

# A Case Control Study on Anemia and Selected Risk Factors among Nursing Students of a Selected College of Nursing, Surat, Gujarat

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**Abstract:** ***Introduction:** Anemia is a critical health problem in India and most commonly found among adolescents and women of reproductive age. Anemia is a leading factor in high maternal morbidity and mortality. Anemia among women has greater consequences on reproductive health. Anemia is caused by a number of factors, including socioeconomic level, worm infestation, nutritional status, blood loss during menstruation, and hand hygiene. **Aim of the study:** The aim of the present study was to identify the prevalence of anemia and selected risk factors for anemia among nursing students. **Material and methods:** The research design adopted by the researcher was case control research design. A cross-sectional survey was carried out among 157 nursing students and their Hb was checked using venous sampling. After obtaining the results, students were identified as anemic and non anemic groups. Sample size was estimated by the following 1:1 ratio from the survey. By using simple random sampling techniques 50 students with anemia (case) and 50 students without anemia (control) were selected. Data related to socio demographic variables were collected by providing structured questionnaires and inventory checklists were used to collect data regarding risk factors. **Result:** Study results showed that prevalence of anemia among 157 surveyed students was 58.6 %. Whereas, 65 (41.40%) students identified with normal levels of hemoglobin. The findings of the odd's ratio suggest that the Nursing students with more than 22 years, urban residence, joint family, non-vegetarian diet pattern, worm infestation and irregular menstrual cycle have a greater risk than those who did not suffer from anemia. **Conclusion:** The purpose of this case-control study was to determine the prevalence of anemia and risk factors of a selected college of nursing. The study discovered that a high percentage of nursing students had mild anemia. Urban residents, joint family, non vegetarian diet pattern, worm infestation and menstrual cycle are the risk factors to cause anemia.*

**Keywords:** Anemia, Prevalence, Risk factors

## 1. Introduction

Anemia is a medical disorder defined by insufficient oxygen-carrying ability to satisfy physiological demands and is related to increased or reduced RBCs. Anemia is a critical health problem in India and most commonly found among adolescents and women of reproductive age.<sup>1</sup> Anemia is a leading factor in high maternal morbidity and mortality. However, it also impacts on development, being the causal factor of adverse birth outcomes, low birth weight and preterm birth, and cognitive impairment, depression and work productivity loss.<sup>2</sup> Based on the level of anemia as a public health concern, the World Health Organization (WHO) ranks India third in severity (more than 50% of women suffer from anemia). National family health survey (2019-21) revealed a significant increase in the anemia burden in India, with 57% of women (15-49 age group) and 67% of children (6-59 months) being anemic.<sup>3</sup> Major risk factors identified from the various studies were socio-economic status, blood loss during menstruation, nutritional status, hand hygiene and worm infestation. Nutritional needs of girls during adolescent period are generally ignored leading to stunting and poor health. One of the major consequences of the physiological changes and the nutritional neglect which happens during this period is anaemia.<sup>4</sup> In a tropical country like India helminthic infestation is very common which can lead to chronic blood loss which in turn results in anemia.<sup>5</sup> As fewer studies were conducted on risk factors for anemia among female nursing students in Gujarat the present study was aimed to find out

the prevalence and risk factors of anemia among nursing students.

## 2. Material and Methods

The research design adopted by the researcher was case control research design. To identify the case and control group, researchers have followed the four basic steps in conducting a case control study, selection of cases and controls, matching, measurements of exposure and analysis and interpretation. After obtaining permission from the management and director of Maniba Bhula Nursing College, researchers approached 2<sup>nd</sup> and 3<sup>rd</sup> year B.Sc. and GNM nursing students. Written consent was obtained from the students who fulfilled the inclusion criteria. Total 157 female students' level of hemoglobin was identified by referring to the blood report of the students. Through the survey, researchers have identified anemic and non anemic students by following WHO classification. Sample size was estimated by the following 1:1 ratio from the survey. By using simple random sampling techniques 50 students with anemia (case) and 50 students without anemia (control) were selected. Data related to socio demographic variables were collected by providing structured questionnaires and inventory checklist was used to collect data regarding risk factors such as nutritional factors, menstrual history, worm infestation, hygiene, iron and folic acid supplements.

