



## KNOWLEDGE OF PREECLAMPSIA AND ITS ASSOCIATED FACTORS AMONG PREGNANT WOMEN

Orjuwan Fuad Bukhari<sup>1\*</sup>, Nour Ahmed Naaman<sup>1</sup>, Orjuwan Ismail Bantan<sup>1</sup>, Rana Hummam Attar<sup>1</sup>, Farah Hussein Aloweiny<sup>1</sup>, Rehab Ahmad Alquzi<sup>2</sup>, Amirah Bakr Albakr<sup>3</sup>, Abdullah Mohammed Alqatari<sup>4</sup>, Hussain Salah Alsinan<sup>4</sup>, Fatimah Ali J Alshaikhjafar<sup>5</sup>

1. Faculty of Medicine, Batterjy Medical College, Jeddah, KSA.
2. Faculty of Medicine, Umm Al Qura University, Makkah, KSA.
3. Faculty of Medicine, King Saud University, Riyadh, KSA.
4. Faculty of Medicine, Imam Abdulrahman bin Faisal University, Dammam, KSA.
5. Faculty of Medicine, Baha University, Baha, KSA.

### ARTICLE INFO

**Received:**  
02 May 2021  
**Received in revised form:**  
18 Aug 2021  
**Accepted:**  
19 Aug 2021  
**Available online:**  
28 Aug 2021

**Keywords:** Preeclampsia, Pathogenesis, Pregnancy, Mortality

### ABSTRACT

Preeclampsia is a medical condition related to pregnancy in women. It is one of the leading causes of morbidity and mortality globally in the maternal side of health. The condition is dangerous and is mainly caused by high blood pressure during pregnancy. In this paper, we study preeclampsia, the disease's pathogenesis process, and how the disease can be dealt with in a better way now than how it could have been dealt with before. This paper uses two conducted studies on preeclampsia. The first study is conducted by Fondjo and his team in 2019 about preeclampsia and its associated factors in pregnant women, and the results are to be tried if they can be a possible link to reduce the outcomes of the disease. The next study is one that He and his team conduct and their study try to summarize the common structural changes in the fundus in preeclampsia patients, and their study includes changes in the blood vessels, choroid, and the retina, and they also try to apply quantitative observation for chorioretinal alterations. Preeclampsia is sometimes associated with no symptoms during pregnancy, and sometimes the effects may be seen after the pregnancy. There grows a need to deal with the issue as it affects women and children in different ways.

This is an *open-access* article distributed under the terms of the [Creative Commons Attribution-Non Commercial-Share Alike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, and build upon the work non commercially.

**To Cite This Article:** Bukhari OF, Naaman NA, Bantan OI, Attar RH, Aloweiny FH, Alquzi RA, et al. Knowledge of Preeclampsia and its Associated Factors Among Pregnant Women. *Pharmacophore*. 2021;12(4):107-11. <https://doi.org/10.51847/iFh8Eq7TBi>

### Introduction

Hypertensive disorders are disorders that occur during pregnancies and are also called maternal hypertensive disorders. These disorders are categorized into four main categories. They include chronic hypertension, preeclampsia, eclampsia, and gestational hypertension. In pregnancy, hypertension is tested in different ways: urine tests, blood measurement, edema assessment, weight measurements, and liver and kidney function tests [1, 2]. Hypertensive disorders in pregnancy have some main causes, including obesity and overweight, lack of better nutrition, lack of enough body rest, and not having enough needed physical activity. All these causes the body to suppress too much of the deficiency that is not supposed to be there. Hypertensive disorders are the leading cause of complication in mothers and their unborn children who may be affected after their bath when not affected during birth. Dealing with hypertensive disorders remains a challenge but due to the improvement in today's technology, dealing with the diseases continues to ease each new day. This paper aims to study preeclampsia as a hypertensive medical disorder during pregnancy, the pathogenesis process of the disorder, the effects of the condition, and the various way that can be implemented to deal with the disease.

