

**DETERMINANTS OF PREECLAMPSIA AMONG PREGNANT WOMEN
AT GESTATIONAL AGE OF ABOVE 20 WEEKS ATTENDING
ANTENATAL CARE AT FPRRH**

**BY
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BMS/0121/133/DF**

**A RESEARCH DISSERTATION SUBMITTED TO THE FACULTY OF
CLINICAL MEDICINE AND DENTISTRY IN PARTIAL FULFILLMENT
OF THE REQUIREMENT FOR THE AWARD OF A DEGREE OF
BACHELORS IN MEDICINE AND SURGERY**

APRIL, 2019

ABSTRACT

Introduction: Despite several interventions put in place in many countries of the world, preeclampsia still contributes greatly to maternal morbidity and mortality. Several factors have been cited as to increase the risk of preeclampsia among which are obesity, extreme of age, Nulliparity, change in pregnancy paternity, obesity among others. Lack of knowledge or awareness concerning preeclampsia has also been cited as to contribute adversely in terms of overall outcome. A study on preeclampsia and the various sociodemographic, modifiable variables would come in handy in informing interventional measures. This study aims to achieve just that.

Objective: Assessing the determinants of preeclampsia among pregnant women at gestational age of 20 weeks and above attending ANC at FPRRH.

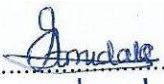
Method: A descriptive checklist- and questionnaire-based cross-sectional study design was used which also involved review of 214 patient records was employed.


Results: Maternal age, Nulliparity, rural residence, obesity and lack of awareness concerning preeclampsia were significantly associated with preeclampsia.

Conclusion: Among women diagnosed with preeclampsia at FPRRH, age (less than 18 or above 35 years), Nulliparity, change in male partner (paternity change) among the multiparas, low socio-economic status with mostly rural residence, and obesity were found to be statistically significant in predicting pre-eclampsia. It was also noted that awareness concerning preeclampsia was so low demanding interventional measures to correct since adequate knowledge and awareness positively impact prognosis and general outcome.

DECLARATION

I, **TOLA PAPA'AKURHYEL MIDALA**, do hereby affirm that this research dissertation is my original work; it has not been handed to any institution and/or college for academic award. Any material(s) which is not mine has been clearly referenced.

Signature.....

Date.....

TOLA PAPA'AKURHYEL
(RESEARCHER)

APPROVAL

This research dissertation has been produced under my close supervision and I therefore recommend it for submission to the Faculty of Clinical Medicine and Dentistry of Kampala International University.

Signature:  Date: 29th April, 2019

PROFESSOR PWAVENO BAMAIYI
(SUPERVISOR)

ACNOWLEDGEMENT

My sincere gratitude goes to The Almighty God, The Author and Director of my life, my family for the unwavering love and support, colleagues and friends for all the contributions made in one way or the other while not forgetting the indispensable inputs of my supervisor **PROFESSOR PWAVENO BAMAIYI** through whose guidance, all the efforts put into this piece of work have seen fruition.

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LIST OF ABBREVIATIONS AND ACRONYMS

ANC	:	Antenatal Care
BMI	:	Body Mass Index
BP	:	Blood Pressure
CDC	:	Centers for Disease Control and Prevention
CI	:	Confidence Interval
DBP	:	Diastolic Blood Pressure
DM	:	Diabetes Mellitus
FBG	:	Fasting Blood Glucose
FPRRH	:	Fort Portal Regional Referral Hospital
HDP	:	Hypertensive Disorders of Pregnancy
HELLP	:	Hemolysis, Elevated Liver Enzymes and Low Platelets
HTN	:	Hypertension
IREC	:	Institutional Research and Ethics Committee
Kg	:	Kilogram
LNMP	:	Last Normal Menstrual Period
m	:	meter
MmHg	:	Millimeter Mercury
MoH	:	Ministry of Health
OR	:	Odds Ratio
SBP	:	Systolic Blood Pressure
SPSS	:	Statistical Package for Social Sciences
UNRWA	:	United Nations Relief and Works Agency for Palestine Refugees
WHO	:	World Health Organization

OPERATIONAL DEFINITIONS

Multiparous: (of a woman) having borne more than one child.

Nullipara: a woman that has never given birth.

Obesity: is a medical condition in which excess body fat has accumulated to the extent that it may have a negative effect on health, leading to reduced life expectancy and/or increased health problems.

Placenta abruptio: is a complication of pregnancy where in the placenta lining separates from the uterus of the mother prior to delivery.

Preeclampsia: is a multi-system, progressive disorder characterized by the new onset of hypertension and proteinuria or hypertension and end-organ dysfunction with or without proteinuria in the last half of pregnancy Progressing from mild to severe and may be gradual or rapid.

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CHAPTER ONE: INTRODUCTION

1.0.BACKGROUND

Preeclampsia is a sustained blood pressure elevation of $\geq 140/90$ mmHg in pregnancy after 20 weeks of gestation in the absence of preexisting hypertension and sometimes with proteinuria on dipstick 1-2+ or ≥ 300 mg on a 24hr urine output(Sajith, Nimbargi, Modi, Sumariya, & Pawar, 2014). It is a multi-system, progressive disorder characterized by new onset of hypertension and proteinuria or hypertension and end-organ dysfunction with or without proteinuria in the last half of pregnancy progressing from mild to severe and may be gradual or rapid(Sajith, Nimbargi, Modi, & Sumariya, 2014a).

A number of theories have been put up to try to explain this for example; failure of trophoblast to completely invade and thereby destroying the spiral arteries by 20-24 weeks of pregnancy (Maputle, Khoza, & Lebese, 2017). The abnormally implanted placenta is believed to result in poor uterine and placental perfusion, which results in a state of hypoxia and increased oxidative stress and the release of anti-angiogenic proteins into the maternal plasma along with inflammatory mediators(Phipps, Prasanna, Brima, & Jim, 2016).Various noxious placental factors released by ischemic changes and toxic radicals generated by oxidative stress cause activation and dysfunction of vascular endothelium. Intact endothelium decreases responsiveness of vascular smooth muscles to agonists by release of nitric oxide and it also has anticoagulant properties. Damage or activated endothelium secretes substances that promote coagulation and increased sensitivity to vasopressors. Increased circulating fibronectin, factor VIII antigen and thrombomodulin, all markers of endothelial dysfunction are reported in pregnancy induced hypertension/preeclampsia (Saleh, Verdonk, Visser, Van Den Meiracker, & Danser, 2016).

