OCULAR MANIFESTATIONS OF PREECLAMPSIA AND ECLAMPSIA AMONG PREGNANT WOMEN ADMITTED AT MUHIMBILI NATIONAL HOSPITAL, DAR ES SALAAM, 2014

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MMed (Ophthalmology) Dissertation
Muhimbili University of Health and Allied Sciences
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By

Edmund F. Mushumbusi, MD

A Dissertation Submitted in Partial Fulfillment of the Requirements for Degree of Master of Medicine (Ophthalmology) of Muhimbili University of Health and Allied Sciences

Muhimbili University of Health and Allied Sciences
May, 2015

CERTIFICATION

The undersigned certify that she has read and hereby recommend for examination by Muhimbili University of Health and Allied Sciences a dissertation entitled: **"O*cular manifestations of pre-eclampsia and eclampsia among pregnant women admitted at Muhimbili National Hospital*"**, in partial fulfillment of the requirements for the degree of Master of Medicine (Ophthalmology) of the Muhimbili University of Health and Allied Sciences

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Date

DECLARATION AND COPYRIGHT

I, **Dr Edmund F. Mushumbusi**, hereby declare that this **dissertation** is my original work and that it has not been presented nor will it be presented to any other University for a similar or any other degree award.

Signature…….. Date……

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DEDICATION

To my parents who devoted their everything and they are the reason who and what I am today. To my wife Masemonica Ndyali and my sons Victor, Delani and Prince who contributed a great deal to this achievement.

ABSTRACT

Background

Pre-eclampsia and eclampsia are pregnancy related complications having various effects in different organs and systems. Cardiovascular changes, hematologic abnormalities, hepatic and renal impairment, neurologic and ophthalmic manifestations have all been implicated in pre-eclampsia and eclampsia. Pre-eclampsia and eclampsia can affect the visual pathways, from the anterior segment to the visual cortex. Visual symptoms are reported in up to 25% of patients with severe preeclampsia and 50% of patients with eclampsia. Many studies done in developed countries have reported various findings such as retinal hemorrhages, cotton wool spots, retinal arteriolar narrowing, exudative retinal detachment, cortical blindness, retinal pigment epithelium lesions like Elschnig's spots and vascular occlusive pathologies. In Tanzania, there are no published studies about the subject. This prompted the need to conduct this study.

Broad objective

To determine the prevalence and causes of visual impairment in patients with pre-eclampsia and eclampsia admitted at Muhimbili National Hospital, Dar es Salaam.

Methodology

This was a hospital-based prospective cross-sectional study that was conducted at Muhimbili National Hospital, Dar es Salaam, Tanzania between May and December 2014. Convenient sampling method was used. Preliminary data was obtained from patients or patients' files and registers at the eclampsia unit. Ocular examination was done by the researcher and the findings were recorded in the questionnaires. Data was entered into a computer using EPI info version 7.0. Analysis was done by SPSS version 20.0 software.

Results

One hundred thirteen patients were recruited and all were included in the analysis. The age range was 18–49 years, with a mean age of 29.26 years.The study population constituted 45(39.8%) patients with pre-eclampsia, 27(23.9%) eclampsia, 35(31%) severe preeclampsia and 6(5.3%) post-partum eclampsia. Poor vision 39(35.4%)was the most common visual symptom. Other ocular complaints included; photopsia 18(15.9%), diplopia 3(2.7%), photophobia 1(0.9%) and ocular pain 1(0.9%).

Papilledema 32(28.3%) was the most common fundus finding among patients with pre-eclampsia and eclampsia followed by retinal edema 22(19.5%), cotton wool spots 21(18.6%), arteriolar narrowing 20(17.7%), flame-shaped hemorrhage 9(8%), temporal disc pallor 9(8%), macular edema 6(5.3%), arterioveinous nipping 5(4.4%) and exudative retinal detachment 1(0.9%).Visual impairment was temporary and time of visual recovery varried among the patients. Thirty nine patients (35.4%) had best corrected visual acuity <6/18 on admission. The visual acuity of most patients improved and there were only 15(13.3%) with the BCVA<6/18 at discharge. This finding was statistically significant ($p<0.001$). The mean visual recovery time was 8.5±1.2 days.

Conclusion

The magnitude of ocular complications among mothers with pre-eclampsia and eclampsia is significantly high. The most common ocular manifestation is poor vision due to macular edema, retinal edema, optic neuropathy, cortical blindness and exudative retinal detachment. Poor vision is associated with severity of the disease and is temporary in majority of cases.

Recommendation

Health care providers should be aware that sudden onset of visual symptoms in pregnant women can be an alarming sign of pre-eclampsia and eclampsia. Obstetricians should include in their practice, fundus examination in mothers with pre-eclampsia and eclampsia and discuss other diagnostic options and management if needed, with the ophthalmologist. A system to follow up patients with pre-eclampsia and eclampsia after discharge for visual evaluation and appropriate management be established at MNH. Efforts to educate patients to seek immediate obstetric care if they experience sudden onset of visual symptoms is important.

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LIST OF ABBREVIATIONS

BCVA	Best Corrected Visual Acuity
CF	Counting Fingers
CNS	Central Nervous System
GA	Gestational Age
IOP	Intraocular pressure
MNH	Muhimbili National Hospital
MUHAS	Muhimbili University of Health and Allied Sciences
NLP	No Light Perception
OPD	Out Patient Department
OCT	Optical Coherence Tomography
PIH	Pregnancy Induced Hypertension
RPE	Retinal Pigment Epithelium
SPSS	Statistical Package of Social Sciences
VA	Visual Acuity
VF	Visual Field

DEFINITIONS OF TERMS

Pre-eclampsia- A syndrome defined by hypertension and proteinuria that may be associated with myriad other signs and symptoms, such as edema, visual disturbances, headache, and epigastric pain usually after 20 weeks of gestation(1)

Eclampsia- Occurrence of seizure and/or altered level of consciousness not caused by epilepsy or other convulsive disorders, with signs of severe pre-eclampsia(2)

Papilledema- Bilateral swelling of the optic nerve head secondary to raised intracranial pressure.

Photopsia- Perception of flashes of light.

Serous/Exudative retinal detachment- Retinal detachment caused by accumulation of sub-retinal fluid in the space between neuro-sensory retina and retinal pigment epithelium.

Visual field- The space or range within which objects are visible (whole extent of the image falling on the retina) when the eyes are fixating a given point in space.

Blindness

According to World Health Organization (WHO):

Normal vision is defined as besst corrected visual acuity of 6/4 to 6/18

Visual impairment is defined as presenting visual acuity of <6/18 to ≥3/60 with best correction

Blindness is defined as vision in a person's better eye of less than 20/500 (3/60) or a visual field of less than 10 degrees.

Cortical blindness- The loss of vision in a normal-appearing eye caused by damage to the occipital cortex of the brain.

Optic neuropathy- Refers to damage or death of optic nerve cells, or neurons causing loss of vision and or color function abnormalities.

CHAPTER ONE

INTRODUCTION

The woman's body undergoes a number of changes throughout pregnancy. These changes include both systemic and ocular and they may be physiological or pathological or modifications of pre-existing conditions. The ocular effects of pregnancy may be divided into:

a. Ocular changes and disorders that develop during pregnancy.
b. The effects of pregnancy on pre-existing eye disorders.
c. Disorders of the eye associated with pregnancy related diseases.
d. Neuro-ophthalmological changes in pregnancy.
e. Disorders related to labor and delivery

Common ocular changes and disorders that can develop during pregnancy include;

Chloasma

Chloasma is also known as the mask of pregnancy or melasma. It is a patchy brown or dark brown skin discoloration which may occur around the eyelids and is associated with hormonal changes during pregnancy.

It does not cause any other symptoms beyond the cosmetic discoloration. The condition is thought to be related to elevated hormonal levels, either melanocyte-stimulating hormone or estrogen and progesterone during pregnancy. The exact worldwide prevalence of chloasma is unknown. It is estimated to develop in 50–70% of pregnant women during the second trimester(3). In Asia a case referent study that was done in India among 250 patients, 56 (22.4%) of them reported that their disease precipitated during pregnancy and 34 (13.6%) patients explained that their disease exacerbated during pregnancy(4). Another cross-sectional study done in Iran in 400 pregnant women estimated the prevalence of chloasma to be 15.8% [95% confidence interval (CI) 12.3-19.4](5). Currently no studies have been conducted in Tanzania.

