CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

Available online at: http://www.iajps.com Research Article

IRON DEFICIENCY ANAEMIA: FREQUENCY IN ADULT FEMALE PATIENTS VISITING TERTIARY CARE HOSPITAL

Anwar Ali Jamali[1], Ghulam Mustafa Jamali[2], Ameer Ali jamali[3], Muhammad Ali Suhail[4], Bhojo Mal Tanwani[5], Naveed Sattar Shaikh[6], Naeem Mustafa Jamali[7], Yash Tanwani[8].

[1] Senior Registrar **MD, DTCD.** Department of Medicine, Peoples University of Medical and Health Sciences for Women, Nawabshah (SBA), Pakistan.

[2] Assistant Professor **MD, FCPS.** Department of Medicine, Peoples University of Medical and Health Sciences for Women, Nawabshah (SBA), Pakistan

[3] Assistant Professor, **FCPS.** Department of Paediatric Medicine, Peoples University of Medical and Health Sciences for Women, Nawabshah (SBA), Pakistan

[4]Professor **FCPS.** Department of Urology, Peoples University of Medical and Health Sciences for Women, Nawabshah (SBA), Pakistan.

[5]lecturer, **M. Phill.** Department of Physiology, Peoples University of Medical and Health Sciences for Women, Nawabshah (SBA), Pakistan.

[6]MBBS,FCPS. Assistant Professor, Department of Nephrology, Peoples University of Medical and Health Sciences for Women Nawabshah Sindh, Pakistan.

[7]Graduate, **BDS,** Liaquat University of Medical and Health Sciences, Jamshoro Pakistan.

[8](MBBS final year Student), Dr Ziaudin Medical University, Karachi.

Abstract:

Introduction: Iron deficiency a*nemia is the most frequent public health dilemma in our community. It had an extensive variety of unfavorable consequences like reduced performance, decreased intelligence, retarded growth in newborns, playgroup and school going youngsters, adult females of different age groups. Anemia also causes the impairment of physical capability, routine working ability of youngsters and grown-ups, decline in immune competency and amplified morbidity due to other diseases in every age of life are also related to Anaemia.*

Objective: *The present clinical study was done to assess the prevalence of Iron Deficiency anemia (IDA) in adult female subjects visiting OPD at PMC Hospital Nawabshah.* ***Study Design and Setting:*** *Current study was cross sectional carried out in adult female patients visiting PMC Hospital Nawabshah District Shaheed Benazirabad (Nawabshah).* ***Duration****: One year from January 2017 to December 2017.* ***Material and Methods:*** *After taking informed written consent, brief history and clinical examination; samples were collected by simple sampling method, vacutainers (EDTA) were used for sample collection and analysed by using MEDONIC auto analyzer MERCK COMPANY. All the Red blood cell (RBC) parameters including the RBC count, Hct (Hematocrit), Hb (Hemoglobin), MCV (Mean Corpuscular volume), and MCHC (Mean Corpuscular hemoglobin concentration) were tested. All obtained data was analysed through SPSS software version 20.0.* ***Results:*** *Our study was based on* ***385*** *female subjects that were selected randomly from different areas attending the OPDs. The total frequency of anemic females was 203(52.7%) and non-anemic* ***182*** *(47.3%) were observed. The average Haemoglobin value of 10.5±3.88 was observed in anaemic subjects. The highest frequency of anemia was observed in young age group (20-40 years).*

Conclusion: *The frequency of iron deficiency anemia in adult females is common in district Shaheed Benazirabad especially pregnant and lactating females are at increased risk to develop IDA in comparison to other categories. This warrants extra studies on a larger sample of healthy females to validate the findings and to care the wellbeing of these forthcoming mothers.*

Key words: *Iron Deficiency Anaemia, Haemglobin, Red Blood Cell, Hematocrit.*

***Corresponding author:**

Anwar Ali Jamali

Department of Medicine,

Peoples University of Medical and Health Sciences for Women, Nawabshah (SBA), Pakistan.

