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Stress Levels and Pre-Eclampsia in Pregnancy

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Abstract:
Tangerang City Hospital still has cases of preeclampsia where in 2022 there will be 5% of preeclampsia cases. Several factors are associated with the incidence of preeclampsia in pregnant women including maternal age, parity, history of hypertension, history of DM, and stress level. This study aimed to determine the relationship between stress levels and the incidence of preeclampsia in pregnant women at Tangerang City Hospital in 2023. This study is an observational analytic study with a case-control design. The population is all pregnant women aged ≥ 20 weeks who visited the RSUD Kota Tangerang during the study. A purposive sampling technique was used to enroll the sample. The research instrument used is the DASS 42 questionnaire to assess stress levels. The relationship between stress levels and pre-eclampsia was analyzed by the chi-square test. The results of the univariate study showed that the majority of pregnant women with normal stress levels (50%) had mild stress (19.4%), moderate stress (14.5%), severe stress (13.9%), and very severe stress (1.9%). The results of the bivariate study showed that there was a significant relationship between stress levels in pregnant women ≥ 20 weeks gestation (p = 0.000) and the incidence of preeclampsia. Pregnant women with mild stress levels are at risk of preeclampsia with an OR of 4.7. It is hoped that pregnant women who experience stress in their pregnancies can accompanied by their families during their pregnancy so that they can reduce the risk of preeclampsia.

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INTRODUCTION

Pregnancy is a natural development in which a woman stores and nurtures a developing embryo in her uterus for about nine months (Cha, Sun & Dey, 2012). This process begins with the fertilization of the egg by sperm, followed by the attachment of the fertilized egg to the lining of the uterus, which ultimately leads to the formation of a fetus. The entire duration of pregnancy lasts 40 weeks and is divided into three trimesters, namely: The initial trimester (0-13 weeks) is characterized by the complicated development of the baby's body structure and organ systems. This phase is associated with a higher chance of miscarriage and congenital abnormalities. The next trimester (14-26 weeks) marks a period of accelerated fetal growth and advancement. The final trimester (27-40 weeks) marks the stage of organ maturation and continued fetal development (Kementerian Kesehatan RI, 2019). The majority of pregnancies usually proceed without complications until the delivery phase. However, there are several conditions that can cause problems, one of which is health problems that pregnant women are susceptible to and which often pose a risk to the well-being of the mother and baby.

Preeclampsia is a number of symptoms that arise in pregnant, childbirth and postpartum women which are characterized by hypertension, edema and increased protein uria. Preeclampsia

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usually occurs when the pregnancy enters 20 weeks until 48 hours after delivery. Preeclampsia is one of the factors causing maternal mortality. One of the health problems of preeclampsia that often arises is high blood pressure, namely a diastolic increase of ≥ 15 mmHg or a systolic increase of ≥ 30 mmHg (Pusparini et al., 2021). Preeclampsia is characterized by an increase in blood pressure after 20 (twenty) weeks of gestation, proteinuria and generalized edema (Ayuni et al., 2023). Premature birth is one of the complications that can occur in pregnant women with preeclampsia, where premature birth is a cause of morbidity and death in babies (Komariah et al., 2023).

Stress is a multifaceted concept that involves external events, individual reactions, and the assessment of coping resources (Beasley, Thompson & Davidson, 2003; Norbeck & Anderson, 1989). Long-term stress can lead to poor mental health, depression, anxiety and sleep problems (Kurniyawan et al., 2023). Stress can escalate into depression if it is not treated immediately, this can worsen and lead to mental disorders (Agustin et al., 2022).This hybrid view recognizes the dynamic interplay between external stressors and internal factors, including an individual's cognitive appraisal and coping mechanisms. Understanding stress from this holistic perspective can inform strategies for coping, resilience, and interventions aimed at managing stress and its potential impact on physical and mental well-being.

