Conference Paper

Correlation Between Hemoglobin Levels and Quality of Life in Pregnant Women in Yogyakarta

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Abstract.
48.9% of pregnant women in Indonesia in 2018 had anemia. This can affect the health and quality of life of pregnant women. The aim of this study was to investigate the correlation between hemoglobin levels and the quality of life of pregnant women at Jetis 1 Primary Health Care in Bantul, Yogyakarta. This was an observational study with a cross-sectional approach and it was conducted from September to November 2019. The patients' quality of life was measured by the Indonesian version of the SF-36 questionnaire. The hemoglobin level was mesured by a hemoglobin test. This study used univariate (descriptive) and bivariate data analysis using the Chi-square test. The results showed that there were 12 pregnant women (23.5%) who experienced mild anemia and 13 pregnant women with moderate anemia (25.5%). There was a significant corelation between hemoglobin levels and the quality of life of pregnant women ($p < 0.05$), especially in the domains of physical health ($p = 0.034$) and emotional health ($p = 0.017$).

Keywords: anemia, hemoglobin, pregnant women, quality of life

1. Introduction

Based on the World Health Organization (WHO) in 2008, the prevalence of anemia in pregnant women was 69.0%. Based on data, anemia affects more than 56 million women throughout the world, two thirds of them are in Asia. The increase in the prevalence of anemia in pregnant women in Indonesia in 2018 was 48.9%. The highest prevalence of anemia was found in women aged 15-24 years (84.6%), while the lowest was in women aged 45-54 years (24%) [1].

Anemia was found to be the main cause of 20-40% of maternal deaths. Anemia causes an increased perinatal risk for both mother and newborn and causes an increased infant mortality rate. In pregnant women, anemia can cause potentially-fatal moderate bleeding. According to WHO, anemia is a condition where the red blood

cell count or the concentration of hemoglobin is below normal. Hemoglobin is needed to carry oxygen if its concentration is too low, the capacity of the blood to carry oxygen will decrease [1] [2].

A study by Yilmaz et al. (2019) mentions that anemia affects patients' physical and mental health as well as social well-being. In other words, anemia decreases patients' quality of life (QoL). It is stated that the value of two domains of quality of life, i.e., physical and mental health, was lower in the anemia group of pregnant women (p 0.000) [3]. This is related to the changes in the health conditions of pregnant women, causing those with anemia to be unable to perform their activities as usual. Lethargy or fatigue in carrying out activities as usual decreases economic aspects, social, and family relationships, as well as causes psychological stress [3].

Considering the fact that changes in the quality of life in patients with anemia are unavoidable, it is very crucial to take preventive mechanisms to maintain quality of life. A study conducted by Yilmaz et al (2019) shows that the severity of anemia has a significant effect on the quality of life of pregnant women because health is related to not only disease but also physical, mental and social well-being. In addition, it also necessary for health professionals to be aware of the importance of quality of life during the pregnancy period and consider that quality is an important part of care [3].

This study aimed to determine the correlation of hemoglobin (Hb) levels and the quality of life of pregnant patients at Jetis 1 Public Health Center Bantul Yogyakarta.

2. Method

This was an analytical observational study with a cross sectional approach. The study was conducted from September to November 2019 with the sampling location at Jetis 1 Public Health Center Bantul, Yogyakarta. The study had been approved by the ethics committee of UAD with Ethical Clearance number 011904024. The data were collected from pregnant respondents who met the inclusion criteria. The inclusion criteria were: being 20-35 years, taking pregnancy supplements including iron, folic acid, and calcium, being literate, and being cooperative. Meanwhile, the exclusion criteria were those who had a miscarriage or had given birth during the data collection.

The data on the respondents' quality of life were collected using the SF-36 questionnaire of which the validation and reliability had previously been tested, while the data on the respondents' Hb level were taken by Hb tests. The SF-36 questionnaire validation test was carried out on a total of 40 respondents and the results showed that each question item had a correlation coefficient of $\geq$ r 0.312. Meanwhile, the value of

the Cronbach alpha of all the domains was 0.865 (> 0.6), thus declared to be valid and reliable. The statistical data analysis to determine the correlation between Hb level and the level of quality of life was the chi square test.