A key focus of routine prenatal care is monitoring pregnancies for signs and symptoms of preeclampsia. If the diagnosis is made, the definitive treatment is delivery to prevent development of maternal or fetal complications from disease progression: Delivery results in resolution of the disease.Timing of delivery is based upon a combination of factors, including disease severity, maternal and fetal condition, and gestational age (Sajith, Nimbargi, Modi, & Sumariya, 2014b).

Pregnancy is a normal physiological process that is supposed to be an enjoyable time for mothers and their families. Despite of this, pregnancy can be associated with risk for both her and the baby, and even death. According to the World Health Organization (WHO), about 514,000

women die every year of pregnancy related causes, 99% of these deaths occur in developing countries(Alkema et al., 2016). Death of a mother is a catastrophe indeed. More than 80% of maternal deaths worldwide are due to five direct causes: hemorrhage, sepsis, unsafe abortion, and pulmonary embolism and hypertensive diseases of pregnancy(Alkema et al., 2016). Most of these deaths are seen in developing countries, including Africa(Sajith, Nimbargi, Modi, & Sumariya, 2014b). Delays in seeking health care in African societies contribute to the high burden of maternal mortality. Delayed responses at the household level to obstetric emergencies often arise as a result of inadequate information on when to seek help and sometimes on where to seek help(Chavane et al., 2018).

The World Health Organization estimates that 14 % of all maternal deaths result from the hypertensive disorders of pregnancy (HDP) especially preeclampsia; it is also associated with a high risk of newborn death(Say et al., 2014). Values are much higher in developing countries especially Africa. For instance, In Mulago hospital, Uganda, in 2011, preeclampsia contributed to 17.6% Maternal morbidity and 21.4% maternal Mortality(Kiondo et al., 2012). Given the high levels of pregnancy induced hypertension (PIH) in Uganda, the researcher proposed to conduct a study on the determinants of preeclampsia among pregnant women attending ANC at FPRRH.

1.1. PROBLEM STATEMENT

Pre-eclampsia accounts for more than 50000 maternal deaths worldwide each year most of which are seen in developing countries(Alkema et al., 2016). Most of these deaths are mainly associated with late presentation of mothers at the health facilities(Alkema et al., 2016). This has resulted in a high maternal morbidity and mortality in the country which is rated at 454 per 100,000 live births(UBOS, 2011).

Lack of information on danger signs during pregnancy is one of the factors that contribute to delay in seeking care and hence sluggish decrease in maternal mortality(Alkema et al., 2016). Preeclampsia remains one of the major contributors to maternal morbidity and mortality in Uganda(Nakimuli et al., 2016). The Ugandan Ministry of Health has put up a number of interventions aimed at minimizing preeclampsia and its associated complications which include; public sensitization, establishment of treatment guidelines and supply of treatment and equipment, training and recruitment of medical staff into health facilities(HEPS-Uganda, 2017).

In FPRRH, most pre-eclampsia cases are referrals from lower level health facilities, where they had been attending ANC and the different contributing variables are largely unassessed.

Preeclampsia associated complications could be due to sociodemographic factors, obesity or individual's lack of knowledge on the condition or due to other unidentified risk factors! The study was therefore aimed at establishing the level of individual knowledge on preeclampsia among pregnant mothers attending antenatal care at FPRRH, assess obesity (BMI of 30 & above) as a factor influencing the prevalence of preeclampsia and to identify the socio-demographic factors associated with the prevalence of preeclampsia all aimed at reduction of maternal morbidity and mortality and as well fetal complications.

1.2. STUDY OBJECTIVES

1.2.1. BROAD OBJECTIVES

Assessing the determinants of preeclampsia among pregnant women at gestational age of 20 weeks and above attending ANC at FPRRH.

1.2.2. SPECIFIC OBJECTIVES

- 1) To assess the sociodemographic factors associated with preeclampsia among pregnant women at gestational age of 20 weeks and above attending ANC at FPRRH.
- 2) To assess the individual knowledge of preeclampsia among pregnant women at gestational age of 20 weeks and above attending ANC at FPRRH.
- 3) To correlate obesity (BMI of 30 & above) with preeclampsia among pregnant women at gestational age of 20 weeks and above attending ANC at FPRRH.

1.3. RESEARCH QUESTIONS

- 1) What are the sociodemographic factors influencing preeclampsia among pregnant women at gestational age of 20 weeks and above attending ANC at FPRRH?
- 2) What is the individual knowledge affecting the prevalence of preeclampsia among pregnant women at gestational age of 20 weeks and above attending ANC at FPRRH?
- 3) What is the association of obesity (BMI of 30 & above) and preeclampsia among pregnant women at gestational age of 20 weeks and above attending ANC at FPRRH?

1.4. JUSTIFICATION OF THE STUDY

This research is important because it is clear that maternal morbidity and mortality associated with preeclampsia among pregnant women remain high despite the interventions put in place. Obesity as single factor plus other sociodemographic factors have been associated with preeclampsia. The study therefore, seeks to find out whether the level of individual knowledge about Preeclampsia, obesity and sociodemographic factors are contributory factors to the

preeclampsia burden in FPRRH in particular such that appropriate interventions can be put in place such as education on risk factors and how to control them in order to minimize the development of complications.

It would also aid the hospital to recognize other risk factors to the disease and thus identify the necessary interventions needed in terms of prevention, diagnostics and management facilities in future. The findings of this research will also form a benchmark for further research once we have been able to establish the weight of the problem and contribute to the general knowledge pool for those who would want to explore more about the problem (Maputle et al., 2017).

1.5. STUDY SCOPE

1.5.1. GEOGRAPHICAL SCOPE

The location of concern to carry out this research was Fort Portal Regional Referral Hospital in Western part Uganda. FPRRH is located in the western region of the country where the educational status of the locals is limited and hence influencing the rate of preeclampsia among the pregnant women hence morbidity and mortality among the pregnant mothers. FPRRH is centrally and is easily accessible to pregnant mothers also due to the facilities and equipment present in the hospital to help with the diagnosis and management of patient to improve the quality of life of the patients.

