Tracing the Socio-demographic Correlates of Anemia among Reproductive Age Women in Azad Jammu & Kashmir, Pakistan

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Abstract:

Anemia is an endemic health issue, particularly for women across low-income countries. Pakistani women are more susceptible to develop anemia at a specific age of their life due to poverty, low levels of education, gender discrimination, unavailability of healthcare services, and poor hygienic conditions at the household level. Previous researches mainly focused on the clinical factors of anemia and very little systematic research on socio-economic and demographic risk factors has been pursued. This study is aimed at analyzing such risk factors for anemia among women of reproductive age in the selected area of Azad Jammu and Kashmir (AJK), Pakistan. A cross-sectional field survey was conducted to gather data from 384 women having at least one child. Standard univariate and bivariate econometric techniques helped in qualifying the hypothesis that anemia among women has been strongly associated with the socio-economic variables of family income and education while demographic variables of age at marriage, number of pregnancies, and distance from health care facilities also played important role. The key policy message is that health facilities, economic self-sufficiency, and education may help in alleviating anemia among vulnerable women.

Keywords: Anemia, Pakistan, demographic factors, women health, women of reproductive age.

INTRODUCTION

Women's health has been given a prime importance in the global agenda. Six out of eight Millennium Development Goals (MDGs) were linked to women's health (Denny, 2011; WHO, 2018). Similarly, the agenda of 2030 or Sustainable Development Goals (SDGs) has a central focus on women's health. All SDGs are implicitly and explicitly related to health and interconnected to create synergetic effects (Dhimal et al., 2017).

Women suffer from numerous health problems such gynecological issues, interstitial cystitis, polycystic ovary syndrome, sexually transmitted diseases, autoimmune disease, breast cancer, pregnancy issues, anemia etc. Anemia is mainly cognizant of health status that ultimately depends on food intake. Women are more vulnerable to develop anemia due to insufficient intake of multiple micronutrients in low and middle-income countries (Henjum et al., 2015). In South Asia, pregnant

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women suffer from the deficiency of several micronutrients (Akhtar et al., 2013; Henjum et al., 2015; Harris-Fry et al., 2018).

Anemia is a plebeian blood cark connected with several red blood cells at a decrement level among women of reproductive age (WRA) (Gotapagar, Gorad, Kane & Magdum, 2016). It is primarily caused due to the deficiency of iron and other fundamental vitamins (e.g. folic acid, A, C, B12, and B-complexed group; niacin, pantothenic acid, amino acids, and proteins) which are important for maintaining hemoglobin level (Kapur, Agarwal &, Agarwal, 2002; Mekonnen, Ambaw & Neri, 2018). Anemia is the outcome of malnutrition, abnormalities from inherited genetics, medicine fallouts, blood loss from internal and external injuries, chronic diseases, abolition, and inefficient productivity of red blood cells (Abbasi et al., 2013). The prevalence of anemia among women around the world is presently 40.1 percent which was 39.8 percent in 2015 (World Bank, 2016). The low and middle-income countries are particularly facing these daunting challenges of micronutrient deficiencies and malnutrition, genetic hemoglobin perturbs, and contagious diseases (Warrell, Cox, Firth & Benz, 2003; Harding, Aguayo, Namirembe & Webb, 2018). Women are more vulnerable to meet their daily dietary needs. For instance, most of the time women take their meals at the last and least in quantity but faster than that of men. They have a limited role in decision-making regarding the purchasing of food (Morrison et al., 2018).