Ptosis

Ptosis is defined as drooping of upper eyelid resulting into obscuration of visual axis. It has been reported during and after normal pregnancies mostly unilateral. Physiologic enlargement of the pituitary gland during pregnancy has been implicated to cause diplopia, ptosis, visual field defects and blurred vision(6)

Conjunctival blood vessels changes

Various changes on conjunctival blood vessels have been described toward the end of normal pregnancies. These changes include a granularity of the conjunctival venules, a mild spasm of conjunctival arterioles, and decreased visualization of conjunctival capillaries(7)**.** There are no reports on global or specific country data.

Cornea:

Decreased corneal sensitivity and increased corneal thickness is possibly due to fluid retention, which is often associated with pregnancy and decreased intraocular pressure(7).

Intraocular Pressure

Decrease in intraocular pressure (IOP) during pregnancy has been reported by previous studies. In a study done to monitor IOP throughout pregnancy, the IOP differences between first and second trimester ($p < 0.05$) and second and third ($p < 0.01$) trimesters of pregnancy were significant. It was found that pregnancy decreased IOP by 19.6%. About 35% of total decrease occurred between 12th and 18th weeks of pregnancy(8). Another study done in Nigeria also reported a fall in mean IOP as pregnancy advanced with mean intraocular pressure (MIOP) was 14.7 +/- 2.2 mmHg, 13.2 +/- 2.0 mmHg and 11.0 +/- 1.3 mmHg in the three trimesters respectively(9).

Contact Lens wearers

It has been documented that there is a decreased tolerance to contact lenses during pregnancy; therefore, it is advisable to fit contact lenses postpartum(10).

Extraocular Muscles

Ophthalmoplegia and diplopia have also been reported to occur in pregnancy(7). Patients with hyperemesis gravidarum (pernicious vomiting in pregnancy) can develop vitamin deficiencies, leading to Wernicke's encephalopathy with nystagmus and extraocular muscle palsies.

Intracranial disorders

Common tumors implicated in pregancy are said to be meningioma and adenomas. The incidence of meningioma in pregnant women is comparable with that in non–pregnant women of the same age group. Only that, symptoms may flare during pregnancy and this has been attributed to water retention, engorgement of vessels, and the presence of sex hormone receptors on tumor cells leading to remarkable growth of the tumor(11).

The primary focus of this research was about the disorders of the eye associated with pregnancy related diseases, specifically pre-eclampsia and eclampsia.

Pre-eclampsia

Pre-eclampsia is the new onset of hypertension and proteinuria during the second half of pregnancy. It affects approximately 6-8% of all pregnancies worldwide, with onset of symptoms in the late second or third trimester, most commonly after the 32nd week of gestation(12). Some women experience pre-eclampsia as early as 20 weeks. In developing countries the prevalence of pre-eclampsia ranges from 1.8% to 16.7%(13).

Diagnostic Criteria

The diagnosis of pre-eclampsia is made when blood pressure >140/90 mmHg on two occasions combined with urinary protein excretion >300 mg/day(1).

Eclampsia

Eclampsia is an acute life-threatening complication of pregnancy characterized by the appearance of tonic-clonic seizures, and coma which is not due to pre-existing or organic brain disorders, usually develops in a patient who had pre-eclampsia. The incidence of eclampsia

has been relatively stable at an incidence of 1 in 2000 pregnancies in Europe and other developed countries(14). A recent study done in Australia showed the overall rate of eclampsia was 8.6/10,000 births or 2.6% of pre-eclampsia cases(15). In developing countries, however, the incidence varies widely from 6 to 157 cases per 10,000 deliveries(13). In Tanzania, a study to determine the incidence of eclampsia at Muhimbili National Hospital in Dar es Salaam estimated the hospital and population-based incidences of eclampsia to be 200/10,000 and 67/10,000, respectively(16). Another study also done at the same hospital reported a prevalence of eclampsia to be 6%(17).

Pathophysiology

Several theories have evolved since 18th century to the present. However, the exact mechanims are still not well known. Review articles have reported numerous and diverse theories. The theories put forward are related to mechanisms involving oxidative stress, immunologic intolerance between the feto-placental unit and maternal tissue, and angiogenic imbalance. For example, the endoglin protein, which is involved in regulation of placental trophoblast differentiation and maintenance of vascular tone has been found to be an anti-angiogenic factor potentially involved in pre-eclampsia development(18).

Clinical Features

A patient presents with typical signs of pregnancy induced hypertension and proeteinuria followed by eclamptic convulsions. Other cerebral signs include nausea, vomiting, headaches and cortical blindness.

Risk factors

Risk factors for pre-eclampsia and eclampsia include; first pregancies, very young or advanced maternal age, multifetal pregnancy, hemolytic disease of the newborn, women with pre-existing vascular diseases such as chronic systemic hypertension, diabetes and nephropathy or thrombophilic diseases such as the antiphospholipid syndrome.

Ocular manifestations of pre-eclampsia and eclampsia

Since complications of pre-eclampsia and eclampsia involve multiple systems and organs, the eye and visual system are of no exception. Earlier Studies have shown up to 25% of patients with severe pre-eclampsia and 50% of patients with eclampsia have visual symptoms of clinical significance(19).

Blurring of vision is the most common visual complaint. Focal or generalized arteriolar narrowing is the most common ocular finding in pre-eclampsia and eclampsia. Other ocular manifestations include photopsia, visual field defects, sudden inability to focus, and in severe cases, complete blindness. Although visual disturbances are quite common, complete blindness is rare, earlier studies reported an incidence of 1–3%(20).

Blindness in pre-eclampsia and eclampsia can be due to the involvement of the occipital cortex, retina, or optic nerve. In the past, most cases of blindness in pre-eclampsia and eclampsia were commonly attributed to retinal pathology including vascular abnormalities, edema or detachment and acute ischemic optic neuropathy as a result of decreased blood supply to the prelaminar portion of the optic nerve. Currently, more emphasis is been put on cortical blindness as documented by several case studies(21,22)

LITERATURE REVIEW

Pre-eclampsia and eclampsia are hypertensive disorders of pregnancy that are associated with various ocular manifestations.

Prevalence of visual impairment

Previous studies reported incidences of visual disturbances of up to 25% and 50% in pre-eclampsia and eclampsia patients respectively(23). In Tanzania, a case study done at Muhimbili National Hospital, reported a prevalence of visual disturbances to be 39% of which blurring of vision alone constituted 36.6%(24).

Ocular signs and symptoms

Blurred vision is said to be the most common visual complaint while focal or generalized arteriolar narrowing is the most common ocular finding in pre-eclampsia and eclampsia(20).Other ensuing symptoms which have been documented to occur in patients with pre-eclampsia and eclampsia include diplopia, amaurosis fugax, photopsia, and scotomata, including homonymous hemianopsia and photophobia(24,25). The following findings have been reported in varying proportions among patients with pre-eclampsia and eclampsia:

Arteriolar Narrowing

Severe arteriolar spasm is the most common fundoscopic finding, occurring in 70% of pre-eclampsia cases(20). The cause of retinal arteriolar narrowing is related to central retinal artery vasospasm suggested by increased central retinal artery blood flow velocity(26). Its incidence globally is unknown and the prevalence in Tanzania has never been documented. However; frequency of arteriolar narrowing has been declining owing to improved management of pregnancy induced hypertension. A retrospective study of fluorescein angiograms in pre-eclamptic patients identified normal retinal vessel caliber in 16 of 16 patients. In contrast, 4 of 14 patients with pre-existing chronic systemic hypertension had retinal vascular changes(27). Another prospective study demonstrated a statistically significant difference in arteriolar caliber between 56 study participants with severe pre-eclampsia and 25 healthy controls, but

no difference between 17 patients with mild pre-eclampsia and controls(23). There is evidence that the severity of retinopathy does not correlate with degree of systolic or diastolic hypertension, suggesting that retinopathy in pre-eclampsia may be independent of systemic blood pressure(28)

Elschnig's spots

Elschnig's spots are hyperpigmented patches in the choroid surrounded by a ring of hypopigmentation caused by poor perfusion of the choriocapillaris. The lesions are usually seen in patients with advanced hypertensive retinopathy. Prevalence of Elschnig's spots in pre-eclampsia and eclampsia is not documented worldwide; also no similar studies in Africa and Tanzania in particular. However characteristic RPE focal elevations and abnormalities corresponding to the Elschnig's spots have been reported in some eclampsia and pre-eclampsia patients(29,30).