### Preeclampsia

Preeclampsia is a dangerous medical condition associated with pregnancy complications mainly characterized by high blood pressure in pregnant women. Preeclampsia may at many times begin after twenty weeks into pregnancy in a woman who may have had normal blood pressure but may have been exposed to the causative agents of the disease immediately, and they

**Corresponding Author:** Orjuwan Fuad Bukhari; Faculty of Medicine, Batterjy Medical College, Jeddah, KSA. E-mail: Orjuwan\_bk@hotmail.com.

conceived or during their pregnancy before the twenty weeks. Preeclampsia continues to be a leading cause of deaths of mothers and fetuses arising during pregnancies and may sometimes cause preterm deaths [3]. At times, the disease may have no symptoms during pregnancy and may sometimes lead to late diagnosis of it in pregnant mothers. Preeclampsia has been found to affect about 5 to 7% of all pregnant women and cause about 70000 maternal deaths and 500000 fetal deaths globally in the United States [4]. Key features of preeclampsia include high blood pressure in pregnant mothers, and sometimes there may be a diagnosis of high protein content in the mother's urine. Sometimes the legs of the expectant mother may swell, but this symptom may be hard to recognize and distinguish between a normal pregnancy. Some other common symptoms may include blurred vision, headaches, nausea, peripheral edema, and weight gain. There have been no results on the main cause of the disease, but it is mainly associated with problems arising from the placenta.

During pregnancy, various changes take place in the body of the mother. The main changes occur in the mother's productive parts, such as the growth and attachment of the placenta to the walls of the mother's uterus. The placentas are the organ that acts as a link between the mother and the child during pregnancy. The placenta facilitates how the fetus gets substances such as oxygen, nutrients and how the baby can excrete waste from their bodies. Preeclampsia affects the arteries that carry blood to the placenta, and if the placenta is not able to get enough blood, the baby may receive inadequate blood, oxygen, and nutrients which can lead to slow growth and other birth complications [5]. High blood pressure affects about 6 to 8% of pregnancies in women between the age of twenty and forty-four in the United States [6]. Healthy blood pressure for pregnant women should be less than 120/80 mm Hg. When the blood pressure readings become higher than this range, she is said to have high blood pressure. If a pregnant woman has a blood pressure of excess about and above 140/90 mm Hg and may have or lack protein in the urine, they may be affected by preeclampsia.

The pathogenesis process of preeclampsia is poorly understood as there is not much data on how the disease takes place in a mother's body. This inadequacy in data leads to a stage in which sometimes it becomes challenging to diagnose and deal with the disease. There have been recent discoveries on upregulated antiangiogenic factors that may have a better promise on future studies on how preeclampsia is tested and diagnosed to help predict the disease and the therapies and better treatments that can be formulated for the disease [7]. This means that there is still less Knowledge on preeclampsia that could help study the disease in a better way. Technological advancements are taking place in every sector, and these advancements seem to be making things easier for the sectors. In issues such as research, medicine making, disease diagnosis, and data storage are among the different uses that technological advancements have been incorporated into the medical sector. Thus, studying diseases and finding medications is becoming a more straightforward process that can be dealt with. The studies below were conducted on preeclampsia, and various methods were used and the different outcomes of the research done.

## Materials and Methods

The pathogenesis process of preeclampsia is poorly understood as there is not much data on how the disease takes place in a mother's body. This inadequacy in data leads to a stage in which sometimes it becomes challenging to diagnose and deal with the disease. There have been recent discoveries on upregulated antiangiogenic factors that may have a better promise on future studies on how preeclampsia is tested and diagnosed to help predict the disease and the therapies and better treatments that can be formulated for the disease [7]. This means that there is still less Knowledge on preeclampsia that could help study the disease in a better way. Technological advancements are taking place in every sector, and these advancements seem to be making things easier for the sectors. In issues such as research, medicine making, disease diagnosis, and data storage are among the different uses that technological advancements have been incorporated into the medical sector. Thus, studying diseases and finding medications is becoming a more straightforward process that can be dealt with. The studies below were conducted on preeclampsia, and various methods were used and the different outcomes of the research done.

The first main article of Fondjo and his team was obtained from Biomed Central (BMC) pregnancy and childbirth. We used this article because it discusses how preeclampsia is associated with pregnant women and some of the main outcomes. The second main article by He and his team was obtained from google scholar, and the reason we chose it is that it discusses some of the alterations that preeclampsia can cause.