In South Asia, anemia is a significant problem of moderate (20.0–39.9 percent) or severe (≥40 percent) intensity from public health perspective among WRA (WHO, 2011; Stevens, et al., 2011). In Pakistan, anemia is traced in the severe category among WRA, and is prevalent more among non-pregnant as compared to pregnant women (WHO, 2015; Siddiqui et al., 2017). Its prevalence among pregnant women declined from 50 percent in 1990 to 47.4 percent in 2002 while it started increasing and reached 51.3 percent in 2016 (World Bank, 2016). Few studies in Pakistan endorsed the severity of this endemic. For instance, Shams, Ahmad and Wadood (2017) observed that iron deficiency (ID) among pregnant women was 64 percent in Karachi, 73 percent in Lahore, and 76 percent in Multan. The population of Azad Jammu and Kashmir (AJK) 4.045 million in 2017 census (Government of AJK, 2019) and 61 percent of the geographical area of AJK is mountainous Due to the mountainous topography of AJK which has 88:12 urban-rural configurations, the people in AJK have inadequate health coverage and facilities (Gilani, 2012; Government of AJK, 2019). The main income sources to maintain the financial needs of the family are small businesses, tourism, livestock, horticulture, collection of medicinal herbs, and remittances. In short, their financial status does not allow them to meet the daily required micronutrients for healthy lives. Habib, Abbasi and Aziz (2020) reported a high prevalence of anemia (47.7 percent) among adolescent girls, which can be the predisposing factor of this ailment among WRA in AJK, Pakistan. Under such circumstances, anemia is thus the obvious ailment among women in this region.

In this context, the present study is carried out for enquiring the health status as well as the associated factors involved in increasing anemic catastrophe among women of reproductive ages. The cause of anemia cannot be determined on the clinical factors (malfunctioning of the biological systems) only, but current societal determinants such as socio-cultural, demographic, economic,

and environmental factors are also responsible for a substantial increase of anemia among women. Thus, the rationale of the present study is to investigate the role of socio-demographic determinants in escalating anemia among WRA, which can be prevented to combat anemia among the female population. Previous researches on anemia mainly focused on the biological factors of the disease, however, limited systematic research investigated the role of socio-demographic factors. This study attempted to qualify the hypothesis that there is a strong association between anemia and its socio-demographic contributors among WRA. The main aim of this study is to highlight the prevalence and severity of anemia among WRA. A policy message may be drawn for revisiting and formulation of a concrete rural-urban health system in the light of international commitments of SDGs, Vision 2025, and WHO.

MATERIALS AND METHODS

Data collection and study design

This study was conducted in district Muzaffarabad, AJK because it is considered as a micronutrient deficient area particularly concerning pregnant women. Since purpose of the study was to investigate the seriousness of the issue of anemia among WRA, the sample size was defined by employing a purposive sampling technique. The purposive sampling technique is the most time and cost-effective sampling method, which serves the purpose of the study. The respondents were taken both from the rural and urban population of Muzaffarabad, AJK through following the statistical justification as suggested by Krejcie and Morgan (1970).

$$n = \frac{\chi^2 NP(1-P)}{d^2(N-1)+\chi^2 P(1-P)} \qquad (1)$$

where n is the sample size, N is the population size, P indicates population proportion (0.50), and d is the marginal error (0.05). The χ^2 value is 30841 at the degree of freedom 1 and 95% confidence interval. Using the values of these parameters in the above formula, the sample size is 384 for the population size of 545817 women of 15-49 years.

The data of WRA (15-49 years) required having at least one child were collected through field surveys with the help of trained interviewers. The study was approved by the board of advanced studies and research, Pir Mehr Ali Shah Arid Agriculture University Rawalpindi, Pakistan. The survey instrument was a self-constructed interview schedule comprising open-ended and close-ended questions. Respondents were briefed about the purpose of the study and consent was taken for data collection. The respondents were asked questions about their socio-economic and demographic characteristics for example age, education, visits made for prenatal care, marital status, educational level, number of pregnancies, family income, and family size to justify the objectives of the study. Due to the mountainous topography of the region, and limited-time and financial constraints, two hospitals; Abbas Institute of Medical Sciences and Combined Civil & Military Hospital Muzaffarabad was selected for collecting blood samples to screen the hemoglobin (Hb) level of the respondents. The severity level was determined by the threshold of hemoglobin. The non-pregnant women were classified as severe anemic if Hb<8.0 g/dL, moderate if it is 8.1-10.9

g/dL, mild anemic if it is 11-11.9 g/dL and normal if it is greater than 12g/, whereas for pregnant women Hb<7.0 g/dL was considered severe, 7.1-9.9 g/dL moderate, 10-10.9 g/dL mild and greater than 11 g/dL normal (WHO, 2001; and WHO, 2008). The data was entered carefully in SPSS 14.0 for the analysis to achieve the results of the research.