### 3. Result

#### Level of hemoglobin among students

The result of the level of hemoglobin showed that out of 157 surveyed students, 41.40 % students had normal levels of

hemoglobin and 58.6 % had less than 12 g/dl hemoglobin. Out of which, 70.65 % had mild and 29.35 % had moderate anemia.

#### Socio demographic variables

**Table I:** Socio demographic Variables of sample studied.

Sl. No	Demographic variables	Case group (N=50)		Control group (N=50)	
		F	%	F	%
1	<b>Age in years</b>				
	19-20	37	74	31	62
	21-22	12	24	17	34
	More than 22	1	2	2	4
2	<b>Residence</b>				
	Urban	9	18	22	44
	Rural	41	82	28	56
3	<b>Type of family</b>				
	Nuclear	40	80	30	60
	Joint	10	20	20	40
4	<b>Religion</b>				
	Hindu	46	92	45	90
	Muslim	00	00	3	6
	Christian	04	8	2	4
5	<b>Standard of studying</b>				
	2nd year B.Sc. Nursing	17	34	17	34
	3rd year B.Sc. Nursing	18	36	12	24
	2nd year GNM	13	26	4	8
	3rd year GNM	2	4	17	34
6	<b>Education of Mother</b>				
	Professional degree	01	2	1	2
	Graduate	8	16	7	14
	Diploma	00	00	1	2
	High school Certificate	22	44	19	38
	Middle School Certificate	10	20	18	36
	Primary school certificate	7	14	4	8
No formal education	2	4	00	00	
7	<b>Education of Father</b>				
	Professional degree	2	4	16	32
	Graduate	14	28	00	00
	Diploma	00	00	3	6
	High school Certificate	12	24	15	30
	Middle School Certificate	13	26	7	14
	Primary school certificate	8	16	9	18
No formal education	01	2	00	00	
8	<b>Occupation of Mother</b>				
	Senior Officer & Managers	00	00	00	00
	Professional	01	2	03	6
	Clerks	00	00	00	00
	Skilled Workers / Shop / Market Sales Workers	03	06	2	4
	Skilled Agricultural	07	14	10	20
	Craft & Related Trade Workers	19	38	8	16
Homemaker	20	40	27	54	
9	<b>Occupation of Father</b>				
	Senior Officer & Managers	2	4	10	20
	Professional	2	4	1	2
	Clerks	00	00	2	4
	Skilled Workers / Shop / Market Sales Workers	5	10	8	16
	Skilled Agricultural	23	46	20	40
	Craft & Related Trade Workers	17	34	6	12
Unemployed	01	2	3	6	
10	<b>Total Monthly Income of the Family</b>				
	>185,895	1	2	00	00
	92952-185894	1	2	3	6
	69535-92951	8	16	5	10
	46475-69534	00	00	02	04

	27883-46474	2	4	13	26
	9308-27882	20	40	18	36
	<9307	18	36	9	18
11	<b>Dietary pattern</b>				
	Vegetarian	28	56	24	48
	Mixed	22	44	26	52
12	<b>Source of health information</b>				
	News paper/ Magazine	14	28	5	10
	Radio/ Television	20	40	24	48
	Friends / Relationships	1	2	4	8
	Health professionals	15	30	17	34

It is evident from table- I, that in case group 74 % of students were from the age group of 19-20 years, 82% of them resided in rural area, 80 % of them belonged to nuclear family, Majority (92%) were from Hindu religion, 36 % of them were studying in 3<sup>rd</sup> year B.Sc. Nursing, 98% of their fathers and 96% of mothers had varied education levels (Primary to Professional education). 40% of their mothers were homemakers and 46 % of fathers followed agriculture and 40% of them belonged to the average income group (<9307-27882).

