

Analysis of Determinant Factors of Hyperemesis Gravidarum in 1st Trimester Pregnant Women at Prima Medika General Hospital Denpasar, Bali

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ABSTRACT

Hyperemesis gravidarum is excessive nausea and vomiting that can disrupt daily activities and endanger the health of pregnant women. The cause of hyperemesis gravidarum is currently unknown. This study aimed to analyse the determinant factors for the incidence of hyperemesis gravidarum in first-trimester pregnant women at Prima Medika General Hospital Denpasar, Bali, for the period January 2023 - July 2024. The design of this research was cross-sectional. The number of samples was 60 first-trimester pregnant women. The data was collected from the medical records of Prima Medika General Hospital Denpasar. Data analysis uses Chi-Square analysis. The results of the study showed that there was an influence of several variables on the incidence of hyperemesis gravidarum, namely maternal age (p-value = 0.02, OR: 10.7), anemia (p-value = <0.001, OR: 45.0), history of gastritis (p = 0.017, OR: 4.3), while the variables gravida (p-value = 0.301), education (p-value = 0.299) and mother's occupation (p-value = 0.195) do not affect the incidence of hyperemesis gravidarum in first-trimester pregnant women. Suggestions for pregnant women can increase their knowledge about hyperemesis gravidarum so that more serious and dangerous complications do not occur.

Keywords: determinant factors; age; anemia; history of gastritis; hyperemesis gravidarum

INTRODUCTION

Pregnancy is a natural and physiological process. Every woman who has healthy reproductive organs, and if she has menstruated and has sexual relations with a man whose reproductive organs are healthy, there is a very high chance of pregnancy. If a pregnancy is planned, it will give a feeling of happiness and hope, but on the other hand, women need the ability to adapt to the changes that occur during pregnancy, both physiological and psychological changes [1].

Pregnancy is a condition where a woman has a fetus developing in their body (generally known as the uterus). Pregnancy in humans lasts 40 weeks or 9 months, starting from the first day of the last menstruation until delivery [2]. The pregnancy period is divided into 3 phases, namely the first trimester (0-3 months), the second trimester (4-6 months), and the third trimester (7-9 months) [2,3]. One of the complications of pregnancy that affects the health status of the mother and the growth and

development of the fetus is hyperemesis gravidarum, where this event can be detected and prevented during pregnancy.

Nausea and vomiting are common things in early pregnancy. Nausea and vomiting usually occur in the morning, which is why it is also called morning sickness, but it does not rule out the possibility that it also occurs in the afternoon and evening. Excessive nausea and vomiting that occurs throughout the day and interferes with daily work and causes dehydration is called hyperemesis gravidarum [4]. Hyperemesis gravidarum is nausea and vomiting that occurs in the first trimester of pregnancy, exceeding the limit in pregnant women and making the mother feel disturbed from carrying out daily work which results in loss of fluids in the mother's body. The exact trigger for hyperemesis gravidarum is not yet known, an increase in the hormone estrogen and human chorionic gonadotrophin (β -HCG) [5].

Nausea and vomiting usually occur 10 times within 24 hours, accompanied by a decrease in appetite and also causes dehydration. For ≤ 20 weeks, nausea and vomiting occur so that the mother's body becomes weak, her face becomes pale and the frequency of urination decreases [6].

According to the World Health Organization (WHO), the number of cases of hyperemesis gravidarum reaches 12.5% of all pregnancies. Nausea and vomiting can irritate and create a fluid imbalance in the kidney and liver tissue, resulting in necrosis. The most important causes of maternal death in Indonesia are bleeding 40-60%, infection 20-30%, and pregnancy poisoning 20-30%, the remaining around 5% are caused by nausea, vomiting, and other diseases that worsen during pregnancy [7].

The exact cause of hyperemesis gravidarum is still not known for certain, but there is a complex interaction between biological, psychological, and socio-cultural factors, multiple pregnancies, women undergoing their first pregnancy, aged less than 20 years and more than 35 years, molar pregnancies, maternal weight. Excessive use is seen as a cause of hyperemesis gravidarum [8].