1.5.1. CONTENT SCOPE

The study dwelt on the sociodemographic factors, individual knowledge and obesity as determinants in Preeclampsia among pregnant women at 20 weeks and above gestation. Other factors such as race and genetics were out of the scope of this study.

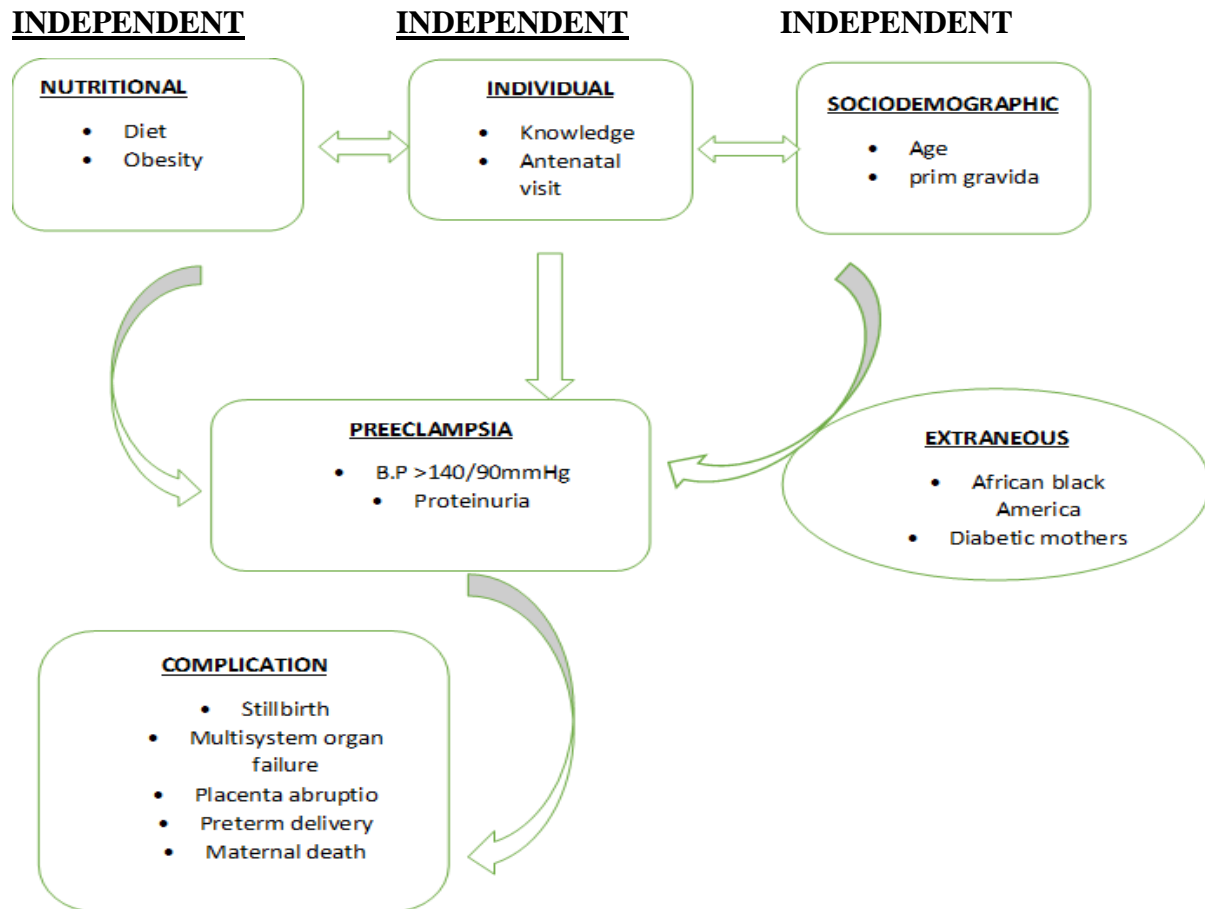
1.5.2. TIME SCOPE

This study was intended to be carried out for a period of 12 months i.e. from March 2018 to March 2019.

1.6. CONCEPTUAL FRAMEWORK

From the diagram below, we see that the independent variables [nutritional, individual factors and demographic factors] have an effect in the occurrence of preeclampsia [dependent variable]. However, the extraneous variables also have an effect on the dependent variable but we won't be focusing on it on this study.

Figure 1: Determinants of Preeclampsia in Pregnancy (Researcher's own Views from Understanding Amassed from Literature Reviewed)



CHAPTER TWO: LITERATURE REVIEW

2.0.INTRODUCTION

This chapter highlights the literature reviewed from other scholars about determinants of Preeclampsia among pregnant women attending Antenatal care.

2.1. THE SOCIODEMOGRAPHIC FACTORS INFLUENCING PREECLAMPSIA

Maternal age lower than 18 years and older than 35 years has been documented, in several literature, as the chief determinant in increasing the risk of Preeclampsia (Kumari, Dash, & Singh, 2016). This can be supported by findings from other studies that documented increased risk of persistent hypertension in women older than 35 years in whom later developed cardiovascular disease. This cases of persistent hypertension after pre-eclampsia among older women has been attributed to previously undiagnosed chronic hypertension(Schoenaker, Soedamah-muthu, & Mishra, 2014).Older women in Finland have also been found to be at an increased risk of Preeclampsia compared to their younger counterparts. Women of advanced maternal age exhibited more preeclampsia (9.4%) than younger women (6.4%)(Lamminpää, Vehviläinen-Julkunen, Gissler, & Heinonen, 2012).

It might sound fictitious, but air pollution has been associated with preeclampsia! Exposure to local traffic-generated air pollution during pregnancy increased the risk of preeclampsia and preterm birth(Yorifuji, Naruse, Kashima, Murakoshi, & Doi, 2015). In India a study noted that women living in households using biomass fuels had two times higher likelihood of preeclampsia/eclampsia symptoms than did those living in households using cleaner fuels, even after controlling for the effects of a number of potentially confounding factors(Agrawal & Yamamoto, 2015). Air pollution with particulate pollutants early in pregnancy has been associated with increased incidence of preeclampsia (Dadvand et al., 2014). More recent studies have shown a relationship between ambient air noise pollution with and pre-eclampsia (Auger, Duplaix, Bilodeau-Bertrand, Lo, & Smargiassi, 2018).

