

A Cross-Sectional Study to Assess the Effect of Epidemiological Determinants on Prevalence of Anaemia among the Adolescent and Reproductive Age Females Residing at Rural Bikaner

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ABSTRACT

Introduction: Nutritional anaemia is a worldwide problem, with the highest prevalence in developing countries. In India, 20-40% of maternal deaths are due to anaemia. 55 % of Indian adolescent girls are anaemic and the prevalence of anaemia in women of reproductive age is 53.1% and 56% of adolescent girls and 46.8 % of the women aged 15-49 years are anaemic in Rajasthan and the prevalence was slightly higher in rural than urban areas.

Objective: To study association between epidemiological determinants and anaemia prevalence among 10-49 year age group females of rural Bikaner.

Methodology: Community based cross-sectional study, A total of 600 women were selected for study by systematic random sampling. Inclusion criteria included informed verbal consent and no critical or chronic illness.

Results: Most (92.50%) of the study population was anaemic. Mean haemoglobin value among anaemic and non-anaemic females was 8.65±1.23 g/dl & 11.24±1.21 g/dl respectively. About 2/3rd (69.55%) of the anaemic study population had moderate anaemia. Only 2.50 % of the anaemic study population had severe anaemia.

Conclusion: Anaemia is a major public health problem among adolescent and reproductive age females in rural area and age groups, type of family, age at marriage, age at first child, pattern of menstrual cycle, medical history of study population and signs and symptoms were associated with anaemia in adolescent and reproductive age females.

Keywords: Anaemia, Adolescent, Reproductive.

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INTRODUCTION

Nutritional anaemia is a worldwide problem, with the highest prevalence in developing countries.¹ Iron deficiency is the most common nutritional disorder in the world.² Nutritional anaemia due to iron and folic acid deficiency is a major global public health problem. South Asia has the highest prevalence of anaemia in the world and India with the highest prevalence of anaemia among the South Asian countries. The very high prevalence of anaemia in South Asia as well as in India to a large extent is due to predominantly vegetarian diet with high phytate and low iron content.³ During the reproductive years, women are at risk of iron deficiency due to blood loss from menstruation.⁴ The detrimental public health effects of iron deficiency anaemia are retarded infant development, increased maternal and foetal mortality and morbidity and reduced work performance.⁵

In India, 20-40% of maternal deaths are due to anaemia.⁶ More than 50% of women do not have adequate iron stores for pregnancy.⁷ 55 % of Indian adolescent girls are anaemic and the prevalence of anaemia in women of reproductive age is 53.1%⁸ and 56% of adolescent girls and 46.8 % of the women aged 15-49 years are anaemic in Rajasthan⁹ and the prevalence was slightly higher in rural than urban areas.

Apart from this anaemia in 15-49 yrs. age group is more prevalent in female (53.1 %) than male (22.7 %) in India, more prevalent in females (46.8 %) than male (17.2 %) in Rajasthan and also more prevalent in females (43 %) than male (12%) in Bikaner.^{8,9} Hence, this study is an effort for identifying epidemiological determinants responsible for higher prevalence of anaemia among females in rural area of Bikaner.

OBJECTIVES

To study association between epidemiological determinants and anaemia prevalence among 10-49 year age group females of rural Bikaner.

METHODOLOGY

The study was conducted at Udairamsar village, the field practice area of Department of Community Medicine, S.P. Medical College, Bikaner. 10-49 years age women were selected as study population from all wards for this community based cross-sectional study (June 2017 to Dec 2017). A total of 600 women were selected for study by systematic random sampling. Inclusion criteria included informed verbal consent and no critical or chronic illness. Study subjects were interviewed about sociodemographic factors, habits and behaviour, about symptoms, signs of anaemia and Hb estimation. Haemoglobin estimation of study population was done using the Haemoglobin colour scale (HCS) method. Data collected were entered into Microsoft Excel Sheet and then analysed in form of percentages, mean, standard deviation, tables and graphs and appropriate test of significance wherever applicable. P<0.05 was considered statistically significant. SPSS 16.0 software was used for statistical analysis.

RESULTS

Most (92.50%) of the study population was anaemic. Mean haemoglobin value among anaemic and non-anaemic females was 8.65±1.23 g/dl & 11.24±1.21 g/dl respectively. About 2/3rd (69.55%) of the anaemic study population had moderate anaemia. Only 2.50 % of the anaemic study population had severe anaemia.

