



College of Medicine and Health Sciences

School of Medicine and Pharmacy

Department of Obstetrics and Gynecology

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**ASSESSING KNOWLEDGE AND PRACTICES OF DISTRICT
HEALTH CARE PROVIDERS ON PREECLAMPSIA AND
ECLAMPSIA: CASE STUDY OF GICUMBI AND KAMONYI
DISTRICT HOSPITALS, RWANDA**

A dissertation submitted to College of Medicine and Health Sciences, School of Medicine and Pharmacy in partial fulfillment for the requirements of award of Masters degree in Obstetrics and Gynecology of University of Rwanda.

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August 17th, 2020

DECLARATION

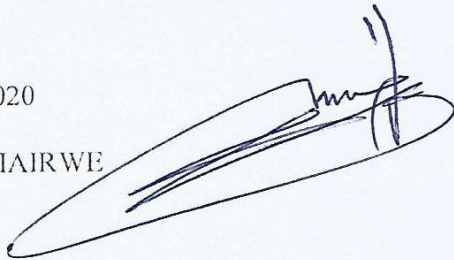
The researcher:

I hereby declare that this dissertation "*Assessing knowledge and practices of district health care providers on preeclampsia and eclampsia: case study of Gicumbi and Kamonyi district hospitals, Rwanda*" is my own work and it has not been submitted by any other university for the award of a degree.

Signed

Date 17/08/2020

Dr Fred MUHAIRWE



The supervisor:

I hereby declare that this dissertation "*Assessing knowledge and practices of district health care providers on preeclampsia and eclampsia: case study of Gicumbi and Kamonyi district hospitals, Rwanda*" was submitted by Dr Fred MUHAIRWE.

Signed

Date 17/08/2020

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Authors' contributions

This study was conducted in close collaboration between the authors. The author FM wrote the protocol, collected data, and data analysis. The authors DN and UM reviewed study design reviewed the literature and corrected the writing errors.

Dedication

To the Almighty God who cares about us.

To my wife MUKAMANZI Barbara for your love, care and encouragement,

To my daughters BWIZA Mickey Briella, KEZA Gwiza Meosha and MWIZA Teto Malka

To my lovely Teachers

I dedicate this work.

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I am very grateful to the Almighty who helped me through this program

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PRECIS

There is a low level of knowledge towards management of preeclampsia among healthcare professionals in district hospitals and health centers who are the frontline of the healthcare system in Rwanda.

Abstract

Objective: To assess the level of knowledge and practice towards management of preeclampsia among healthcare professionals.

Methods: This was a prospective cross-sectional study among healthcare professionals working in maternity services at District Hospitals (DH) and Health Centers (HC) in Byumba and Kamonyi districts in Rwanda. A pre-designed questionnaire was distributed to doctors, nurses and midwives assessing knowledge and practice towards preeclampsia management. The score were graded low (<16.5), fair (16.5-23) and good (>23). ANOVA test was used to compare the mean scores and the p-values were significant if <0.05.

Results: There were 214 participants, recruited (14 doctors, 57 midwives and 143 nurses). The mean age was 35 ± 7.7 years. Most of the participants were recruited from health centers (74%). The majority (50.9%) of participants had fair knowledge score, 31.6% had low score and only 17.5% had good knowledge scores. The mean knowledge score was 16.7 ± 4.7 with a significant difference between the DH and HC (19.4 ± 5.1 vs. 15.8 ± 4.2 , $p < 0.01$). Scores for doctors were significantly higher than midwives whose scores were also significantly higher than nurses. The mean differences in knowledge scores were still significantly higher between DH and HC when socio-demographics were controlled for. Years of experience were not a significant predictor of good knowledge score.

Conclusions: The study illustrates a low level of knowledge among healthcare professionals in DH and HC surveyed. This is the frontline of the healthcare system in Rwanda. Ongoing training and medical education are needed for these professionals as this could impact the quality of healthcare services they provide and hence improve maternal morbidity related to hypertensive diseases of pregnancy.

