Factors associated with anemia and its prevalence level among pregnant women in Rathnapura, Sri Lanka

K. M. J. I. B. Senarathna[a]*, M. C. Alibuhtto[b]

Department of Mathematical Sciences, Faculty of Applied Sciences,
South Eastern University of Sri Lanka

([a]jinidusenarathna@gmail.com, [b]mcabuhtto@seu.ac.lk)

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Introduction

Anemia in pregnancy is a global medical problem that can harm pregnant mothers and their newborns. Pregnant women with anemia are more likely to experience poor childbirth and an increased risk of maternal and perinatal death [1]. Anemia accounts for nearly 20% of maternal deaths, most of which occur in developing countries [2]. Generally, the frequency and intensity level of anemia during pregnancy varies from country to country, indicating a wide range of health problems. For instance, a study carried out in Jashore (Bangladesh) reported an overall anemia prevalence of 58.9% among pregnant women with excessive blood loss during previous surgery, pregnancy gap of fewer than two years, gestational age of the third trimester, the joint family size were significant factors associated with anemia [3]. On the other hand, in a similar study conducted in Peradeniya, Sri Lanka found an overall prevalence of anemia of 8.19%, where, 56.76%, 42.79%, and 0.45% had moderate, mild, and severe anemia, respectively. Among the associated factors with anemia were, low monthly family income, low consumption of red meat per week, and high intake of tea per week [4].

Although different studies were undertaken to determine the occurrence of anemia among pregnant women in Sri Lanka, however, there is an inadequate record with poor accessibility of pervasiveness of anemia among pregnant women. More specifically, no related studies have been carried out in the Rathnapura area to determine the prevalence of anemia and its associated factors among pregnant women. Thus, the main objective of this research is to determine the present status of anemia during pregnancy in the Rathnapura municipal region and to identify the significant risk factors related to this issue.

Methodology

A health facility-based cross-sectional research design was used to obtain data from June to September 2020 in the Rathnapura MOH region. The data consisted of women aged 15 and above who visited the MOH prenatal clinic for postpartum follow-up. A Single population proportion sampling technique [5] was used to calculate the sample size (n=357). For data collection, two techniques, namely data extraction from medical reports and interviews using a standardized questionnaire, were used. The study took a total of 25 categorical variables into account including anemia status (dependent variable), age, religion, family size, education level, occupation, income, gravidity, pregnancy gap, history of abortion, BMI, regular vegetable, fruit, and meat consumption, milk consumption, add tea or coffee to milk, drink tea or coffee before or after a meal, regular iron intake, intake of folic acid, participation in the clinics, deworm treatment before pregnancy, presence of chronic diseases, blood group, pre-pregnancy menstruation, and frequent vomiting (independent variables).

Descriptive statistics were used to estimate the anemia prevalence. Multicollinearity was checked using Spearman and Cramer's V techniques. The variables were reduced to the optimum model using the "backward elimination" in the binary logistic method. The risk variables for worse anemia were discovered using multinomial logistic regression.

Results and Discussion

The overall anemia prevalence among the study participants was 57.42%, with 2.44% severe,

22.93% moderate, and 74.63% mild cases (Figure 1). The prevalence of anemia in our study was higher than the study published in Peradeniya (8.19%) [4]. This prevalence is almost similar to the study conducted in Bangladesh [3].
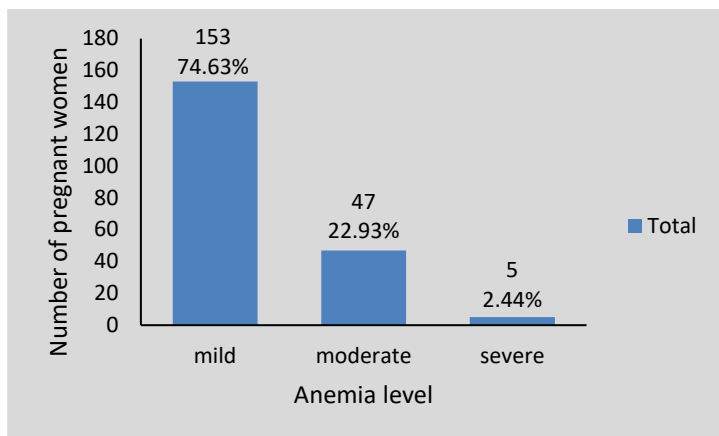

Figure 1. Prevalence of anaemia level.