The age included in a high-risk pregnancy is less than 20 years and above 35 years. Age under 20 years is not an inappropriate time to get pregnant because the reproductive organs are not yet perfect so it can cause nausea and vomiting. Nausea and vomiting occur at the age of under 20 years due to inadequate maturity of the pregnant mother's physical, mental, and social functions, which can cause doubts about body shape, love, and the care and upbringing of the child she will give birth to. Meanwhile, nausea and vomiting that occur when pregnant women are over 35 years old are caused by psychological factors, where the mother is not ready to get pregnant or doesn't even want to get pregnant so she will feel very depressed and stressed [9].

Parity can be divided into nullipara, primipara, multipara, and grandemultipara. Gravida is an ongoing pregnancy, where the incidence of Hyperemesis gravidarum is more often experienced by primigravida and multigravida, this is related to the stress level and age of the mother when experiencing the first pregnancy [6].

Hyperemesis gravidarum tends to occur in primigravida pregnant women. This is caused by a lack of physical readiness to face pregnancy and experience childbirth, which causes fear during pregnancy, nausea, and vomiting occur in 60-80% of primigravida. In one in a thousand pregnancies other symptoms are more severe, this is caused by increased levels of the hormones estrogen and HCG [8]. About 60-80% of primigravidas and 40-60% of multigravidas experience nausea and vomiting, but these symptoms occur more severely in only 1 in 1,000 pregnancies. The incidence of hyperemesis gravidarum in Indonesia in 2015 was 1.5-3% in pregnant women [10,11].

Gastritis is inflammation of the gastric mucosa that is acute, chronic, diffuse, or local. Characteristics of this inflammation include anorexia, a feeling of fullness or discomfort in the epigastrium, nausea, and vomiting. Local inflammation of the gastric mucosa will develop if the protective mechanisms of the mucosa are filled with bacteria or other irritants. Gastritis often known as stomach ulcers is a very annoying disease [5].

Gastritis usually occurs in people who have irregular eating patterns and consume foods that stimulate the production of stomach acid. Some microorganism infections can also cause gastritis. Pregnant women who experience vomiting will usually cause irregular eating patterns and will cause gastritis to recur. Recurrence of gastritis causes the mother to lose appetite, causes excessive nausea and vomiting, and causes hyperemesis gravidarum [12] (Suhartini, 2024).

From the results of Basic Health Research (RISKESDAS) in 2018, there were 37.1% of pregnant women with hyperemesis gravidarum, namely pregnant women with Hb levels of less than 11.0 grams/dl, with almost the same proportion in urban areas (36.4 %) and rural (37.8%) [13].

Based on the description of the background to the problem above, researchers are interested in conducting research on the determinant factors that influence the incidence of hyperemesis gravidarum in first-trimester pregnant women at RSU Prima Medika Denpasar for the period January 2023-July 2024.

RESEARCH METHOD

This type of research is a cross-sectional design, all 1st-trimester pregnant women who visited the delivery room, who experienced hyperemesis gravidarum at RSU Prima Medika Denpasar in the months 1 January 2023 - 31 July 2024, namely with a sample of 60 respondents. The sampling technique in this research used total sampling. The data collection technique uses secondary data from medical records at RSU Prima Medika Denpasar, Bali. The instrument in this research uses a questionnaire. The data analysis test used in this research is the chi-square statistical test.

RESULT

Based on Table 1, it can be seen that the majority of respondents were in the low-risk category (20-35 years), namely 46 respondents (76.7%), while there were 14 respondents in the high-risk category (< 20 and > 35 years). Respondents (23.3%). Of the 60 respondents, the results showed that the majority of respondents were gravida in the primigravida category, namely 31 respondents (51.7%), while respondents with gravida in the multigravida category were 29 respondents (48.3%). Most of the respondents worked, namely 32 respondents (53.3%), while those who did not work were 28 respondents (46.7%). Regarding respondent's education, the majority of respondents had higher education, namely 33 respondents (55%), while those

with low education were 27 respondents (45%). Respondents with anemia were 28 respondents (46.7%), while respondents who were not anemic were 32 respondents (53.3%).