The study is conducted by Fondjo and his team in 2019 about preeclampsia and its associated factors in pregnant women, and the results are to be tried if they can be a possible link to reduce the outcomes of the disease. The study was conducted at the antenatal care unit at Kwame Nkrumah University of science and technology (KNUST) hospital in Kumasi in Ghana. The size of the sample was calculated using the MedCalc statistical software version 18.9.1 (MedCalc software bvba, Ostend, Belgium). Three hundred fifty-one pregnant women were recruited for the study, although the minimum number required was supposed to be 186 [8]. Only pregnant women in critical condition were excluded from the study. The team used a closed-ended questionnaire to collect the socio-demographic information of preeclampsia [8]. The Knowledge on preeclampsia was assessed based on the questions on the awareness, signs and symptoms, risk factors, and complications associated with preeclampsia at the university. The responses were grouped in percentages, and the groups included low, which was below 60% (<60%), moderate, which was between 60 to 80 % (60-80%), and high which ranged between 80 to 100 % (80-100%). The knowledge score on the disease was rearranged into a percentage of the above low score (% score of  $\geq 60\%$ ), and inadequate Knowledge of preeclampsia was recorded in a percentage score below the low score (% score of <60%).

This other study is one that He and his team conduct. Their study tries to summarize the common structural changes in the fundus in preeclampsia patients, and their study includes changes in the blood vessels, choroid, and the retina, and they also

try to apply quantitative observation for chorioretinal alterations. Hypertension during pregnancy should not be underestimated as it easily leads to organ failure of parts such as the kidney, lungs, and brain [9]. This research is based on other researches from PubMed and the web of science database from 2000 to 2020. First, they study the anatomy and physiology of the fundus. Fundus in pregnancy is the measurement of the distance in centimeters from the pubic bone to the top of the uterus. The fundus is non-invasive and is most important when determining women that may be at risk during pregnancy [10]. Secondly, they study how preeclampsia causes changes in the fundus of pregnant women. Hypertension during pregnancy has been found to cause a shrinking effect on the capillaries flowing through the organs [9]. The following research used studies of vascular changes in the retina during pregnancy. Pregnancy can affect the pathways related to vision from the anterior segment to the visual cortex of expectant mothers [11]. Effects of hypertension on the retina can sometimes be a sign of preeclampsia in pregnant women [12]. The next research on this article is about hypersensitivity-choroidopathy and -retinopathy. Another research is on systematic rheumatic disease (SRD) and central serous chorioretinopathy (CSC) disorders related to pregnancy.

## Results and Discussion

Looking at the results from the first research by Fondjo and his team, the Knowledge about preeclampsia among many populations is low; specifically, it is lower among developing third world countries such as Ghana. The results are as follows: the prevalence rate of inadequate and adequate Knowledge on preeclampsia was 88.6% (mean score =  $55.5 \pm 4.3\%$ ) and 11.4% (mean score =  $76.3 \pm 5.9\%$ ), respectively. The participants found adequate Knowledge of preeclampsia was 9.1%, and 2.3 had moderate and high Knowledge of preeclampsia, respectively. Results from univariate logistic regression models showed that women older than 35 and having a higher level of education had a significant association with having more Knowledge on preeclampsia. In developing countries, higher education is associated more with higher socioeconomic status in society. Women with low educational levels have a higher risk of getting affected with gestational hypertension [13]. The level of education does affect the adequacy of Knowledge that women have on preeclampsia [9]. Learning about different issues is of central importance to the rapidly evolving information in society [14]. Education is thus important as it helps those who wish to learn more about some issues they need to know.

The results from the second research were as follows. During normal pregnancy, there are no physiological or visible changes in the fundus. But if a pregnant woman has preeclampsia, then there are significant changes that occur on the fundus. Fundus examination helps medical personnel assess how severe pregnancy-induced hypertension (PIH) can affect a pregnant mother [15]. Retinal, cerebral, and renal blood vessels are closely related, and the eye serves many at times as a tool for study on the state of brain vessels and other parts such as kidneys if there is a problem that relates to the parts [16]. Many pregnant patients with high blood pressure and are diagnosed with preeclampsia are found to have changed in the length of their fundus [17]. Hypertension in pregnancy affects capillaries that flow blood through the organs between the mother and the fetus, which is why preeclampsia is referred to as a vascular disorder [9]. Some of the changes that preeclampsia causes on retinal vascular parts include blurred vision, photopsia, diplopia, and sometimes may lead to blindness if the intensity is severe. This shows that there is a relevant relationship between preeclampsia and the retinal vascular organs of the body.