Estimation Methods

The study is aimed to find the prevalence of anemia and its association with sociodemographic factors. A quantitative research design was used to estimate the role of sociodemographic risk factors of anemia in AJK. For this reason, univariate and bivariate econometric techniques were applied to calculate and analyze the associations and proportions among and between the variables of importance. The univariate analysis was performed for calculating descriptive statistics of socio-demographic factors behind anemia and anemia prevalence among women. The bivariate technique was used to explain the distributions of the outcome variables by the exposure variables while the univariate was applied for describing the prevalence of the outcome. Frequency distributions and percentages were utilized for performing univariate analysis. In the bivariate analysis, the association among different variables was examined by using the chi-square (χ^2) test (Tutor's Operations Research of WHO, 2001), which is a nonparametric test performed to study the association between dependent and independent variables. The formula of the Chi-Square test is as followed.

$$\chi^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i} \tag{2}$$

"O" represents observed frequency and "E" shows expected frequency with 2 degrees of freedom and a significance level of 0.01. The odds ratio (OR) is computed using the following relation (Szumilas, 2010).

$$OR = \frac{odds\ of\ an\ event\ occurring\ in\ the\ test\ group}{Odds\ of\ an\ event\ occurring\ in\ the\ reference\ group} \tag{3}$$

The OR=1, represents that odds of occurrence of an event in the test and reference groups are the same, OR> 1 reveals that odds of occurrence of an event in the test group are higher than the reference group, and OR<1 depicts that odds of occurrence of an event are high in the reference group than the test group. Statistical package for social sciences (SPSS) version 14.0 is used for preparing datasheet and performing data analysis.

Results

Table 1 shows the absolute percentage distribution of 384 respondents (50 percent each from urban and rural areas) based on socio-demographic factors. The respondents were divided into four groups based on their current age: up to 18 years, 19-25 years, 26-35 years, and 35+ years. The mean current age of the respondents was 28.97±5.71 (mean± standard deviation) years. The majority (58.9 percent) of the respondents were 26-35 years old, followed by (27.9 percent) 19-25 years, (10.9 percent) more than 35 years, and only 2.3 percent were up to 18 years. It is evident

from the data that majority of women are in their peak reproductive age. The mean age at the time of marriage of the respondents was 20.52±4.26. The age at the time of marriage was categorized into three groups: up to 18 years, 19-25 years, and 26+ years. About half (49.2 percent) of the women were married on or before reaching the age of 18 years, followed by 37.8 percent between 19-25 years and the remaining 13 percent at the age above 25 years. The results depict that early age marriage is highly prevalent in the study area. The conjugal age refers to the length of the marital life of a couple. The data revealed that the conjugal age of 35.7 percent of the respondents was up to five years, 36.5 percent 6 to 10 years, and the remaining 27.8 percent more than 10 years.

Based on educational attainment, respondents were divided into six categories (illiterate, primary, middle, matric, intermediate, bachelors, and masters/above). About 28.9 percent of the respondents were illiterate, and those who attained education of masters/above were 10.7 percent. The family monthly income plays an important role to meet household needs, dietary intake of diverse food, and utilization of adequate healthcare. It is evident from the table that only 6.5 percent of the respondents have a monthly income of more than 100,000 in Pakistani rupees (PKR), which is the highest income category. Thus, low monthly income is one of the major hurdles in acquiring adequate nutritional food, education, and healthcare. The table also reveals that majority of the respondents are living in families having a family size of 8+, which further aggravates the livelihood of the respondents. The table shows a higher number of pregnancies among women. The population growth rate in AJK is 2.41 percent which is higher than that of 2.10 percent reported in Pakistan (Habib, 2020; Habib et al., 2020), which is manifested by the higher number of pregnancies among women in this study. More pregnancies deplete the iron store in the body and increase the prevalence of anemia among them. Around 6 percent of the respondents paid no prenatal care visits, 35.5 percent managed 1 to 3 visits, 25.3 percent reported 4 to 6 visits and 33.3 percent respondents reported 6+ prenatal care visits.