Most of the respondents had a history of gastritis, 36 respondents (60%), while 24 respondents (40%) did not have a history of gastritis.

TABLE 1: Frequency Distribution of Maternal Age, Gravida Mother, Education, Work, Anemia, and History of Gastritis (N=60).

Variable	N	Percentage(%)
Maternal Age		
High Risk (<20&>35 yo)	14	23,3
Low Risk (20-35 y o)	46	76,7
Gravida Mother		
Primigravida	31	51,7
Multigravida	29	48,3
Education		
Low Education	27	45
Higher Education	33	55
Occupation		
Not Working	28	46,7
Working	32	53,3
Anemic Status		
Anemic	28	46,7
Not Anemic	32	53,3
History of Gastritis		
With a history of gastritis	36	60
Without a history of gastritis	24	40

The cause of hyperemesis gravidarum is not yet known with certainty, however, factors such as biology, namely multiple pregnancies and primigravida, physiology such as metabolic disorders, and history of previous pregnancies, psychology such as age, parity, and education. Sociocultural factors such as husband's support can be a risk factor for hyperemesis gravidarum. Some theories suggest that nausea and vomiting during pregnancy may be related to adaptations to prevent the intake of harmful foods, such as pathogenic microorganisms in meat and toxins in vegetables and drinks. By preventing the entry of harmful components, this will prevent embryos from miscarriage [8].

The results of the analysis of the effect of age on the incidence of hyperemesis gravidarum obtained 28 respondents (62.2%) who were included in the high-risk category experiencing hyperemesis gravidarum, while among mothers who were in the low-risk category, there were 2 respondents (13.3%) who experienced hyperemesis gravidarum. The results of the chi-square statistical test obtained a p-value = 0.02 $\alpha = 0.05$, meaning that there was an effect of age on hyperemesis gravidarum in pregnant women in the first trimester at Prima Medika Denpasar Bali General Hospital for the period January 2023-July 2024.

The results of the analysis also obtained an OR value = 10.7, which means that respondents who are at high risk have a 10.7 times greater risk of experiencing hyperemesis gravidarum than respondents who are at low risk (Table 2).

The results of the analysis of the influence of gravida on hyperemesis gravidarum obtained 17 respondents (58.6%) included in the multigravida category experienced hyperemesis gravidarum while among primigravida mothers there were 13 respondents (41.9%) who experienced hyperemesis gravidarum. The results of the chi-square statistical test obtained a p-value = 0.301 > $\alpha = 0.05$ meaning that there was no influence of gravida on the incidence of hyperemesis gravidarum in pregnant women in the first trimester at Prima Medika Denpasar Bali General Hospital for the period January 2023 - July 2024. The results of the analysis of the influence of maternal education on hyperemesis gravidarum obtained 19 respondents (57.6%) included in the higher education category experienced hyperemesis gravidarum while among mothers with low education, there were 11 respondents (40.7%) who experienced hyperemesis gravidarum. The results of the chi-square statistical test obtained a p-value.

TABLE 2: The Effect of Maternal Age, Education, Occupation, Anemic Status and History of Gastritis on Hyperemesis Gravidarum.

Variable	Hyperemesis Gravidarum				N	%	p value	OR CI 95%
	Yes		No					
	n	%	n	%				
Maternal Age								
High Risk	28	62,2	17	37,8	45	100	0.02	10.7
Low Risk	2	13,3	13	86,7	15	100		(2.15-53.35)
Total	30		30		60	100		
Gravida Mother								
Primigravida	13	41,9	18	58,1	31	100	0.301	
Multigravida	17	58,6	12	41,4	29	100		
Total	30		30		60	100		
Education								
Low Education	11	40,7	16	59,3	27	100	0.299	
Higher Education	19	57,6	14	42,4	33	100		
Total	30		30		60	100		
Occupation								
Not Working	11	39,3	17	60,7	28	100	0.195	
Working	19	59,4	13	40,6	32	100		
Total	30		30		60	100		
Anemic Status								
Anemic	25	89,3	3	10,7	28	100	< 0.001	45
Not Anemic	5	15,6	27	84,4	32	100		(9.73-208.07)
Total	30		30		60	100		
History of Gastritis								
With a history of gastritis	23	63,9	13	36,1	36	100	0.017	4.3
Without a history of gastritis	7	29,2	17	70,8	24	100		(1.41-13.07)
Total	30		30		60	100		

p= 0.299 > α = 0.05, meaning that there was no effect of maternal education on the incidence of hyperemesis gravidarum in pregnant women in the first trimester at Prima Medika Denpasar Bali General Hospital for the period January 2023-July 2024.