### *Treatment and Prevention of Preeclampsia and Associated Hypertension*

People with hypertension are mostly at times not advised to take part in doing heavy tasks. Hypertension at most times does not have symptoms that can be seen without there being a diagnosis done on the patient. This makes it challenges for one to know if they are suffering from the disease or not. If untreated in its early stages, hypertension may lead to health conditions such as heart disease and stroke. High blood pressure damages arteries that can become blocked, and blood flow does not accurately take place. Hypertension is the disease mostly associated with high morbidity and mortality cases globally, and due to having no symptoms, less than half of the patients with hypertension are aware of their condition [18]. In pregnancy, preeclampsia can cause placental abruption, poor fetal growth, preterm birth, damage to the kidneys, and stillbirth in rare cases, among other complications [19]. Hypertension is the most common medical problem during pregnancies found to affect 10% of pregnancies. To deal with this problem, there must be set and tested ways and known to deal with preeclampsia before it can affect more people.

Preeclampsia, just like other diseases, needs to be diagnosed and treated before it can cause harm to the patient. Bodies of pregnant women sometimes take long to adapt to the realization that the body might be sharing some things such as nutrients. Dealing with preeclampsia first needs people to know what the disease is and its effects on pregnant women. Although much may not be known, teaching the patients and other people that gestational hypertension is associated with features of metabolic syndrome, which later leads to hypertension and other cardiovascular disease and that the conditions have similar pathological mechanisms [13] can be the first step to helping people know what the disease is and this may make them want to know more. Providing education for women suspected to have preeclampsia can increase Knowledge and reduce the anxiety that may be there if they realize they have it, but they do not know about it [20]. Thus, patient education is the first strategy for dealing with preeclampsia. When the same women know preeclampsia, they may go for checkups when they feel an abnormal way, which often helps through the process as it leads to things like early diagnosis and prevention.

The second way that preeclampsia can be dealt with is through different types of medications that are there. Focusing on improving antenatal management of preeclampsia helps develop accurate predictions that may help identify women that are highly at risk of the disease [21]. Pharmacological treatment is the treatment of disease using medication. Low-dose aspirin is

a more effective pharmacological therapy administered for preeclampsia [22]. Sometimes, pregnant women are asked to take antioxidants, anti-inflammatory or vasoactive properties, and micronutrients that can be good for preeclampsia prevention. Women with low calcium intake are advised to take in more calcium supplementation. Sometimes if a pregnant woman is affected by the disease, they may not give birth normally. For this, cesarean birth is advised as through it, and more complications are easily avoided. Some of the complications associated with a normal birth include being at risk of seizures during the mid-birth process, placental abruption may occur when least expected and planned for, stroke, and sometimes bleeding. Thus, it is better if the birth process is done through surgery.

### Conclusion

Preeclampsia is a problem that continues to ravage the medical world. The rate at which it affects women has been high since the past, and the effects it has been having are high. More study on the disease ensures more knowledge of the disease, and people can understand more of its effects. Through more Knowledge, people can create ways they can use to deal with this disease. Technology has been at the forefront to try and ease everything, and the same technology has enhanced better research on preeclampsia, and through it, medicines have been produced that prove to be more effective than before. Through the same technology, diagnosis of the disease has also become an easier process to deal with.