3. Result and Discussion

This study was conducted from September to November 2019 with a total of 98 pregnant respondents. A total of 58 respondents met the inclusion criteria, while 7 were excluded. The exclusion criteria in this study were caused by several things, such as gestational age approaching the delivery date, a blighted ovum, miscarriage, and patient unwilling to participate in the study. The demographic characteristics of the respondents are presented in Table 1.

According to the results of the study, the demographic characteristics (Table 1) indicate that most of the pregnant women (51 respondents) fell in the category of non-high-risk pregnancy (20-35 years). The majority of the respondents were in the second trimester (51%) and third trimester (33.3%). Most of the respondents had no illness history (74.5 %). In terms of occupation, most of them were occupied (52.9%).

Gestational age influences the occurrence of anemia in pregnant women. An increase in gestational age is directly proportional to the increase in nutrient intake needed by the fetus. This study showed that in terms of gestational age, most of the respondents (26 pregnant women or 51%) were in the second trimester, followed by the third trimester (17 people or 33.3%), and the first trimester (8 people or 15.7%). A study conducted by Putri (2017) shows that mostly anemia occurs in the second and third trimester of pregnancy [4]. This study is also in line with Astriana Willy (2017), stating that there is a correlation between the occurrence of anemia in pregnant women and gestational age (P = 0.028) [5].

Illness history in this study was hypertension, diabetes, digestive disorders. However, the results of the study showed that the majority of the pregnant respondents (74.5%) did not have an illness history, while the remaining 25.5% had an illness history. This is in line with research by Salmariantity (2012), showing that pregnant women who have an infectious disease before pregnant are at risk of developing anemia 1.57 times greater than those who do not have one [6].

There were 26 pregnant women who did not suffer from anemia (51%). This number was higher than the number of pregnant women who had anemia, i.e., 12 people (23.5%) with mild anemia and 15 people (25.5%) with moderate anemia as shown in Table 2. A

Table 1: Data of patients'characteristics based on Hb levels, age, gestational age, weight, illness history, occupation.

Subjects' Characteristics	Number (N)	%
Age		
20-35	51	100
20> atau <35	0	0
Gestational Age		
Trimester 1	8	15.7
Trimester 2	26	51
Trimester 3	17	33.3
Weight		
> Average (61.4 kg)	17	33.3
≤ Average (61.4 kg)	34	66.7
Illness history		
Yes	13	25.5
No	38	74.5
Occupation		
Employed	27	52.9
Unemployed	24	47.1

study conducted by Yilmaz et al (2019) showed that anemia and the severity of anemia have a significant effect on the quality of life in pregnant women [3].

Table 2: Clinical characteristics of pregnant respondents at Jetis 1 Public Health Center Bantul Yogyakarta (*Indian Council of Medical Research*, 1989).

Categories	Number (N)	%
No Anemia	26	51
Mild Anemia	12	23.5
Moderate Anemia	13	25.5
Severe Anemia	0	0

An overview of the quality of life of the pregnant respondents in each domain based on the SF-36 questionnaire is presented in Table 3. The level of the quality of life was categorized as good or bad based on the mean of the respondents. The results showed that there were a higher number of respondents with a good quality of life in the domains of physical functioning, physical health, emotional health, body pain, vitality, mental health, and general health than those with a poor quality of life in each of these domains. The score for the quality of life in Table 3 shows that social functioning had the lowest score, i.e., 39.3% while the highest score was obtained by physical condition, i.e., 60.7%. The domain of social functioning is used to describe health problems and emotional disturbances that interfere with social relationship with family, friends, neighbors, or groups. The low score in the domain of social function

indicated that the pregnant respondents experienced limitations due to the conditions they experienced in general.

An overview of the level of quality of life of the respondents can be seen in Table 4. The study showed that most of the pregnant respondents had a poor level of quality of life (57%), while the remaining 43% had a good level of quality of life.