The results of the analysis of the influence of work on hyperemesis gravidarum obtained 19 respondents (59.4%) who worked experienced hyperemesis gravidarum while among mothers who did not work 11 respondents (39.3%) experienced hyperemesis gravidarum. The results of the chi-square statistical test obtained a p-value = 0.195 > α = 0.05 meaning that there was no influence of the mother's work on the incidence of hyperemesis gravidarum in pregnant women in the first trimester at Prima Medika Denpasar Bali General Hospital for the period January 2023-July 2024.

The results of the analysis of the influence of anemia on the incidence of hyperemesis gravidarum obtained 25 respondents (89.3%) who were included in the anemia category experienced hyperemesis gravidarum, while among mothers who were in the non-anemia category, 5 respondents (15.6%) experienced hyperemesis gravidarum. The results of the chi-square statistical test obtained a p-

value = <0.001 < α = 0.05, meaning that there is an effect of anemia on hyperemesis gravidarum in pregnant women in the first trimester at Prima Medika Denpasar Bali General Hospital in the period January 2023-July 2024. The results of the analysis also obtained an OR value = 45, which means that respondents who are anemic have a 45 times greater risk of experiencing hyperemesis gravidarum than respondents who are not anemic (Table 2).

The results of the analysis of the effect of gastritis history on the incidence of hyperemesis gravidarum were obtained from as many as 23 respondents (63.9%) who had a history of gastritis, experienced hyperemesis gravidarum, while among mothers who did not have a history of gastritis, 7 respondents (29.2%) experienced hyperemesis gravidarum. The results of the chi-square statistical test obtained a p-value = 0.017 < α = 0.05, meaning that there was an effect of gastritis history on hyperemesis gravidarum in pregnant women in the first trimester at Prima Medika Denpasar Bali General Hospital for the period January 2023-July 2024. The results of the analysis also obtained an OR value = 4.3, which means that respondents who have a history of gastritis have a 4.3 times greater risk of experiencing hyperemesis gravidarum than respondents who do not have a history of gastritis (Table 2).

DISCUSSION

The Effect of Age on Hyperemesis Gravidarum

The results of the analysis of the effect of age on the incidence of hyperemesis gravidarum obtained 28 respondents (62.2%) who were included in the high-risk category experiencing hyperemesis gravidarum, while among mothers who were in the low-risk category, there were 2 respondents (13.3%) who experienced hyperemesis gravidarum. The results of the chi-square statistical test obtained a p-value = $0.02 < \alpha = 0.05$, meaning that there is an effect of age on hyperemesis gravidarum in pregnant women in the first trimester at Prima Medika Denpasar Bali General Hospital for the period January 2023-July 2024. The results of the analysis also obtained an OR value = 10.7, which means that respondents who are at high risk have a 10.7 times greater risk of experiencing hyperemesis gravidarum than respondents who are at low risk.

Factors influencing the incidence of hyperemesis gravidarum include age, where the age included in high-risk pregnancies is less than 20 years and above 35 years. Age under 20 years is not a good time to get pregnant because the reproductive organs are not yet perfect so it can cause nausea and vomiting. Nausea and vomiting occur at the age of under 20 years due to the lack of physical, mental, and social maturity of the prospective mother it can cause physical doubts, love, and care and care for the child she will give birth to.

Nausea and vomiting that occur above the age of 35 years are caused by psychological factors, where the mother is not ready to get pregnant or even does not want her pregnancy anymore so she will feel so depressed which causes stress to the mother. Research by Masruroh (2019) shows that there is a significant relationship between age and the incidence of hyperemesis gravidarum [9].