The high maternal mortality rate due to preeclampsia highlights the urgency of the need for treatment to prevent further complications. Efforts to prevent preeclampsia involve regular antenatal check-ups, maintaining an ideal body weight, avoiding smoking and alcohol, exercising regularly, maintaining normal blood sugar levels, reducing salt consumption, and managing stress. In treating preeclampsia, anticonvulsant therapy (such as MgSO4) and antihypertensive drugs (such as nifedipine, methyldopa) are used (Kementerian Kesehatan RI, 2019). Early diagnosis of preeclampsia has important significance to ensure appropriate and immediate treatment. In a preliminary study conducted by researchers by observing medical records and patient records at Tangerang City Regional Hospital during 2022, a total of 664 patients were recorded from May 2022 to December 2022. Of this number, there were 104 patients (16%) diagnosed with preeclampsia and 30 patients (5%) with hypertension during pregnancy. This data was obtained from the preliminary study. Based on the description above, researchers are interested in conducting research on "The Relationship between Stress Levels and the Incidence of Preeclampsia in Pregnant Women at the Tangerang City Regional General Hospital in 2023".

METHOD

The design of this study is a case-control study. The population is all pregnant women in the second trimester and >= 20-week gestation who visited RSUD Kota Tangerang during July and August 2023 which consisted of 198 pregnant women. 54 women were enrolled in the case group and 54 women were enrolled in the control group. The study setting is at RSUD Kota Tangerang. The independent variables are stress levels and dependent variable is the incidence of Pre-Eclampsia. The instrument used in this study was DASS (Depression Anxiety Stress Scale 42) to measure stress levels. As the existing instrument, it has been tested the validity and reliability. The study has gained ethical approval from Uhamka Research Ethic Committee (No. 182/23.11/01982).

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RESULT

Table 1. The Relationship of stress level and pre-eclampsia

Stress Levels	Case group		Control group		p-value
	Frequency	Percentage	Frequency	Percentage	
Normal	10	18.5	44	81.5	0.005
Mild	16	29.6	5	9.3	
Moderate	14	25.9	2	3.7	
Severe	12	22.2	3	5.6	
Very severe	2	3.7	0	0	
Total	54	100	54	100	

Table 1 shows that out of 54 women in the case group, most experienced mild stress levels (29.6%). Out of 54 women in the control group, majority of them did not experienced stress (54%). The bivariate analysis shows that the p value is .005 which means that there is a significant relationship between stress levels and pre-eclampsia among pregnant women.

DISCUSSION

Preeclampsia is a hypertensive condition that occurs during pregnancy, characterized by blood pressure that reaches or exceeds 140/90 mmHg after 20 weeks of gestation, as well as proteinuria of ≥ 300 mg/24 hours. Preeclampsia can arise when there is a disturbance in the development and function of the placenta which results in narrowing of the blood vessels. This condition leads to decreased blood flow, causes a decrease in placental prostaglandin production and causes uterine ischemia.

Ease of trophoblastic material, which results from fat hyperoxidation and renin release in the uterus. This trophoblastic material triggers a condition called endotheliosis, which in turn causes the release of thromboplastin. Thromboplastin release contributes to thromboxane release and activation of platelet aggregation and fibrin deposition. The release of thromboxane also plays a role in causing vasospasm, which in turn can increase blood pressure (Tutik, 2019).

According to the results of research conducted by Ningsih (2018) in a study entitled "The Relationship between Stress Levels and the Incident of Hypertension in Pregnant Women at Muntilan Regional Hospital," it was found that out of a total of 32 respondents from pregnant women, 28 respondents (87.5%) had hypertension. Most of these conditions are triggered by the high levels of stress experienced by pregnant women. This finding is in line with research conducted by Apriliyanti (2022), which showed a relationship between stress levels and the incidence of preeclampsia. When a person experiences stress, the hypothalamus will be activated and release a series of biochemical reactions to restrain the release of adrenaline and non-adrenaline into the system, followed by the hormone cortisol.

As a result, pregnant women's bodies become more susceptible to various diseases and disorders, including preeclampsia. If stressful conditions persist for a long period of time, the body will continue to be in a psychologically active state with excessive adrenaline and cortisol. The impact of this is an increased risk of preeclampsia in pregnant women who experience chronic stress.

