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Prevalence and risk factors for preeclampsia/eclampsia among pregnant women attending antenatal clinic at Morogoro Regional Referral Hospital, Tanzania

Sylivester Wanyaseleli Mkama *

Department of Obstetrics and Gynaecology, Faculty of Medicine, St. Francis University college of Health and Allied Sciences, Ifakara, Tanzania.

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Abstract

Background: Preeclampsia/ eclampsia is a pregnancy specific hypertensive disorder and is one of the leading causes of direct maternal and infant morbidity and mortality in Tanzania and worldwide. The aim of this study is to assess the prevalence and associated risk factors of preeclampsia / eclampsia among women attending antenatal clinic at Morogoro Regional Referral Hospital, Tanzania.

Materials and Method: This was a descriptive cross-sectional study conducted from January 01 to December 31, 2023. A total of 160 preeclampsia /eclampsia pregnancy women were enrolled in this study. Interviews were conducted with 160 sampled preeclampsia /eclampsia pregnancy women.

Results: The analysis focused on 160 preeclampsia /eclampsia pregnant women. Of these, 62.5% preeclampsia / eclampsia pregnant women aged 21-29 years. 87.5% were living in rural area. Education level, not educated 78.1%; Marital status 87.5% were married. Occupation 82.5% were peasants. Gravidity 57.5% were 2, family history of hypertension 90.6% were no, history of preeclampsia 93.1% were no, history of abortion 87.5% were no, inter pregnancy interval 84.4% were equal or less than 5 years, number of fetuses 95.0% was one. Multigravida 62.5%, family history of twin pregnancy 69.4% no, previous history preeclampsia 80.6 % no, history of still birth or congenital anomaly 83.1% no, history of abortion 76.2 % no. Desire of the current pregnancy 93.1 % were planned, new partner in the past 6 months 87.5% no, number of visits made 62.5 % were less than 3.

Conclusion: Risk factors identified in this study can be used to identify women at risk of preeclampsia during antenatal clinic visit to minimize the complications of preeclampsia in both the mother and the fetus.

Keywords: Preeclampsia / Eclampsia Pregnant Women; Prevalence; Risk Factors; Morogoro Regional Referral Hospital; Tanzania

1. Introduction

Preeclampsia is a condition characterized by hypertension and significant proteinuria, usually occurring after 20 weeks of gestation in a woman that was previously normotensive and non proteinuric. The blood pressure value indicative of hypertension is > 140/90 mmHg and of significant proteinuria is 0.3 g/day or a urine protein/ creatinine ratio > 30 mg/ mmol [1]. While eclampsia is defined as the occurrence of one or more convulsions preceded by changes in cardiac structure and function in association with the preeclampsia syndrome [2]. Hemorrhage, sepsis, hypertensive disorder of pregnancy are the leading causes of maternal mortality. Among the hypertensive disorders, preeclampsia and eclampsia have the most significant impact on maternal and newborn morbidity and mortality [3]. Preeclampsia, if not detected early, can lead to eclampsia which is one of the severe and direct causes leading to maternal and infant mortality and morbidity. About 5% to 10% of all pregnancies are complicated by preeclampsia and other hypertensive

*Corresponding author: Sylivester Wanyaseleli Mkama.

disorders [4]. Genetic factors [5], advanced maternal age [6], being primiparous [7], being overweightor obese [7], previous history of PE [7], family history of chronic family history of diabetes mellitus (DM) [8], family history of PE [8]. Maternal anemia [7], multiple pregnancies, partner change, lack of antenatal care (ANC) follow-up [7], inadequate consumption of fruits and vegetables [9] are among the characters known to increase the risk of PE development in different populations. Hypertensive disorders of pregnancy including preeclampsia /eclampsia accounts for about 18%of maternal deaths globally, with an estimated of sixty-two to seventy-seven thousand deaths per year 2006 [10]. Preeclampsia is responsible for 1 in 7 maternal deaths worldwide and 1 in 4 perinatal deaths [11]. In Nigeria, preeclampsia is reported to be associated with 5.84/1000 birth perinatal mortality rate [12]. Around 40,000 women , mostly from developing countries, die each year due to preeclampsia or eclampsia [13].In Kenya eclampsia accounted for 22% of all maternal death [14] . An additional 7% of all neonatal deaths were directly attributable to eclampsia and 38% to prematurity which is often associated severe preeclampsia [14]. The prevalence of hypertension in pregnancy, in Uganda, is not well documented. However, a recent study indicated range of 1.2% to 18.25% [15]. In Tanzania, eclampsia is associated with 11% case fatality rate and 30% mortality rate [16], 2015.The aim of this study is to assess the prevalence and associated risk factors associated of preeclampsia/ eclampsia among women attending clinic at Morogoro Regional Referral Hospital , Tanzania. The finding of this study could help health care providers and higher official to engage in preventing maternal and fetal complications.