The results of this study are also in line with Rudiyaniti and Rosmadewi (2019), entitled The Relationship between Age, parity, work and Stress with Emesis Gravidarum in the Way Kandis Health Center Work Area, Bandar Lampung City in 2018. The results showed a significant relationship between age, work, and stress with emesis gravidarum. The most dominant variable is work [14]. Similar results were also obtained by Pont et al (2024), who stated that one of the risk factors for hyperemesis gravidarum is maternal age. Where the age of the mother who is less than 20 years has a 2.5 times greater risk of experiencing hyperemesis gravidarum [15]. In the study of Mohammed Seid et al (2024), women aged 18-19 years were found to be 3 times more at risk of experiencing hyperemesis gravidarum than women over 35 years of age [16]. This is in accordance with other studies [17]. Younger women have lower resistance to hyperemesis gravidarum symptoms than older women. Exposure to elevated levels of human chorionic gonadotropin (HCG) and other stress hormones in pregnancy, all occur for the first time.

In the opinion of researchers, age is related to hyperemesis gravidarum because if a pregnant woman is in the high-risk category, she will have a higher risk of experiencing hyperemesis gravidarum. This occurs because the psychological conditions are different from pregnancy at a younger age, and the ability to adapt to physical changes during pregnancy is also different.

The Effect of Gravida on Hyperemesis Gravidarum

The results of the analysis of the influence of gravida on hyperemesis gravidarum showed that 17 respondents (58.6%) who were included in the multigravida category experienced hyperemesis gravidarum, while among primigravida mothers there were 13 respondents (41.9%) who experienced hyperemesis gravidarum. The results of the chi-square statistical test obtained a p-value = $0.301 > \alpha = 0.05$, meaning there was no influence of gravida on the incidence of hyperemesis gravidarum in pregnant women in the 1st trimester at Prima Medika Denpasar Bali General Hospital for the period January 2023-July 2024.

Gravida is a term used in midwifery which means a woman who is pregnant. Primigravida is a woman who is pregnant for the first time, while multigravida is a woman who is pregnant for the second time or more [18].

The effect of hyperemesis gravidarum on the mother and fetus is very large. Increases the risk of problems with pregnancy. Pregnant women with symptoms of hyperemesis gravidarum have the potential to experience dehydration, lack of carbohydrate and fat reserves in the body, and small tears can also occur in the mucous membrane of the esophagus and stomach or Mallory Weiss syndrome due to gastrointestinal bleeding [18].

Some studies show that higher gravida Elarby et al, (2024) increases the risk of hyperemesis gravidarum, while other studies state the opposite. According to Nurmi et al (2020), obtaining data comparing women who have never been diagnosed with hyperemesis gravidarum, have a greater risk of suffering from hyperemesis gravidarum [19].

Nurfadillah et al (2023) found that primigravida women (55 patients, 45.8%) compared to the control group (34 patients, 28.3%) had a 2.14 times greater risk of experiencing hyperemesis gravidarum compared to multigravida women [20].

Likewise, Mohammed Seid et al (2024) obtained data that more than half of the female sample (52.5%) were primigravida, whereas in other studies it was less than half (47.1%) and around 36.2% is a primigravida [16]. Primigravida women have a 2 times greater risk of experiencing hyperemesis gravidarum compared to multigravida women. This is in accordance with studies conducted at Jimma University Medical Center, southwest Ethiopia (Segni et al, 2016), in Bahir Dar, Ethiopia [21].

Which found that nulliparous women had a higher risk of being hospitalized due to hyperemesis gravidarum in multiparous women. Exposure to increased levels of the hormone human chorionic gonadotropin (HCG) and other stress hormones in pregnancy, all occurring for the first time. A study according to Aminu et al (2020) found that multigravida women have a significantly high risk of experiencing hyperemesis gravidarum.