Figure 1 shows the distribution of the respondents based on the anemia severity determined by the Hb level. It is evident from the figure that 14 percent of total respondents were suffering from severe anemia, 41 percent were suffering from moderate and 45 percent of the respondents were suffering from no/mild anemia.

In table 2, the association of socio-demographic variables with anemia severity among respondents is presented. The results reveal that prevalence of severe anemia is almost double in respondents in rural dwellings, whereas, moderate anemia is also highly prevalent in the respondents of rural areas. Chi-Square value of 9.2, degrees of freedom 2, and p-value 0.010 depicts a strong association between anemia and respondent's residential status. The anemia in the respondents of rural areas may be attributed to limited access to education, scarce health facilities, poor socioeconomic status, and unhygienic environmental conditions.

The current age is an important determinant of anemia. The respondents were classified into four mutually exclusive categories. The majority of the women were 26 to 35 years old. The data revealed that 7.5 percent of the respondents were from the age group 19 to 25 years, 15.5 percent

belonged to the age group 26 to 35 years, and 26.2 percent of the respondents of over 35 years were suffering from severe anemia. Furthermore, the severe and moderate anemia was high among the women above 19 years of age.

Table 1: Distribution of the respondents based on the socio-demographic profile in terms of frequency, percentages, and 95% confidence interval (CI)

Variable	Groups	Frequency	Percentage	95% CI
	Up to 18	9	2.	0.81-3.79
Current age (years)	19 to 25	107	27	23.38-32.35
	26 to 35	226	58	53.93-63.78
	35+	42	10	7.82-14.06
	Up to 18	189	49.2	44.22-54.22
Age at marriage (years)	19 to 25	145	37	32.91-42.61
	25+	50	13	9.56-16.39
	Up to 5	137	35.7	30.91-40.49
Conjugal age (years)	6 to10	140	36	31.68-41.32
	10+	107	27	23.32-32.28
	Illiterate	111	28.9	24.37-33.44
	Up to middle	43	11	8.04-14.35
	Matric	64	16	12.94-20.39
Education	Intermedia	26	6.	4.26-9.28
	Bachelors	57	14	11.29-18.40
	Maters/ab	41	10	7.59-13.77
	Up to 10000	77	20.1	16.05-24.06
	10001-	151	39	34.44-44.21
Family monthly income (PKR)	25001-	87	22	18.47-26.84
	500001-	44	11	8.27-14.64
	100000 +	25	6.	4.04-8.98
	2 to 4	66	17.2	13.41-20.96
	5 to 6	113	29	24.87-33.99
Family size	7 to 8	78	20	16.28-24.32
	8+	127	33	28.37-37.78
	1 to 2	144	37.5	32.66-42.34
Number of pregnancies	3 to 4	136	35	30.63-40.20
	5 to 6	59	15	11.76-18.97