Key words: Hypertensive diseases, preeclampsia, eclampsia and health care professionals

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List of abbreviations and acronyms

ANOVA: Analysis Of Variance

DH : District Hospital

DHS : Demographic and Health Survey

HC : Health Center

HDP : Hypertensive Diseases of Pregnancy

HTN : Hypertension

MgSO₄: Magnesium Sulfate

PET : Preeclampsia Toxemia

SPSS : Statistical Package for Social Sciences

WHO : World Health Organization

Introduction

Pre-eclampsia is a pregnancy complication which is typically characterized by hypertension with or without features of target organ damage after 20 weeks of gestation on a singleton pregnancy and has maternal and fetal adverse effects.¹⁻³ Based on current literature, the etiology of pre-eclampsia is not well understood despite its prevalence of 3-5% worldwide, and its being one of the leading global causes of maternal morbidity and mortality especially in developing countries. The only definitive management is delivery of the fetus and placenta but there are also concerns about appropriate recognition of the disease, treatment of hypertension, prevention of seizures and management of fetal and maternal complications.^{4,5}

There are no reliable laboratory investigations that can predict preeclampsia. However, based on patients history and current presentation during antenatal care, a health professional can identify women at risk for developing preeclampsia and establish individualized follow up that improves maternal and neonatal outcome.^{3,6} Relevant information like prior hypertensive disease on pregnancy, pre-existing hypertension, body mass index, autoimmune diseases, and diabetes mellitus can alert a care provider to initiate disease prevention-medication, particularly daily aspirin initiated at 12 weeks of gestation and calcium supplement or antihypertensive medications.^{4,7-9}

For pregnant women with already developed pre-eclampsia, the management goals involve blood pressure control, prevention of eclampsia and delivery.⁴ Women with severe complications and end organ damage may require transfer to referral hospitals for specialized services such as dialysis or ICU support.¹⁰ During the in-hospital management, laboratory investigations that assess the liver and kidney function are performed. Fetal compromise is typically due to placenta insufficiency which is a common complication of preeclampsia and hence there is a need to monitor fetal weight, amniotic fluid in addition to fetal and umbilical dopplers by ultrasound.^{4,10}

Pregnant women with danger signs and symptoms should seek medical care and, healthcare professionals, especially those who care for pregnant women, are expected to have a certain level of awareness on pre-eclampsia and this enables them to identify women at risk and women with the disease who need immediate management plan, part of which can be initiated at primary healthcare level¹¹. In many cases, the diagnosis is made as an incidental finding during antenatal care especially mild preeclampsia that has minimal symptoms compared to the severe form of the disease where women often present to the health institution with severe symptoms like headache,

visual disturbances, dizziness, epigastric pain and sometimes with already developed convulsions predicting a more advanced state of the disease (eclampsia).⁹

The Rwandan health system has three levels of patient care that include primary, secondary and tertiary health care levels. The primary healthcare in Rwanda is made of health centers (HC) fully staffed by nurses and midwives only and this is the main level that treats over 82% of patients in the country.¹² The secondary health care level is made of district hospitals (DH) and is staffed by doctors in addition to nurses, midwives and anesthetists. Patient flow starts from primary health care to secondary and finally to tertiary (referral) health care level.¹³

According to data from the health and demographic survey of 2015 (DHS), more than 99% of Rwandan pregnant women attend at least one antenatal care by a skilled health professionals and 44% completed 4 antenatal visits¹⁴. Pre-eclampsia and eclampsia as well as most other pregnancy complications are treatable, and most maternal deaths could be avoidable, if healthcare providers have enough knowledge and skills to identify and provide timely appropriate obstetrical care that call for early diagnosis, early decision making and early transfer for patient to whom the treatment requires a more advanced health institution.¹⁵

Most Rwandan women with hypertensive diseases of pregnancy (HDP) are transferred from the community in remote areas and the delay to arrive at the tertiary level of care is either due to the geographical distance or due to system errors and can result into adverse outcome with severe maternal and fetal morbidity. It is essential to have healthcare providers in the community who are knowledgeable about the disease and who can identify women at risks and women who need timely transfer to a higher level of care. In addition, when HDP are diagnosed there is a minimum pre-transfer management that should be offered to the patient. These include administration of magnesium sulfate to prevent convulsions and antihypertensive medication to prevent stroke during the transfer process. Therefore, the health care providers' knowledge and practice are very crucial to identify preeclampsia and eclampsia and make decisions about immediate medical care, delivery and transfer. There is no accessible published data on current knowledge and practice of health care providers in the community towards pre-eclampsia in Rwanda and yet, it is known that good knowledge influences the healthcare services in many other public health domains.

The aim of this study was to assess and document the current knowledge and practice of Rwandan healthcare providers in regards to preeclampsia and eclampsia at secondary and primary healthcare levels.