Cell Phone# +923003065826. Email: jamalianwarali@gmail.com

QR code

Please cite this article in press Agussalim et al., ***Iron Deficiency Anaemia: Frequency in Adult Female Patients Visiting Tertiary Care Hospital,*** *Indo Am. J. P. Sci, 2018; 05(05).*

INTRODUCTION:

Anemia is the mainly significant community wellbeing trouble in children, females of all age groups. There is about 02 billions of world population affected due to anemia as reported by World Health Organization [1]. Generally iron deficiency affects all age groups of females resulting in delayed growth and the impaired cognitive development [2]. There are many factors responsible for the development of anemia it may result from dietary deficiency, infectious and other diseases, geographic distribution, hygienic conditions, low academic profile. [3] [4]. There is broad outcome of effects because of anemia, starting from poor growth milestone, decrease mental activity, affecting daily activities of life in different age groups. [5]. In African children and females anemia is one important reason of morbidity and mortality in severe cases. [6]. Diet, mal-absorption, bone marrow suppression may lead to iron deficiency commonly in different age and gender groups. The daily iron requirements of body varies at different levels like age group, sexually, racial groups and in pregnant and lactating females. Identification of various factors producing hindrances and causing increased requirements for daily iron requirements is an essential step in the management of iron deficiency. From the beginning days of Pakistan anemia is there in our population markedly present in different eras and different age and gender groups. Nutritional deficiency was blamed as main cause of anemia in those days in 1977 it was 38%. [7]. in 1988 a survey report in Pakistani children on nutrition declared that about 65% were anemic. [8]. Anemia due to iron deficiency or other reasons effect child growth physically and mentally in different developmental stages [9]. Studies had shown that in Pakistan 65%, 70% and 78% of children of age group 07- 60 months were suffering from iron deficiency anemia. [10].

The whole world is affected by anemia especially children and females of different age groups and marital status. About 750 millions of population is suffering from iron deficiency anemia in developed countries of the world as reported by researchers. [11].

In Kids aged 1 to 2 years, approximately 0.70 million are affected by anemia, from whom 0.24 million are suffering from iron deficiency anemia. [12].

Due to dietary deficiency and increased demand, Decreased amount of iron is responsible for about half of the cases of anemia so the steps to modify the supply and demand are vital to control in the various states of the world that are under development. [13].

The kidney and bone marrow are the main responsible agents for the production of RBCs. Thru renal production and release of hormone erythropoietin, the bone marrow produces the RBCs and releases them in the systemic circulation. This is a multi step process and for the formation of hemoglobin. A lot of the factors like vitamin B2 and B6 influence and affect the formation and productivity of RBCs and Hemoglobin. [14] [15] [16].

The mean hemoglobin status within systemic circulation is affected by certain important ecological and physiological items like pregnancy, level of oxygen, cigarette smoking and living at the increased height above the sea level. [17].

Assessment of anemia was done thru hemoglobin status and various red cell indices were used, which are very helpful in the diagnosis and determination of the iron deficiency anemia. In United States National Health Data had shown a great concern regarding the increasing prevalence of iron deficiency anemia in different age sex groups. [18].

Objective

To estimate the occurrence of Iron Deficiency Anemia in >18 years in adult female patients visiting PMC Hospital Nawabshah.

MATERIAL AND METHODS:

This cross sectional study was conducted in adult female patients visiting PMC Hospital Nawabshah District Shaheed Benazirabad (Nawabshah) during the period of January 2017 to December 2017.

The present study was planned to examine the proportion of anemia in adult female patients visiting PMC Hospital Nawabshah in relationship with Socio-economic status, age and education. The patients were selected by visiting of different OPDs. Females aged > 18 years were enrolled for the study. The questionnaire was designed including age, sex, education, and social class. The verbal consent for acceptance of participation of subjects of selected subjects in the study was obtained. Apparently normal subjects of female genders were selected and with no history of bleeding, blood transfusion, inflammation, infection, liver disease, malignancy and any extensive surgery. The participants were selected from rural and urban areas of Nawabshah District Shaheed Benazirabad and surroundings visiting the hospital.