**Acknowledgments:** None

**Conflict of interest:** None

**Financial support:** None

**Ethics statement:** None

### References

1. Sargazi M, Taghian F. The Effect of Royal Jelly and Exercise on Liver Enzymes in Addicts. *Arch Pharm Pract.* 2020;11(2):96-101.
2. Almutairi NM, Alzaidi SA, Alotaibi SM, Alsharari AM, Alsaleh AI, Alotaibi SS, et al. Liver Trauma Diagnosis and Surgical Management. *Int J Pharm Res Allied Sci.* 2020;9(1):70-4.
3. National Institute of Health (NIH). Leading progress in preeclampsia research. National Institute of Child Health and Human Development. Available from: <https://www.nichd.nih.gov/newsroom/news/051619-maternal-health-research-advances/slide6>
4. Rana S, Lemoine E, Granger JP, Karumanchi SA. Pathophysiology, challenges, and perspectives. *Circ Res.* 2019;124(7):1094-112. doi:10.1161/CIRCRESAHA.118.313276
5. Mayo Clinic. Preeclampsia. Diseases and Conditions. 2021. Available from: <https://www.mayoclinic.org/diseases-conditions/preeclampsia/symptoms-causes/syc-20355745#:~:text=Preeclampsia%20affects%20the%20arteries%20carrying,Preterm%20birth>
6. Ernst H, Eske J. What to know about high blood pressure during pregnancy? *Medical News Today.* 2019. Available from: <https://www.medicalnewstoday.com/articles/323969>
7. Young BC, Levine RJ, Karumanchi SA. Pathogenesis of Preeclampsia. *Annu Rev Pathol.* 2010;5:173-92. Available from: <https://svmi.web.ve/wh/intertips/REVISION-PREECLAMPSIA.pdf>
8. Fondjo AL, Boamah EV, Fierti A, Gyesi D, Owiredu E. Knowledge of preeclampsia and its associated factors among pregnant women: a possible link to reduce related adverse outcomes. *BMC Pregnancy Childbirth.* 2019;19(456):1-7. doi:10.1186/s12884-019-2623-x
9. He X, Ji Y, Yu M, Tong Y. Chorioretinal alterations induced by preeclampsia. *J Ophthalmol.* 2021. Available from: <https://www.hindawi.com/journals/joph/2021/8847001/>
10. Pay ASD, Wiik J, Backe B. Symphysis-fundus height measurement to predict small-for-gestational-age status at birth: a systematic review. *BMC Pregnancy Childbirth.* 2015;15(22):1. doi:10.1186/s12884-015-0461-z
11. Eugene W, Waite K, Bennett M. Retina pearls: retinal manifestations of preeclampsia. *Retin Today.* 2010. Available from: <https://retinatoday.com/articles/2010-sept/retina-pearls-retinal-manifestations-of-preeclampsia?c4src=issue:feed>
12. Mackensen F, Paulus WE, Max R, Ness T. Ocular changes during pregnancy. *Deutsch Arztebl Int.* 2014;111(33-34):567. doi:10.3238/arztebl.2014.0567
13. Silva L, Coolman M, Steegers E, Jaddoe V, Moll H, Hofman A, et al. Maternal educational level and risk of gestational hypertension: The Generation R Study. *J Hum Hypertens.* 2008;22(7):483. doi:10.1038/jhh.2008.22
14. UNESCO Institute for Information Technology in Education (IITE). Education and Knowledge societies: Round Table Discussions. World Summit on the Information Society (WSIS). 2003. Available from: <https://iite.unesco.org/pics/publications/en/files/3214630.pdf>

15. Reddy SC, Nalliah S, George S, Who TS. Fundus changes in pregnancy-induced hypertension. *Int J Ophthalmol.* 2012;5(6):694. doi:10.3980/j.issn.2222-3959.2012.06.08
16. Mithila R, Datti NP, Gomathy E, Krishnamurthy D. Study of association of fundal changes and fetal outcomes in preeclampsia. *J Evol Med Dent Sci.* 2014;3(21):5894-902. Available from: <https://www.thefreelibrary.com/Study+of+association+of+fundal+changes+and+fetal+outcomes+in...-a0467680578>
17. Krishnakumar S, Chatterjee P. Fundus changes in preeclampsia. *J Evol Med Dent Sci.* 2016;5(36):2159-63. doi:10.14260/jemds/2016/503
18. Oparil S, Acelajado MC, Bakris GL, Berlowitz DR, Cifková R, Dominiczak AF, et al. Hypertension. *Nat Rev Dis Primers.* 2018;4:18014. doi:10.1038/nrdp.2018.14
19. MedlinePlus. High blood pressure in pregnancy. U.S National Library of Medicine. 2018. Available from: <https://medlineplus.gov/highbloodpressureinpregnancy.html#:~:text=Gestational%20hypertension%20is%20high%20blood,within%2012%20weeks%20after%20childbirth>.
20. Sauve N, Powrie RO, Larson L, Phipps MG, Weitzen S, Fitzpatrick D, et al. The impact of an educational pamphlet on Knowledge and anxiety in women with preeclampsia. *Obstet Med.* 2008;1(1):11. doi:10.1258/om.2008.070001
21. Duhig K, Vandermolen B, Shennan A. Recent advances in the diagnosis and management of preeclampsia. *F1000Research.* 2018;7:242. doi:10.12688/f1000research.12249.1
22. Peres GM, Mariana M, Cairrão E. Pre-Eclampsia and Eclampsia: An Update on the Pharmacological Treatment Applied in Portugal. *J Cardiovasc Dev Dis.* 2018;5(1):6. doi:10.3390/jcdd5010003