In Washington State risk/protective factors for preeclampsia were found to be older maternal age, Hispanic and Native-American race, smoking, unmarried status, and male fetus (Lisonkova & Joseph, 2013). Several multi-analytical studies have suggested that smoking during pregnancy is inversely associated with incidence of preeclampsia but further large scale multi-center prospective studies are warranted to validate those findings(Wei, Liu, Gong, Wu, & Wu, 2015).

2.2. KNOWLEDGE ABOUT PREECLAMPSIA AMONG PREGNANT WOMEN

Pre-eclampsia is a complication of pregnancy responsible for high rates of morbidity and mortality, particularly in sub-Saharan Africa. When undetected or poorly managed, it may progress to eclampsia which further worsens the prognosis explaining why understanding the perceptions of pre-eclampsia among pregnant mothers and within the community is vital (Salam, Das, Ali, Bhaumik, & Lassi, 2016).

In a study to establish the perceptions of pregnant mothers on pre-eclampsia and eclampsia in Ogun State community, Nigeria, it was revealed that there was no terminology reportedly used for pre-eclampsia in the native language - Yoruba; although, hypertension had several terms independent of pregnancy status. The cause of hypertension in pregnancy was thought to be due to depressive thoughts as a result of marital conflict and financial worries, while seizures in pregnancy were perceived to result from prolonged exposure to cold. There seemed to be no traditional treatment for hypertension. However, for seizures the use of herbs, concoctions, incisions, and topical application of black soap were widespread. This study illustrated that knowledge of pre-eclampsia and eclampsia was limited amongst communities of Ogun State, Nigeria. Findings reveal that pre-eclampsia was perceived as a stress-induced condition, while eclampsia was perceived as a product of prolonged exposure to cold (Akeju et al., 2016).

In preeclampsia awareness survey which was conducted by BabyCenter (pregnancy and parenting digital resource) among 1,591 women, showed a high overall awareness of preeclampsia and its association with high blood pressure. There was also near universal knowledge to call a healthcare provider if experiencing symptoms of preeclampsia. In fact, 83% of respondents had heard of preeclampsia and 99% of these knew that it is extremely serious, even life-threatening for mother and baby, 88% knew that high blood pressure is a sign of preeclampsia and 96% would call their doctor or midwife if they experienced symptoms (BabyCare Center, 2014).

However, 78% incorrectly linked preeclampsia to swelling of the feet, only 70% correctly linked preeclampsia to headache and vision changes, 3 out of 5 women were not sure about several other symptoms, 44% didn't know that preeclampsia can occur even after the baby is delivered, up to six weeks postpartum, 46% didn't know that women with preeclampsia are at risk for future health problems. The study conclusion, according to the above revealed gaps among women despite the wide spread awareness about preeclampsia (BabyCare Center, 2014).

According to Maputle, Khoza and Lebese, in their study to establish the level of Knowledge towards Pregnancy-induced Hypertension (PIH) among Pregnant Women in Vhembe District, Limpopo Province, the findings, showed that 92% of the prim gravidae who were interviewed did not have any knowledge about preeclampsia. As well Majority (86%) of multigravida displayed no knowledge on the condition and its predisposing factors, signs and symptoms, complications and measures to control it. Also, accurate knowledge about the physiological causes of PIH was not known (Maputle et al., 2017).

In a study to establish Perceptions about Eclampsia, Birth Preparedness, and Complications Readiness among Antenatal Clients Attending a Specialist Hospital in Kano, Nigeria, the study findings revealed that; all the respondents had heard about eclampsia or seen some one with the condition. Up to three-quarters (75.6%) believed that it is possible to identify causes or risk factors of developing eclampsia in pregnancy. A significant proportion of them correctly perceived that preexisting hypertension and poor prenatal care are risk factors of the disease. Interestingly, however, some of the ANC clients wrongly perceived that eclampsia occur as a destiny from God (51.2%) or that it is inflicted upon the clients by evil spirits (18.8%).

2.3. OBESITY AS A FACTOR ASSOCIATED WITH PREECLAMPSIA

Maternal obesity is a well-known risk factor for the development of preeclampsia. Several large population studies have shown that obese women are two to three times more likely to develop preeclampsia than their leaner counterparts. A population-based study of 159,072 singleton births in U.S.A. revealed that not only obese women (pre-pregnancy body mass index [BMI] ≥ 30.0), but also overweight women (pre-pregnancy BMI=25.0–29.9) were at a significantly higher risk for preeclampsia (Odds ratio 2.0 and 3.3, respectively) than women with a pre-pregnancy BMI of less than 20.0 (Sohlberg, Stephansson, Cnattingius, & Wikström, 2012).

In a British population-based study of 287,213 births reported that the incidence of preeclampsia was significantly higher in obese women (pre-pregnancy BMI ≥ 30.0 ; Odd ratio 2.14) as well as overweight women (pre-pregnancy BMI=25.0–29.9; Odd ratio 1.44) than in women with a pre-pregnancy BMI of 20.0–24.9. A population-based study of 972,806 births in Sweden revealed that obese women (pre-pregnancy BMI 29.1–30.0, pre-pregnancy BMI 35.1–40.0, pre-pregnancy BMI >40) were at a significantly higher risk of preeclampsia (Odds ratio 2.62, 3.90 and 4.82, respectively) than women with a pre-pregnancy BMI of 19.8–26.0 (Bartsch et al., 2016).

An overlapping spectrum of disorders is commonly observed in obese women and obesity is hypothesized to play a central role in the concept of “metabolic syndrome”. Chronic hypertension, insulin resistance and/or hypertriglyceridemia may be present prior to conception in obese women. Insulin resistance as well as hypertriglyceridemia are risk factors for preeclampsia, and are also important cofactors in the development of endothelial dysfunction (Weissgerber & Mudd, 2015). Since endothelial dysfunction is hypothesized to play a central role in the pathogenesis of preeclampsia, it is plausible that the pre-pregnancy presence of endothelial dysfunction by insulin resistance and/or hypertriglyceridemia may be causatively associated with the high incidence of preeclampsia in obese pregnant women (Hauth et al., 2011). Therefore, the association between maternal obesity and preeclampsia is sometimes confused by the presence of metabolic syndrome due to obesity. However, Jensen et al., studied 2,459 women with normal glucose tolerance and found that the incidence of preeclampsia was still significantly higher in obese women (pre-pregnancy BMI ≥ 30.0 ; Odd ratio 5.6) and overweight women (pre-pregnancy BMI = 25.0–29.9; Odd ratio 1.7) than in women with a pre-pregnancy BMI of 18.5–24.9.