Age wise distribution of subjects in three Categories
1) Young age >18 - 40 years,
2) Middle age 41 – 60 years,
3) Old age > 60 years.

Measurements

Clinical examination was carried on these females. Socio-economic group of subjects were entitled according to patients verbal statement as lower class, middle class and upper class.

After all strict anti septic measures, three ml of venous blood was collected from all the subjects. The blood sample was taken thru a vein by new sterilized disposable syringes and collected into a tube containing ethylene diamine tetra acetic acid (EDTA).

Laboratory analysis

The collected blood samples were immediately carried to Research Diagnostic Laboratory, Nawabshah. MEDONIC auto analyzer MERCK COMPANY was used for analysis of different parameters of blood such as, values for haemoglobin and hematocrit, MCV (Mean Corpuscular volume), MCHC (Mean Corpuscular Haemglobin concentration) and count of red blood cells were measured. Haemoglobin concentration less than 11 g/dl for female was considered as anaemic.

Data Analysis

All the collected information of study subjects were processed through computer based software SPSS (version 20.0). Frequency, distribution, means ± SD (standard deviation) were calculated and results were analysed.

RESULTS:

Total 385 female subjects were studied. Mean age of subjects with SD was 35.43±12.47 years, and age ranged between 18 and 72 years. The mean and SD for RBC count was 4.26+ 0.61 million/cumm, Hb% 10.67+1.89 g/dl, HCT 33.26+5.39, MCV 77.40+10.50, MCH 25.21+3.62, MCHC 32.52+1.89, WBCs count was 8143.01+2310.1 and mean platelet counts were 275.07+94.64. Different haematological variables were compared. Mean age, hemoglobin level, haematocrit, MCHC, RBC count, WBC, and platelet count with p= < 0.001 which was statistically significant. **Table 1**

The study population was divided in three groups, 215 (55.8%) from younger age group (18-40 years), 142 (36.9%) were from middle age (41-60 years) and 28 (7.3%) belonged to elderly group (> 60 years). A large number 273 (70.9%) of subjects were unmarried and 112 (29.1%) were married. Regarding educational status 53%, participants were illiterate followed by 24.4% primary, 13.8% middle to matriculation, 7.5% intermediate and only 1.3% were graduate. Most of study subjects 363 (94.3%) were house wives and 22 (05.7%) were employed mostly in education and health. A large portion of study population 228 (59.2%) from to the countryside and 157 (40.8%) were from city areas. In present research, 41 (10.6%) females were menopausal, 45(11.7%) were breast-feeding women and 13(3.45%) females were pregnant. Iron deficiency anemia was present in 52.7% females. **Figure 1**

Table 3 and table 4 were designed to check the correlation of different study variables that were included in the current study. These tables were divided into quantitative and qualitative variables of study. The 2-tailed correlation was significant at the 0.05 level while it was strongly statistical significant at the level 0.01 (2-tailed). This study had shown statistically significant and not significant correlation between different variables as shown in **Table 2 and 3.**

Current study presents various levels of hemoglobin in different age groups, subjects with haemoglobin levels less than 11 gram/dl was were considered as anemic. Haemetocrit < 36% considered as abnormal. In 52.7% of subjects of study had microcytic hypochromic aneamia (MCV < 80fL).

In **Table 4 & 5** it was observed that IDA was common in rural population (111/228), out of them (79/157) married and (32/71) were unmarried. 92/157 had IDA belonging to urban society out of them 71/116 were married and 21/41 were unmarried women. In low socio economical group 84/153 had IDA, in middle class 54/97 and in upper class 12/23 females were anaemic. IDA was seen in 111/209 uneducated subjects, from which 76/138 were married and 35/71 were unmarried. In menopausal women, 17/41 had IDA. IDA was observed in 33/45 in breast feeding women and 10/13 subjects had IDA during pregnancy. Young age group had IDA 61/133 rural, 52/82 urban, 65/120 in lower socio economic class.