2. Materials and methods

2.1. Study area and period

This study was conducted at Morogoro Regional Referral Hospital, Morogoro Urban district, Morogoro Regional, Tanzania from January 01 to December 31, 2023.

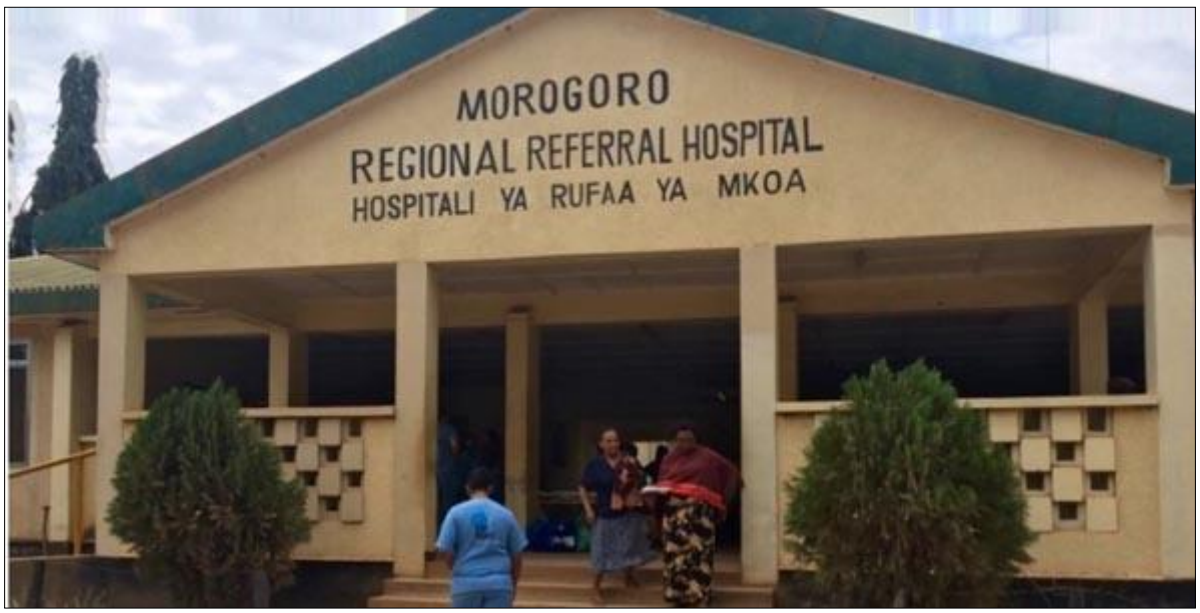

Figure 1 Morogoro Regional Referral Hospital

The study was conducted to assess the prevalence and associated risk of preeclampsia /eclampsia pregnancy among women attending antenatal clinic at Morogoro, Morogoro Urban district

Morogoro Urban District is one of the six districts of the Morogoro Region of Tanzania. It contains the city Morogoro, capital of the Morogoro Region, and no villages. Morogoro Urban District covers 260 square kilometres (100 sq mi). It is bordered to the east and south by the Morogoro Rural District and to the north and west by Mvomero District

As of 2012 census, the population of the Morogoro Urban District was 315,866

2.2. Study design

The study design was a descriptive cross-sectional study which prevalence and associated risk factors of preeclampsia/eclampsia pregnancy among women attending antenatal clinic at Morogoro Regional Referral Hospital was studied at a time. Structured pretested questionnaire with key information was used to collect the desire data.

2.3. Study population

Preeclampsia /eclampsia pregnant women attending clinic at Morogoro Referral Hospital were registered in the study.

2.4. Sample size

The sample size in this study was 160 participants. The sample size calculation obtained by Kirkwood formula.

- $N= z^2xp(1-p)/d^2$
- $N= (1.96)^2x\ 0.118\ (1-0.118)/0.05^2$
- N=3.8416 x0.118(0.882)/0.0025
- N=0.4533088x0.882/0.0025
- N=0.3998183616/0.0025
- N=159.92734464
- N=160
- N= Sample size
- Z=Confidence interval level 95% in this study which is 1.96
- P= Proportional of study prevalence (estimated prevalence) 11.8% 2023
- D= Absolute error precision 0.05 has to be decided by researcher.