TABLE 3: Overview of Domains of Quality of Life of Pregnant Women at Jetis 1 Public Health Center Bantul Yogyakarta.

Domain	Good		Bad		Mean
	N	%	N	%	
Physical Functioning	28	54.9	23	45.1	55.3
Physical Health	31	60.7	20	39.3	48.3
Emotional Health	28	54.9	23	45.1	54.2
Social Functioning	20	39.3	31	60.7	68.8
Body Pain	31	60.7	20	39.3	59.5
Vitality	29	57	22	43	64.1
Mental Health	27	53	24	47	78.4
General Health	30	58.8	21	41.2	63.3

TABLE 4: Overview of Quality of Life of Pregnant Women at Jetis 1 Public Health Center Bantul Yogyakarta.

Variable	Good		Bad		Mean
	N	%	N	%	
Quality of Life	22	43	29	57	61.4

3.1. Correlation between Hemoglobin Levels and Quality of Life of Pregnant Respondents

According to WHO, anemia is a condition in which the red blood cell count is not sufficient to meet the physiological needs of the body. One of the results is a reduced oxygen-carrying capacity. WHO defines anemia as Hb levels <12 g/dl in women and Hb <13 g/dl in men [7]. In addition to decreasing health, anemia also affects patients' productivity, socioeconomics, and emotions. In other words, anemia decreases patients' quality of life (QoL) [3].

The correlation between anemia and the quality of life of the pregnant respondents is presented in Table 5. The results showed that there were 18 pregnant respondents (81.8%) who did not suffer from anemia and had a good quality of life, and there were 8 respondents (27.6%) who had a poor quality of life. There were 4 subjects with anemia who had a good quality of life (18.2%) and 21 respondents (72.4%) had poor quality of life. The analysis results of the correlation between hemoglobin levels and

KnE Medicine

quality of life showed p <0.05, i.e., 0.0001. This means that there was a significant correlation between hemoglobin levels and the quality of life of the pregnant women. This result is in line with a study conducted by Yilmaz et al (2019), showing that anemia has a significant effect on the quality of life of pregnant patients. The OR value was 11.812, indicating that the pregnant women who did not suffer from anemia had an opportunity to have a good quality of life 11.812 times higher than those with[3].

TABLE 5: Correlation between hemoglobin level and quality of life of pregnant patients.

Variable	Quality of Life			OR (CI95%)	P
	good	bad	total		
No Anemia	18	8	26	11.812	*0.0001
Anemia	4	21	25		

Where: *there is a correlation between hemoglobin level and quality of life of pregnant patients

A study by Anwar Muhammad (2019) shows several factors affecting the quality of life of pregnant women, including gestational age, health information and health cost [7]. Another study conducted on pregnant women in Korea in relation to quality of life using the EQ-5D showed a positive correlation with Hb levels. This shows that the higher the Hb level, approaching the normal levels, the better the quality of life Kim Young-Ju et al, 2019 . It is also mentioned tha t the incidence of anemia is related to HRQOL of pregnant women, especially in the domains of mobility, self-care, and general activities [8].

The results of this study indicated that, in the domain of social functioning, most of the pregnant women had a poor quality of life, i.e., 60.7% (Table 3). The correlation between each domain of quality of life based on the SF-36 is presented in Table 6. Physical and emotional health showed a significant p (p<0.05), i.e., p=0.034 and 0.017, respectively. Meanwhile the other 6 domains did not show a statistically significant correlation due to p > 0.05. This is in line with Yilmat et al (2019), showing that there is a significant correlation between Hb Ferritin levels and scores of physical and emotional health [3].

