

ANALYSIS OF RELATIONSHIP GESTATIONAL DIABETES MELLITUS WITH NEWBORN BABY WEIGHT AND LENGTH

Enda Silvia Putri¹, Marniati², Khairunnas³, Sufyan Anwar⁴, Itza Mulyani⁵, Siti Maisyarah Fitri Siregar⁶, Sukma Elida⁷, Suci Eka Putri⁸, Ernawati⁹, Arfriani Maifizar¹⁰

^{1,2,3,4,5,6,7,8,9}Faculty of Public Health, Universitas Teuku Umar

¹⁰Faculty of Social and Politic Science, Universitas Teuku Umar

Cooresponding author: endasilviaputri@utu.ac.id

Abstract

Gestational Diabetes Mellitus (GDM), was a condition in which pregnant women experience higher blood sugar levels than usual. This can affect the development of the fetus and the health of the newborn. The purpose of the reasearch was to analyze the gestational relationship of diabetes mellitus with the newborn's weight and height. The research method uses a quantitative method with cross sectional design, the sample represents a total population of 126 people, data analysis using a chi square test using the application of SPSS 21.0. The results of the study show that there was a relationship between GDM and weight with values (P Value =1,00 \geq α :0,05 and RP = 1,00) and the length of the newborn with value (P value =0,695 \geq alpha :0,05, RP = 2,00). An abnormal blood sugar level in the mother during pregnancy affects the nutrition received by the fetus so affecting the length of the baby. Important advice for mothers at the time of pregnancies to observe blood sugar levels at normal levels by paying attention to nutrition intake and stress management through regular consultation with the nearest health officials and health services on a regular basis during the pregnant, so that the baby is born healthy especially the length of the body.

Keywords: *Gestational Diabetes Mellitus, Baby, Weight, Length*

1. INTRODUCTION

Gestational Diabetes Mellitus (GDM) was one of the increasingly prevalent global health problems. This condition not only affects the individual suffering, but can also affect the development of the newborn's health. One important aspect to note was the relationship between DM during pregnancy and the weight and height of the newborn. (IDF,2020., WHO, 2023., PERKENI, 2021.). Pregnancy DM, known as gestational diabetes (GDM), was a condition in which pregnant women experience higher than normal blood sugar levels. During pregnancy, the fetus gets nutrition from the mother through the placenta, and therefore, uncontrolled blood sugar levels in the mother can affect fetal growth. (IDF,2020., WHO, 2023). The growth and development of the fetus during pregnancy was heavily influenced by a variety of factors, including the nutrition received by the foetus through the mother. Uncontrolled blood sugar levels in mothers with GDM can cause the fetus to receive excess nutrition, which can lead to overgrowth and weight gain at birth. On the other hand, GDM may also inhibit fetal growth, because the baby's body may not be able to process glucose properly. (Lei, 2022, dan Sweeting, 2022).

The weight of the newborn was an important indicator of the fetal health during pregnancy. Babies born with low body weight (LBW) have a higher risk of developing a variety of health problems, including respiratory disorders, infections, and even neonatal deaths. Therefore, it was important to understand the relationship between GDM and BBLR (Harahap, 2020). In addition, the height of the newborn was also a relevant factor in evaluating the growth of the fetus. Less than the standard height can be an indication of growth problems during pregnancy. If GDM has a negative impact on fetal growth, then the baby's height may also be affected.

A number of previous studies have attempted to explain the relationship between GDM, the newborn's weight, and the height of a newborn. Although the results vary, many studies suggest that GDM can increase the risk of BBLR. Some studies also show a link between the GDM and the low newborns' height. (Safitri, 2022). For example, a study conducted by (Teshome, 2021) found that before pregnancy body mass index (BMI), gestational weight gain (GWG) and GDM are all associated with fetal growth and birth results. GDM effects decrease after adjusting BMI and GWG prior to pregnancies. Early examination and management of GDM, preventing excessive GWG can help protect the GDM mother's fetus from adverse births.

2. RESEARCH METHOD

The research method was quantitative with cross sectional design, the sample of the research represents the total population of the 4 research locus villages (kude tanjong, pungkie, puuk, and tangjong bunggong) in Kaway XVI district, West Aceh district. Purposive sampling. As for the subjects of the study, newborn babies were 126 samples from 123 mothers. The analysis of this study uses univariate and bivariate analysis, on the bivariat analysis using the chi square test. The tool used in this analysis was SPSS 21.0.

3. RESULTS AND DISCUSSION

As for the results of the study, we can read in Table 1 and Table 2:

Table 1. Relationship of incidence of gestational diabetes mellitus (GDM) with body weight (BW) of baby

GDM/BW	Yes		No		Total		P Value 1,000	RP 1
	n	f	n	F	n	f		
Risk	1	5%	19	95%	20	100%		
Not Risk	5	4,7%	101	95,3	106	100%		
Total	6	4,8%	120	95,2%	126	100%		

Interpretation of the results of the chi square test analysis suggests that there is no sufficiently significant relationship between GDM and BB born baby and no risk. P Value > 0.05 (1,000) and RP=1. This may be due to the small and non-heterogeneous samples, and also because researchers did not directly measure blood sugar levels of mothers during pregnancy and did not measure the baby's weight at birth. Data collection is based only on mother's memory, so there could be errors. Some studies indicate that DM during pregnancy affects the fetus such as deficiency of Janis's nutritious pad can even cause premature birth, low birth weight, up to death at birth. (Ye, 2022).