2.5. Sampling Technique

Simple randomly technique was employed when participants attending at Morogoro Regional Referral Hospital antenatal clinic were allocated numbers (even and old numbers). Participants who had even numbers were involved in the study.

2.6. Data Collection

The data collected by structure guided questionnaires. The questionnaire prepared in English and translated into Swahili to maintain the consistency and content of the questionnaire, confidentiality of information participant's rights and voluntarily informed consent were secured, the participants were asked the questions and their answers filled in the questionnaire by the researcher.

2.7. Data analysis

Questionnaire filled with irrelevant information were removed. The data from questionnaire with relevant information were analyzed with statistical Package for Social Science (SPSS version 20).

2.8. Inclusion Criteria

Preeclampsia/eclampsia pregnant women attending antenatal clinic willing to participate in the study were included.

2.9. Exclusion Criteria

Preeclampsia/eclampsia pregnant women attending antenatal clinic but unwilling to participate in the study were excluded.

2.10. Ethical Clearance

A letter from St. Francis University College of Health and Allied Sciences ethical committee was obtained. The letter submitted to Regional Administrative Secretary, Morogoro Regional who forwarded the letter to the Regional Medical Officer, Morogoro Region, who forwarded the letter to the Medical Officer in charge who give permission to use participant at Morogoro Referral Hospital.

3. Results

3.1. Socio-Demographic Characteristic of the participants at Morogoro Regional Referral Hospital in the study.

A total of 160 participants were involved in this study. Age; less than 20 years 3(1.9%), age group 21-29 years 100(62.5%), and more than 30 years 57(36.6%). Residence; 20(12.5%) were Urban, and 140 (87.5%) were Rural. Education level of participants; 125(78.1%) were not educated, 15(9.4%) were primary school, 8(5.0%) were secondary school,12(7.5%) was University. Marital status; 140 (87.5%) were married, 20 (12.5%) were single. Occupation of participants; 132 (82.5%) were peasants, 8(5.0%) were civil servants,20 (12.5%)were self-employed as shown in Table1.

Table 1 Socio-demographic characteristics of participants at Morogoro Regional Referral Hospital

Variable	Frequency	Percentage
Age in year		
≤ 20 years	3	1.9
21- 29 years	100	62.5
≥ 30 years	57	35.6
Residence		
Urban	20	12.5
Rural	140	87.5
Education level		
Not educated	125	78.1
Primary School	15	9.4
Secondary school	80	5
University	12	7.5
Marital status		
Married	140	87.5
Single	20	12.5
Occupation		
Peasants	132	82.5
Government employee	8	5.0
Self- employed	20	12.5

3.2. Obstetric factors of the participants among preeclampsia/eclampsia women attending antenatal clinic at Morogoro Regional Referral Hospital.

In this study the gravidity of the participants 7(4.4%) was one, 92(57.5%) were two, 61 (38.1%) were more than three; family history of hypertension 5(3.1%) were yes, 155(96.9%) were no; history of preeclampsia 11(6.9%) were yes, 149(93.1%) were no; history of abortion 20(12.5%) were yes , 140 (87.5%) were no; Inter pregnancy interval 135 (84.4%) were less than 5 years, 25(15.6%) were more than 5 years; number of fetus 152 (95.0%)was one,8 (5.0%) were two as shown in Table 2.

Table 2 Obstetric factors of the participants among preeclampsia / eclampsia pregnant women attending clinic at Morogoro Regional Referral Hospital

Variable	Frequency	Percentage
Gravidity		
1	7	4,4
2	92	57.5
≥3	61	38.1
Family history of Hypertension		
Yes	15	9.4
No	145	90.6
History of pre-eclampsia		
Yes	11	6.9
No	149	93.1
History of abortion		
Yes	20	12.5
No	140	87.5
Interpregnancy interval		
≤5 years	135	84.4
>5 years	25	15.6
Number of fetuses		
1	152	95
2	8	5

3.3. Behavioral and obstetric determinants of preeclampsia/eclampsia pregnant among women attending antenatal clinic at Morogoro Regional Referral Hospital.