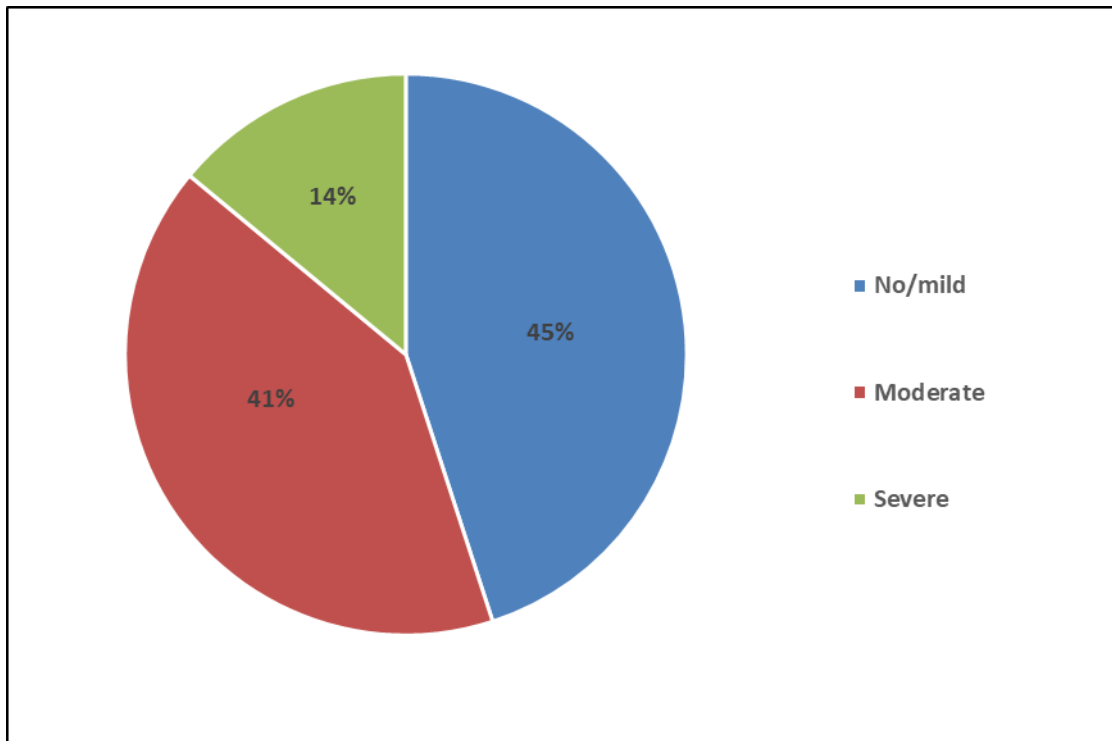|			
	6+	45	11	8.50-14.94
	None	23	6	3.62-8.36
Visits made for prenatal care	1 to 3	136	35	30.63-40.20
	4 to 6	97	25	20.91-29.61
	6+	128	33	28.62-38.05

Figure 1: Distribution of anemic respondents based on the anemia severity determined by the level of hemoglobin

The high prevalence of severe and moderate anemia may be ascribed to childbearing, lactation, and menstrual periods. The early age of marriage of the girls may cause reproductive and physical health problems that can be associated with anemia or anemia related problems. The mean marriage age for females in Pakistan is 22 years (Batool, Zafar, Maann, & Ali, 2010).

The present study revealed that the mean age at marriage was 20.52 years (19.44 years in rural and 21.60 years in urban populations) which is well below the mean marriage age in Pakistan. Most (49.2 percent) of the women got married up to the age of 18 years. Severe and moderate anemia was highly prevalent among the women who got married up to the age of 18 years. Chi-square value of 23.19 with 4 degrees of freedom and p-value of 0.001 showed a strong association of anemia with early age marriage. Based on conjugal age, the responders were categorized into three

groups, i.e., up to the age of 5 years, 6 to 10 years, and more than 10 years. The results highlighted that prevalence of severe and moderate anemia increased with the increase in conjugal period among the women. Chi-square value 41.15 and P<0.001 revealed a significant positive association between conjugal age and prevalence of anemia among women.

