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RELATIONSHIP BETWEEN BODY MASS INDEX LEVELS AND THE GRADES OF HYPEREMESIS GRAVIDARUM IN TORA BELO REGIONAL HOSPITAL, SIGI REGENCY

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ABSTRACT

Hyperemesis Gravidarum (HG) is a condition of severe nausea and vomiting in pregnant women which has many negative impacts, including economic losses due to treatment costs, the threat of maternal and fetal safety, also adverse pregnancy outcomes such as Chronic Energy Deficiency (CED), the birth of Low Birth Weight (LBW), to stunting. The risk factors for HG are multifactorial, with one modifiable risk factor is Body Mass Index (BMI) levels. Quantitative research with analytic observational design and cross-sectional approach, analyzed using Somers' d test. Result shows data from 63 patients, the majority had an underweight (44.4%). The grades of HG in the sample there are 2 types, namely grade 1 and grade 2, with 93.7% of patients are in grade 2. Somers' d test showed a significant relationship between BMI levels and the grades of HG with a value of $p = 0.049$ ($p < 0.05$). The correlation obtained was a negative correlation ($r=-0.201$). The relationship was also supported by additional data that the most HG patients who has positive ketonuria, abnormal heart rate, and blood pressure, were patients with underweight. Most patients were young adults (88.9%), with multigravida (44.4%) and primipara (36.5%). Most patients had never an abortion (76.2%). In conclusions: There is a significant negative correlation between BMI levels and the grades of HG**,** namely that the lower the patient's BMI level, the more severe the grades of HG.
Keywords: Hyperemesis Gravidarum, Body Mass Index, Gravida, Parity, Abortion History, Ketonuria, Blood Pressure, Heart Rate.

ABSTRAK

Hiperemesis Gravidarum (HG) merupakan kondisi mual dan muntah hebat pada ibu hamil yang memiliki banyak dampak negatif, antara lain kerugian ekonomi akibat biaya pengobatan, ancaman terhadap keselamatan ibu dan janin, serta luaran kehamilan yang tidak diharapkan seperti Kekurangan Energi Kronis (KEK), kelahiran Berat Badan Lahir Rendah (BBLR), hingga stunting. Faktor risiko HG bersifat multifaktorial, dengan salah satu faktor risiko yang dapat dimodifikasi adalah kadar Indeks Massa Tubuh (IMT). Penelitian kuantitatif dengan desain observasional analitik dan pendekatan cross-sectional, dianalisis menggunakan uji Somers' d. Hasil penelitian menunjukkan data dari 63 pasien, mayoritas memiliki berat badan kurang (44,4%). Derajat HG pada sampel ada 2 jenis, yaitu derajat 1 dan derajat 2, dengan 93,7% pasien berada pada derajat 2. Uji Somers' d menunjukkan adanya hubungan yang signifikan antara kadar IMT dengan derajat HG dengan nilai $p = 0,049$ ($p < 0,05$). Korelasi yang diperoleh adalah korelasi negatif ($r=-0,201$). Hubungan tersebut juga didukung

oleh data tambahan bahwa pasien HG yang memiliki ketonuria positif, denyut jantung abnormal, dan tekanan darah paling banyak adalah pasien dengan berat badan kurang. Pasien terbanyak adalah dewasa muda (88,9%), multigravida (44,4%) dan primipara (36,5%). Pasien terbanyak tidak pernah melakukan abortus (76,2%). Simpulan: Terdapat korelasi negatif yang signifikan antara kadar IMT dengan derajat HG, yaitu semakin rendah kadar IMT pasien, maka derajat HG semakin berat.
Kata Kunci: Hiperemesis Gravidarum, Indeks Massa Tubuh, Gravida, Paritas, Riwayat Aborsi, Ketonuria, Tekanan Darah, Denyut Jantung.