Stress is a risk factor for preeclampsia. Stress triggers preeclampsia through several mechanisms, where stress activates the hypothalamus which then triggers a series of biochemical reactions, including the release of adrenaline and non-adrenaline into the system, followed by the hormone cortisol. If stress persists for a long period of time, the body remains in an active

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psychological state with stress hormones such as adrenaline and cortisol in excess. This increase in cortisol levels can weaken the immune system, making pregnant women's bodies more susceptible to diseases and disorders, including preeclampsia. Thus, pregnant women who experience stress tend to have a higher risk of experiencing preeclampsia. Furthermore, women who have experienced preeclampsia in a previous pregnancy are at a higher risk of encountering preeclampsia again in subsequent pregnancies (Hnat et al., 2002; Vollebregt et al., 2008). Additionally, it indicates that these women may also face increased rates of adverse perinatal outcomes, particularly those related to preterm delivery caused by preeclampsia.

Previous study found a significant correlation between high psychosocial stress and chronic hypertension, highlighting that when these two factors are present together, the risk of developing preeclampsia increases substantially, up to 20 times (Yu et al., 2013). Preeclampsia is a condition that can occur during pregnancy and is characterized by high blood pressure and damage to other organs, typically the liver and kidneys. It is a serious and potentially life-threatening condition for both the mother and the baby. The implication of this finding is that addressing chronic hypertension alone may not be sufficient in preventing preeclampsia. Efforts should also be directed towards identifying and managing psychosocial stress in pregnant women, especially those with pre-existing chronic hypertension. This holistic approach involves a combination of preventive measures, screening protocols, and management strategies.

Preventing and managing chronic hypertension is crucial, and steps should be taken to monitor and control blood pressure during pregnancy (Malakoti, Sehhati, Mirghadourvand & Nahangi, 2015). Additionally, efforts to reduce psychosocial stress can include counseling, support services, and lifestyle interventions. By addressing both factors simultaneously, healthcare providers may be better equipped to reduce the risk of preeclampsia and improve overall maternal and fetal health outcomes. It's important to note that individual medical situations can vary, and decisions about prevention and management should be made in consultation with healthcare professionals based on the specific circumstances of each pregnant woman.

In the context of prevention, the recommendation proposed is to promote health to pregnant women and their families. The aim is to ensure that the family supports the mother's pregnancy by providing support and attention, so that the pregnant mother feels appreciated and cared for by her environment. This support from the family can help pregnant women avoid preeclampsia. Apart from that, families can also play a role in helping pregnant women maintain their health by arranging healthy eating patterns, exercising together, accompanying pregnant women when checking their blood pressure, and providing emotional support. All of this can increase pregnant women's self-confidence, maintain the health of their pregnancy, and reduce the risk of preeclampsia.

CONCLUSION

Pregnant women who experience preeclampsia need special attention. This is because if preeclampsia is not treated properly, it can develop into eclampsia which endangers the lives of the mother and fetus. Therefore, prevention recommendations are given, including health promotion for pregnant women and their families to better understand the danger signs of pregnancy, care more about pregnancy and their own health, and involve the family in an active role during pregnancy. In addition, preventive measures can involve early identification of pregnant women who are at high risk, especially those who have a history of preeclampsia, so that appropriate treatment can be carried out early to prevent the condition from becoming more serious.

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CONFLICT OF INTEREST

There was no conflict of interest while conducting this study.

REFERENCES

Agustin, N. L., Kurniyawan, E. H., Kusumaningsih, A., & Deviantony, F. (2022). The Effectiveness of Occupational Therapy: Drawing on Mrs. "K" on The Ability to Control Auditory Hallucinations in The Flamboyant Room Dr. RSJ. Radjiman Wediodiningrat Lawang. *D'Nursing and Health Journal (DNHJ), 3*(2), 1–11. https://doi.org/10.61595/dnursing.v3i2.423

Apriliyanti, E. (2023). Hubungan Riwayat Preeklampsia, Pemeriksaan Antenatal Dan Tingkat Stres Dengan Kejadian Preeklampsia Berta Pada Ibu Hamil Di Desa Permis Tahun 2022. *Ejournal.nusantaraglobal.ac.id., 2*(4).