Serous retinal detachment

This is usually bilateral and bullous but occasionally may be cystic. Serous retinal detachment in pre-eclampsia and eclampsia is due to choroidal ischemia. It is a rare complication of pre-eclampsia and eclampsia affecting 1 – 2% of patients with severe pre-eclampsia and 10% of those with eclampsia(31). The complication may be present either before delivery or in the postpartum period(32). There is no documented data on prevalence worldwide. Though very few cases have been reported, it is a well-documented cause of visual loss in pre-eclampsia.

Occlusive vascular disorders

An increase in the level of clotting factors and clotting activity occurs during pregnancy increasing the risk of vaso-occlusive disease which may also manifest as retinal or choroidal vascular occlusions. The prevalence of this condition has not been documented worldwide. However various case study reports of occurrences of occlusive retinal vascular disorders in patients with pre-eclampsia and eclampsia are available. A case of bilateral central retinal artery occlusion with long-lasting blindness in severe pre-eclampsia has been reported(33).

Visual Field Defects

Common patterns of visual field defects resulting from visual pathway lesions include; central or centro-cecal scotoma; arcuate or altitudinal scotoma; nasal wedge scotoma; generalized depression; and hemianopia. There are numerous reports about visual field defects that occur in normal pregnancy, pre-eclampsia and eclampsia consisting of bitemporal visual field loss, concentric constriction, and enlarged blind spots. Most visual field defects just like blindness in pre-eclampsia and eclampsia are reversible though a case of bilateral permanent concentric visual field defect secondary to severe pre-eclampsia has been reported(34).

Papilledema and Macular edema

On fundus examination papilledema is characterized by venous engorgement (usually the first sign)**,** loss of venous pulsation**,** hemorrhages over and / or adjacent to the optic disc**,** blurring of optic disc margins**,** elevation of optic disc and Paton's lines. Paton's lines are radial retinal lines cascading from the optic disc. It is usually bilateral and can occur over a period of hours to weeks.

Papilledema is associated with transient loss of vision while macular edema is the cause of severe visual impairment(35). There is no global data on prevalence, however many case studies have been published reporting these findings. In the United Kingdom, a case of bilateral papilledema was reported in a patient with pre-eclampsia who presented with blurry vision(36).Another study done in Italy, demonstrated a case of acute macular edema in a patient of pre-eclampsia using a high resolution spectral domain OCT imaging(37).

Miscellaneous

Other less common documented ocular abnormalities seen in pre-eclampsia and eclampsia include; retinal hemorrhages, cotton wool spots, white-centered retinal hemorrhages (Roth's spots), papillophlebitis, optic neuritis, optic atrophy, and ischemic optic neuropathy(38).

BLINDNESS

Although Visual impairment is common in patients with severe pre-eclampsia and eclampsia, complete blindness is rare with an incidence of 1-3%(39). The causes of blindness in these patients may be due to involvement of the occipital cortex or the retina. Most cases were, in the past, commonly attributed to retinal pathologies such as retinal vascular abnormalities, edema or detachment. Current studies however, suggest that blindness in severe pre-eclampsia and eclampsia is mostly associated with cortical etiology(35,39,40). Cortical blindness is characterized by intact pupillary reflexes and normal fundus examination. It is said to occur in 1–15% of patients with severe pre-eclampsia and eclampsia(39).It may occasionally be the first clinical symptom preceding seizures by 4–7 hours(20).Vision is usually regained within 4 hours to 8 days(41).

Risk factors for development of ocular complications in pre-eclampsia and eclampsia

The only documented risk factor for the development of ocular complications in patients with pre-eclampsia and eclampsia is the presence of pre-existing ocular and systemic diseases such as chronic systemic hypertension and diabetic retinopathy. In this study, patients with preexisting ocular and systemic diseases that may give similar findings as may be seen in pre-eclampsia and eclampsia were excluded from the study.

STATEMENT OF THE PROBLEM

It is known that pre-eclampsia and eclampsia can cause wide range of ocular manifestations ranging from mild visual disturbances to severe visual impairment. Visual disturbances, including scotoma, diplopia, photopsia, and loss of vision have all been reported to be common visual complaints with severe pre-eclampsia and eclampsia.

In Tanzania, a case referent study which was done at Muhimbili National Hospital; only reported proportions of patients who presented with visual disturbances among mothers with eclampsia. No details for the underlying causes of visual loss were provided.

This research was conducted to cover that gap by identifying the causes of visual impairment in these patients.

RATIONALE

This is the first study about the subject matter to be conducted at Muhimbili National Hospital. Therefore it was expected to provide baseline information for future studies related to the subject. Moreover the study has impacted knowledge and awareness among healthcare providers and patients about the causes of the visual impairment commonly occurring in patients with eclampsia and pre-eclampsia. From this study, quality of care will be improved by emphasizing on doing fundoscopy to all patients with pre-eclampsia and eclampsia with visual complaints and appropriate consultation to the ophthalmologists.

RESEARCH QUESTIONS

1. What is the prevalence of visual impairment in patients with pre-eclampsia/eclampsia at MNH?
2. What are the causes of visual impairment in pre-eclampsia/eclampsia at MNH?
3. What are the ocular signs and symptoms in patients with pre-eclampsia/eclampsia at MNH?
4. What is the average duration for visual recovery in patients with pre-eclampsia/ eclampsia at MNH?

OBJECTIVES

Broad objective

To determine the prevalence and causes of visual impairment in patients with pre-eclampsia and eclampsia admitted at Muhimbili National Hospital.

Specific objectives

1. To determine the prevalence of visual impairment in patients with pre-eclampsia and eclampsia admitted at MNH.
2. To determine socio-demographic distribution of pre-eclampsia and eclampsia at MNH.
3. To describe the pattern of obstetric history in patients with pre-eclampsia and eclampsia admitted at MNH.
4. To analyze ocular symptoms and signs among patients with pre-eclampsia and eclampsia admitted in eclampsia unit at MNH

CHAPTER TWO

METHODOLOGY

Study design

A hospital based cross-sectional descriptive study.

Study area

The study was carried out in the eclampsia unit, obstetric department at Muhimbili National Hospital. Muhimbili National Hospital is a tertiary hospital serving in-patients as well as out-patients from all over the country and a teaching hospital for the Muhimbili University of Health and Allied Sciences. The Obstetrics and gynecology department at MNH provides tertiary services to residents of Dar es Salaam and to all patients referred from other regions of Tanzania. On average 40 patients with pre-eclampsia and eclampsia are admitted every month.

Study population

All pregnant patients diagnosed with pre-eclampsia and eclampsia, who were admitted in eclampsia unit at MNH during the study period were eligible for recruitment in the study.

Study sampling technique

Convenient sampling technique was used where all patients with pre-eclampsia and eclampsia who met the criteria and admitted in the eclampsia unit were selected for the study.

Study sample

With the proportion of about 8% eclampsia among all pregnancies in a general population, sample size was estimated as follows:

$$n=\frac{Z^2P(1-P)}{d^2}$$

Where:

n= sample size

P= estimated prevalence, 8%=0.08 (13)

1-p=Expected proportion of subjects without the disease

Z= Z statistic for the level of confidence, i.e. 1.96= 95% CI

d=marginal error, 0.05

$$n = \frac{1.96^2*0.08*0.92}{(0.05)^2}$$

n = 113, hence an estimated sample size was expected to be not less than 113 patients

Inclusion criteria

1. All pregnant mothers diagnosed by an obstetrician with pre-eclampsia and eclampsia admitted in eclampsia unit, obstetric department, MNH during the study period.
2. Patients with above criteria, who signed an informed consent form themselves or their next of kin.