Education is the social right of every human, especially females. The women education serves numerous benefits, such as reduced rate of mother-child mortality, improved socio-economic status of a family, awareness about diverse nutritional food, better healthcare for family, basic hygiene, awareness about contraception and family planning, better decisions about prenatal care, active participation in decision making, participation in politics and contribution to the betterment of local community (Batool et al., 2010). The results of the study depict that severe and moderate anemia has been substantially high among illiterate women. Chi-Square value of 48.36 and p-value <0.001 shows a significantly high association between education and the prevalence of anemia among women. These findings are consistent with previous studies reporting that education of women boosts the family income, knowledge about contraceptive behaviour and healthcare, use of nutritional diet and food supplements and adoption of adequate personal hygienic practices that consequently helps in reducing anemia.

Table 2: Association of socio-demographic variables with prevalence of anemia severity

Variable	Groups	Anemia Severity			Chi-square (df)	P-value
		No/Mild (%)	Moderate (%)	Severe (%)		
Residence	Urban	99(51.6)	74(38.5)	19(9.9)	9.70(2)	0.008
	Rural	73(38.0)	83(43.2)	36(18.8)		
Current age (years)	Up to 18	7(77.8)	1(11.1)	1(11.1)	18.55(6)	0.005
	19 to 25	44(41.1)	55(51.4)	8(7.5)		
	26 to 35	100(44.2)	91(40.3)	35(15.5)		
	35+	21(50.0)	10(23.8)	11(26.2)		
	Up to 18	65(34.4)	84(44.4)	40(21.2)		
Age at marriage (years)	19 to 25	77(53.1)	57(39.3)	11(7.6)	23.19(4)	<0.001
	25+	30(60.0)	16(32.0)	4(8.0)		
Conjugal age (years)	Up to 5	76(55.5)	54(39.4)	7(5.1)	41.15(4)	<0.001
	6 to 10	67(47.9)	58(41.4)	15(10.7)		
	10+	29(27.1)	45(42.1)	33(30.8)		
Education	Illiterate	38(34.2)	44(39.6)	29(26.2)	48.36(10)	<0.001
	Up to Middle	34(40.0)	33(38.8)	18(21.2)		
	Matric	22(34.4)	36(56.2)	6(9.4)		
	Intermediate	14(53.8)	11(42.1)	1(3.8)		
	Bachelors	37(64.9)	19(33.3)	1(1.8)		
	Maters/above	27(65.9)	14(34.1)	0(0.0)		

Family monthly income	Up to 10000	25(32.5)	36(46.8)	16(20.8)	13.91(8)	0.084
	10001- 25000	68(45.0)	59(39.1)	24(15.9)		
	25001- 50000	41(47.1)	34(39.1)	12(13.8)		
	500001- 100000	22(50.0)	20(45.5)	2(4.5)		
	100000 +	16(64.0)	8(32.0)	1(4.0)		
Family size	2 to 4	37(56.1)	22(33.3)	7(10.6)	11.8(6)	0.088
	5 to 6	54(47.8)	46(40.7)	13(11.5)		
	7 to 8	30(38.5)	39(50.0)	9(11.5)		
	8+	51(40.2)	50.0(39.4)	26(20.5)		
Number of pregnancies	1 to 2	86(59.7)	50(34.7)	8(5.6)	71.35(6)	<0.001
	3 to 4	59(43.4)	65(47.8)	12(8.8)		
	5 to 6	20(33.9)	26(44.1)	13(22.0)		
	6+	7(15.6)	16(35.6)	22(48.9)		
Visits made for prenatal care	None	5(21.7)	11(47.8)	7(30.4)	11.8(6)	0.083
	1 to 3	65(47.5)	51(37.5)	20(14.7)		
	4 to 6	38(39.2)	46(47.4)	13(13.4)		
	6+	64(50.0)	49(38.3)	15(11.7)		

The socio-economic status of the respondent and her family is linked to better nutrition and health facilities for the family. It is evident from table 2, lower family monthly income is associated with severe and moderate rates of anemia among the respondents, however, this variable was not significant. The increased family size intensifies poor food intake, hygiene level, and stress. A realistic elucidation is the seemingly lower iron intake in the large families along with more exposure to uncleanliness and parasitic infestations. As indicated in table 2, the respondents were divided into four categories. The results revealed that with the increase in family size, the prevalence of moderate and severe anemia increased. The number of pregnancies is an important contributing risk factor for anemia. The results of the Chi-square test revealed a highly significant association in the severity of anemia and number of pregnancies (Chi-square value is 71.35, degree of freedom 6 and p-value<0.001). The number of prenatal visits were not significantly associated with anemia severity.