Among 160 pregnant women attending antenatal clinic at MRRH. Women with gravidity; 60 (37.5%) were primigravida, 100 (62.5%) were multigravida. Parity; 80(50%) were primiparous, 80 (50%) were multiparous. Family history of twin pregnancy; 49 (30.6%) were yes, 111 (69.4%) were no. Previous history PE; 31 (19.4%) were yes, 129 (80.6%) were no. History of still birth or congenital anomaly; 27 (16.9%) were yes, 133 (83.1%) were no. History of abortion; 38 (23.8%) were yes, 122 (76.2%) were no. Desire of the current pregnancy; 149 (93.1%) were planned, 11 (6.9%) were unplanned. New partner in the past 6 months; 20 (12.5%) were yes, 140 (87.5%) were no. Number of visit made; 100 (62.5%) were less than 3, 60 (37.5%) were more than 4 and above as shown in Table 3

Table 3 Behavioral and obstetric determinants of preeclampsia / eclampsia pregnant among women attending antenatal clinic at Morogoro Regional Referral Hospital

Variable	Frequency	Percentage
Gravidity		
Primigravida	60	37.5
Multigravida	100	62.5
Parity		
Primiparous	80	50

Multiparous	80	50
Family history of twin pregnancy		
Yes	49	30.6
No	111	69.4
Previous history of PE		
Yes	31	19.4
No	129	80.6
History of still birth/ Congenital anomaly		
Yes	27	16.9
No	133	83.1
History of abortion		
Yes	38	23.8
No	122	76.2
Desire of the current pregnancy		
Planned	148	93.1
Unplanned	11	6.9
New partner in the past 6 months		
Yes	20	12.5
No	140	87.5
Number of Visit made		
<3	100	62.5
≥4	60	37.5

4. Discussion

This study measured prevalence risk factors for preeclampsia /eclampsia among pregnant women attending antenatal clinic at Morogoro Regional Referral Hospital, Tanzania. It was observed that 62.5% were between 21-29 years. Study done in Uganda showed that odds of developing hypertension in pregnancy were less in pregnant women who were between the age of 21 and 29 years [17]. Likewise, a study conducted in UK showed that advanced maternal age to be significantly associated with hypertension in pregnancy [18]. The odds of developing hypertension in pregnancy increased with age as 71.4% of the pregnant women who had hypertension were aged 30+ years. Likewise, a study conducted in USA showed that maternal age extremes were significantly associated with hypertension in pregnancy [19]. The increased risk of preeclampsia with higher maternal age could be due to maternal immune mal-adaptation and aging-mediated vascular damage or could be attributed by chronic hypertension. In this study, it was found that 78.1% were not educated. The increased risk of preeclampsia among women with high education level could be due to the fact that in Tanzania, people with high income are more likely to fall into those people with moderate /middle income to high income. Individuals in this group are practicing poor life style practices including lack of physical exercise and poor eating habits such as eating / access to unhealthy foods that could lead to overweight or obese which increases the risk of developing preeclampsia /eclampsia. In the other hand, the increased risk of preeclampsia among women with high education could be attributed by increased maternal age, as women with higher education achievement are more likely to have their child at advanced maternal age. However, a study conducted in Uganda has reported higher education to be protective against preeclampsia / eclampsia [20].87.5% in this study were married. Being not married was found to have increased odds of preeclampsia / eclampsia; being unmarried could be associated with change of partner or increased inter pregnancy interval which may lead to the development of preeclampsia [21]. In this study 50% were primiparous and 50% were multiparous. Primiparous pregnant women were found to be more times likely to develop preeclampsia as compared to multiparous pregnant women. Similar reports were communicated

by the researchers from East Africa [22], Middle- East [23] and Latin America [24]. Furthermore, a review on controlled studies demonstrated that primiparity is the commonest determinant preeclampsia [25]. Preeclampsia has been recognized as the disease of the first pregnancy markedly due to immune mal adaptation [26], genetic predisposition [5], insulin resistance and increased circulating angiogenic factors, which, in turn aggravate the risks preeclampsia in primiparous women [27]. In this study the number of visit made < 3 were 62.5% . A statistically significant difference was observed in the odds for developing preeclampsia among pregnant women having ≥ 4 ANC visits as compared to women having ≤ 3 visits. Those pregnant women having ≤ 3 ANC visits were more likely of developing preeclampsia as compared to those pregnant women having ≥ 4 ANC visits. Comparable evidence was reported in the study conducted in Nekemte Referral Hospital, Ethiopia [28] and the result of this study was further supported by the systematic review on the same topic in Africa [7]. The more pregnant women visit the ANC, the more chance of discussing health issues which are more likely to reduce pregnancy related complications including preeclampsia.