Exclusion criteria

1. Unconscious patients
2. Patients with established ocular and systemic diseases that may have similar fundoscopic pattern as in pre-eclampsia and eclampsia such as diabetic retinopathy, Glaucoma, HIV and chronic systemic hypertension

Data collection

Purpose and all the proceedings of the study were explained to the study participants and/or their next of kin. All study participants signed the informed consent forms. Preliminary data was gathered from patients or their next of kin and from the patients' files by research assistants (nurses in eclampsia unit) and/or by the researcher himself. Standard ocular examination was carried out and information filled in the questionnaires by the researcher**.**

History, clinical examination and investigation

A thorough history was taken from patients to elicit visual complaints in relation to current pregnancy related complications, pre-eclampsia and eclampsia for the purpose of this study. Standard ophthalmological examination was conducted as follows:

Inspection

General appearance, facial symmetry and skin condition were all thoroughly assessed.

Visual Acuity and IOP measurement

Visual acuity test was performed using Snellen's chart/illiterate E-chart. The intraocular pressure was measured by Tonopen-tonometer.

Anterior Segment Examination

The anterior segment was examined beginning with the eyelids where all disorders pertaining to the form and function of eyelids and eyelid margins were assessed, including, infections, colobomas, and positional eyelids disorders such as ptosis, lagophthalmos, ectropion and entropion. The pupils were examined for direct and indirect light reflex using a pen-torch.

Posterior segment examination

Posterior segment was examined following dilatation of pupils by tropicamide (1%) using the Keeler head-mounted indirect ophthalmoscope.

Data management and Analysis

All questionnaires were counter-checked daily by the researcher. Where necessary, re-interviewing and re-examination of patients was done to correct the discovered information gaps. Data collected was coded and then entered into a computer using EPI-info version 7. Analysis was done by the researcher with the assistance of a Statistician using SPSS version 20.0 software.

Ethical Consideration

This study was conducted only after it was granted ethical approval by the Ethics committee of the Muhimbili University of Health and Allied Sciences. All bioethical issues about research involving human subject were observed.

Patients' well-being was given first priority throughout study period. All patients were treated by obstetrician and when needed were seen and treated by an ophthalmologist. Patients had the right not to sign to participate in the study, only those who agreed and signed the informed consent form were included in this study. There were no conditions imposed on patients for the purpose of influencing their decision to participate in the study.

Only participants, who were required to come back after their discharge just for the purpose of this study, were refunded their public transport.

In addition all participants had an advantage of undergoing thorough ocular evaluation and treated accordingly for any abnormality detected. Permission to conduct the study was sought from the MNH authorities.

CHAPTER THREE

RESULTS

One hundred thirteen patients were recruited for the study and all were included in the analysis. The age range was 18–49 years, with mean age of 29.26 ± 6.97 years

Table 1: Socio-demographic distribution of pre-eclampsia and eclampsia (n=113)

Character	Specific variable	(N)	(%)
Age (years)			
	≤ 20	11	9.7
	21 - 30	50	44.2
	31 - 39	43	38.1
	≥ 40	9	8
Marital status			
	Single	14	12.4
	Married	96	85
	Widow/Divorced	3	2.7
Education level			
	No formal education	9	8
	Primary school level	69	61.1
	Secondary school level	25	22.1
	College/University	10	8.8
Occupation			
	Peasant	46	40.7
	Petty trader	30	26.5
	Medium scale business	16	14.2
	Employed	8	7.1
	Others	13	11.5

Majority (44.2%) of the study population were aged between 21-30 years. The mean age was 29.26 ± 6.97 years and the age range was 18- 49 years. Most (85%) patients were married and majority were peasants (40.7%) and petty traders (26.5%). About two-thirds (61%) of the study population had primary school education and only 8.8% had college/university education.

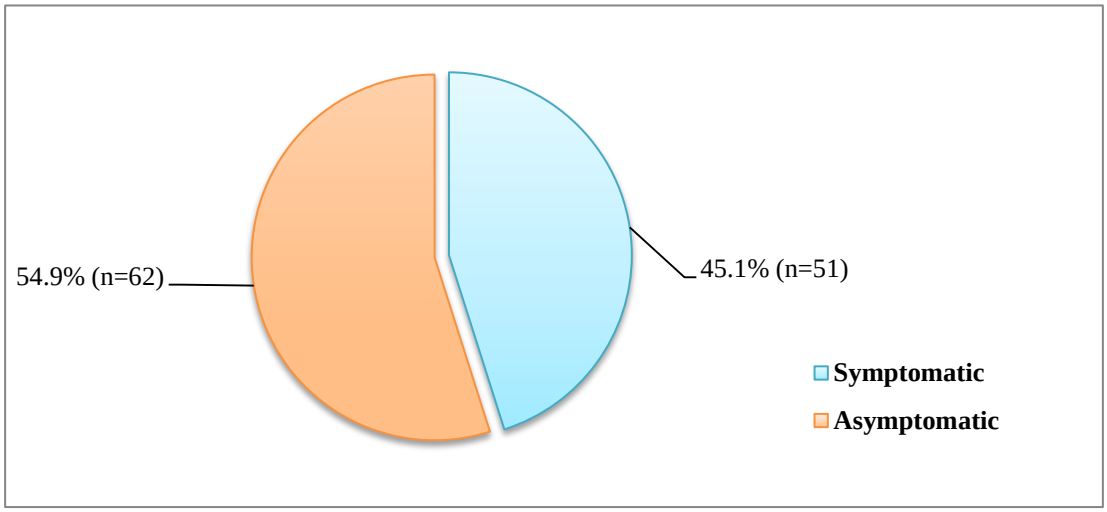
Table 2: Obstetric characteristics of the study population

Character	Specific variable	(N)	(%)
Current gestation age (months)			
	4 - 6	2	1.8
	7 - 9	111	98.2
Parity			
	Null-porous	27	23.9
	Para 1	24	21.2
	Para 2	22	19.5
	Para 3	16	14.2
	≥ Para 4	24	21.2
Any complication in previous pregnancy			
	None	90	79.7
	*PIH	9	8
	Severe pre-eclampsia	3	2.7
	Eclampsia	6	5.3
	Others	5	4.3
Obstetric diagnosis			
	Pre-eclampsia	45	39.8
	Eclampsia	27	23.9
	Severe pre-eclampsia	35	31.0
	Post-partum eclampsia	6	5.3

** PIH –pregnancy induced hypertension*

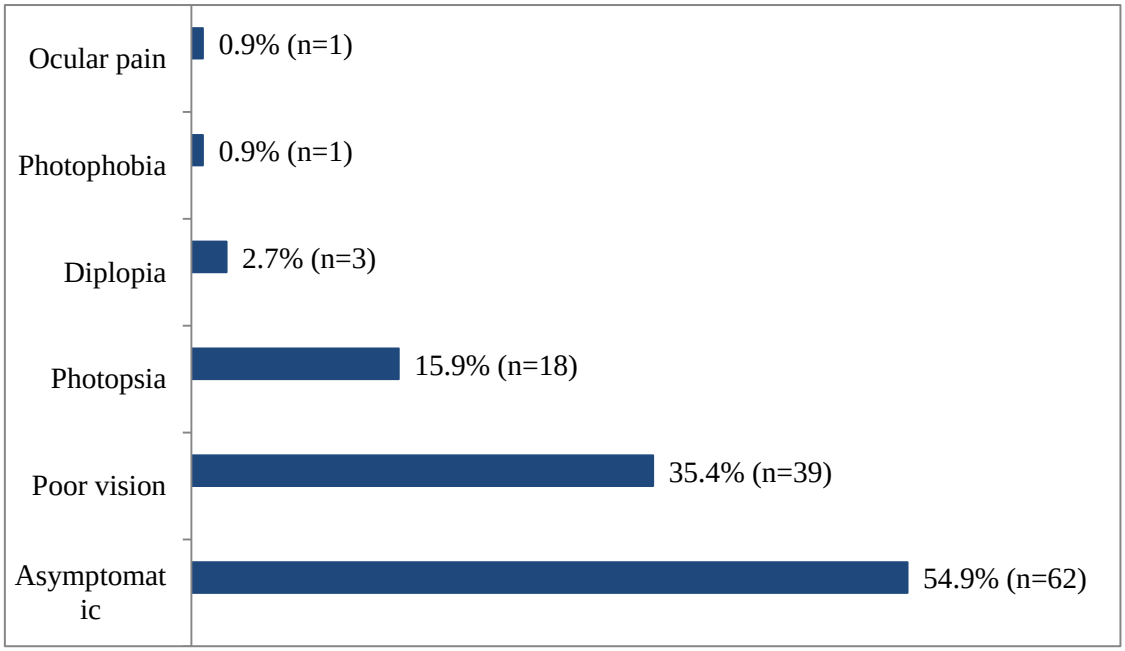
Majority (98.2%) of the participants were in their 3rd trimester of pregnancy during admission. Most (79.70%) had no previous obstetric complications. Previous obstetric complications included: PIH 9(8%), severe pre-eclampsia 3(2.7%), eclampsia 6(5.3%) and others 5(4.3%). Most 45(39.8%) patients were diagnosed with pre-eclampsia, 27(23.9%) eclampsia, 35(31%) severe pre-eclampsia and 6(5.3%) post-partum eclampsia

Figure 1: Distribution of ocular symptoms among the study population



About half (45.1%) of the study participants, presented with various ocular complaints.