Table 2. Relationship of incidence of gestational diabetes mellitus (GDM) with body length of baby

GDM/BL	Yes		No		Total		P Value 0,695	RP 2
	n	f	n	F	n	f		
Risk	3	5,7%	50	94,3%	53	100%		
Not Risk	3	4,1%	70	95,9%	73	100%		
Total	6	4,8%	120	100%	126	100%		

Interpretations of the chi square test results show that there was no significant relationship between GDM and the birth length of the baby, but at risk mothers with gestational diabetes have a risk of two times that the baby was born with an abnormal length compared to mothers who do not have gestational diabetic. P Value > 0.05 (0.695) and RP= 2. This may be due to the shorter and non-heterogeneous samples, and it may also be because the researchers indirectly measured the blood sugar levels of the mother during pregnancy and indirect to the length of the baby at birth.

Data collection is based only on mother's memory, so there could be errors. Other researchers found that mothers who had abnormal weight and uncontrolled blood sugar levels or were diagnosed with gestational diabetes affected fetal growth such as fetal weight and length. (Kawasaki, 2023, dan Bhattacharya, 2021).

4. CONCLUSION

Although this study does not show significant results between GDM and BB and baby body length at birth, however, in the measure of risk associated with GDM with baby PB $RP=2$, which means gestational diabetes has a 2 times risk of the baby born with abnormal length of body compared to a mother who does not have gestational diabetic, it was still necessary to be careful noting many studies that indicate the danger of GDM at the time of pregnancy to the growth and development of the fetus and baby. It is necessary to perform routine screening of pregnant mothers in each semester of pregnancy, especially blood sugar measurement as a determining factor and further preventive measurements.

REFERENCES

Buku

- Bhattacharya ,Saptarshi., Kalra , Bharti., Nagendra, Lakshmi., Krishnamurthy, Aishwarya., Lakhani, Om J., Kapoor, Nitin. and Kalra,Sanjay., 2021. Review :Early Gestational Diabetes Mellitus: Diagnostic Strategies and Clinical Implications, *Medical Science (Med. Sci.)*, 2021, 9, 59. <https://doi.org/10.3390/medsci9040059>, <https://www.mdpi.com/journal/medsci>
- Harahap, Nia Adelina., 2020. Hubungan Kadar Gula Darah Ibu Hamil Trimester III dengan Berat Badan Bayi Baru Lahir. Artikel Politeknik Kesehatan Kemenkes RI.
- International Diabetes Federation (IDF), 2020. Gestational Diabetes, Brussels (Belgium): IDF
- Kawasaki,Maki., Arata, Naoko., Sugiyama, Takashi., Moriya, Tatsumi., Itakura, Atsuo., Yasuhi, Ichiro., Uchigata, Yasuko., Kawasaki, Eiji., Sone, Hirohito., Hiramatsu, Yuji., 2023. Risk of fetal undergrowth in the management of gestational diabetes mellitus in Japan. *Journal of Diabetes Investigation (J Diabetes Investig)* 2023; 14: 614–622, doi: 10.1111/jdi.13977
- Khairani, Misykah., 2018. Hubungan Kadar Gula Darah dan Hemoglobin pada ibu hamil dengan berat badan bayi baru lahir di klinik bersalin pratama jannah dan nurhalma medan tembung tahun 2018
- Lei, J., Zhao, M., Li, L., Ji, B., Xu, T., Sun, M., Chen, J., Qiu, J., Gao, Q., 2022. Research progress of placental vascular pathophysiological changes in pregnancy-induced hypertension and gestational diabetes mellitus. *Front. Physiol.* 13:954636. doi: 10.3389/fphys.2022.954636
- Perkumpulan Endokrinologi Indonesia (PERKENI), 2021. Pedoman Pengelolaan dan Pencegahan Diabetes Melitus Tipe 2 di Indonesia 2021, Jakarta : Perkeni
- Sweeting, Arianne., Wong, Jencia., Murphy, Helen R., Ross, Glynis P., 2022. A Clinical Update on Gestational Diabetes Mellitus, *PMC Endocr Rev.* 2022 Oct; 43(5): 763–793. Published online 2022 Jan 18. doi: 10.1210/endrev/bnac003: 10.1210/endrev/bnac003. PMID: PMC9512153. PMID: 35041752
- Safitri, Nimas Pristiwanto Dwi., Siahaan, Salmon Charles P. T., 2022. Hubungan Diabetes Melitus Gestasional dengan Preeklamsia dan Luaran Neonatal di Rumah Sakit Kristen Mojowarno, *NJM*, Vol 8, No 1, 2022, E-ISSN 2686-2565
- Teshome, Anissa Abebe., Li, Qian., Garoma, Wondu., Chen, Xi., Wu, Meng., Zhang, Yu., Zhang, Xu., Lin, Lixia., Wang, Huanzhuo., Yang, Xuefeng., Hao, Liping., Sun, Guoqiang., Han, Weizhen., Chen , Xinlin., Xiong, Guoping., Yang, Nianhong., 2021. Gestational diabetes mellitus, pre-pregnancy body mass index and gestational weight gain predicts fetal growth

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and neonatal outcomes, *Clinical Nutrition ESPEN*, Volume 42, April 2021, Pages 307-312. Publisher Elsevier. <https://doi.org/10.1016/j.clnesp.2021.01.016>

World Health Organization (WHO), 2023. *Diabetes*, Geneva (Switzerland) : WHO

Ye, Wenrui., Luo, Cong., Huang, Jing., Li, Chenglong., Liu, Zhixiong., Liu, Fangkun, 2022. Gestational diabetes mellitus and adverse pregnancy outcomes: systematic review and meta-analysis, *PMC, BMJ*. 2022; 377: e067946. Published online 2022 May 25. doi: 10.1136/bmj-2021-067946: 10.1136/bmj-2021-067946. PMCID: PMC9131781. PMID: 35613728