Based on the results of the study conducted at Jetis 1 Public Health Center, Bantul Yogyakarta, it was found that there was a significant correlation between hemoglobin levels and the quality of life of the pregnant respondents, particularly in the domains of physical and emotional health. In the domain of physical condition, anemia greatly affected the health of pregnant women, causing these pregnant women to be unable to perform their activities as usual. In the domain of emotional health, because these pregnant women were unable to perform their activities as usual, they felt depressed because they felt restricted. Thus, health workers, especially pharmacists, should play an

Table 6: Correlation between hemoglobin level and each domain of quality of life of pregnant patients

Variable	Domain	Good		Bad		OR	p
		N	%	N	%		
Category	**Physical Functioning**						
Anemia		11	39.3	14	60.9	2.404	0.21
No Anemia		17	60.7	9	39.1		
Category Anemia	**Physical Health**	11	35.5	14	70	4.242	*0,034
No Anemia		20	64.5	6	30		
Category	**Emotional Health**						
Anemia		9	32.1	16	69.6	4.825	*0,017
No Anemia		19	67.9	7	30.4		
Category	**Social Functioning**						
Anemia		8	40	17	54.8	1.821	0.454
No Anemia		12	60	14	45.2		
Category	**Body Pain**						
Anemia		17	54.8	8	40	0.549	0.454
No Anemia		14	45.2	12	60		
Category	**Vitality**						
Anemia		11	37.9	14	63.6	2.864	0.125
No Anemia		18	62.1	8	36.4		
Category	**Mental Health**						
Anemia		11	40.7	14	58.3	2.036	0.33
No Anemia		16	59.3	10	41.7		
	General Health						
Anemia		13	43.3	12	57.1	1.744	0.493
No Anemia		17	56.7	9	42.9		

Where: *$p < 0.05$ means there is a correlation between hemoglobin level and domain of quality of life of pregnant patients

educational role concerning compliance with iron tablets consumption so as to achieve clinical outcomes, in terms of Hb levels, thus improving the quality of life of pregnant women.

4. Conclusion

Based on the results of the study at Jetis 1 Public Health Center, Bantul Yogyakarta, it can be concluded that there was a significant correlation between hemoglobin levels

and the quality of life of pregnant women, especially in the domain of physical and emotional health.

Acknowledgements

References

[1] Kemenkes RI, "Hasil Riset Kesehatan Dasar Tahun 2018.," *Kementrian Kesehatan RI*. vol. 53, no. 9, pp. 1689–1699, 2018.

[2] H.J.C.M. Wouters, M.M. van der Klauw, T. de Witte, et al., "Association of anemia with health-related quality of life and survival: A large population-based cohort study.," *Haematologica*. vol. 104, no. 3, pp. 468–476, 2019.

[3] E. Yilmaz, "The Impact of Iron Deficiency Anemia on Health Related Quality of Life in the Last Trimester of Pregnancy.," *Eurasian Journal of Medical Investigation*. vol. 3, no. 3, pp. 182–188, 2019.

[4] Pratiwi Hariyani Putri, "PENGARUH UMUR KEHAMILAN USIA REMAJA, PENGE-TAHUAN IBU TENTANG ANEMIA, DAN STATUS GIZI TERHADAP KEJADIAN ANEMIA DI KECAMATAN SAWAHAN KOTA SURABAYA.," *Medical technology and public health journal*. vol. 1, no. 1, pp. 1–55, 2017.

[5] W. Astriana, "Kejadian Anemia pada Ibu Hamil Ditinjau dari Paritas dan Usia.," *Jurnal Aisyah : Jurnal Ilmu Kesehatan*. vol. 2, no. 2, pp. 123–130, 2017.

[6] Salmariantity, "Faktor-Faktor Yang Berhubungan Dengan Anemia Pada Ibu Hamil Di Wilayah Kerja Puskesmas Gajah Mada Tembilahan Kabupaten Indragiri Hilir Tahun 2012," (2012).

[7] M. Anwar, S. Sirajuddin, R. Amiruddin, R. Thaha, T. Sudargo, and A.J. Hadi, "The Effect of Health Social Determinant on the Life Quality of Pregnant Mother.," *Indian Journal of Public Health Research & Development*. vol. 10, no. 10, pp. 1604–1608, 2019.

[8] Y.J. Kim, K. Do Han, K.H. Cho, Y.H. Kim, and Y.G. Park, "Anemia and health-related quality of life in South Korea: Data from the Korean national health and nutrition examination survey 2008-2016.," *BMC Public Health*. vol. 19, no. 1, pp. 1–8, 2019.