Among the numerous factors for preeclampsia, an increase in obesity among women of reproductive age is expected to be one of the strongest risk factors underlying the increasing prevalence of preeclampsia.

CHAPTER THREE: METHODOLOGY

3.0.INTRODUCTION

This chapter involves the description of data collection tools, study design that will be used, the area of study in which the research will be carried out and methods that will be used in the procedure of collecting data, analysis, pretesting; ethical considerations to be taken into account and study limitations that might be encountered.

3.1. STUDY AREA

Fort Portal Regional Referral Hospital from which the research was done is located in Western part of Uganda. The coordinates of the town are 0°39'16.0"N, 30°16'28.0"E (Latitude:0.654444; Longitude:30.274444). The town is situated at an average elevation of 1,523 metres (4,997 ft) above sea level. The hospital serves the entire Ruwenzori region consisting of seven Ugandan districts (Bundibugyo, Kabarole, Kyenjojo, Kasese, Kamwenge, Kyegegwa and Ntoroko) and part of eastern Democratic Republic of Congo. The hospital houses the Department of Surgery, Medicine, Obstetrics and Gynecology, Pediatric, Psychiatry, Ophthalmology, HAART clinic, OPD and casualty. In 2002, the district, as configured after August 2014, the national population census put the population at 54,275. The population growth rate in the district was estimated at 5.2%. It is estimated that the population of the district in 2017 was approximately of about 300,937 people of which 150,837 are males and 149,100 are females. On a monthly basis, about 1,000 women register for antenatal care and about 100 women attend the immunization clinic. The Obstetrics and Gynecology Department has its clinic days from Monday through Friday every week from 9 am. Anecdotal evidence shows an average daily attendance by pregnant women at this clinic is more than 50 patients per day.

3.2. STUDY DESIGN

A cross sectional study design approach was used to obtain the data needed for this study. And a systematic random sampling technique was applied in selecting 200 consenting respondents using the Kish & Leslie formula from the antenatal clinic of the hospital. Deductions will be made on pregnant mothers attending antenatal clinic at FPRRH during the study period.

3.3. STUDY POPULATION

The study population was all pregnant mothers with gestational age more than 20 weeks attending ANC at FPRRH at the time of the study.

3.3.1. INCLUSION CRITERIA

All pregnant women diagnosed with preeclampsia at 20 weeks and above within the study period and who offered consent to take part in the study were included in the study.

3.2.2. EXCLUSION CRITERIA

All pregnant women diagnosed with preeclampsia before the stated gestation age, or those who had been diagnosed at the gestation age under study but refused or could not offer consent were exempted from the study.

3.4. SAMPLE SIZE DETERMINATION

Using the Kish Leslie formula, the sample size was estimated to be 200 women. Where

$P = 26\%$

$Z = 1.96$

$D = 5\%$

Kish Leslie formula = Z^2pq/d^2

$(1.96^2 \times 0.26 \times 0.5) / 0.05^2 = 200$

Hence the estimated sample size that was used for the study was 200 women also reviewing files and medical records during the time frame of study.

3.5. SAMPLING TECHNIQUE

Purposive sampling technique was used whereby among the pregnant women, the researcher recruited those with a gestational age of 20 weeks and above by use of self-reported last normal menstrual period (LNMP) or ultrasound scan. From this sample, all who consented were recruited to take part in the study.

3.6. DATA COLLECTION METHOD AND TOOLS

Data was collected by face to face interview technique using a researcher-administered questionnaire with both closed- and open-ended questions, structured and also by reviewing medical records.

3.7. DATA COLLECTION PROCEDURE

The procedure was carried out on pregnant women who had consented and were included in the inclusion criteria. The questionnaire was prepared in English. Four midwives and one supervisor were involved in the data collection process. Medical records were also reviewed for some clinical and laboratory results including proteinuria. Data collectors and supervisor underwent two days training on interviewing technique, the objective of the study, and the different sections

of the questionnaire. The participants were allowed to take a rest for ten minutes before the blood pressure was measured. Blood pressure readings were taken while the woman was seated in the upright position using a mercury sphygmomanometer apparatus which covered two-thirds of the upper arm. The measurement was taken from participant's right hand. The cuff was inflated at a rate of 2–3 mmHg per second. Systolic blood pressure (SBP) was taken up on hearing the first sound, and diastolic blood pressure (DBP) was taken up on 4th (muffled) Korotkoff sound. Those pregnant women with abnormal findings were checked again and again and then underwent another BP measurement after 4–6 hours in order to confirm the diagnosis. For the sake of ensuring whether the BP apparatus was functioning correctly, the data collector checked it by measuring the blood pressure of other data collectors. However, when a pregnant woman was found to have severe preeclampsia (BP of 160/110 mmHg), she was sent for immediate re-checkup and medical advice. Data regarding proteinuria and other clinical data was accessed from the women's medical records. Proteinuria was assessed using urine dipstick method and urinalysis which was part of the routine investigation for all pregnant women.

3.8. QUALITY CONTROL

Data collectors and supervisor were given training on how to approach the participants and perform measurements. The performance of the instruments was checked and measurement tools monitoring done. Pretest of the questionnaires was carried out to check if the questions were well understood. Participants were asked to remove tight outer-wearing and shoes. Blood pressure measurement was taken by one nurse so as to avoid the inter-observer bias. The supervisor and the principal investigator checked the checklist and questionnaire on daily basis for inconsistencies and omissions.

3.9. DATA ANALYSIS

The filled checklist was checked for completeness, cleaned manually and entered in to EPI INFO version 3.5.3 statistical software and then transferred to SPSS version 24 statistical package for further analyses. Descriptive statistics was used to explore the data in relation to relevant variables. Binary logistic regression was used to assess the association between the dependent variable and independent variables. Then variables with P-value less than or equal to 0.2 were fitted to multiple logistic regression. Finally, variables with P- value less than 0.05 were considered as factors associated with preeclampsia.

3.10. ETHICAL CONSIDERATIONS

Study was conducted upon approval by the supervisor and IREC plus the administration at FPRRH. This was preceded by obtaining a letter of introduction from the office of the Dean faculty of Clinical Medicine and Dentistry which was then presented to the Hospital management upon arrival at the facility. The researcher then sought permission from the department management to be allowed to proceed with the research before embarking on data collection.