5. Conclusion

In this study risk factors identified can be used during routine antenatal check up to identify pregnant women at risk of preeclampsia / eclampsia early. Giving more focus to at risk mothers and providing them better antenatal care help minimize the complications of preeclampsia in both mother and fetus and also help in preventing maternal deaths due to hypertensive disorders of pregnancy.

Recommendation

A strong political agenda is essential in reducing the burden of maternal mortality and morbidity associated with preeclampsia. Adequate health care funding, improving education and empowerment in the society are strategies that can deployed by the government in curbing the debilitating effect of preeclampsia /eclampsia.

Compliance with ethical standards

Acknowledgments

I wish to thank the management of St. Francis University College of Health and Allied Sciences for the support to this study. Also, I thank the Regional Administrative Secretary Morogoro Region, Regional Medical Officer Morogoro, Medical Officer Morogoro Hospital, antenatal clinic staff for their support in this study and all pregnant women attending antenatal clinic who participate in this study.

Disclosure of conflict of interest

No conflict of interest in this study.

Statement of ethical approval

In this study no animal was used but human was used. The only study tool used to collect data was questionnaire. However, ethical clearance was obtained from the respective authorities to conduct the study. The research committee of St. Francis University College of Health and Allied Sciences, Regional Administrative Secretary Morogoro Region, Regional Medical Officer, Morogoro Region, Medical Officer in charge Morogoro Regional Referral Hospital gave permission the study to be conducted.

Statement of informed consent

Written informed consent was obtained from all antenatal preeclampsia /eclampsia pregnant women who consented to the study, records were coded and participants / researcher names were not used. All the information collected remained confidential and was used for purposes of the study only. Participation was voluntary and no incentives were given.

References

[1] Dulay A.T. Main Line Health System: Preeclampsia and Eclampsia. New Jersey: MSD Manual, Professional Version, 2020. [(accessed on 13 September 2022)]. Available online: https: / /www.msdmanuals.com/ professional/ gynecology-and-obstetrics / abnormalities-of-pregnancy / preeclampsia-and-eclampsia.

[2] World Health Organization (2011). WHO recommendation for prevention and treatment of preeclampsia and eclampsia. Geneva: World Health Organization.

[3] Geneva: World health organization; [Dec;2022].2011. WHO Recommendations for Prevention an d Treatment of Pre-Eclampsia and Eclampsia. [PubMed] [Google Scholar]

[4] Determinant of pre-eclampsia at a tertiary care hospital. Goyal D, Bhati I, Rana S. https :/ /www. Iosrjournals.org / iosrjdms/ papers / Vol 19-issue7/ series-4 / K1907045661.pdf IOSR Journal ofDental and Medical Sciences [Internet. 2020;19:56-61. [Google Scholar]

[5] Mohaupt M. Molecular aspects of preeclampsia. Mol Aspects Med. 2007; (2) : 169-191. [PubMed] [Google Scholar].

[6] Birhamu MY, Temesgen H, Demeke G, et al. Incidence and predictors of pre-eclampsia among pregnant women attending antenatal care at debremarkos referral hospital, north west Ethiopia :prospective cohort study. Int J Womens Health. 2020;12:1013-1021. [PMC free article] PubMed] [Google Scholar].

[7] Meazaw MW, Chojenta C, Muluneh MD, Loxton D. Systematic and meta-analysis of factors associated with preeclampsia and eclampsia in sub-Saharan Africa. PLos One. 2020;15(8):e0237600.[PMC free article] [PubMed] [Google Scholar].

[8] Haile TG, Assefa N, Alemayehu T, et al. Determinants of preeclampsia among women attending delivery services in public hospitals of central tigray, northern Ethiopia: a case-control study. J Pregnancy. 2021; 2021 (4654828):1-8.[PMC free article] [Google Scholar]

[9] Grum, T, Hintsa S, Hagos G, Dietary factors associated with preeclampsia or eclampsia among women in delivery care services in Addis Ababa, Ethiopia: a case control study.BMC Res Notes. 2018; 11(1):683. [PMC free article] [PubMed] [Google Scholar].

[10] Khan KS, Wojdyla D, Say L, Gulmezoglu AM, Van Look PF (2006). WHO analysis of causes of maternal death: a systematic review. Lancet 367: 1066-1074.

[11] Hodgins A. Pre-eclampsia as underlying cause for perinatal deaths: time for action. GHSP. 2015; 3 (4): 525-7.

[12] Makinde On (2012). The contribution of severe Preeclampsia and Eclampsia to Perinatal Mortality in a Nigerian Teaching Hospital, Perinatal Mortality Dr. Oliver Ezechi(Ed.), ISBN:978-953-51-0659-3.