Methods

This was a prospective cross-sectional study conducted among healthcare providers in district hospitals and health centers of Byumba and Kamonyi districts of Rwanda. Doctors, midwives and nurses working in maternity department were included and excluded the professionals who were out of the service during the study period. Sample size was calculated using the conventional formula with 95% confidence level and obtained 202 participants needed to represent the study population. The sampling was both random and purposeful. The purposeful sampling was used to cover all categories of healthcare professionals, nurses, midwives and doctors. Within every category, a random sampling was used.

Data was collected using a self-administered printed or online questionnaire after consenting to participate. The data was then analyzed using SPSS software version 25. An association was interpreted as significant if it is below the alpha value of 0.05 and Odd Ratios calculated at confidence interval of 95%. For the knowledge assessment, a one-way ANOVA test was used to compare the means. 33 questions were asked to assess the knowledge and each was scored 1 if correctly answered. The knowledge was graded as good if above 23, fair if between 16.5-23 and low if it is below 50%. Ethical approval was obtained before conducting the study and there was no competing interest in this study.

Results

During our study, a total of 214 participants meeting the inclusion criteria were recruited. The mean age of the participants was 35 ± 7.7 years with 25% aged under 30 years, half of them (51%) middle-aged between 30-39 years and 7% aged 50 years or above. The male to female ratio was 1:2. Between both districts of our study population, Gicumbi represented 73% of all the recruited participant. Furthermore, 74% of all participants recruited were health care providers at HCs. Nurses, midwives and doctors represented 67%, 27%, and 7% respectively.

Demographic characteristics are shown in Table 1. Among our study participants, 26 (12%) had only completed high school as nurses and were all employed at health center. The majority were holder of A1 advanced diploma either in general nursing or in midwifery representing 61% of all participants while 43 (20%) were university graduate either in general nursing or midwifery.

Looking at the professional experience as health professionals, one third of the participants had experience above 10 years, 27% had experience of 2-5 years and 23% had experience less than or equal to 2 years.

Table 2 shows the responses on the major questions that were used to assess knowledge about different aspects of the disease. Though 79% of all participants had good knowledge on correct definition of preeclampsia, only 38% of all respondents demonstrated knowledge on the symptoms of preeclampsia with significantly higher knowledge score in the DH compared to HC (19.4 ± 5.1 vs 15.8 ± 4.2 , $p < 0.001$).

Furthermore, the most known risk factor for preeclampsia was previous history of the disease reported by 67.8% of all respondents and this awareness was significantly higher at DH than HC (85.5% vs 61.6%, $P = 0.001$). Compared to participants from HC, those from DH were significantly more likely to define pregnant women with obesity (72.7% vs 45.3%, $p < 0.001$), chronic HTN (63.6% vs 47.2%, $p = 0.035$) and multiple pregnancy (56.4% vs 37.7%, $p = 0.016$) as high risk for preeclampsia that would need special attention.

Even though 73.4% were knowledgeable that proteinuria should be requested to differentiate uncomplicated preeclampsia from gestational or chronic hypertension, only 47% were knowledgeable about other essential laboratory exams such as Liver enzymes, renal function tests and FBC but with significant higher awareness at DH ($p < 0.001$). 91.6% responded that blood pressure should be measured for every pregnant woman during every antenatal visit, but only 66.4% actually do this practice (56.4% at DH vs 69.8% at HC) and only 55.6% had correct knowledge on when the BP is considered too high to initiate antihypertensive.

Regarding the management, 61.7% of all respondents know that the definitive management of preeclampsia is delivery (78.2% at DH and 56.0 at HC, $P = 0.004$), 85.5% mentioned that women with severe preeclampsia should be given an initial dose of magnesium sulfate prior to transfer and 97.2% know the appropriate route of the drug (100% at DH and 96.2% at HC, $P = 0.144$).

Table 3 represents the knowledge scores and grading. The mean knowledge score was 16.7 ± 4.7 which is graded as fair. Compared to other health professionals, doctors had significantly the highest mean knowledge score of 22.4 ± 4.7 followed by midwives (18.2 ± 4.4) and nurses (15.54 ± 4.4). There was a significant higher mean score among midwives at DH compared to midwives at HC (19.7 ± 4.3 vs 17.2 ± 4.2 , $p = 0.033$) and the same was observed among nurses but it was not statistically significant (16.8 ± 5.2 vs 15.4 ± 4.2 , $p = 0.194$).