Figure 2: Distribution of ocular symptoms among patients who presented with visual disturbances.



Poor vision was the most common (35.4%) presenting visual complaint. Some patients had multiple complaints.

Table 3: Visual acuity status on the day of admission and discharge among the study population (n=113)

Visual Acuity	VA on the day of admission N (%)	VA on the day of discharge N (%)
Normal **vision** (BCVA:< 6/18)	74 (64.6)	98 (87.6)
BCVA: 6/18-6/4 **(Visual impairment)**	39 (35.4)	15 (13.3)
Total	113 (100)	113 (100)

(Chi-square = 20.8, *p*<0.001)

*BCVA- Best corrected visual acuity

On admission, 39(35.4%) of patients had visual impairment, while at discharge only 15(13.3%) had visual impairment.There was a remarkable improvement of visual acuities between admission and discharge day. This finding was statistically significant. (p <0.001)

Table 4: Distribution of visual acuity among patients with pre-eclampsia and eclapmsia.

Obstetric diagnosis	Visual impairment (BCVA:<6/18) N (%)	Normal vision (BCVA:6/18-6/4) N (%)
Pre-eclampsia	5 (11.1)	40 (88.9)
Severe pre-eclampsia	10 (28.6)	25 (71.4)
Eclampsia	20 (74.1)	7 (25.9)
Post-partum eclampsia	4 (66.7)	2 (33.3)

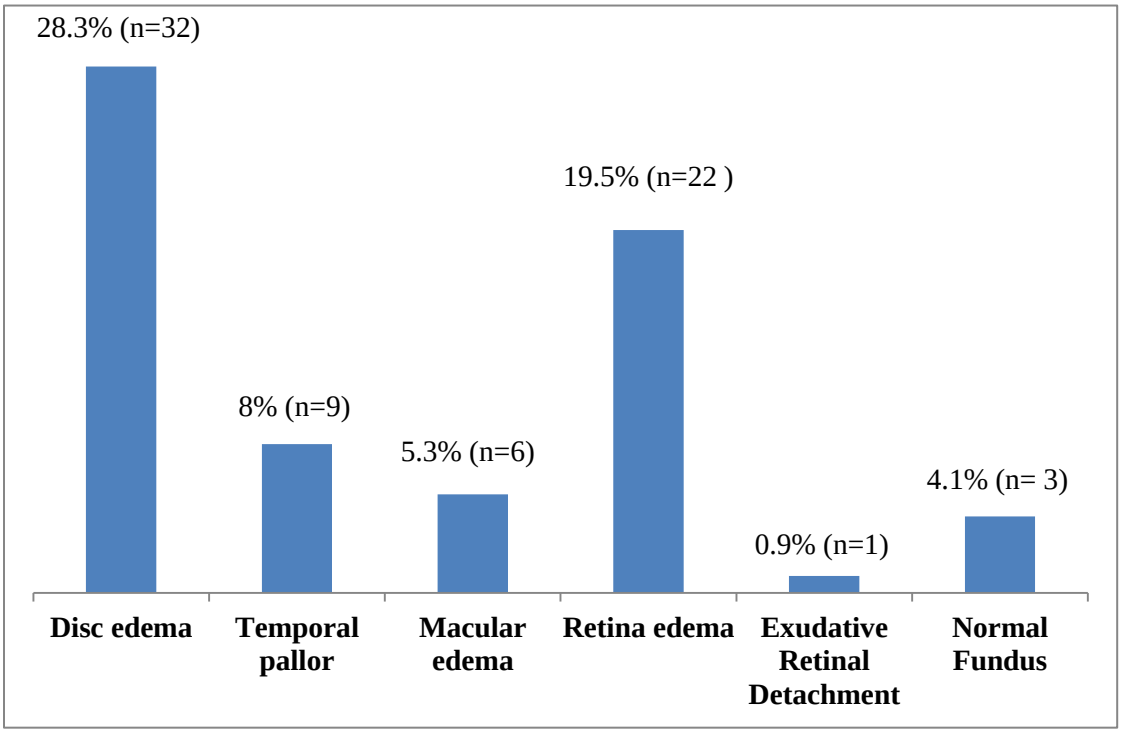
Majority of patients (74.1%) with eclampsia had visual impairment compared to pre-eclampsia (11.1%).

Table 5: Average duration for recovery of transient vision loss among the study population

Duration of visual recovery (days)	(N)	(%)
< 1	7	20.5
1-4	9	26.5
5-10	13	38.3
>10	5	14.7

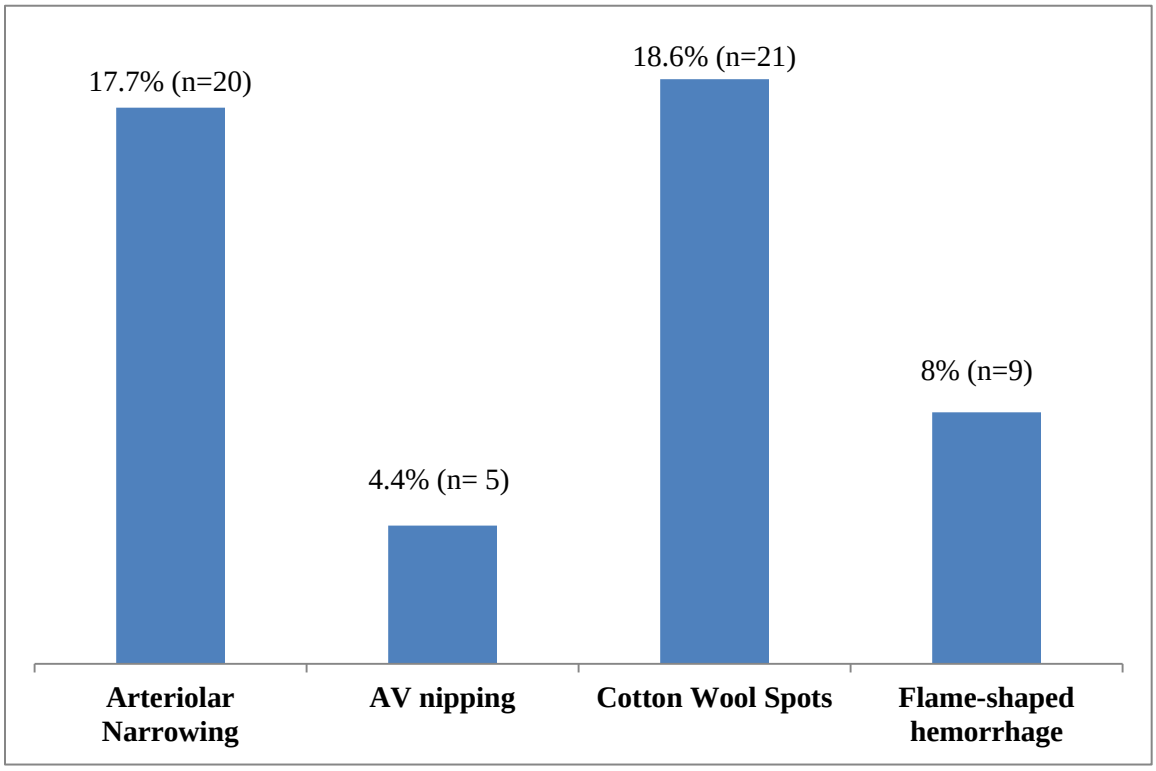
Majority of patients who presented with visual impairment spontaneously regained their normal vision within one week. The mean recovery time was 8.5±1.2 days.