BACKGROUND

Hyperemesis gravidarum (HG) is a condition of excessive nausea and vomiting in pregnant women aged less than 22 weeks, which can cause dehydration, electrolyte imbalance, and ketosis.[1] The incidence of HG in the world is relatively high, with 12,5% of pregnant women diagnosed, and in Indonesia, it was approximately 14,8% in 2020.[2,3] This condition not only disturbs the mother's physical condition but can also significantly reduce the quality of life, including the impact on social life, work, and household, as well as adding a large economic burden due to treatment and care.[4] Research also demonstrates that HG might influence maternal mental health, including anxiety and sadness, and may affect the developmental disorders of the child born.[5,6]

HG is also associated with various serious pregnancy complications, such as premature birth, fetal growth restriction, and maternal health problems, such as acute kidney failure and in most severe cases could lead to Wernicke's Encephalopathy.[7] These symptoms do not only occur in the first or second trimester but can also continue throughout pregnancy, causing malnutrition, dehydration, and severe weight loss. In addition, this condition carries the risk of causing chronic energy deficiency (CED) and the birth of low birth weight (LBW).[8] Research indicates that mothers with a history of CED or LBW have a greater risk of giving birth to children with stunting if not treated properly.[9,10] The risk factors for HG are multifactorial.[11] This study, therefore, aims to provide further understanding of BMI levels risk factors and their impact on the severity experienced by patients with HG.

METHOD

This study employed a quantitative design with an analytical observational method and a cross-sectional time approach to examine the relationship between BMI levels and hyperemesis gravidarum (HG). The data used were medical records of patients diagnosed with HG at Tora Belo Regional Hospital, Sigi Regency, in 2023. The study population consisted of pregnant women diagnosed with HG in that year, with samples calculated using the Slovin formula, resulting in a minimum sample of 58 patients from a total population of 138 patients. The sampling technique utilized was purposive sampling based on inclusion and exclusion criteria.

BMI levels is a independent variable, which is divided into three levels, namely underweight, normal, and overweight.[12] The Grades of HG is a dependent variable, which is divided into

three grades based on symptom severity, from mild symptoms like weakness and dehydration in Grade 1, and then more serious with dehydration and dirty tongue in Grade 2, to most serious issues like somnolence and dysfunction organ in Grade 3.[13]

The variables analyzed were relationship between BMI levels and the grades of HG, which were measured through medical records. Data processing included editing, coding, and tabulation, with univariate analysis using the Kolmogorov-Smirnov Test and bivariate analysis using Somers' d Correlation Test. This study also paid attention to research ethics, including anonymity and confidentiality of respondent data.

RESULTS

Patients with HG at Tora Belo Regional Hospital, Sigi Regency, were dominated by the young adults age group (20-44 years old), with a percentage of 88.9% or 56 patients. Furthermore, it was found that the most common gravida status of the sample was multigravida, meaning the patient was experiencing their second or third pregnancy, namely 28 patients with a percentage of 44.4%. The predominant parity status among the sample was primiparous woman or had given birth once, with 23 individuals representing 36.5%. Besides that, the majority of patients with HG at Tora Belo Regional Hospital did not have a history of previous abortion, as many as 48 patients, or 76.2%.

Beside characteristics of the sample, researchers also conducted cross-tabulations to describe the relationship between BMI levels and severity of HG, namely in the table below:

Table 1. Crosstabulation and Bivariate Analysis Between BMI Levels and Severity of HG

	Crosstabulation			**Bivariate Analysis**	
				Significance Value (p)	Correlation Coefficient (r)
	Body Mass Index Levels			**BMI Levels**	
	Underweight	Normal	Overweight		
Grades of HG					
Grade 1	0	2	2	0.049	-0.201
Grade 2	28	24	7		
Grade 3	0	0	0		
Ketonuria					
Negative	17	17	6	-	-
Positive 1	0	1	0		
Positive 2	2	1	1		
Positive 3	5	3	0		
Positive 4	4	4	2		

Heart Rate					
Normal	22	24	7	-	-
Tachycardia	6	2	2		
Blood Pressure					
Hypotension	2	0	1		
Normal	17	20	0	-	-
Prehypertension	8	6	0		
Grade 1 Hypertension	1	0	1		

Source: (Secondary Data, 2023)

Table 1 reveals that patients with grade 2 HG mostly had an underweight (28 people) and the least had an overweight (7 people), while in patients with grade 1 HG, most were overweight and had normal BMI, with 2 people each. The patients with an underweight were the ones who encountered positive ketonuria levels the most frequently, also with the most severe ketonuria which is positive 4. Furthermore, patients with an underweight were the most likely to experience abnormal heart rates (tachycardia). Besides that, patients with an underweight were the most likely to experience abnormal blood pressure (hypotension, prehypertension, and grade 1 hypertension).