The odds ratio (OR) is a useful statistic that provides the strength of association between two variables. In table 3, the estimates of the odds ratio are presented to study the strength of association between various socio-demographic variables and severity of anemia. The results depict that in rural communities the prevalence of

Table 3: Estimates of Odd Ratio, 95% CI, and p-values for the respondent's demographic variables and Severity Prevalence of Anemia.

Variable	Groups	Severe/ Moderate Anemia	No/Mild Anemia (%)	dd Ratio	95% CI	hi- square	P-value

		(%)					
Residence	Rural	119(62.0)	73(38.0)		1.16-2.61		0.008
	Urban	93(48.4)	99(51.6)	.74		.11	
Current age (years)	Up to 25	65(56.0)	51(44.0)		0.68-1.63		0.83
	25+	147(54.9)	121(45.1)	.049		.05	
Age at marriage (years)	Up to 18	124(65.6)	65(34.4)		1.54-3.50		<0.001
	18+	88 (45.1)	10 7(54.9)	.32		6.28	
Conjugal age (years)	Up to 5	61(44.5)	76(55.5)		0.33-0.78		0.002
	5+	151(61.1)	96(38.9)	.51		.83	
Education	Up to Matric	166(63.8)	78(39.6)		1.92-4.67		<0.001
	Higher than Matric	46(37.1)	78(62.9)	.99		4.29	
Family monthly income	Up to 25000	135(59.2)	93(40.8)		0.99-2.25		0.05
	25000 +	77(49.4)	79(50.60)	.49		.64	
Family size	Up to 6	88(49.2)	91(50.8)		0.42-0.95		0.03
	6+	124(60.5)	81(39.5)	.63		.96	
Number of pregnancies	1 to 3	91(44.0)	116(56.0)		0.24-0.55		<0.001
	3+	121(68.4)	56(31.6)	.36		2.29	
Visits made for prenatal care	0 to 3	89(56.0)	70(44.0)		0.70-1.59		0.80
	3+	123(54.7)	102(45.3)	.054		.06	

severe and moderate anemia is 1.74 times more prevalent compared to urban communities. However, there is no such significant association of severe/moderate anemia found based on the respondents' current age and number of prenatal visits. Among the respondents, those married before the age of 18 years have had 2.32 times more chances of developing severe/moderate anemia. The respondents having a conjugal age of up to 5 years have an almost 50 times less chance of developing severe/moderate anemia compared to the respondents having a marital life of more than 5 years. The high prevalence of severe/moderate anemia may be attributed to repeated pregnancies with the increasing length of the marital life. The respondents qualifying higher than matric have almost 3 times lesser chances of developing severe/moderate anemia. The prevalence of severe/moderate anemia is 1.49 times more in respondents having monthly family incomes up to PKR 25,000. Furthermore, women with up to 3 number of pregnancies have 64 percent lesser odds of severe/moderate anemia compared to those with more than 3 pregnancies.

DISCUSSION

Anemia is a severe public health problem among WRA in Pakistan and its prevalence has increased during the last decade (Harding et al., 2018). It is equally prevalent among both pregnant and non-pregnant women (WHO, 2015; Siddiqui et al., 2017). Targeted efforts are needed to combat anemia by considering its multifactorial etiology among vulnerable groups with well-executed evidence-based interventions. In this study, we analyzed the socio-demographic correlates of anemia among WRA in AJK to investigate the contributory association of this ailment in the region. The findings of the study revealed that The findings revealed that the prevalence of moderate and severe anemia in AJK is 55 percent among WRA in the study population.