Figure 3: Ocular findings in patients who presented with poor vision/transient visual loss



Papilledema (bilateral disc swelling) was generally the most common (28.3%) fundus finding among patients who presented with visual impairment and among the study population. Macular edema(5.3%) and exudative retinal detachment (0.9%) were the fundus abnomalities found to be the underlying causes of visual impairment. In 3(4.1%) of the patients who presented with visual impairment, no abnormalities were detected by indirect ophthalmoscopy. None of the study participants had significant abnormal anterior segment findings.

Figure 4: Distribution of retinal vascular abnormalities among the study population



Arteriolar Narrowing 20 (17.7%),was the most common retinal vascular abnormality.

CHAPTER FOUR

DISCUSSION

Majority of the participants in this study were aged between 21 and 31 years, with the mean age of 29.26 ± 6.97 years and about 85% of the study population were married. This is because the age above is commonly attributed to the most common marriage and child bearing age in the urban general population in Tanzania(42). This age group is essentialy a potential work force for the families and society at large and therefore requires a special attention to help prevent morbidities and reduce mortalities with all means possible to alleviate socio-economic burden. Among the study participants, 23.9% were first time pregnant women (null-porous) and most of them (98.2%)were in 3rd trimester of pregnancy. This distribution complies with the documented facts that nulliparity is one of the risk factors for pre-eclampsia and eclampsia. It is estimated that women with pre-eclampsia are twice as likely to be nulliparous as women without pre-eclampsia(43).This group of patients needs extra attention and counselling for anxiety. If possible, posters with full information regarding pregnancy induced hypertension and related complications should be distributed to these patients during antenatal clinic visits.

It is known worldwide that pregnancy induced hypertensive disorders may cause visual impairment. In this study, 35.4% of the study participants had poor vision (VA<6/18) which was also the most common ocular symptom. This is similar to the findings of other studies which also reported poor vision as the most common ocular manifestation among patients with pre-eclampsia and eclampsia(20,39,44). This prevalence is slightly lower than the one reported in a previous study done at the same hospital of 36.6%(24). This difference may be due to the fact that management and care of patients with pregnancy induced hypertension has improved dramatically in recent years. In addition, Muhimbili National Hospital receives patients referred from the peripheral hospitals across the country and that the trend may not be consistent. Majority of these patients were not referred to ophthalmologists for review and appropriate management until when presented with severe visual impairment. It is important for healthcare providers at the peripheral hospitals to improve their referral systems and

obstetricians at MNH to at least include fundoscopy as part of essential examinations in patients with pre-eclampsia and eclampsia and consult an ophthalmologist accordingly.

Of those who presented with poor vision in this study the underlying causes were macular edema, papilledema which was responsible for the transient loss of vision, exudative retinal detachment and optic neuropathy. This is in agreement with a study which also reported similar findings as the underlying causes of visual impairment in pre-eclampsia and eclampsia(40). However, recent studies put more emphasis on cortical blindness(39,40). Clinically cortical blindness is characterized by a triad of reduced visual acuity, intact pupillary reflexes and normal fundus. The exact mechanism of cortical blindness is unclear but is associated with cerebral vasospasms, ischemic injury of the occipital cortex, vasogenic edema due to increased capillary permeability and focal edema of the occipital lobe. In this study visual impairment of cortical etiology was suspected in 4.1% of the patients who presented with poor vision. These findings may be limited because they depended on clinical examination alone, it is likely that if other diagnostic investigations such as OCT was to be done, may have revealed other subtle retinal changes which could not be identified by clinical examination alone. This argument is supported by the studies done in the United States which documented the identification of sub-clinical retinal and choroidal thickening, subretinal fluid and photoreceptors irregularities by OCT as causes of visual impairment in patients with pre-eclampsia and eclampsia.(45,46). OCT was not included in this study because it was located in separate building far from the eclampsia unit and so it was risky taking patients there for research purposes. The diagnosis of cortical blindness may also be supported in future studies by examining plasma levels of S100B protein which is a peripheral biomarker of central nervous (CNS) injury as it is documented by a cross-sectional case-control study in antenatal care centers done in Sweden which revealed increased plasma levels of S100B protein among women with pre-eclampsia indicating CNS damage in women with pre-eclampsia(47).

This study has found that (74.1%) of patients with eclampsia had impaired vision, followed by severe pre-eclampsia (28.6%), and (11.1%) pre-eclampsia. This trend is similar with previous

studies which also reported more visual impairment in patients with eclampsia (50%) than pre-eclampsia (25%)(23). This implies that visual impairment was related to the severity of the disease as pre-eclampsia is a less severe form of the disease in comparison with eclampsia. It is of utmost importance to strengthen the capacity of screening and managing pregancy induced hypertension in antenatal clinics in the peripheral hospitals so as to halt the progression of the disease to a more severe form. This will decrease both mortalities and morbidities, in particular visual impairment related to pre-eclampsia and eclampsia.

Fortunately visual impairment was temporary and most patients recovered to VA>6/18.The average duration of visual recovery in this study was 8.5±1.2 days. This finding is within the range of other study findings which reported visual recovery within 8 days(39,41).Furthermore a study done in Nigeria reported a reversible blindness in fulminating pre-eclampsia following appropriate and timely management of the disease(35). This correlates with the findings of this study which showed a remarkable difference in visual acuities between the day of admission and at discharge whereby the findings were statistically significant ($p<0.001$). This may be explained by the fact that there is a well-established eclampsia unit at MNH which ensures standard management of pregnancy induced hypertension, pre-eclampsia and eclampsia which led to significant visual recovery in majority of patients before being discharged.

Apart from poor vision, other symptoms reported were photopsias, diplopia, and photophobia. These symptoms have been similarly reported in previous studies(7,24) and are more likely associated with changes occurring in pregnant women. Diplopia is associated with vitamin deficiencies especially in pregnant mothers with pernicious vomiting, leading to Wernicke's encephalopathy with nystagmus and extraocular muscle paresis. Photopsia in pre-eclampsia and eclampsia may be due to retinal detachment.

Hypertensive retinopathy is also a common feature in patients with pre-eclampsia and eclampsia. The mechanisms revolve around vasospasms of the retinal arterioles and increased vascular permeability which results from hypoxia and is responsible for retinal haemorrhages, exudates and focal retinal edema. Arteriolar narrowing was reported in one study to be the most common retinal abnormality with the prevalence of 70% in pre-eclampsia(20). This study found only 17.7% of mothers with pre-eclampsia and eclampsia had arteriolar narrowing. This finding however; was supported by the results of other studies which reported a significant decline in arteriolar narrowing among mothers with pre-eclampsia and eclampsia(27,23). This is possibly because of increased awareness of pregnancy related complications among healthcare providers; improved antenatal care where pregnancy induced hypertension is identified early and managed before referral to MNH. Also strict exclusion criteria might have contributed to such a decline, where patients with a known history of hypertension and diabetes were excluded from the study, furthermore the fact that the study was a hospital based study may as well contribute to the descrepancy. Other hypertensive retinopathy findings in this study included AV nipping, cotton wool spots and flame-shaped haemorrhage in varying proportions. It is important to do fundus examination to evaluate these changes as they may contribute greatly to the visual impairment in patients with pre-eclampsia and eclampsia.

CHAPTER FIVE

CONCLUSION

Visual impairment among patients with pre-eclampsia and eclampsia is still high, showing only slight reduction in prevalence for the past 2 years. The underlying causes were macular edema, optic neuropathy, cortical blindness and exudative retinal detachment. Visual impairment is associated with severity of the disease and is temporary in majority of cases.

RECOMMENDATIONS

1. More efforts should be undertaken to build capacity of peripheral hospitals in provision of standard services for pregnant mothers.