Table 1. Statistics

		Age in Years	RBC Count	HB level	Haematocrit	MCV	MCH	MCHC	WBC count	Platelets
N	Valid	385	385	385	385	385	385	385	385	385
	Missing	0	0	0	0	0	0	0	0	0
Mean		35.43	4.2626	10.687	33.269	77.406	25.217	32.526	8143.01	275.07
Std. Deviation		12.47	0.61479	1.8975	5.3942	10.5013	3.6247	1.899	2310.102	94.647
Range		54	4.6	12.5	36.2	46.3	19.2	7.9	13000	645
Minimum		18	1.4	3.3	10.4	50.1	16.9	29.1	1300	35
Maximum		72	6	15.8	46.6	96.4	36.1	37	14300	680
p-value		0.000.	0.000.	0.000.	0.000.	0.000.	0.000.	0.000.	0.000.	0.011.

Figure 1. Demographic Variables n=385

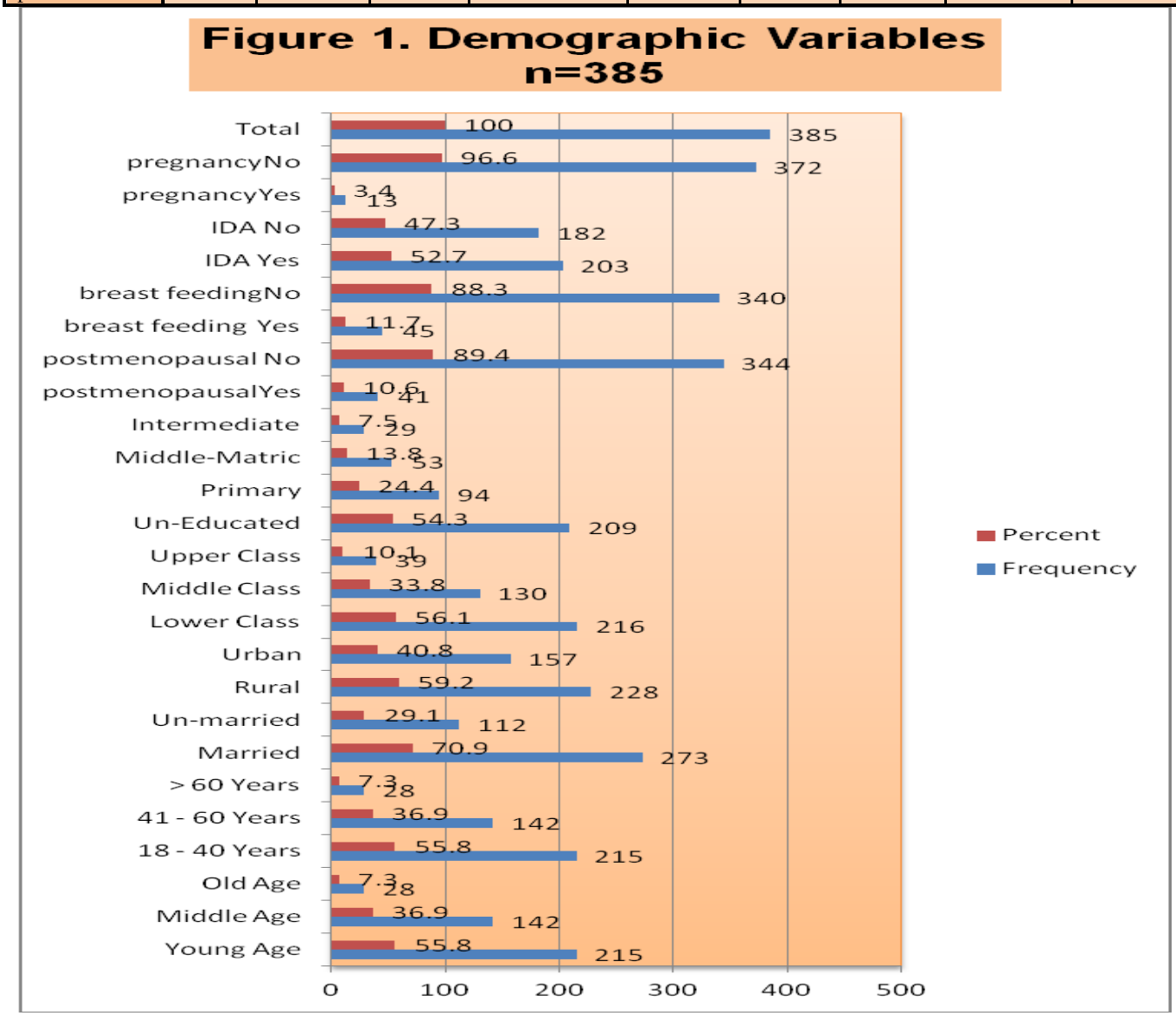

Table 2. Correlations. n=385

Variable	statistics	IDA	Age in Years	RBC Count	HB level	HCT	MCV	MCH	MCHC	White Cell Count	Platelets
IDA	Pearson Correlation	1	0.059	0.009	-0.059	-0.051	-0.025	-0.037	0.025	.102*	0.029
	Sig. (2-tailed)		0.246	0.854	0.248	0.32	0.625	0.466	0.63	0.046	0.572
Age in Years	Pearson Correlation	0.059	1	-0.012	-0.032	-0.077	-0.061	-0.021	0.053	-0.048	-0.037
	Sig. (2-tailed)	0.246		0.813	0.526	0.133	0.234	0.674	0.301	0.351	0.471
RBC Count	Pearson Correlation	0.009	-0.012	1	.131*	.361**	-.227**	-.186**	-0.046	0.064	0.033