In addition, 42.9% of doctors had good knowledge while only 17.5% of midwives and 7% of nurses had good scores. The majority (84.6%) of professionals who had only completed the secondary level of education had a low knowledge score with a total mean score of 14.6 ± 3.5 and they were all

employed at health centers (table 4). The statistics show that there was significantly higher knowledge scores between respondents from DH and respondents from HC regardless of the gender ($p < 0.05$). Table 5 shows that there was no significant association between knowledge score and the years of experience even when the institution and job titles were controlled for ($p\text{-value} > 0.05$). However, respondents employed at HD with experience of less than 5 years or more than 10 years were significantly more knowledgeable about PET compared with their counterparts at HC ($P < 0.05$).

Responses on practice questions

The majority (63.6%) of our study participants had treated at least one patient with preeclampsia at the time of data collection, distributed as 55.3% among health professionals recruited from health centers and 87.3% among professionals recruited from hospitals. In most cases, over 98% of the health professionals at health centers and hospitals measure blood pressure for every pregnant woman at least once during antenatal care. Fifty percent of all participants had administered magnesium sulfate at least once by the time of data collection. 87.3% of respondents from hospitals had administered magnesium sulfate compared to 38.4% among respondents from health centers and when asked about their perceived feeling of confidence in managing women with preeclampsia, 71% responded positively (66% in health centers and 85.5% in hospitals) (**Table 6**).

Discussion

The purpose of this study was to assess and compare the knowledge on preeclampsia and eclampsia between healthcare professionals from district hospitals and professionals from health centers and assess their management towards the disease. The results of this study demonstrate low level of knowledge among the study participants and this is significantly lower among health professionals from health centers compared to those recruited from district hospitals.

The results of this study showed a wide range of generations working in health sector in Rwanda and the mean age showed that the health care providers are mostly middle aged at mean age of 35 ± 7.7 years with more than 75% aged less than 40 years which provides an expected 20 years more in

labor services as health care providers. Similar age characteristics were reported in a study that was conducted in Nigeria reporting the average age of healthcare staff working in maternity service as 35.45 ± 7.622 , comparable to the health care professionals in Rwandan health settings¹⁶ but different from the results of a study conducted in Eastern Cape showing the majority of healthcare professionals working in pregnancy-related services aged above 40 years.¹⁷ Even though our population appears young, more than three quarters had an experience of more than 2 years including 34% who had experience of more than 10 years serving as healthcare professionals. Having an experience of at least 2-3 years is considered as an experience level at which a healthcare provider is competent enough at least to his or her academic limits while those with more than 10 years of experience are considered as experts and, hence, the participants in this study are expected to have practical knowledge in nursing and midwifery practices.^{17,18}

Nearly 80% of the respondent had good knowledge on the definitions of preeclampsia and eclampsia regardless of their institution whether health center or hospital even though the proportion of respondents who were aware of the signs and symptoms of the disease was below 40%. It is common in medical practice for the care providers to have information about the definition of a disease because this is needed during the translation phase of telling the patient what disease they have but it requires an extra effort to be able to characterize the disease and understand the symptomatology related to it.

Only half of the study participants were aware that women with chronic HTN are at higher risk of developing preeclampsia but this proportion was higher among respondents recruited from hospitals (63.6%) while it was less than 50% among those recruited from health centers and yet, antenatal care services and vaccination calendar are almost exclusively done only at health centers unless a pregnancy is assessed as a high risk pregnancy that needs to be transferred to the hospital for closer follow-up like in case of previous multiple cesarean deliveries. The scores were much lower regarding risk factors like multiple pregnancy and autoimmune disease such as anti-phospholipid antibody syndrome that is known by only 13.6% of all participants. This expresses a likelihood that women at risks for pre-eclampsia who come to health center for antenatal care may miss a clinical assessment that triage her as high risk for preeclampsia and hence the risk reduction management like aspirin initiated towards the end of first trimester may not be implemented on time.

The most commonly used medications to treat high blood pressure among women with preeclampsia include Nifedipine and Hydralazine.¹⁶ Our results show that, similarly to the

responses from health centers, the majority of respondents from hospitals were aware of Nifedipine but only less than half were aware of hydralazine and yet this is an essential drug that is used to lower severe hypertension with safety to both the mother and fetus with decrease in risk of stroke.^{1,19} Furthermore, in this study, a good number of participants (>85%) demonstrated good knowledge on the use of magnesium sulfate and this is in agreement with the study in Lagos Island Hospital in Nigeria that also showed good knowledge about the WHO recommendations on the use of MgSO₄ in preeclampsia mothers.¹⁶