The results of the bivariate analysis highlight importance of socio-demographic risk factors of anemia among WRA in this region. The present study demonstrated that severe and moderate anemia among women residing in rural settings is significantly higher than those living in urban areas. The study highlighted that severe and moderate anemia is more prevalent among illiterate respondents than educated ones. The results are supported by other studies that revealed the prevalence of anemia as more among women living in rural areas (Government of Pakistan, 2018; Parks et al., 2019). The study highlighted that severe and moderate anemia is more prevalent among illiterate women compared to educated ones. The findings are supported by studies (Batool et al., 2010; Melku, Addis, Alem & Enawgaw, 2014), which reported that educated women are less vulnerable to anemia. Educated women have better knowledge about anemia, its prevention, and treatment, utilize adequate healthcare service, and consume iron-rich food. Early marriage is an important determinant of anemia, which is directly linked to a longer conjugal period and more number of pregnancies. In Pakistan, the majority of girls get married during their teen age (Batool et al., 2010), when they are not mentally, physically, and reproductively mature enough to cope with pregnancy and other married life responsibilities. Early marriage is significantly associated with higher prevalence of severe and moderate anemia in women. The findings are in line with the studies of Dorsey and Murdaugh (2003) and Batool et al. (2010).

The present study also revealed that low family monthly income, a large family size, and repeated pregnancies are significant contributors to severe and moderate anemia among WRA. Income is an indicator that determines the utilization of healthcare of an individual and their families. Low income is the pivotal factor in anemia among WRA (Batool et al., 2010; Harding et al. 2018; Habib, 2020). The family size deceptively increases food intake disparity, hygiene level, and stress (Batool et al., 2010). Repeated pregnancies are strongly linked with the probability of anemia among WRA (Batool et al., 2010; Tayade, Singh, Kore, Gangane & Singh, 2018).

This is now established that the most affected populations suffering from anemia in the low and middle-income countries are pregnant and non-pregnant women, and children. There might be some standard way-forward to combat this epidemic in Pakistan. Anemia in Pakistan is a multifactorial problem, which requires an integrated approach to combat it. The government needs to devise short, medium and long-term strategies to improve iron status and to reduce anemia

among WRA in AJK, Pakistan. As a policy guideline, the most important starting point is to educate and train the ignorant women who have limited social interactions. To achieve this, there should be a dissemination of awareness through electronic and print media along with awareness pamphlets dispatched at the local utility stores. In areas with anemia prevalence > 20 percent weekly iron and folic acid supplementation (WIFS) dose should be provided to adolescent girls, pregnant and non-pregnant women, and three months after pregnancy as per WHO recommendations. Rural pockets should specifically be targeted because there is a high prevalence of anemia but low level of facilities. The health structure should be renovated and refined. A mother's health is not only a serious concern for the current age but for the coming generations as well. Anemia can also be prevented by ensuring low-cost iron supplements. Moreover, employment is also a very necessary dimension for fulfilling the dietary needs of a household because purchasing power determines one's dietary requirements. Therefore, regulatory authorities are needed to take proactive measures in market regulations particularly the price regulation mechanism.

CONCLUSION

In this study, an analysis of socio-demographic factors contributing to anemia among women during their reproductive age has been made in AJK, Pakistan. The whole study was meant to identify which socio-demographic factors predispose anemia in the region. The requisite information was collected from carefully selected respondents between the age group of 15 to 48 years. It was also ensured to include only women who had at least one child of less than five years of age. It was empirically inferred that the prevalence of anemia was significantly associated with education, age at marriage, family monthly income, the number of pregnancies, household size and residential status. The Government of AJK and the district management authorities need to take concrete measures for eradicating anemia by providing better and equal educational facilities to females, ensuring employment opportunities, dietary diversity and provision of WIFS. An awareness campaign may also be initiated about the benefits of a small family size, consequences of repeated pregnancies and early age marriages to combat anemia among women.

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