The result of the Somers's d correlation analysis test, it was found that the significance value is 0.049, which is less than 0.05. That result indicates a significant relationship between BMI levels and the grades of HG. The correlation coefficient of -0.201 indicates a weak negative correlation.

DISCUSSION

This study used secondary data in the form of medical records of patients with HG obtained from Tora Belo Regional Hospital, Sigi Regency, focusing on two main variables: Body Mass Index (BMI) levels as the independent variable and the grades of Hyperemesis Gravidarum (HG) as the dependent variable. In addition, additional data collected included blood pressure, ketone levels, and heart rate frequency of patients. The sample involved was 63 patients who met the inclusion and exclusion criteria. The distribution of the age of the patients was mostly young adults (20-44 years old), while the age of adolescents and middle adults was relatively small. It aligns with the findings of previous studies showing an increased risk of HG after the age of 30 years old. This is due to the influence of hormonal changes and decreased body function with age.[14]

In terms of gravidarum status, the majority of patients with HG at Tora Belo Regional Hospital were multigravida (28 people), followed by Grande multigravida (19 people) and primigravida (16 people). This is contrary to the findings of other studies, which revealed that HG is more common in primigravida.[15] This difference is due to other factors that could not be controlled by researchers, such as psychological factors such as anxiety or

stress, which can affect the incidence of HG in pregnant women.[16] Furthermore, the distribution of parity status indicates that primipara is the group that experienced the most HG (23 people). This is consistent with research stating that pregnant women with primipara status are more susceptible to HG.[17]

The patient's abortion history also varied, with the majority having a history of never had abortion. However, this result is contrary to research demonstrating that women with a history of abortion have a higher risk of developing HG.[18] This difference may be due to other uncontrollable variables, such as psychological factors, medical conditions, or heredity, which also affect the prevalence of HG.[19] Regarding BMI, most patients with HG had an underweight (28 people), followed by a normal BMI (26 people) and an overweight (9 people). This corroborates with research conducted by Jenabi (2024) that the majority of patients with HG had poor nutritional status.[20] Based on the grades of HG in the sample, most patients with HG were grade 2 HG (59 people), while only 4 people experienced grade 1 HG. This is due to differences in care and treatment for each grade of HG. Patients with grade 1 HG tend not to come to the hospital because the symptoms are still relatively mild and can still be compensated by the body, while grades 2 and 3 require more intensive care in the hospital.[19]

The results of the bivariate analysis indicated a significant negative correlation between BMI levels and the grades of HG, namely that the lower the patient's BMI level, the more severe the grades of HG. The Somers' d correlation test uncovered a significance value (p) of 0.049, indicating a significant relationship between BMI levels and the grades of HG. The negative correlation coefficient values (r=-0.201) suggest that the lower the BMI, the higher the severity of HG. This is supported by the crosstabulation results showing that in patients with grade 2 HG, the majority of patients were underweight (28 people), while in grade 1 HG, there were more patients with overweight.

Aside from BMI levels, additional data such as ketone levels, heart rate, and blood pressure were also analyzed. Positive ketone levels were more frequently found in patients with underweight, indicating that poor nutritional status is associated with increased severity of HG. Tachycardia, an indicator of severity, was also more frequently found in patients with underweight. Abnormal blood pressure ratios, including hypotension to hypertension, were more common in underweight patients, supporting the finding that patients with poor nutritional status tend to have higher severity of HG. These findings emphasize the importance of managing nutritional status and monitoring medical conditions in patients with HG, especially in those with low BMI level.

Conclusion and Recommendation

Based on this study, it was concluded that there is a significant relationship between BMI levels and the grades of HG, with a negative correlation, meaning that the lower the BMI level, the higher the severity of HG. The majority of patients with HG had an underweight. This is supported by the finding that most grade 2 patients with HG had an underweight. Patients with positive ketone levels, heart

rate with tachycardia, and abnormal blood pressure were also mostly experienced by patients with an underweight. Therefore, researchers suggest that health facilities in the community can provide education to prospective pregnant women regarding the prevention of HG severity by modifying nutritional status or BMI levels.

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