In the control group, 62 % of students were from the age group of 19-20 years, 56% of them resided in rural areas, 60 % of them belonged to nuclear families, Majority (90%) were from Hindu religion, 34 % of them were studying in 2<sup>nd</sup> year B.Sc. Nursing, 56% of their fathers and 66% of mothers had above higher education levels. 54% of their mothers were homemakers and 40 % of fathers followed agriculture and 36% of them were from the average income group (<9307-27882).

#### Data related to Menarche

**Table 2:** Distribution of sample according to their menstrual history

Sr. No	Menstrual History	Case Group (N=50)		Control Group (N=50)	
		F	%	F	%
1.	<b>Age of Menarche</b>				
	8-10 years	1	2.0	00	00
	10-12 years	6	12.0	10	20.0
	12-14 years	29	58.0	29	58.0
	> 14 years	14	28.0	11	22.0
2.	<b>Cycle of menstruation</b>				
	Regular	39	78	44	88
	Irregular	11	22	6	12
3.	<b>Days of cycle</b>				
	< 28 days	16	32	15	30
	28- 30 days	23	46	29	58
	> 30 days	11	22	6	12
4.	<b>Days of menstruation bleed</b>				
	2-4 days	14	28	15	30
	4-6 days	25	50.0	31	62
	6-8 days	10	20	4	8
	More than 8 days	01	02	0	00
5.	<b>Number of pads used for menstruation per day</b>				
	Less than 3 pads (Scanty)	21	42	22	44
	3-6 pads (normal)	20	40.0	27	54
	More than 6 pads (heavy)	09	18	01	2

As reported in table no 2, in case group 58% of the samples have attained menarche between 12-14 years of age. 78% of them had a regular cycle whereas 22% had an irregular cycle. 46 % of them had a 28-30 day cycle. Majority, (50%) of them had menstrual bleeding for 4-6 days of duration and 40 % of them had normal flow.

In the control group 58% of the samples have attained menarche between 12-14 years of age. 88% of them had a regular cycle whereas 12 % had an irregular cycle. 58 % of them had a 28-30 day cycle. Majority, 62% of them had menstrual bleeding for 4-6 days of duration and 54 % of them had scanty flow.

#### Data related to Nutritional factors

In the case group, 62 % of students followed good nutrition like regular consumption of 3 to 4 meals per day, daily consumption of breakfast and vitamin C rich fruits, followed by a balanced diet and fiber rich food. Whereas, 38 % had poor nutrition patterns which include daily consumption of junk food and aerated drinks; consume food cooked in non stick pan. In the control group 76 % had a good nutrition pattern and 24 % found with poor nutrition.

#### Findings related to worm infestation

Findings related to worm infestation showed that 90 % of students had no risk of worm infestation and 5 % of them were at risk to develop worm infestation. In the control group, 96 % were found with negative risk to develop worm infestation.

**Data regarding iron supplements**

Out of 50 anemic nursing students, 90% of them have not taken iron supplementation and only 10 % of them have

taken iron supplementation, whereas, in the control group 22% of them have taken iron supplementation.

**Table 3:** Finding related to assessment of risk factors for anemia among case groups, N=50

Factors	Odds Ratio	P Value	95% C.I. for EXP(B)	
			Lower	Upper
Age (19 - 20) ®	1	-	-	-
Age (21 - 22)	1.136	0.798	0.428	3.014
Age (More Than 22)	1.666	0.711	0.112	24.884
Residence (Rural) ®	1.000	-	-	-
Residence (Urban)	3.113	0.023	1.171	8.276
Type family (Nuclear) ®	1.000	-	-	-
Type family (Joint)	2.111	.131	0.801	5.560
Diet (Vegetarian) ®	1.000	-	-	-
Diet (Non Vegetarian)	1.303	0.557	0.539	3.152
Cycle (Regular) ®	1.000	-	-	-
Cycle (Irregular)	1.255	0.691	0.409	3.849
Worm (Negative) ®	1.000	-	-	-
Worm (Positive)	1.488	0.679	0.227	9.752
Nutrition (Good Nutrition) ®	1.000	-	-	-
Nutrition (Poor Nutrition)	1.300	0.596	0.492	3.435