The Effect of Maternal Education on Hyperemesis Gravidarum

The results of the analysis of the influence of maternal education on hyperemesis gravidarum showed that 19 respondents (57.6%) who were in the high education category experienced hyperemesis gravidarum, while among mothers with low education, 11 respondents (40.7%) experienced hyperemesis gravidarum. The chi-square statistical test results obtained p value = $0.299 > \alpha = 0.05$, meaning there is no influence of maternal education on the incidence of hyperemesis gravidarum in pregnant women in the 1st trimester at Prima Medika Denpasar Bali General Hospital for the period January 2023-July 2024.

Pregnant women with low educational status (grade < 10) will more easily experience hyperemesis gravidarum compared to pregnant women with diploma and higher educational status [16]. This is in accordance with studies obtained in Norway [22]. In the study by Latifah et al (2020), the highest incidence of women with emesis gravidarum was found at a low education level (Junior High School) [23]. This is slightly different from what was obtained by Heitmann et al (2017), women who experienced emesis gravidarum were at a higher level of education. The differences in the results of the following studies could be caused by differences in the location where the studies were carried out, where Latifah's study was carried out in rural areas and Heitmann's study was carried out in urban areas [24].

The Effect of Maternal Occupation on Hyperemesis Gravidarum

The results of the analysis of the influence of work on hyperemesis gravidarum showed that 19 respondents (59.4%) who worked experienced hyperemesis gravidarum, while among mothers who did not work, 11 respondents (39.3%) experienced hyperemesis gravidarum. The chi-square statistical test results obtained p value = $0.195 > \alpha = 0.05$, meaning there is no influence of maternal employment on the incidence of hyperemesis gravidarum in pregnant women in the 1st trimester at Prima Medika Denpasar Bali General Hospital for the period January 2023-July 2024.

Being a housewife (not working) has a 6 times greater risk of experiencing hyperemesis gravidarum compared to working as a civil servant. The results of this study are in accordance with those obtained at Bale Zone Hospital, southeast Ethiopia, where women who work as government or private employees have a lower risk of experiencing hyperemesis gravidarum [25], with a study conducted in Mekelle which found

women Those who work have a lower risk of suffering from hyperemesis gravidarum compared to housewives [26], and Roseboom et al (2011) found that housewives are at higher risk of experiencing hyperemesis gravidarum [27]. This happens because housewives are more exposed to triggers for vomiting at home. In contrast to the results of previous studies, in several studies conducted in Turkey, being an employee had no effect on the incidence of hyperemesis gravidarum [28,29].

The Effect of Anemic Status on Hyperemesis Gravidarum

The results of the analysis of the influence of anemia on the incidence of hyperemesis gravidarum showed that 25 respondents (89.3%) who were included in the anemia category experienced hyperemesis gravidarum, while among mothers who were in the non-anemic category, 5 respondents (15.6%) experienced hyperemesis gravidarum. The chi-square statistical test results obtained p value = $<0.001 < \alpha = 0.05$, meaning that there is an influence of anemia on hyperemesis gravidarum in pregnant women in the 1st trimester at Prima Medika Denpasar Bali General Hospital for the period January 2023-July 2024. From the results of the analysis, the OR value was also obtained. = 45, which means that respondents who are anemic are 45 times more likely to experience hyperemesis gravidarum than respondents who are not anemic. Anemia is a condition where the hemoglobin (Hb) level in the blood is less than 12 grams. Meanwhile, anemia in pregnant women is a condition of mothers with hemoglobin (Hb) levels of less than 11 gram% in the first and third trimesters or less than 10.5 gram% in the second trimester.

The pregnancy period results in various physiological changes in pregnant women. One of the changes occurs in the hematological system. These changes often result in pregnant women experiencing anemia during pregnancy if the body's iron needs are insufficient due to excessive vomiting. Anemia is a decrease in red blood cells (erythrocytes) in the blood circulation or a decrease in hemoglobin concentration which results in it being unable to carry oxygen to all body tissues of pregnant women, which will have an impact on the mother's health and the development of the unborn baby [1,30].

Anemia that occurs in pregnant women can have an impact on the growth and development of the fetus and there is a risk of complications during pregnancy, childbirth, and postpartum and can even cause death in the mother and child. As a result of the increased risk of complications, prevention needs to be carried out as early as possible starting from providing understanding through providing knowledge about anemia, which occurs mostly due to low levels of knowledge [31].