Considering the knowledge scores among our study participants, there was a mean score of 16.71 ± 4.7 which was graded as fair mean-score. This is slightly lower compared to the results of the study done among healthcare providers in Nigeria where the mean score were 16.69 ± 3.53 but they had 26 items for scoring while our study had 33 items.¹⁶ While other studies have reported significant association between professional experience and knowledge scores, the results of this study, however, have shown no significant association between the two variables. Comparing the mean scores between respondents from DH and respondents from HC, there were significant differences between these two groups even when the sociodemographics were controlled for. On the other hand, the study conducted in Eastern Cape has demonstrated lower knowledge scores in health facilities attended by a doctor for consultation compared to those where there is no doctor¹⁷ and also compared to a study that compared the knowledge, attitude and practice between doctors and nurses in primary healthcare settings in Saudi Arabia.²⁰ These results from Saudi Arabia also have demonstrated findings that are different from our study which has demonstrated higher knowledge among doctors compared to midwives and nurses.

The perceived lack of confidence towards management of preeclampsia that was highlighted by the results of our study especially among health personnel at health centers was also highlighted in a qualitative study conducted among health care professionals in Pakistan²¹ and this would be due to lack of knowledge regarding preeclampsia.

Strength and Limitations of study

The findings from this study represent only 2 of 30 districts of the country and different findings might be observed in referral and urban areas. Hence the results cannot be generalized nationwide or represent the situation at referral levels. Future research would investigate the situation at referral hospital that are expected to receive the patients from lower levels.

The strength of this study was prospective representing the most current level of knowledge. Also, the sample size was powered to reflect the situation in primary and secondary health care providers in the sampled rural communities and all staff (nurses, midwives and doctors) were represented.

Conclusion: the results of our study have highlighted low level of knowledge among healthcare professionals in the community even though a good number of them know the definition of the disease but, also, demonstrate poor practice in measurement of blood pressure on every pregnant woman for the early antenatal care. These results demonstrate a need for continuous training on hypertensive diseases of pregnancy and also training health professionals on the use of their existing settings to screen women at risk for preeclampsia and transfer them before severe complications are developed. Given the participants in this study were sampled from the community health settings in rural areas of the country where more than 85% of patients are managed, and given the documented association between pre-eclampsia and low socioeconomic status, it is imperative that health care professionals develop a high index of suspicion for the disease and initiate the emergency intervention like early initiation of magnesium sulfate, antihypertensive and steroids to optimize the woman's condition during the referral process and hence impact the maternal and fetal outcome.

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Index1. Tables

Table 1. Sociodemographic characteristics of the study participants

		N	%
Age	<30 years	53	25%
	30-39 years	110	51%
	40-49 years	37	17%
	>=50 years	14	7%
	Mean \pm SD	35 \pm 7.7	
Gender	Male	82	38%
	Female	132	62%
Marital status	Single	61	29%
	Married/cohabitate	147	69%
	Divorced/Separated	4	2%
	Widow	2	1%
Work Place (District)	Gicumbi	156	73%
	Kamonyi	58	27%
Institution	Health center	159	74%
	District hospital	55	26%
Job title	Midwife	57	27%
	Nurse	143	67%
	Doctor	14	7%
Level of education	Secondary	26	12%
	A1	131	61%
	A0	43	20%
	MD/GP	14	7%
	Masters	2	1%
Working experience	<=2 years	49	23%
	2-5 years	58	27%
	6-10 years	35	16%
	>10 years	72	34%

Table 2. Responses on knowledge about preeclampsia

Responses on knowledge	Overall	Institution		p-value
		HC	DH	
Know the definition of preeclampsia	170 (79.4)	125 (78.6)	45 (81.8)	0.613
Know the definition of eclampsia	169 (79.0)	123 (77.4)	46 (83.6)	0.325
Signs and symptoms				
Headache	72 (33.6)	48 (30.2)	24 (43.6)	0.069
Visual disturbance	83 (38.8)	56 (35.2)	27 (49.1)	0.069
Epigastric pain	81 (37.9)	45 (28.3)	36 (65.5)	0.000
Proteinuria	79 (36.9)	60 (37.7)	19 (34.5)	0.673
Risk factors				
Smoking (as protective)	56 (26.2)	46 (28.9)	10 (18.2)	0.118
Overweight/obesity	112 (52.3)	72 (45.3)	40 (72.7)	0.000
Genetics	57 (26.6)	38 (23.9)	19 (34.5)	0.124
Alcohol	44 (20.6)	36 (22.6)	8 (14.5)	0.200
Advanced maternal age	93 (43.5)	64 (40.3)	29 (52.7)	0.108
Chronic HTN	110 (51.4)	75 (47.2)	35 (63.6)	0.035
Auto-immune	29 (13.6)	23 (14.5)	6 (10.9)	0.507
Multiple gestation	91 (42.5)	60 (37.7)	31 (56.4)	0.016
Family History	67 (31.3)	52 (32.7)	15 (27.3)	0.454
previous PET	145 (67.8)	98 (61.6)	47 (85.5)	0.001
Investigation and management				