2. Obstetricians at MNH, should include fundus examination as part of essential examination in patients with pre-eclampsia and eclampsia and consult ophthalmologist promptly.

3. There is a need to establish a system whereby all patients who had been admitted for pre-eclapmsia and aclampsia at MNH can be followed up after discharge to ascertain their visual status and manage them accordingly.

STUDY LIMITATIONS

1. Being a hospital based study with highly selected group of patients, the results may not reflect the situation in the general population.
2. Lack of control group
3. Set up of the study area made it difficult to use other diagnostic investigations as the equipments were located in a seprate building away from the eclampsia unit.

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APPENDICES

Appendix I: Questionnaire (English version)

OCULAR MANIFESTATIONS OF PREECLAMPSIA AND ECLAMPSIA AMONG PREGNANT WOMEN ADMITTED AT MUHIMBILI NATIONAL HOSPITAL.

Serial number: …….

Hospital Registration Number: ……..

A: Demographic Data

1. Age…….
2. Parity……..
3. Religion
    a. Christian
    b. Moslem
    c. None
    d. Others.(specify)……..
4. Marital status
    a. Single
    b. Married
    c. Widow
    d. Divorced
5. Level of education
    a. No formal education
    b. Primary school
    c. Secondary school
    d. College/ university

6. Occupation

a. Peasant/housewife

b. Petty trader

c. Employed

d. Others (specify)…….

B: History

7. What is the current gestational age?

a. 1^{st} – 3^{rd} month

b. 4^{th} – 6^{th} month

c. 7^{th} – 9^{th} month

8. Any complication in previous pregnancy?

a. None

b. PIH

c. Severe preeclampsia

d. Eclampsia

c. Other……..(specify)

9. Any ocular symptoms?

a. Poor vision

b. Ocular pain

c. Tearing

d. Photophobia

e. Photopsia

f. Diplopia

g. Loss of vision

f. Eye dryness

10. Any known ocular diseases? If yes, which ones?

    a. Eyelids disorders
    b. Trachoma
    c. Dry eye syndrome
    d. Allergic conjunctivitis
    e. Viral keratitis
    f. Glaucoma
    g. Diabetic retinopathy
    h. Hypertensive retinopathy
    i. Optic neuropathy
    j. Retinitis pigmentosa
    k. Refractive errors (specify)……..
    l. Other (specify)……

11. Do you have any of the following systemic disease?

    a. Diabetes
    b. Hypertension
    c. Dyslipidaemias
    d. Autoimmune disease
    e. TB
    f. HIV
    g. Demyelinating disease
    h. None

12. Is there a positive family history of blindness?

    a. Yes
    b. No

C: Clinical Examination

13. Average Blood pressure and Intraocular pressure

Blood pressure on admission (mmHg)	
Blood pressure on discharge (mmHg)	
IOP (RE)	
IOP (LE)	

14. Number of seizures ☐

15. Visual Acuity

	RE	LE
On admission		
On discharge		

a. 6/6
b. 6/9
c. 6/12
d. 6/18
e. 6/24/
f. 6/36
g. 6/60
h. CF 6m
i. CF 5m
j. CF4m
k. CF 3m
l. CF 2m
m. CF 1m
n. CF Near
o. HM
p. LP
q. NLP

16. Any significant abnormality noted in the examination of anterior segment?

……...

17. Positive findings on fundus examination

a. Media haze

b. Papilledema

c. Temporal Pallor

d. Disc Cupping

e. Papillitis

f. Maculopathy

g. Retinal edema

h. Arteriolar Narrowing

i. AV nipping

j. Blood vessels engorgement

k. Haemorrhage(specify type)……

l. Cotton wool spots

m. Microaneurysms

n. New vessels

o. Other (describe)……

18. Special investigations done revealed (describe)

a. B-scan……

b. VF…….

c. OCT……..

d. CT brain…….

e. Fluorescein Angiogram……

f. Fundus Photography……..

g. Other (state)……...

19. How long after delivery did visual function recover??

a. Immediately after delivery

b. Within 6 hours

c. Within 24 hours

d. Within 72 hours

f. Within 4-7 days

g. Within 2 weeks

h. Within 1 month

i. Within 2-6 months

j. > 6 months.

20. How did the visual function recover?

a. Spontaneously

b. Medical intervention

c. Surgical intervention

21. Obstetric diagnosis on admission……

22. Ophthalmic diagnosis…….

Thank you for cooperation. Your time and honest response is greatly appreciated!

Appendix II: Dodoso (Questionnaire Swahili Version)

TATHMINI YA MADHARA YA KIFAFA CHA MIMBA KWENYE MACHO KWA KINAMAMA WAJAWAZITO WALIOLAZWA HOSPITALI YA TAIFA MUHIMBILI 2014.

Namba ya dodoso…….

Namba ya faili…….

1. Umri (miaka)……

2. Umejifungua mara ngapi……..

3. Dini yako ni

A. Mkristo

B. Muislamu

C. Sina dini

D. Nyinginezo

4. Hali ya mahusiano

A. Sijaolewa

B. Nimeolewa

C. Nimeachika

D. Mjane

E. Tumetengana

5. Kiwango chako cha elimu

A.Sijasoma

B.Elimu ya msingi

C.Elimu ya sekondari

D.Elimu ya chuo.

6. Kazi yako

A. Mkulima/ Mama wa nyumbani

B. Biashara ndogo ndogo

C. Nimeajiriwa

D. Nyingineyo……..

7. Umri wa mimba wakati wa kulazwa hospitali?

a. Miezi 1-3

b. Miezi 4-6

c. Miezi 7-9

8. Ulipata shida yoyote wakati wa ujauzito uliopita?

a. Hapana

b. Presha ya ujauzito

d. Kifafa cha mimba

c. Mengineyo (Eleza)…….

9. Tatizo lolote kwenye macho wakati wa kulazwa?

a. Uono hafifu

b. Maumivu kwenye macho

c. Kutokwa machozi

d. Kuogopa mwanga

e. Kuona miale mikali ya mwanga

f. Kuona viwili viwili

g. Kupoteza uono kabisa

f. Macho kuwa makavu

10. Je, una ugonjwa wowote wa macho unaojulikana? Kama ndio, Je ni upi kati ya haya?

    a. Magonjwa ya kope

    b. Trakoma

    c. Ukavu wa macho

    d. Magonjwa ya konjaktiva, ikiwamo aleji

    f. Ugonjwa wa presha ya macho (glaukoma)

    g. Sukari ya macho

    h. Ugonjwa wa macho unaosababishwa na presha ya damu

    i. Kusinyaa kwa mshipa wa ufahamu wa macho

    j. Retinitis pigmentosa

    k. Matatizo ya uono hafifu yanayohitaji miwani (yataje)……

    l. Mengineyo ……

11. Je, una magonjwa mengine ya mwili? Ni yapi kati ya haya?

    a. Kisukari

    b. Presha

    c. Kuganda kwa mafuta kwenye mirija ya damu

    d. Kinga ya mwili kushambulia sehemu ya mwili

    e. TB

    f. Upungufu wa kinga mwilini

    f. Mengineyo (Yataje)……...

