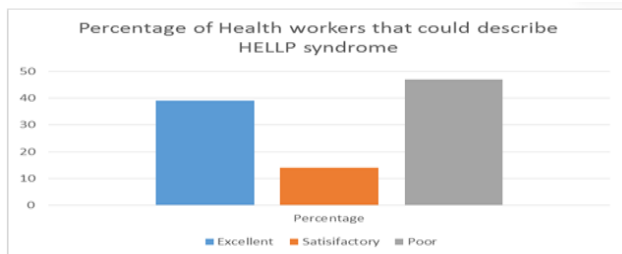

Figure 1: Shows how health workers could effectively describe HELLP syndrome.

The study demonstrated 61% could effectively identify the complications of preeclampsia and eclampsia and the effects on the fetus [21]. On managing convulsions in severe preeclampsia/eclampsia, 30 (83%) could effectively demonstrate the steps in management of convulsions while 6 could not. 48% of the health workers managed to demonstrate how magnesium sulphate is dosed and used in management of eclampsia while 18 (52%) showed poor practices.58% could identify the signs of magnesium sulphate toxicity while 86% knew the antidote. The study found that 33 (92%) showed good practices with the hypertensive drugs in treating preeclampsia.

About indications for delivery of preeclamptic mother, it was found out that 20 (55%) knew them while 45% could not mention at least 3 indications. Study also found that health workers with at least diploma in education could demonstrate more knowledge on preeclampsia but health workers with at least 3 years' experience could confidently handle a pre-eclamptic mother or offer timely referral (p<0.005) [22].

Discussion

Health workers' level of knowledge of in relation to preeclampsia

This study showed that 9 (26%) did not know the definition of pre eclampsia, in agreement with study done in Eastern Cape which is showed that (27.7%) of the participants could incorrectly answer questions pertaining the definition of pre-eclampsia.

The study showed that 29 (80%) correctly identify the risk factors compared to 20% that knew less on risk factors of preeclampsia as was earlier demonstrated by Saria in her 2014 study. These findings also corresponds with the study conducted in Tanzania which also shown that (87%) knew the risk factors of preeclampsia [23].

The study also showed that 25(69%) could satisfactorily tell the effects of preeclampsia on the fetus, in agreement with a study done by Maembe that showed that 34 (68%) could do the same. HELLP

Syndrome is one of the complications of severe preeclampsia that occurs 10-20% increased maternal and fetal morbidity and mortality. The study found that more than half 18(49%) of study sample did not know the signs of HELLP syndrome and this could significantly affect the management and early identification of complications in preeclampsia. More to that, classifying preeclampsia is essential in its management. 44% of the participants in the study could not adequately classify preeclampsia into severe and non-severe cases.

Practices of health workers in relation to diagnosis and treatment of preeclampsia

The study found that 83% showed very good practices on the best drug used in managing convulsions in severe preeclampsia/eclampsia. These findings are in agreement with study conducted in Cairo that found out that 90% knew indications for use of $MgSO_4$. The study also showed that 86% showed very good practices on antidote drug used in case of magnesium toxicity.

The study also found that 92% could adequately use the best antihypertensive drugs used in managing severe preeclampsia as showed, as compared to a study conducted in Zanzibar that showed that 98% was able to choose correctly antihypertensive when the diastolic pressure remains above 110 mmHg. However in this study 52% could not adequately prescribe magnesium sulphate and 46% could not signs of magnesium toxicity [24].

Conclusion

Most of the participants knew about the following ;the risk factors for preeclampsia, subjective signs of preeclampsia, drugs of choice used in managing hypertension in severe preeclampsia, drug of choice used in managing convulsions in severe preeclampsia/eclampsia, effects of preeclampsia on fetus

Also many of the study samples did not know the following; dose of magnesium sulphate, Signs of magnesium toxicity, HEELP syndrome signs, indications for delivery of preeclamptic mother, signs that indicate progress from mild to severe preeclampsia and classification of preeclampsia.

Recommendations

Basing on of the study results and conclusion, the researchers would like to recommend the following:

- Frequent refreshing courses and conduct seminars related to preeclampsia.
- Encourage HWs to always update themselves on preeclampsia
- HWs to Conduct further studies related and seminars to this research.
- Advise the government to make new policies concerning management and prevention of preeclampsia
- Training schools encourage facilitating students with hands on skills for management of obstetric emergencies.

• Install and utilize the preeclampsia phone application.

Conflict of interest

None

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None

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