We should test proteinuria for all at ANC	204 (95.3)	154 (96.9)	50 (90.9)	0.720
Proteinuria is always a sign of preeclampsia	90 (42.1)	68 (42.8)	22 (40.0)	0.072
Nifedipine	162 (75.7)	109 (68.6)	53 (96.4)	0.000
Hydralazine	94 (43.9)	67 (42.1)	27 (49.1)	0.371
Give IVF and transfer	49 (22.9)	37 (23.3)	12 (21.8)	0.825
Give MgSO4 before transfer	183 (85.5)	134 (84.3)	49 (89.1)	0.382
Send with ambulance	45 (21.0)	29 (18.2)	16 (29.1)	0.089
RFT	139 (65.0)	93 (58.5)	46 (83.6)	0.001
LFT	101 (47.2)	59 (37.1)	42 (76.4)	0.000
FBC	102 (47.7)	63 (39.6)	39 (70.9)	0.000
Proteinuria to differentiate PET	157 (73.4)	114 (71.7)	43 (78.2)	0.348
Know responsible organ for PET	74 (34.6)	44 (27.7)	30 (54.5)	0.000
Know when to measure BP	196 (91.6)	144 (90.6)	52 (94.5)	0.359
Know the definitive management	132 (61.7)	89 (56.0)	43 (78.2)	0.004
Know the route for MgSO4	208 (97.2)	153 (96.2)	55 (100)	0.144
Know when to treat BP	119 (55.6)	83 (52.2)	36 (65.5)	0.088

Table 3. Knowledge score

	N	Mean	SD	Min	Max	Knowledge grading		
						Poor	Fair	Good
Job title								
Midwife	57	18.23	4.383	9	29	18 (31.6)	29 (50.9)	10 (17.5)
Nurse	143	15.54	4.318	7	28	87 (60.8)	46 (32.2)	10 (7.0)
Doctor	14	22.43	4.669	15	30	1 (7.1)	7 (50.0)	6 (42.9)
Institution								
Health center	159	15.77	4.225	7	28	90 (56.6)	59 (37.1)	10 (6.3)
District hospital	55	19.42	5.141	10	30	16 (29.1)	23 (41.8)	16 (29.1)
Level of education								
Secondary	26	14.62	3.534	8	23	22 (84.6)	3 (11.5)	1 (3.8)
A1	131	16.49	4.755	7	29	65 (49.6)	52 (39.7)	14 (10.7)
A0	43	17.12	4.338	9	30	17 (39.5)	20 (46.5)	6 (14.0)
MD/GP	14	22.43	4.669	15	30	1 (7.1)	7 (50.0)	6 (42.9)
Masters	2	15.50	6.364	11	20	1 (50.0)	1 (50.0)	0 (.0)
Total	214	16.71	4.743	7	30	106 (49.5)	82 (38.3)	26 (12.1)

Table 4. Comparison of mean scores between hospital and health centers

Variable		Health Center		Hospital		p-value
		N	Mean	N	Mean	
Gender	Male	64	16.5 ± 4.4	18	20.5 ± 5.1	0.001
	Female	95	15.3 ± 4.1	37	18.9 ± 5.2	0.000
Job title	Midwife	33	17.2 ± 4.2	24	19.7 ± 4.3	0.033
	Nurse	125	15.4 ± 4.2	18	16.8 ± 5.2	0.194
	Doctor	1	20	13	22.6 ± 4.8	0.609
Level of education	Secondary	26	14.6 ± 3.5	0	-	-
	A1	96	15.8 ± 4.4	35	18.5 ± 5.2	0.003
	A0	34	16.5 ± 4.1	9	19.3 ± 4.8	0.085
	MD/GP	2	21 ± 1.4	10	22.6 ± 4.6	0.651