12. Kuna historia ya upofu kwenye familia?

    a. Ndiyo

    b. Hapana

13. Wastani wa presha ya damu na ya macho

Presha ya damu wakati wa kulazwa (mmHg)	
Presha ya damu wakati wa kuruhusiwa (mmHg)	
Presha ya jicho la kulia	
Presha ya jicho ya kushoto	

14. Umekakamaaa mara ngapi mpaka wakati wa kujifungua / kuruhusiwa

15. Uwezo wakuona

	RE	LE
Wakati wa kulazwa		
Wakati wa kuruhusiwa		

a. 6/6
b. 6/9
c. 6/12
d. 6/18
e. 6/24/
f. 6/36
g. 6/60
h. CF 6m
i. CF 5m
j. CF4m
k. CF 3m
l. CF 2m
m. CF 1m
n. CF Near
o. HM
p. LP
q. NLP

16. Taja matatizo yaliyoonekana kwenye uchunguzi wa mbele / nje wa macho?

……...
……
……
……

17. **Taja matatizo yaliyoonekana kwenye uchunguzi wa ndani ya jicho**

a. Ukungu kwenye jicho

b. Kuvimba kwa mshipa wa fahamu wa jicho

c. Kusinyaa upande mmoja wa mshipa wa ufahamu wa jicho

d. Kuchimbika kwa sehemu ya kichwa cha mshipa wa fahamu wa jicho

e. Sehemu ya kichwa cha mshipa wa fahamu wa jicho kuwa mwekundu

f. Tatizo kwenye sehemu ya kati nyuma ya jicho inayohusika na kuona.

g. Kuvimbakwa retina, utando wa ndani ya jicho

h. Mishipa ya damu ya ateri kuwa myembamba

i. Kugandamizwa kwa vena na ateri

j. Kutanuka kwa mishipa ya damu, kwenye retina

k. Kuvuja kwa damu kwenye retina (taja aina)……

l. Muonekano mweupe wa mfano wapamba kwenye retina

m. Kutaza mishipa ya damu kuwa dhaifu na kuweka viuvimbe vidogo vidogo

n. Mishipa ya damu isiyo ya kawaida kuota kwenye retina

o. Mengineyo (eleza)……

18. Uchunguzi wa ziada umeonyesha nini? (Eleza)

a. B-scan……

b. VF…….

c. OCT……...

d. CT brain…….

e. Fluorescein Angiogram……

f. Fundus Photography……..

g. Mengineyo (eleza)……..……...

19. Uwezo wa kuona tena ulirejea baada ya muda gani?

a. Muda mchache tu baada ya kujifungua

b. Ndani ya masaa 6

c. Ndani ya masaa 24

d. Ndani ya masaa 72

f. Siku 4-7

g. Wiki 2

h. Ndani ya mwezi 1

i. Miezi 2-6

j. Zaidi ya Miezi 6.

20. Uwezo wa kuona ulirejea vipi?

a. Pasipo matibabu yoyote

b. Baada ya matibabu ya macho

21. Ugonjwa uliogundulika…….

22. Tatizo lililo gundulika linalohusiana na macho ……..

…….....

Appendix III: Informed Consent Form (English Version)

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

SCHOOL MEDICINE, Department of ophthalmology

INFORMED CONSENT FORM

ID-NO | | | | | | | | | | | |

Consent to participate in a research study about ocular manifestations of preeclampsia and eclampsia among pregnant women admitted at Muhimbili National Hospital, Dar es Salaam, 2014.

Introduction and Purpose of the study

I am Dr. Edmund F. Mushumbusi, a postgraduate student, doing masters of medicine in ophthalmology at MUHAS. I am conducting a research on ocular manifestations of preeclampsia and eclampsia among pregnant women admitted at Muhimbili National Hospital. Preeclampsia and eclampsia is known to affect many other non-reproductive organs and systems, the eyes being amongst the organs affected mostly. The purpose of this research is to determine the magnitude of ocular manifestations of these pregnant related complications.

How to participate in the study

If you have agreed to participate in this study, the researcher will interview you and perform thorough ocular examinations and other specialized non-invasive ocular investigations, and information will be recorded into the structured questionnaire.

Confidentiality

Researcher-patient confidentiality will be observed throughout the study. There will be no use of names but serial numbers. All the information gathered from patients will be used for the purposes of this study ONLY.

Risk

No harm is expected to occur because of participating in the study.

Benefits

The results of this research will help to improve the quality of care of preeclamptics and eclamptics as well as the pregnant mothers in general.

The participants will benefit from complete eye checkup and treatment of any eye disorder discovered in the course of the research.

Right to withdrawal

It is your complete decision to participate in the study. You have the right to withdraw at any particular moment. You will continue to receive treatment and care similar to other patients. No conditions shall be imposed on you for the purpose of pressurizing you to participate in the study.

Whom to contact

Feel free to contact us in case of any concern or question about the study. You can directly contact the Principal researcher, Dr Edmund F. Mushumbusi, through (0767692785), or by email, eddferd@gmail.com, you can also contact the main supervisors, Dr Milka Mafwiri or Dr Anna Sanyiwaand Head of department of Ophthalmology, MUHAS, P.O. BOX 65001, Dar es Salaam. You can also contact the Chairperson of the Muhimbili University Research and Publications Committee, **Prof. M. Moshi**, P.O.BOX 65001, Dar es Salaam, Tel; **+255222152489** for any matters that may arise.

Declaration

I ……..have read and understood the contents in this consent form. My questions have been sufficiently answered and I agree to participate in this study.

Signature of interviewee…….. Date……..

Signature of interviewer…….. Date……..

Appendix IV: Informed Consent (Swahili Version)

Kibali cha kushiriki kwenye utafiti

Tathmini ya madhara ya kifafa cha mimba kwenye macho kwa kina mama wajawazito waliolazwa Hospitali ya Taifa Muhimbili, 2014.

Utangulizi

Jina langu ni Dk. Edmund F. Mushumbusi. Ni mwanafunzi wa shahada ya uzamili, idara ya macho, chuo kikuu cha Afya na Sayansi Shirikishi Muhimbili. Ninafanya utafiti kuhusu tathmini ya madhara ya kifafa cha mimba kwenye macho kwa kina mama wajawazito. Inafahamika duniani kote kwamba kifafa cha mimba huwa kinaleta athari kwenye macho. Ingawa athari nyingi ni za muda mfupi lakini mara nyingine zinawezakuwa za kudumu, zipo tafiti zinazoonyesha kifafa cha mimba kinaweza hata kupelekea mtu kupoteza uwezo wake wa kuona. Madhumuni ya utafiti huu ni kujua kiwango cha madhara hayo ya kifafa cha mimba kwenye macho hapa kwetu, hasa katika hospitali ya taifa muhimbili.Matokeo ya utafiti huu yatasaidia kutoa mapendekezo ili kuboresha afya ya macho kwa kina mama wajawazito na pindi watakapokuwa wameshajifungua.

Jinsi ya kushiriki katika utafiti huu

Ukikubali kushiriki, utahojiwa kwa kutumia dodoso kwa lugha ya kiswahili mara moja tu. Na pia utafanyiwa vipimo vya macho. Vipimo hivyo havitaleta madhara wala maumivu ya aina yoyote katika mwili wako.

Usiri

Kila kitu kitabakia kuwa siri na kitatumika kwa ajili ya utafiti tu. Timu inayohusika na utafiti itatumia majibu yote kuandaa ripoti itakayokuwa na habari za wanawake wengine watakaohojiwa pia , bila kutaja jina lako mahali popote.

Madhara

Sitegemei kutakuwa na madhara yoyote yatakayotokea kwako kwa kushiriki katika utafiti huu.

Haki ya kushiriki

Hakuna shuruti yoyote juu ya ushiriki wako katika utafiti huu. Una uwezo wa kukubali ama kukataa bila kutoa sababu zozote za kufanya hivyo. Na ukikubali, unaweza kubadili uamuzi wako ukijisikia kufanya hivyo wakati wowote.

Faida za kushiriki

Ukikubali kushiriki, utatusaidia kujua kiwango cha madhara ya kifafa cha mimba kwenye macho, hivyo kutoa mchango mkubwa wa namna ya kuboresha afya ya macho kwa kina mama wajawazito hospitali na taifa ya Muhimbili na jamii yetu kwa ujumla.

Mawasiliano

Endapo utakuwa na maswali au maoni yoyote juu ya utafiti huu tafadhari wasiliana nami, Dr Edmund F. Mushumbusi (0767692785) au Dr Milka Mafwiri, Dr Anna Sanyiwa (wasimamizi wa utafiti) kwa anuani hii; S.L.P 65001, Dar es Salaam. Pia waweza kuwasiliana moja kwa moja na Mwenyekiti wa kamati maalumu ya Muhimbili inayoshughulika na tafiti na maadili yake, **Prof. M. Moshi**, S.L.P 65001, Dar es Salaam. **Simu +255222152489**

Kama umekubali kuhojiwa, tafadhali saini hapa:

Mimi……., nimesoma na kuelewa kilichoelezwa kwenye fomu hii na maswali yangu yamejibiwa kiufasaha. Hivyo ninakubali kuhojiwa kwa ajili ya utafiti huu.

Sahihi ya mhojiwa …….. Tarehe ……..

Sahihi ya mhoji…… Tarehe……