3.11. LIMITATIONS OF THE STUDY

The anticipated limitations to were failure of the pregnant mothers to give proper data (multiple sexual partners) due reasons of social impact. Pre-pregnancy BMI was also anticipated to bring problems since most mothers might not know their pre-pregnancy weight. Gestation age by LNMP alone was also anticipated to be a problem.

CHAPTER FOUR: STUDY FINDINGS

4.0.INTRODUCTION

This chapter presents the results of the study as per objectives presented in the form of statements, tables, charts and graphs. A total of 214 women with a diagnosis of preeclampsia took part in the study whose records, checklists and records were analyzed giving a response rate of 100%.

4.1. SOCIODEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

4.1.1. Respondents' age, residence, marital status, education and occupation (N=214)

AGE (YRS.)	FREQUENCY (n)	PERCENTAGE (%)
Less than 18	84	39.25
18 – 25	22	10.28
26 – 33	16	7.48
34 and above	92	42.99
RESIDENCE		
Rural	200	93.46
Urban	14	6.54
MARITAL STATUS		
Single	63	29.44
Married	126	58.88
Divorced / Separated	25	11.68
EDUCATION		
None	10	4.67
Primary	132	61.68
Secondary	46	21.5
Tertiary	24	11.22
OCCUPATION		
Formally employed	51	23.83
Business	22	10.28
Peasant / Housewives	141	65.89
TOTALS	214	100

Table 1: Respondents' ages, residence, marital status, education level and occupation (N=214)

Majority of the preeclampsia diagnoses were made among women below 18 years (39.25%) and those aged 34 years and above (42.99%) who resided in rural setups (93.46%), were married (58.88%), with mostly primary level of education (61.68%) and who were peasants or housewives (65.89%). This is shown in table 1 above.

4.1.2. Family history of preeclampsia, parity & change of male partner in current pregnancy

Assessment of family history of preeclampsia (in mother or sister) was marred with shortfalls. Most either did not know of any history or recalled of problematic pregnancies in the sister(s) but were not sure if they were similar problems. Of the 214 study participants, 61 (28.51%) were nulliparous while 153 (71.49%) were multiparous. Of the multiparous, 71 (46.41%) had a history of multiple sexual partners or change of male partner just about the time and events surrounding the current pregnancy. This is shown in figures 2 and 3 respectively.

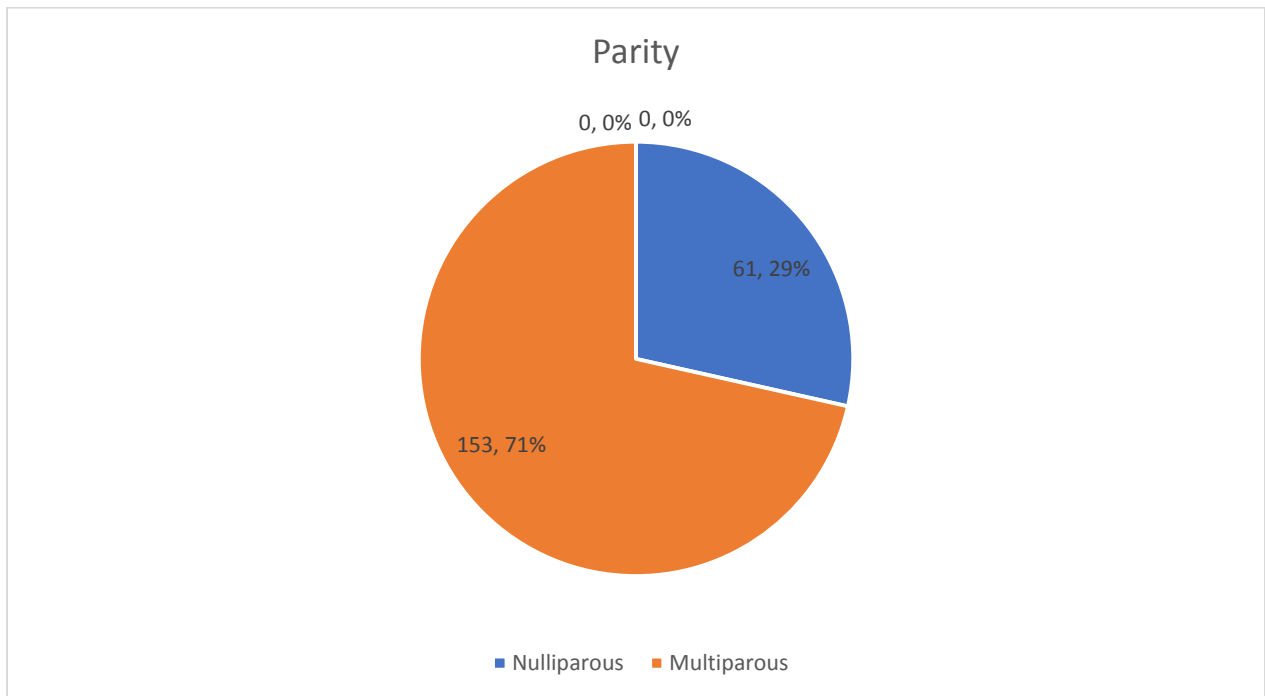


Figure 2: Parity of Respondents (N=214)