The findings of the odd's ratio in case of students age more than 22 years was (1.666), urban residence (3.113), joint family (2.111), non- vegetarian diet pattern (1.303), irregular menstrual cycle (1.255), students with worm infestation (1.488) and poor nutrition was (1.300). The obtained odd's ratio suggests that the Nursing students with more than 22 years, urban residence, joint family, non- vegetarian diet pattern, worm infestation and irregular menstrual cycle have a greater risk than those who did not suffer from anemia.

**4. Discussion**

Present study result revealed that the prevalence of anemia among the surveyed population (157 female students) was 58.6 % out of which 70.65 % had mild and 29.35 % had moderate anemia. Vibhute, Nupura A. and Shah, Unnat et. al. (2019) in their study reported that about 54 (18%) has mild anemia and 32 (10.6%) has moderate anemia among 300 female students studying at a health institute in western Maharashtra and no case of severe anemia found in their study.<sup>6</sup>

In terms of risk variables, results of present study indicated that worm infestation, irregular menstrual cycles, and joint families were significant at the  $p < 0.05$  level. N. S. Sunitha Mercy, (2017) in her research found that same risk factors, such as the extent of the worm infestation and menstrual history, were significant.<sup>7</sup>

It was identified in the current study that students from urban residency are at higher risk for anemia as they consume more junk food, skip breakfast and do not follow proper diet patterns. Jeetendra Yadav et. al. (2017) in their study, observed that prevalence of anaemia was high in urban (65.3%) as compared to rural (57.3%) students.<sup>8</sup>

The current study found a significant correlation between students' consumption of junk food and living in an urban location. The findings of a substantial correlation between anemia and urban residency among females are supported by Premalatha T (2012) and Sachan Beena (2008).<sup>9</sup>

Result of Socio demographic data indicates that students living in joint families are more likely to experience anemia. Anemia was discovered to be significantly correlated with socio demographic variables, such as joint family, by M.S. Pony and V.R. Nandini. (2021)<sup>10</sup>

The current study's worm infestation results indicated that students who have worm infestations are more likely to acquire anemia. PM Siva and A Sobha (2016) discovered a strong correlation (odds ratio 4.150) between worm infestation and both.<sup>11</sup>

In the result of nutritional history it was identified that students with poor nutritional patterns such as skipping breakfast and having less than 3 meals are at higher risk for anemia. These findings are supported by Naglaa Kamel Abdullallah Hussein and Marwa Mohamed Ahmed Ouda (2018) not eating daily breakfast, eating less than 2 meals/day are at risk to develop Iron deficiency anemia.<sup>12</sup>

**5. Limitations**

This study was conducted on a small sample size hence results cannot be generalized.

**6. Recommendations**

- Periodic health surveys are needed on anemia for updating prevalence rate.
- This study on finding out anemic students in college implies that more studies are required on various dimensions such as awareness of physiological changes and nutrition, psychological status and nutrition and health problems related to nutrition.
- This study reveals that anemia prevails more among female students which stresses the need to increase awareness of consequences of anemia among them.
- Health programs for mothers on utilization of easily available and affordable iron rich diets should be carried out.

- A study can be carried out by selecting a larger sample size to generalize the findings.

## 7. Conclusions

Anemia is a global issue that is typically found in developing countries, particularly among women. Infections, worm infestation, high menstrual blood loss, and dietary deficits are some of the expected causes. In the present study total 157 nursing students were screened for anemia. The result of prevalence showed that 58.6 % of the female nursing students had anemia whereas only 41% of them had Normal Hb. Further, to identify the risk factors for anemia, researcher has adopted case control study design. The result of the study depicted that age, poor nutrition, students from joint families, irregular menstrual cycle are the risk factors to develop anemia among nursing students. Identifying the root causes of anemia is a prerequisite for effective management and prevention among women.

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