No assumptions of binary and multinomial logistic regressions were violated except for the multicollinearity issue. Therefore, factors like pregnancy gap, occupation, history of abortion, pre-pregnancy menstruation, and regular fruit consumption were removed to avoid the multicollinearity.

Table 1 depicts the results of the final revised model of the binary logistic method. These results reveal that anemia was more common among women who did not eat vegetables regularly. Also, low monthly income and lack of iron intake were associated with anemic pregnant women. Further, pregnant women who add tea or coffee to milk had a higher risk of being anemic. This may be due to the restriction of iron absorption. In addition, a pregnant woman undergoing deworming before pregnancy and up to young age is less likely to suffer from anemia than a pregnant woman receiving deworming at an early age. The odds of pregnant women with tertiary level education are 5.278 times more likely than pregnant women with a secondary level education. Moreover, a pregnant woman who consumes milk on a daily basis is more prone to anemia than a pregnant woman who does not consume milk. This proves that milk interferes with the absorption of iron, which causes iron deficiency anemia. Relatedly, pregnant women who experience frequent vomit and low BMI have a high chance of developing anemia. Finally, the odds of gravida-3 pregnant women were 3.771 times higher than that of primigravida pregnant women, and a pregnant woman with blood group O was 67.8% less than of a pregnant woman with blood group A.

Table 1. Final reduced model (using backward elimination method).

Factors	Category levels	B	Sig.	Exp(B)
Educational Level	Secondary		0.032	
	Collegiate	0.69	0.090	2.006
	Tertiary	1.66	0.010	5.278
Monthly income	Low		0.004	
	Middle	-1.47	0.064	0.231
	High	-2.59	0.003	0.075
Gravidity	1		0.008	
	2	-0.49	0.214	0.609
	3	1.33	0.011	3.771
	>3	-0.53	0.547	0.586

Table 1. continue.

		B	Sig.	Exp(B)
BMI	Low		<0.001	
	Normal	-2.48	<0.001	0.083
	High	-3.08	<0.001	0.046
Regular vegetable consumption	No	2.13	<0.001	8.384
	No		0.008	
	Sometimes per week	-0.82	0.127	0.441
	Daily	1.57	0.012	4.814
Add tea/coffee to milk	No	-2.98	<0.001	0.051
Regular iron intake	No	1.96	<0.001	7.073
Participation for clinics	Government		0.058	
	Private	0.83	0.294	2.293
	Both	1.08	0.017	2.929
Deworming treatments before pregnancy	Small age		0.005	
	Up to young age	-1.94	0.003	0.144
	Up to pregnancy	-1.95	0.001	0.143
	No	-1.06	0.113	0.348
Presence of chronic diseases	No	-1.02	0.086	0.361
Blood group	A		0.080	
	B	-0.65	0.186	0.523
	AB	-1.11	0.213	0.328
	O	-1.13	0.011	0.322
Vomit frequently	No	-1.32	0.001	0.268
Constant		7.18	<0.001	

Table 2. Estimated risk factors from multinomial logistic regression.

Factors	Estimated category	Reference category	B	Sig.	Exp(B)
BMI	Low	High	2.511	0.001	12.32
Regular vegetable consumption	Yes	No	-1.84	<0.001	0.159
Milk consumption	No	Daily	-1.46	0.045	0.233
	Sometimes per week	Daily	-1.84	0.032	0.158
Add tea/coffee to milk	Yes	No	2.47	<0.001	11.82
Regular iron intake	Yes	No	-1.57	0.002	0.208
Had frequent vomit	Yes	No	1.368	0.001	3.927

Conclusion

The prevalence of anemia in this study was 57.42% indicating high prevalence of anemia in the sampled population. Among the selected 24 independent variables, the education level, monthly income, gravidity, BMI, regular vegetable consumption, milk consumption, add tea or coffee to milk, regular iron intake, participation in the clinics, deworming treatment before pregnancy, blood group, and frequent vomiting were significantly associated with anemic pregnant women. However, low BMI, no regular consumption of vegetables, daily consumption of milk, no regular iron intake, added tea or coffee to milk and frequent vomiting were influenced for pregnant women with moderate to severe anemia.

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