	Masters	1	11	1	20	-
Experience	<=2 years	38	15.6 ± 4.7	11	21.2 ± 6.1	0.002
	2-5 years	34	15.1 ± 4.1	24	18.4 ± 5.9	0.015
	6-10 years	26	15.8 ± 4.3	9	19 ± 3.2	0.055
	>10 years	61	16.2 ± 3.9	11	20.2 ± 3.3	0.002
Total		159	15.8 ± 4.2	55	19.4 ± 5.1	0.000

Table 5. Association between knowledge scores and work experience in years

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.738	3	1.579	0.069	0.976
Within Groups	4787.715	210	22.799		
Total	4792.453	213			

Table 6. Participants' responses on practice questions

		All N=214	Institution	
			HC N=159	DH N=55
Have you ever treated a woman with preeclampsia?	Yes	136 (63.6)	88 (55.3)	48 (87.3)
	No	78 (36.4)	71 (44.7)	7 (12.7)
Do you measure BP for every pregnant woman?	Yes	211 (98.6)	157 (98.7)	54 (98.2)
	No	3 (1.4)	2 (1.3)	1 (1.8)
How often do you take BP for pregnant women?	For the first contact	69 (32.2)	45 (28.3)	24 (43.6)
	2 times during pregnancy	2 (.9)	2 (1.3)	0 (0.0)
	With every contact	142 (66.4)	111 (69.8)	31 (56.4)
	I don't measure BP	1 (0.5)	1 (0.6)	0 (0.0)
Have you ever given MgSO4 in maternity?	Yes	109 (50.9)	61 (38.4)	48 (87.3)
	No	105 (49.1)	98 (61.6)	7 (12.7)
Do you feel confident in managing PET	Yes	152 (71.0)	105 (66.0)	47 (85.5)
	No	62 (29.0)	54 (34.0)	8 (14.5)

Appendices

APPENDIX 1: CONSENT FORM FOR

RESPONDENTS May 2019

Dear Respondent,

My name is MUHAIRWE Fred, student of the University of Rwanda, College of Medicine and Health Sciences, Department of Obstetrics and Gynecology. I am conducting a research study on: **ASSESSING KNOWLEDGE AND PRACTICES OF HEALTHCARE PROVIDERS ON PRE- ECLAMPSIA AND ECLAMPSIA: A CASE STUDY OF GICUMBI AND KAMONYI DISTRICT HOSPITALS, RWANDA**

The study involves all the doctors, nurses and midwives of the selected health facilities. You are among those selected to provide the necessary information by answering some questions. Your participation in this study is voluntary. The results of the research study may be published, but your name will not be used. The results will also be maintained in confidence and complete anonymity is guaranteed. There are no direct or indirect risks to you or your organization. If you have any questions, feel free and contact me. I would be most grateful if you kindly accept to fulfill this questionnaire.

Thanks!

I accept to participate to the study

I do not agree to participate to the study

Assessing knowledge and practices of healthcare providers on preeclampsia and eclampsia: case study of Gicumbi and Kamonyi district hospitals, Rwanda

APPENDIX 2: QUESTIONNAIRE

Section 1: Socio-demographic characteristics of respondents

1. Age in years:
2. Gender
 1. Male
 2. Female
3. Marital status
 1. Single
 2. Married/cohabitate
 3. Divorced/separated
 4. Widowed
4. Job title
 1. Midwife
 2. Nurse
 3. Doctor
 4. Clinical officer/ medical assistant
5. Institution
 1. Health center
 2. District hospital
6. Level of education
 1. Secondary
 2. A1
 3. A0
 4. MD/GP
 5. Masters
 6. PhD
7. Working experience from graduation in years:.....

Knowledge about preeclampsia and eclampsia

8. Where did you learn the management of pre-eclampsia/eclampsia?
 1. At school
 2. I had special training after school
 3. I learned from the hospital during CPD activities
 4. I don't have knowledge on preeclampsia/eclampsia
9. Pre-eclampsia is:
 1. Blood pressure of more than 140/90 with proteinuria on a singleton pregnancy of more than 20 weeks
 2. Blood pressure of more than 140/90 without proteinuria on a singleton pregnancy of more than 20 weeks
 3. Blood pressure of more than 140/90 with proteinuria.