Association of anaemia among different age groups of our study population was observed highly significant. Maximum (97.50%) anaemic population belonged to 40-44years age group followed by 10-14 year age group (96.40%) and 25-29 years age group (95.61%). Anaemia was more (96.88%) in the Muslim population. Association between anaemia and religion was statistically significant. Most (93.75%) of illiterate women were anaemic. Association of anaemia status with the socio-economic status of study population shows although no statistically significant association present between anaemia and socio-economic status but with improvement in social class anaemia proportion was decreasing.

Association between anaemia and type of family of study population was highly significant. Association between anaemia and age of marriage was statistically significant.

Table 1: Anaemia prevalence and grades

Presence of Anaemia	Number	Percentage
Anaemia	555	92.50%
Non-anaemic	45	7.50%
Grades of anaemia		
Mild	154	27.75%
Moderate	386	69.55%
Severe	15	2.7%

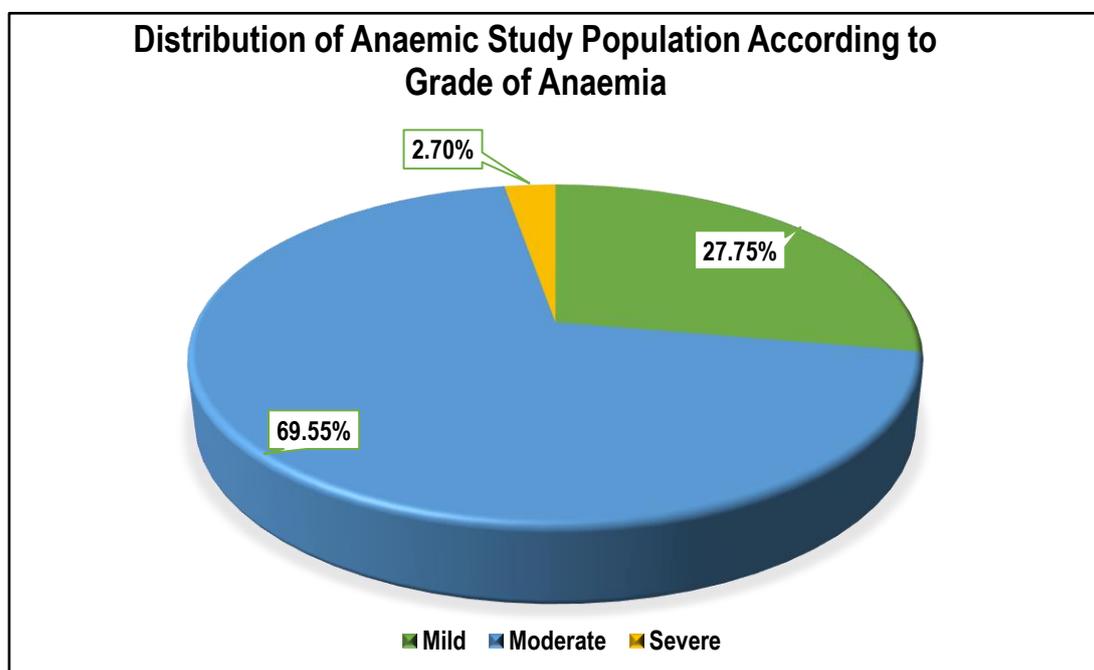


Fig 1: Distribution of Anaemic Study Population According to Grade of Anaemia

Table 2: Association of Anaemia with socio-demographic factors

Variable	Category	Anaemia status		P Value
		Non-anaemic No. (%)	Anaemic No. (%)	
Age Group (Years)	10-14	4(3.60%)	107(96.40%)	0.002
	15-19	11(16.42%)	56(83.58%)	
	20-24	6(5.08%)	112(94.92%)	
	25-29	5(4.39%)	109(95.61%)	
	30-34	3(5.77%)	49(94.23%)	
	35-39	6(16.67%)	30(83.33%)	
	40-44	1(2.50%)	39(97.50%)	
	45-49	9(14.52%)	53(85.48%)	
Religion	Hindu	44(7.75%)	524(92.25%)	0.535
	Muslim	1(3.12%)	31(96.88%)	
Educational Status	Illiterate	11(6.21%)	166(93.79%)	0.792
	Primary	4(7.55%)	49(92.45%)	
	Middle	10(6.62%)	141(93.38%)	
	Secondary	7(9.46%)	67(90.54%)	
	Sr. Secondary	4(6.78%)	55(93.22%)	
	Graduate	6(8.96%)	61(91.04%)	
	Post Graduate	3(15.79%)	16(84.21%)	
	Socio-economic status	I	3(10.00%)	
II	8(9.64%)	75(90.36%)		
III	13(7.98%)	150(92.02%)		
IV	20(7.38%)	251(92.62%)		
V	1(1.89%)	52(98.11%)		
Type of Family	Joint	17(4.86%)	333(95.14%)	0.006
	Nuclear	28(11.20%)	222(88.80%)	
Marital Status	Married	29(7.06%)	382(92.94%)	0.658
	Unmarried	16(8.47%)	173(91.53%)	
Age at Marriage (Years)	< 18	6(3.97%)	145(96.03%)	0.012
	18-21	17(7.46%)	211(92.54%)	
	> 21	6(18.75%)	26(81.25%)	

The proportion of anaemia was decreasing with increasing age at marriage. Maximum (96.03%) anaemic persons were present in the study population with less than 18 years of age at marriage and 81.25% population with more than 21 years was anaemic.

DISCUSSION