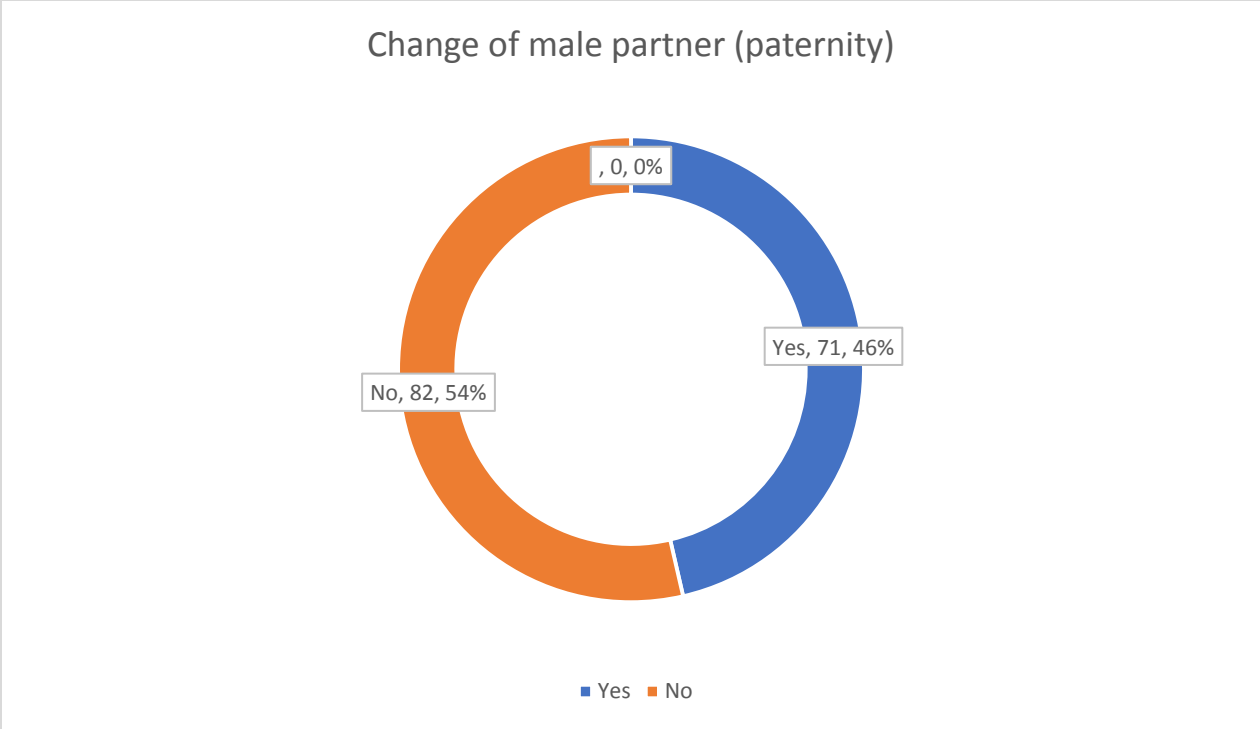


Figure 3: Male partner (paternity) change among the multiparous women (N=153)

4.2. KNOWLEDGE / AWARENESS CONCERNING PREECLAMPSIA (N=214)

The respondents’ knowledge / level of awareness pertaining preeclampsia was very low. Only 48 (22.43%) of the total 214 had heard about preeclampsia and its adverse impact on pregnancy outcome. These were adequately aware of the dangers posed to both the mother and unborn child when a diagnosis of preeclampsia is made. The remaining 77.57% knew nothing concerning preeclampsia.

4.3. OBESITY (BMI OF 30 & ABOVE) AS AN ASSOCIATED FACTOR IN PREECLAMPSIA (N=214)

Obesity was assessed based on mothers’ recall on pre-pregnancy weights, mother’s own opinion of having had a problem with controlling her body weight plus actual measurements of weight (in Kilograms) and height (in meters) so as to facilitate BMI calculation. From the methods mentioned above, but with considerable provision for error, high BMIs or problems with weight were reported in 82 (38.32%) of the preeclamptic mothers. This was found as statistically significant despite the afore-mentioned limitations.

CHAPTER FIVE: DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.0.INTRODUCTION

This chapter presents the discussion of results obtained, conclusions derived from the said results and recommendations made to the various stakeholders to whom this study was deemed to affect.

5.1. DISCUSSION OF STUDY FINDINGS

5.1.1. Sociodemographic Factors Associated with Preeclampsia

As earlier shown, the majority of the preeclampsia diagnoses were made among women below 18 years (39.25%) and those aged 34 years and above (42.99%) who resided in rural setups (93.46%), were married (58.88%), with mostly primary level of education (61.68%) and who were peasants or housewives (65.89%). Nulliparity and partner change among the multiparous women were found to be significantly associated with preeclampsia in the study population. The factors that stood out were extremes of age (Kumari et al., 2016), older maternal age(Lamminpää et al., 2012), low socioeconomic status(reflected by mostly rural residence, low education and occupation standing with most being peasants or housewives). This rural setup could also imply the use of biofuels such as charcoal and firewood for cooking, exposure to which has been

documented to increase the risk of preeclampsia among pregnant women (Agrawal & Yamamoto, 2015). Even the few that resided in urban setups were not spared either since outdoor pollution by car fumes have also been associated with preeclampsia (Yorifuji et al., 2015).

5.1.2. Awareness / Knowledge Concerning Preeclampsia

The knowledge base of the respondents concerning preeclampsia leaves a lot to be desired, to say the least. A paltry 22.43% of the respondents had some knowledge about preeclampsia. While the remaining did not even know what it was. This could have a number of implications; either the mothers' ANC attendance history is poor, little or no preeclampsia awareness is created to the pregnant mothers during their ANC visits. In either case, the diagnostic and prognostic repercussions are dire due to non- or late-diagnosis with consequent non- or delayed-interventions. Undiagnosed or preeclampsia caught late increases the chances of it complicating into severe forms such as eclampsia and HELLP syndrome which have a worse prognosis compared to preeclampsia (Salam et al., 2016). The respondents did not have a name for preeclampsia in their local language since it was unknown to them as an entity just like it was the case in Ogun State in Nigeria (Akeju et al., 2016). Most were aware that pregnancy was associated with increases in blood pressure but did not know preeclampsia as one of the causes, agreeing with (Maputle, Khoza, & Lebeso, 2015) findings in South Africa.

5.1.3. Obesity (BMI > 30) and Association with Preeclampsia

Among the numerous factors for preeclampsia, an increase in obesity among women of reproductive age is expected to be one of the strongest risk factors underlying the increasing prevalence of preeclampsia.

BMI's of 30 and above (obese) were found significant in 38.32% of the preeclamptic mothers. These value could have been higher if limitations borne from problems with recall of pre-pregnancy weights could be eliminated completely. This supports the findings of several other studies that have come out clearly to prove the association between obesity and preeclampsia. In their studies, (Sohlberg et al., 2012), (Bartsch et al., 2016) among many others clearly highlighted the relationship. The disorder overlap seen in obese individuals, metabolic syndrome being a very pertinent example, could explain this correlation between obese individuals and preeclampsia (Weissgerber & Mudd, 2015).