	Sig. (2-tailed)	0.854	0.813		0.01	0	0	0	0.367	0.211	0.512
HB level	Pearson Correlation	-0.059	-0.032	.131*	1	.295**	.226**	.259**	.117*	-0.09	-.103*
	Sig. (2-tailed)	0.248	0.526	0.01		0	0	0	0.021	0.078	0.043
Haematocrit	Pearson Correlation	-0.051	-0.077	.361**	.295**	1	.596**	.466**	-.176**	0.036	-.139**
	Sig. (2-tailed)	0.32	0.133	0	0		0	0	0.001	0.483	0.006
MCV	Pearson Correlation	-0.025	-0.061	-.227**	.226**	.596**	1	.878**	-0.06	-0.02	-.169**
	Sig. (2-tailed)	0.625	0.234	0	0	0		0	0.243	0.689	0.001
MCH	Pearson Correlation	-0.037	-0.021	-.186**	.259**	.466**	.878**	1	0.089	-0.039	-.179**
	Sig. (2-tailed)	0.466	0.674	0	0	0	0		0.08	0.446	0
MCHC	Pearson Correlation	0.025	0.053	-0.046	.117*	-.176**	-0.06	0.089	1	-.100*	-.139**
	Sig. (2-tailed)	0.63	0.301	0.367	0.021	0.001	0.243	0.08		0.049	0.006
White Cell Count	Pearson Correlation	.102*	-0.048	0.064	-0.09	0.036	-0.02	-0.039	-.100*	1	.112*
	Sig. (2-tailed)	0.046	0.351	0.211	0.078	0.483	0.689	0.446	0.049		0.028
Platelets	Pearson Correlation	0.029	-0.037	0.033	-.103*	-.139**	-.169**	-.179**	-.139**	.112*	1
	Sig. (2-tailed)	0.572	0.471	0.512	0.043	0.006	0.001	0	0.006	0.028	
	N	385	385	385	385	385	385	385	385	385	385