10. Which of the following are signs of severe preeclampsia
 1. Weight gain
 2. Nausea and vomiting
 3. Headache
 4. Visual disturbance
 5. Epigastric pain
 6. Proteinuria
 7. Edema
 8. Polyuria
 9. Excessive hunger
 10. I don't know
11. Which organ is responsible for pre-eclampsia
 1. Liver
 2. Kidney
 3. Placenta
 4. Heart
 5. The eye
 6. Uterus
 7. I don't know
12. What are the risk factors for preeclampsia
 1. Smoking(protective)
 2. Overweight/obesity
 3. Genetics
 4. Too much salt
 5. Alcohol
 6. Advanced maternal age
 7. Chronic HTN
 8. Autoimmune diseases
 9. Multiple gestation
 10. Chronic kidney disease
 11. Previous preeclampsia
13. when should we measure the BP for a pregnant woman for the first time
 1. first trimester
 2. second trimester
 3. third trimester
 4. during labor
 5. I don't know
14. For every pregnant woman, we should test for proteinuria during antenatal care even if the BP is normal
 1. Yes
 2. No
15. Proteinuria is always a sign of preeclampsia
 1. Yes
 2. No
16. Which medication do we give to treat HTN in case of preeclampsia
 1. Nifedipine
 2. Hydralazine
 3. Captopril
 4. Cytotec

17. The definitive management of preeclampsia is
 1. Anti hypertensive
 2. Delivery of the fetus
 3. It resolves spontaneously
 4. Painkillers
18. What is eclampsia
 1. Pre-eclampsia with renal failure
 2. Preeclampsia with headache and blurred vision
 3. Pre-eclampsia with convulsion/coma
 4. Proteinuria with high blood pressure
 5. I don't know
19. What to do during transfer of a pre-eclampsia woman?
 1. Give her IV fluid and transfer
 2. Give Magnesium sulfate IM before transfer
 3. Don't give MgSO₄ until she is at referral hospital
 4. Send as OPD
 5. Send with ambulance
20. Women with preeclampsia should be restricted from taking salt
 1. Yes
 2. No
21. Have you ever treated a woman with preeclampsia?
 1. Yes
 2. No
22. How many patients of preeclampsia do you see per year? (approximate)
23. Do you measure BP for every pregnant woman?
 1. Yes
 2. No
24. How often do you take BP for pregnant women?
 1. For the first contact with her
 2. 2 times during her pregnancy period
 3. With every contact
 4. First and third trimesters
 5. I don't measure BP
25. Have you ever given MgSO₄ for women with severe preeclampsia?
 1. Yes
 2. No
 3. I have never seen a woman with severe preeclampsia
26. Which laboratory investigations do you do when a patient has preeclampsia
 1. Renal function tests
 2. Liver function test
 3. Cholesterol level
 4. Urinalysis
 5. FBC
 6. Blood smear for malaria
 7. I do vaginal swab
 8. I do proteinuria

27. When are the BP considered so high that you would initiate treatment?
 1. Above 140/90
 2. 155/105
 3. 160/110
 4. No need of treatment if the woman is pregnant
 5. I don't know
28. How many patients have you seen with preeclampsia eclampsia?(number)
29. Have you ever administered MgSO4 to patients with preeclampsia /eclampsia?
 - 1.yes
 - 2.no
30. What is the appropriate route to administer MgSO4?
 1. Intravenous
 2. Per or (oral)
 3. Intramuscular
 4. Topical
 5. I don't know.
31. How many patients with preeclampsia/eclampsia have you treated with MgSO4? (number)
32. Do you feel confident in managing a patient with pre-eclampsia?
 1. Yes
 2. No
33. Do you feel confident in managing a patient with eclampsia?
 1. Yes
 2. No



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CMHS INSTITUTIONAL REVIEW BOARD (IRB)

Kigali, 21st/ 11/2019
No 495/CMHS IRB/2019

Dr MUHAIRWE Fred
School of Medicine and Pharmacy, CMHS, UR

Re: Amendment Request for Research Protocol


Dear Dr MUHAIRWE Fred

We thank you for submitting your request for research project amendments in the project titled *“Assessing Knowledge And Practices Of Healthcare Providers On Pre Eclampsia And Eclapsia: A Case Study Of Byumba And Remera Rukoma District Hospitals, Rwanda*

After reviewing your request, the amendments have been approved with changes in the following:

The title has been changed from **“Assessing Knowledge and Practices of Healthcare Providers in Pregnancy Complications”** to *“Assessing Knowledge And Practices Of Healthcare Providers On Pre Eclampsia And Eclapsia: A Case Study Of Byumba And Remera Rukoma District Hospitals, Rwanda.*

We wish you success in this important study.


Professor Gahutu Jean Bosco
Chairperson Institutional Review Board
College of Medicine and Health Sciences, UR
Cc:

- Principal College of Medicine and Health Sciences, UR
- University Director of Research and Innovations, UR