In our study 20-29 years age group contributed to 38.67% of total population. Almost similar age representation was observed by Panigrahi A et al (2011)¹⁰ Bansal A et al (2016).¹¹ Similarities in age group may be due to the fact that the study setting of these studies was similar. Whereas higher proportion of early reproductive age group was observed by Gautam VP et al (2002)¹², Ahmad N et al (2008)¹³, Sharma P et al (2013)¹⁴, Mbule MA et al (2013)¹⁵, Joy A et al (2017).¹⁶ Raghuram et al (2012)¹⁷, Melwani V et al (2018)¹⁸ reported lesser proportion of 20-29 years age group population (36.4% and 21.4% respectively). The difference in the composition of study population depends on the selection of study place whether it is an urban setting or rural or urban slum.

Mean age of our study population was 25.85±10.62 years. The similar mean age of participants was observed by Sharma JB et al

(2008)¹⁹, Mangla M et al (2016)²⁰ (26.5 years and 26.17 years respectively).

In our study 94.67% population was Hindu. Similar proportion (91.2%) was observed by Gautam VP et al (2002).¹² NFHS-3 data also reports that 82% of households are Hindu whereas Ahmad N et al (2008)¹³, Sharma P et al (2013)¹⁴, Siva PM et al (2016)²¹ reported that almost 2/3rd Hindu population in their study. Higher percentage of Hindu women could be explained by proportion of Hindus in the community. Whereas Mbule MA et al (2013)¹⁵ reported higher proportion of roman catholic (35.9%) and Raghuram et al (2012)¹⁷ reported 51.4% Muslim study population. In our study 29.5% population was illiterate and 8.83 % population was educated up to primary level. Almost similar results were observed by Mbule MA et al (2013)¹⁵ as 26.3% of their study population had no formal education and 39.2% were illiterate. Other studies had higher proportion of formally educated women. Panigrahi A et al (2011)¹⁰, Raghuram et al (2012)¹⁷, Mangla M et al (2013)²⁰, Melwani V et al (2018)¹⁸ reported higher proportion of literacy (primary and above level of education ranging from 66% to 77.8%). According to Census 2011 female literacy rate is 65.46 % which is lower than the study population (73.70%).

In present study 54% study population belonged to lower socioeconomic classes (Class IV & V) whereas Birdar SS et al (2012)²², Sharma P et al (2013)¹⁴, Melwani V et al (2018)¹⁸ reported higher proportion of study population in socioeconomic class III & IV. Raghuram et al (2012)¹⁷ reported 64.5% study population from upper middle class (class II) whereas Panigrahi A et al (2011)¹⁰ reported 31.7% population belonging to class IV of modified B. G. Prasad classification.

58.33% of our study population lived in joint family. Similar (63%) results were observed by Sharma P et al (2013)¹⁴. This could be the influence of Indian tradition and culture to keep living in joint family. Whereas Ahmad N et al (2010)¹³, Premlatha T et al (2012)²³, Siva PM et al (2016)²¹ reported that majority of their study population was living in their nuclear family. However, Joy A et al (2017)¹⁶ reported 80% study population from joint family. In our study about 2/3rd (64.17%) of study population had 5-8 members in their family. This coincides with previous data that 58.33% of our study population was from joint family.