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3. Correlations

Variable	statistics	IDA	Age Class	Age Groups	Marital Status	Address	Socio-Economical Class	Education	Post-meno-pausal	Breast Feeding	Pregnancy
IDA	Pearson Correlation	1	-0.022	-0.022	0.069	-0.098	0.044	0.007	-0.078	.150**	0.091
	Sig. (2-tailed)		0.674	0.674	0.174	0.056	0.39	0.888	0.127	0.003	0.076
Age Class	Pearson Correlation	-0.022	1	1.000**	-.524**	0.053	-0.018	0.019	-.642**	.298**	.153**
	Sig. (2-tailed)	0.674		0	0	0.303	0.721	0.71	0	0	0.003
Age Groups	Pearson Correlation	-0.022	1.000**	1	-.524**	0.053	-0.018	0.019	-.642**	.298**	.153**
	Sig. (2-tailed)	0.674	0		0	0.303	0.721	0.71	0	0	0.003
Marital Status	Pearson Correlation	0.069	-.524**	-.524**	1	-0.054	0.038	-0.045	.221**	.233**	.120*
	Sig. (2-tailed)	0.174	0	0		0.287	0.454	0.381	0	0	0.019
Address	Pearson Correlation	-0.098	0.053	0.053	-0.054	1	0.017	-0.072	-0.022	-0.06	-0.05
	Sig. (2-tailed)	0.056	0.303	0.303	0.287		0.737	0.159	0.668	0.24	0.331
Socio Economical Class	Pearson Correlation	0.044	-0.018	-0.018	0.038	0.017	1	0.008	-0.023	0.052	0.022
	Sig. (2-tailed)	0.39	0.721	0.721	0.454	0.737		0.878	0.65	0.31	0.668
Education	Pearson Correlation	0.007	0.019	0.019	-0.045	-0.072	0.008	1	-0.013	0.013	-0.005
	Sig. (2-tailed)	0.888	0.71	0.71	0.381	0.159	0.878		0.805	0.799	0.928
Post-menopausal	Pearson Correlation	-0.078	-.642**	-.642**	.221**	-0.022	-0.023	-0.013	1	-.126*	-0.065
	Sig. (2-tailed)	0.127	0	0	0	0.668	0.65	0.805		0.014	0.206
Breast Feeding	Pearson Correlation	.150**	.298**	.298**	.233**	-0.06	0.052	0.013	-.126*	1	-0.068
	Sig. (2-tailed)	0.003	0	0	0	0.24	0.31	0.799	0.014		0.183
Pregnancy	Pearson Correlation	0.091	.153**	.153**	.120*	-0.05	0.022	-0.005	-0.065	-0.068	1
	Sig. (2-tailed)	0.076	0.003	0.003	0.019	0.331	0.668	0.928	0.206	0.183	
	N	385	385	385	385	385	385	385	385	385	385

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4. Iron Deficiency Anaemia * Marital Status * Address, Education, Menopausal, Breast Feeding and Pregnancy Cross Tabulation					
			Marital Status		
Address			Married	Un-married	Total
Rural	Iron Deficiency Anaemia	Yes	79	32	111
		No	78	39	117
	Total		157	71	228
Urban	Iron Deficiency Anaemia	Yes	71	21	92
		No	45	20	65
	Total		116	41	157
Socio Economical Class					
Lower Class	Iron Deficiency Anaemia	Yes	84	32	116
		No	69	31	100
	Total		153	63	216
Middle Class	Iron Deficiency Anaemia	Yes	54	16	70
		No	43	17	60
	Total		97	33	130
Upper Class	Iron Deficiency Anaemia	Yes	12	5	17
		No	11	11	22
	Total		23	16	39
Education					
Un-Educated	Iron Deficiency Anaemia	Yes	76	35	111
		No	62	36	98
	Total		138	71	209
Primary	Iron Deficiency Anaemia	Yes	43	6	49
		No	35	10	45
	Total		78	16	94
Middle-Matric	Iron Deficiency Anaemia	Yes	20	8	28
		No	18	7	25
	Total		38	15	53
Intermediate	Iron Deficiency Anaemia	Yes	11	4	15
		No	8	6	14
	Total		19	10	29
Menopausal					
Yes	Iron Deficiency Anaemia	Yes	17	0	17
		No	24	0	24
	Total		41	0	41
No	Iron Deficiency Anaemia	Yes	133	53	186
		No	99	59	158
	Total		232	112	344
Breast Feeding					
Yes	Iron Deficiency Anaemia	Yes	33	0	33
		No	12	0	12
	Total		45	0	45
No	Iron Deficiency Anaemia	Yes	117	53	170
		No	111	59	170
	Total		228	112	340
Pregnancy					
Yes	Iron Deficiency Anaemia	Yes	10	0	10
		No	3	0	3
	Total		13	0	13
No	Iron Deficiency Anaemia	Yes	140	53	193
		No	120	59	179
	Total		260	112	372