5.2. CONCLUSIONS

Among women diagnosed with preeclampsia at FPRRH, age (less than 18 or above 35 years), Nulliparity, change in male partner (paternity change) among the multiparas, low socio-economic status with mostly rural residence, and obesity were found to be statistically significant in predicting pre-eclampsia. It was also noted that awareness concerning preeclampsia was so low demanding interventional measures to correct since adequate knowledge and awareness positively impact prognosis and general outcome.

5.3. RECOMMENDATIONS

5.3.1. To the Respondents

Lifestyle modification with maintenance of a healthy weight so as to avoid obesity, a proven risk factor for preeclampsia. They should also ensure early physician-diagnosis of pregnancy whenever they suspect that they could be, with early maiden ANC visit that would facilitate adequate monitoring of the gravid mother, her pregnancy and the unborn child which would make possible early institution of prevention and/or interventional measures.

4.3.2. To the ANC staff at FPRRH

Apart from the routine monitoring procedures, immunizations and preventive treatments routinely offered during each ANC visit, take time to talk to these mothers either singly or in groups concerning all there is to know about preeclampsia with emphasis on the need of the pregnant mothers to maintain a healthy weight.

4.3.3. To the Government of Uganda through the Ministry of Health

Scale up awareness creation on preeclampsia with commensurate allocation of both financial and professional human resource towards this venture. Advertisements, policy papers and directives on the subject matter should be periodically and regularly presented through the various forums such as print, audio-visual and social media so as to reach as many people as possible.

4.3.4. To Fellow Researchers

This study left quite a number of questions unanswered as well as creating more research questions as is expected of any study. For instance, the limitation of weight estimation from patient recall warrant a study be conducted assessing closely the relationship between BMI and preeclampsia only this time a prospective study approach could be used. Along the same line, a study could be conducted on the relationship between the severity of BMI elevation and severity of preeclampsia, progression to complications and ultimately prognosis. Recent information,

though from minimal studies, suggest an inverse relationship between smoking and preeclampsia thus suggesting that smoking somewhat confers some protection. More studies into this is warranted and would be of tremendous contribution to the medical field.

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APPENDICES

APPENDIX I: CHECKLIST

(I) SOCIODEMOGRAPHIC FACTORS

AGE

<18 years []

18-25 years []

26-33 years []

34 years and above []

OCCUPATION

White collar job []

Peasant []

Others []

RESIDENCE

Rural []

Urban []

(II) INDIVIDUAL FACTORS

EDUCATIONAL STATUS

Primary education []

Secondary education []

Tertiary level []

None = []

GRAVIDITY

Prim gravida []

Multi gravida []

B.P []

MARITAL STATUS

Single []

Married []

Divorced []

Multiple sexual partners []

Change of sexual partners []

ANTENATAL VISIT

If yes, how many >2 []

2-4 []

<4 []

FAMILY HISTORY OF PREECLAMPSIA (IN MOTHER OR SISTER)

No []

If yes, how many []

NUTRITION

ANTHROPOMETRY

Weight ___kg

Height ___m

BMI

Underweight <18.5 []

Normal 18.5 – 25 []

Over weight 25 – 30 []

Obese 30 – 40 []

Extreme Obesity >40 []

BIOCHEMICAL

Elevated liver enzymes

Yes []

No []

Proteinuria

Yes []

No []

CLINICAL

chronic illness

HTN Yes []

No []

DM Yes []

No []

Medication Yes []

No []

APPENDIX II: STUDY QUESTIONNAIRE

SERIAL NO:

INTRODUCTION

STUDY TITLE:DETERMINANTS OF PREECLAMPSIA AMONG PREGNANT WOMEN AT GESTATIONAL AGE OF ABOVE 20 WEEKS ATTENDING ANTENATAL CARE AT FPRRH.

CONFIDENTIALITY: I am **TOLA PAPA’AKURHYEL MIDALA**, a final year medical student at Kampala International University – Western Campus carrying out the above research. I would hereby wish to assure you that the information you will provide will be accorded the confidentiality it deserves and will not be used for purposes other than those meant for this research. Therefore, fill in the questionnaire freely and honestly.

SECTION A: DEMOGRAPHIC DATA

1. Age
 - <18yrs []
 - 18-24yrs []
 - 25-30 yrs. []
 - 30-35yrs []
 - >35yrs []
2. Marital status
 - Single []
 - Married []
 - Divorced []
- (iii) Religion
 - Christian []
 - Muslim []
 - Others []
3. Occupation
4. Residence (rural or urban)
5. Educational status
 - Unable to read and write []
 - Able to read and write []

- Primary education []
- Secondary education []
- Tertiary level []

SECTION B: MAIN BODY

Instructions: Answer Yes, No, or Don't Know to each question below

Variable Studied: Pre- eclampsia is high blood pressure that occurs in pregnancy after 20 weeks of gestation characterized with proteinuria, edema and elevated blood pressure reading above 140/90mmHg

A. OBESITY (BMI OF 30 & ABOVE) influencing preeclampsia

1. Do you add salt to food when it has already been served?
2. How often do you take fatty meals in a week?

B. Sociodemographic factors influencing preeclampsia

1. Have you changed your male partner after your previous pregnancy?
2. Is this your first pregnancy?
3. Do you have a family history of preeclampsia (in your mother or sister)?
4. How often do you engage in physical exercise like brisk walking, jogging, running (others)?
5. How well do you sleep night? How many hours of undisturbed sleep do you have at night?
6. Do you consider your weight problematic?
7. Has anything been a cause of constant worry lately?

C. Individual factors influencing preeclampsia

1. Have you ever heard about preeclampsia?
2. How often do you attend ANC while you are pregnant?

(ii) BP:mmHg

(iii) Height:cm

(iv) Weight:kg

APPENDIX III: CONSENT FORM

STUDY TITLE:DETERMINANTS OF PREECLAMPSIA AMONG PREGNANT WOMEN AT GESTATIONAL AGE OF ABOVE 20 WEEKS ATTENDING ANTENATAL CARE AT FPRRH.

I have read and understood the research topic above on the planned study and the explanations given to me. I understand what I have been requested to do in respect to this study. I have asked questions and gotten clarifications about the study and I am satisfied. I have, after due consideration, willingly consented to take part in this study as explained.

Participant’s signature Date

Investigators name Signature

Date

Investigator’s Contacts:

APPENDIX IV: APPROVAL LETTER FROM IREC, KIU