Ayuni, Homsiatur Rohmatin, & Agustina Widayati. (2023). Effect of Breathing Relaxation Techniques on Changes in Blood Pressure among Pregnant Women with Pre-Eclampsia. *Health and Technology Journal (HTechJ), 1*(2), 165–171. https://doi.org/10.53713/htechj.v1i2.24

Beasley, M., Thompson, T., & Davidson, J. (2003). Resilience in response to life stress: the effects of coping style and cognitive hardiness. *Personality and Individual differences, 34*(1), 77-95.

Cha, J., Sun, X., & Dey, S. K. (2012). Mechanisms of implantation: strategies for successful pregnancy. *Nature medicine, 18*(12), 1754-1767.

Hnat, M. D., Sibai, B. M., Caritis, S., Hauth, J., Lindheimer, M. D., MacPherson, C., ... & Dombrowski, M. (2002). Perinatal outcome in women with recurrent preeclampsia compared with women who develop preeclampsia as nulliparas. *American journal of obstetrics and gynecology, 186*(3), 422-426.

Kementerian Kesehatan RI. (2019). *Pedoman Pelayanan Antenatal Terpadu.* Kementerian Kesehatan RI.

Komariah, A., Sunanto, & Iis Hanifah. (2023). The Relationship between Preeclampsia and Premature Incidence Rates. *Health and Technology Journal (HTechJ), 1*(1), 57–62. https://doi.org/10.53713/htechj.v1i1.8

Kurniyawan, E. H., Cahyani, P. S. R., Khoiriyah, A. A., Purnomo, F. K. A., Afandi, A. T., Kurniawan, D. E., & Nur, K. R. M. (2023). Coping Mechanisms Used by Farmers to Encounter Psychosocial Problems: Literature Review. *Health and Technology Journal (HTechJ), 1*(4), 445–454. https://doi.org/10.53713/htechj.v1i4.84

Malakouti, J., Sehhati, F., Mirghafourvand, M., & Nahangi, R. (2015). Relationship between health promoting lifestyle and perceived stress in pregnant women with preeclampsia. *Journal of caring sciences, 4*(2), 155.

Ningsih, R. R., Pratiwi, M. L. E., & ST, S. (2017). Hubungan Tingkat Stress denganHipertensi pada Ibu Hamil di RSUD Muntilan (Doctoral dissertation, Universitas' Aisyiyah Yogyakarta).

Norbeck, J. S., & Anderson, N. J. (1989). Life stress, social support, and anxiety in mid-and late-pregnancy among low-income women. *Research in nursing & health, 12*(5), 281-287.

Pongmanda, P., &Yulita, H. (2018). Hubungan Status Gizi Dan Stress DenganKejadianHipertensi Pada Ibu Hamil Di Wilayah KerjaPuskesmas Lepo-Lepo Kota Kendari Tahun 2018 (Doctoral dissertation, PoltekkesKemenkes Kendari).

Volume 02 Number 01
February 2024
p-ISSN: 2986-5662
e-ISSN: 2985-959X

Pusparini, D., Kurniawati, D., & Kurniyawan, E. (2021). Hubungan Tingkat Stres dengan Kualitas Tidur pada Ibu Preeklamsi di Wilayah Kerja Puskesmas Tempurejo-Jember. *Pustaka Kesehatan, 9*(1), 16-24. doi:10.19184/pk.v9i1.16139

Tutik. (2019). *Deteksi Dini Preeklampsia dengan Antenatal Care.* Yayasan Ahmar Cendekia Indonesia.

Vollebregt, K. C., Van Der Wal, M. F., Wolf, H., Vrijkotte, T. G., Boer, K., & Bonsel, G. J. (2008). Is psychosocial stress in first ongoing pregnancies associated with pre-eclampsia and gestational hypertension?. *BJOG: An International Journal of Obstetrics & Gynaecology, 115*(5), 607-615.

Yu, Yunxian, Shanchun Zhang, Guoying Wang, Xiumei Hong, Eric B. Mallow, Sheila O. Walker, Colleen Pearson, Linda Heffner, Barry Zuckerman, and Xiaobin Wang. (2013). The combined association of psychosocial stress and chronic hypertension with preeclampsia. *American journal of obstetrics and gynecology,* 209(5), 438-e1.