68.5% of our study population was married. Almost similar proportion (69.25%) was observed by Mishra P et al (2012)²⁶ whereas almost all women were married as observed by Raghuram et al (2012)¹⁷ and Mbule MA et al (2013)¹⁵ in their respective studies.

In our study almost 1/4th of study population got married before the legal minimum age of 18 year whereas NFHS-3 data and study by Rao S et al (2010)²⁴ showed about 50% of women had age at married below 18 yr. In our study mean age at marriage was 18.14 year whereas NFHS-3 data showed median age at marriage to be 17.2 years. In rural India early marriage of girls (< 18 years) prevails more due to lack of education and tradition.

92.5 % of our study population was anaemic. Similar prevalence was observed by Gautam VP et al (2002)¹², Sharma JB et al (2008)¹⁹, Kaur M et al (2009)²⁵, Mishra P et al (2012)²⁶, Patle RA et al (2015)²⁷, Mangla M et al (2016)²⁰. Lower proportion of anaemic population was reported by Rao S et al (2010)²⁴, Panigrahi A et al (2011)¹⁰, Ahmad N et al (2012)¹³, Premlatha T et al (2012)²³, Dubey RK et al (2013)²⁸, Sharma P et al (2013)¹⁴, Mbule MA et al (2013)¹⁵, Kaushik NK et al (2014)²⁹, Jawarkar AK et al (2015)³⁰, Joy A et al (2017)¹⁶, Melwani V et al (2018)¹⁸ ranging from 60% to 75%.

Lesser prevalence was observed by Chaudhary S et al (2008)³¹, Pala K et al (2008)³², Birdar SS et al (2012)²², Raghuram et al (2012)¹⁷, Patavegar B et al (2014)³⁴, Verma R et al (2015)³², Siva PM et al (2016)²¹, Bansal A et al (2016)¹¹ and Dhupper P et al (2017)³⁵ (ranging from 35% to 49%).

Majority (69.55%) of our anaemic study population demonstrated moderate anaemia similar results were obtained by Gautam VP et al (2002)¹², Ahmad N et al (2012)¹³ and Kaushik NK et al (2014).²⁹ In our study 2.7 % study population was severe anaemic. Similar results were obtained by Chaudhary S et al (2008)³¹, Pala K et al (2008)³², Rao S et al (2010)²⁴, Panigrahi A et al (2011)¹⁰, Birdar SS et al (2012)²², Sharma P et al (2013)¹⁴, Kaushik NK et al (2014)²⁹, Verma R et al (2015)³², Jawarkar AK et al (2015)³⁰, Mangla M et al (2016)²⁰, Joy A et al (2017)¹⁶ whereas higher proportion of severe anaemia (5% to 7%) was observed in Sharma JB et al (2008)¹⁹, Mishra P et al (2012)²⁶, Premlatha T et al (2012)²³, Dubey RK et al (2013).²⁸ Bansal A et al (2016)¹¹ and Melwani V et al (2018)¹⁸ reported severe anaemia prevalence in their study up to 20%.

In present study almost 1/4th of the anaemic study population demonstrated mild anaemia. Similar proportion was observed by Sharma P et al (2013)¹⁴, Premlatha T et al (2012)²³, Siva PM et al (2016).²¹ Higher proportion of mild anaemia was observed by Birdar SS et al (2012)²² (34.6%), Kaushik NK et al (2014)²⁹ (37.06%), Dhupper P et al (2017)³⁵ 35%, Panigrahi A et al (2011)¹⁰ (39.6%), Mangla M et al (2016)²⁰ (41.76%), Jawarkar AK et al (2015)³⁰ (42%), Patle RA et al (2015)²⁷ (50 %), Rao S et al (2010)²⁴ (59%), Chaudhary S et al (2008)³¹ (69.2%), Dubey RK et al (2013)²⁸ (59.14), Mishra P et al (2012)²⁶ (75.3%), Sharma JB et al (2008)¹⁹ 89.8%.

High prevalence of moderate anaemia may be due to poor emphasis on iron-folic acid supplementation and inappropriate health education on consumption of iron-rich food among beneficiaries.