[13] Obeagu, E. I. and Agreen , F.C. (2023). Anaemia among pregnant women : A review of African pregnant teenagers. J Pub Health Nutri. 6 (1). 138.

[14] Yego F, et al. A retrospective analysis of maternal and neonatal mortality at a teaching and referral hospital in Kenya. Reprod Health. 2013; 10:13.

[15] Nakimuli, A., Chazara, O., Byamugisha, J., Elliott, A. M., Kaleebu, P., Mirembe, F. and Moffett, A. (2014). Pregnancy, parturition and preeclampsia in women of Africa ancestry. In American Journal ofObstetrics and Gynecology (Vol. 210, Issue 6).https :/ / doi.org / 10. 1016/ j.ajog. 2013. 10.879.

[16] Mooij R, Lugumila J, Mwashambwa MY, Mwampagatwa IH, Van Dillen J, Stekelenburg J(2015). Characteristics and outcomes of patients with eclampsia and severe preeclampsia in rural hospital in Western Tanzania: retrospective medical record study . BMC Pregnancy and Childbirth 15 (1): 213

[17] Obegu, E.I., Ikpenwa, J. N., Chukwueze, C.M. and Obeagu, G. U (2022). Evaluation of protein C, protein S and fibrinogen of pregnant women in Owerri Metropolis. Madonna University Journal of Medicine and Health Sciences ISSN: 2814-3035. 2 (1) : 292-8.

[18] Ukah, U. V., De Silva, D.A., Payne, B., Magee, L. A., Hutcheon, J.A., Brown , H., Ansermino, J.M., Lee, T. and von Dadelszen, P. (2017). Prediction of adverse maternal outcomes from preeclampsia and other hypertensive disorders of pregnancy: A systemic review. https :/ / doi.org / 10. 1016/ j.preghy. 2017.11.006.

[19] Buegess, A. and Founds, S. (2016). Preeclampsia. MCN The American Journal of Maternal / Child Nursing 41 (1), 8-15.https:/ / doi.org/ 10.1097/ NMC. 000000000000204.

[20] Kiondo P, Wamuyu-Maina G, Bimenya GS, Tumwesigye NM, Wandabwa J and Okong P (2012). Risk factors for preeclampsia in Mulago Hospital, Kampala, Uganda. Tropical Medicine and International Health 17 (14) :480-487.

[21] Bilano VL, Ota E, Ganchimeg T, Mori R, Souza JP (2014). Risk Factors of Pre Eclampsia / Eclampsia and its Adverse Outcomes in low-and Middle-Income Countries: A WHO Secondary Analysis. PLoS ONE 9(30):198.

[22] Logan GG, Njoroge PK, Nyabola LO, Mweu MM. Determinants of preeclampsia and eclampsia among women delivering in county hospitals in Nairobi, Kenya. F100Research.2020;9 (9) :192.[Google Scholar].

[23] Funai EF,OB, Malaspina D, Friedlander Y, Deutsch L, Harlap S .Risk factors for preeclampsia in nullparous and parous women : the Jerusalem perinatal study. PaediatrPerinatEpidemiol. 2005; 19:59-68.[PubMed] [Google Scholar].

[24] Conde –Agudelo A, Belizan JM. Risk factors for preeclampsia in a large cohort of Latin American and Caribbean women.BJOG. 2000;107 (1): 75-83 .[PubMed] [Google Scholar].

[25] Duckitt K, Harrington D. Risk factors for preeclampsia at antenatal booking: systematic review of controlled studies. BMJ. 330 (7491), 2005: 565.[PMC free article] [PubMed] [Google Scholar].

[26] Saito S, Shiozaki A, Nakashima A, Sakai M, Sasaki Y. The role of the immune system in preeclampsia. Mol Aspects Med. 2007; (2):192-209.[PubMed] [Google Scholar].

[27] Bdolah Y, Elchalal U, Natanson-Yaron S, et al. Relationship between nulli parity and preeclampsia may be explained by altered circulating soluble fms-like tryrosine kinase 1. Hypertens Pregnancy. 2014: 33 (2) :250-259.[PubMed] [Google Scholar].

[28] Hinkosa L, Tamene A, Gebeyehu N. Risk factors associated with hypertensive disorders in pregnancy in Nekemte referral hospital, from July 2015 to June 2017, Ethiopia :case –control study. BMC Pregnancy Childbirth.2020; 20 (1) : 16.[PMC free article] [PubMed] [Google Scholar].