The Effect of a History of Gastritis on Hyperemesis Gravidarum

The results of the analysis of the influence of a history of gastritis on the incidence of hyperemesis gravidarum showed that 23 respondents (63.9%)

who had a history of gastritis experienced hyperemesis gravidarum, while among mothers who did not have a history of gastritis, 7 respondents (29.2%) experienced hyperemesis gravidarum. The results of the chi-square statistical test obtained a p-value = $0.017 < \alpha = 0.05$, meaning that there is an influence of a history of gastritis on hyperemesis gravidarum in pregnant women in the 1st trimester at Prima Medika Denpasar Bali General Hospital for the period January 2023-July 2024. From the results of the analysis, the OR value was also obtained. = 4.3, which means that respondents who have a history of gastritis are at 4.3 times greater risk of experiencing hyperemesis gravidarum than respondents who do not have a history of gastritis.

Hyperemesis gravidarum can cause carbohydrate reserves to be used up for energy needs. This causes the body's burning to shift to fat and protein reserves. The fat burning that occurs is incomplete fat burning. Therefore, ketone bodies are formed in the blood which increases the severity of clinical symptoms. Some gastric fluids and electrolytes such as sodium, potassium, and calcium are excreted through vomiting. Decreased potassium will increase the severity of vomiting symptoms in hyperemesis gravidarum patients. In other words, the lower the potassium in the body's balance, the more the occurrence of vomiting increases [32].

Increased levels of the hormone human chorionic gonadotropin (β -hCG) will induce the ovaries to produce estrogen, which can stimulate nausea and vomiting. Women with multiple pregnancies or hydatidiform moles are known to have greater levels of vomiting. Progesterone is also thought to cause nausea and vomiting by inhibiting gastric motility and the rhythm of contraction of the gastric smooth muscles. Decreased thyrotropin-stimulating hormone (TSH) levels in early pregnancy are also associated with hyperemesis gravidarum although the mechanism is not clear. Hyperemesis gravidarum reflects hormonal changes that are more drastic than normal pregnancy [33].

Physiological changes in the gastrointestinal tract in pregnancy, primarily caused by the action of progesterone, can cause problems, including relaxation of the cardiac sphincter (located between the esophagus and stomach) leading to esophageal reflux and heartburn. And decreased peristalsis which causes constipation. Nearly 79% of women who experience heartburn and/or reflux report experiencing daily nausea and vomiting which generally appears in the first trimester and disappears in the second trimester. Other literature states that 60% of pregnant women experience heartburn and esophageal reflux which occurs more often in the third trimester.

CONCLUSION

Based on the research results and description above, the following conclusions can be drawn :

- (1) There is an influence of maternal age on the incidence of hyperemesis gravidarum in first-trimester pregnant women at RSU Prima

Medika Denpasar for the period January 2023 – July 2024 (p-value: 0.02; OR: 10.7).

- (2) There is an influence of maternal anemia on the incidence of hyperemesis gravidarum in first-trimester pregnant women at RSU Prima Medika Denpasar for the period January 2023 – July 2024 (p-value: <0.001 ; OR: 45).
- (3) There is an influence of the maternal history of gastritis on the incidence of hyperemesis gravidarum in first-trimester pregnant women at RSU Prima Medika Denpasar for the period January 2023 – July 2024 (p-value: <0.017 ; OR: 4.3).
- (4) There is no influence of gravida, education, or maternal occupation on the incidence of hyperemesis gravidarum in first-trimester pregnant women at RSU Prima Medika Denpasar for the period January 2023 – July 2024.

SUGGESTION

It is hoped that this research will increase knowledge about one of the complications of pregnancy in 1st trimester, known as hyperemesis gravidarum, so that more serious and dangerous complications do not occur by routinely attending classes for pregnant women and carrying out routine antenatal care (ANC) examination can increase socialization by providing counseling to 1st-trimester pregnant women about nausea and vomiting during pregnancy and how to deal with this situation and can be used as a reference and literature study for other researchers who want to conduct research related to hyperemesis gravidarum by taking the research location and age characteristics of the respondent's different.

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