Our study shows that maximum (97.50%) anaemic population belonged to the 40-44 years age group followed by the 10-14 age group (96.40%) and 25-29 age group (95.61%). The occurrence of anaemia among different age groups of our study population was observed to be highly significant (P=0.002). Similar results were observed by Gautam VP et al (2002)¹², Kaur M et al (2009)²⁵, Ahmad N et al (2010)¹³, Rao S et al (2010)²⁴, Panigrahi A et al (2011)¹⁰, Premlatha T et al (2012)²³, Raghuram et al (2012)¹⁷, Verma R et al (2015)³², Mangla M et al (2016).²⁰ Whereas significant prevalence of anaemia among younger age group (< 30 years) was observed by Birdar SS et al (2012)²², Mishra P et al (2012)²⁶, Sharma P et al (2013)¹⁴, Dubey RK et al (2013)²⁸, Melwani V et al (2018).¹⁸ However, Pala K et al (2008)³², Patavegar B et al (2014)³⁴ observed no significant association between anaemia and age of study population.

In our study mean haemoglobin among anaemic population was 8.65±1.23g/dl whereas Dubey RK et al (2013)²⁸ reported mean haemoglobin level 9.85±1.87 g/dl in their study. In our study 163 (91.57%) adolescent were anaemic whereas 448 (91.6%) females of reproductive age were anaemic.

In our study prevalence of anaemia was higher in Muslim population as compared to Hindu population (96.88% versus 92.52 %). Association between anaemia and religion is not found to be statistically significant. Patavegar B et al (2014)³⁴ observed more prevalence in Hindu but not significant association was found. Ahmad et al (2010)¹³ also observed higher prevalence of anaemia among Hindu.

Those with higher education had lesser prevalence of anaemia compared to those with lesser or no education though the association was not statistically significant. Similar observations were made by Ahmad N et al (2010)¹³, Sharma P et al (2013)¹⁴, Patavegar B et al (2014)³⁴ however Pala K et al (2008)³² observed no significant relation between anaemia and educational status.

Women educational status place an important role in the prevalence of anaemia which can be attributed to better knowledge of literate women on the importance of taking iron rich diet and importance of personal hygiene and environmental sanitation.

In our study with improvement in social class anaemia proportion was decreasing. Similar observation was found by Ahmad N et al (2010)¹³, Panigrahi A et al (2011)¹⁰, Mishra P et al (2012)²⁶, Birdar SS et al (2012)²², Patavegar B et al (2014)³⁴, Jawarkar AK et al (2015)³⁰ and Dhupper P et al (2017).³⁵ Reasons for higher prevalence of anaemia among lower socioeconomic group may be

due to availability of inadequate amount of food which contributes to poor nutrition and higher prevalence of anaemia.

Although no statistically significant association present between anaemia and socio-economic status in our study. Similar results were obtained by Pala K et al (2008)³², Siva PM et al (2016)²¹, Melwani V et al (2018)¹⁸ but significant association between prevalence of anaemia and socio-economic status was observed by Ahmad N et al (2010)¹³, Panigrahi A et al (2011)¹⁰, Birdar SS et al (2012)²², Jawarkar AK et al (2015).³⁰ No statistically significant association was present between anaemia and marital status. Pala K et al (2008)³² also observed no significant association between anaemia and marital status. Association between anaemia and age of marriage was found to be statistically significant. The proportion of anaemia was decreasing with increasing age at marriage. Similar results were observed by Rao S et al (2010).²⁴

In our study most of (95.14%) study population living in joint family was anaemic. Association between anaemia and type of family of study population was found to be highly significant (P=.006). Higher prevalence of anaemia among joint family members was also observed by Panigrahi A et al (2011)¹⁰ and Patavegar B et al (2014)³⁴ though they didn't observe any significant association whereas Ahmad N et al (2010)¹³ and Premalatha T et al (2012)²³ observed higher prevalence of anaemia in nuclear family though the prevalence had no significant association. Higher prevalence in females living in joint family may be due to the reason that females usually eat food after serving the whole family so less proportion of food is left for them. Apart from this in rural area there is ignorant attitude towards optimum female nutrition.

CONCLUSION

Therefore, it is concluded from our study that anaemia is a major public health problem among adolescent and reproductive age females in rural area and age groups, type of family, age at marriage, age at first child, pattern of menstrual cycle, medical history of study population and signs and symptoms were associated with anaemia in adolescent and reproductive age females.

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