Table 5. Iron Deficiency Anaemia * Age Groups * Address, Education, Menopausal, Breast feeding and Pregnancy Cross Tabulation						
			Age Groups			
Address			18 - 40 Years	41 - 60 Years	> 60 Years	Total
Rural	Iron Deficiency Anaemia	Yes	61	41	9	111
		No	72	38	7	117
	Total		133	79	16	228
Urban	Iron Deficiency Anaemia	Yes	52	32	8	92
		No	30	31	4	65
	Total		82	63	12	157
Socio Economical Class						
Lower Class	Iron Deficiency Anaemia	Yes	65	46	5	116
		No	55	41	4	100
	Total		120	87	9	216
Middle Class	Iron Deficiency Anaemia	Yes	35	25	10	70
		No	29	25	6	60
	Total		64	50	16	130
Upper Class	Iron Deficiency Anaemia	Yes	13	2	2	17
		No	18	3	1	22
	Total		31	5	3	39
Education						
Un-Educated	Iron Deficiency Anaemia	Yes	67	37	7	111
		No	62	32	4	98
	Total		129	69	11	209
Primary	Iron Deficiency Anaemia	Yes	18	25	6	49
		No	14	26	5	45
	Total		32	51	11	94
Middle-Matric	Iron Deficiency Anaemia	Yes	18	8	2	28
		No	16	7	2	25
	Total		34	15	4	53
Intermediate	Iron Deficiency Anaemia	Yes	10	3	2	15
		No	10	4	0	14
	Total		20	7	2	29
Menopausal						
Yes	Iron Deficiency Anaemia	Yes		0	17	17
		No		13	11	24
	Total			13	28	41
No	Iron Deficiency Anaemia	Yes	113	73	0	186
		No	102	56	0	158
	Total		215	129	0	344
Breast Feeding						
Yes	Iron Deficiency Anaemia	Yes	33		0	33
		No	12		0	12
	Total		45		0	45
No	Iron Deficiency Anaemia	Yes	80	73	17	170
		No	90	69	11	170
	Total		170	142	28	340
Pregnancy						
Yes	Iron Deficiency Anaemia	Yes	10		0	10
		No	3		0	3
	Total		13		0	13
No	Iron Deficiency Anaemia	Yes	103	73	17	193
		No	99	69	11	179
	Total		202	142	28	372

DISCUSSION:

Millions of world populations are being affected by anaemia, especially the rising nations. Most commonly lower socioeconomic class, illiteracy, deprived health education, insufficient health facilities mainly in rural community are the some essential grounds. All the above and other factors are responsible for the worsening of this trouble.

Iron deficiency anaemia is the most frequent type of anaemia all over the world; about 700-800 millions of world populace is targeted by IDA. Most of them are from the developing nations. About 56% of pregnant subjects in the developing nations had anaemia. [19]

Present study was conducted on female subjects belonging to different areas of district SAB. Anemia a common health issue influencing above the half of public in the rising countries. In the females, the increased frequency of anemia affects the development milestones, routine activities and economical status of patients. Easy fatigability and pallor are common presentation of anemia in females.

At earlier age anemia had been categorically surveyed to interruption of psychomotor maturity, deprived cognitive activities, weakened immunity and diminished working capability.

South Asia and Africa are the two regions of the world where the incidence of IDA in all age groups, apart from males (adult) and pregnant women is uppermost (40%) than rest of the other regions of world. In Asia, (South) the occurrence of IDA in pregnancy ranges around 65%. The frequency of IDA during pregnancy in Indian subcontinent ranges up to 88%. [19]

In the developing countries, anaemia is the most frequent public health problem; it influences more than half of populace in these regions.

In Pakistan, studies had disclosed IDA as the wide spread nutritional insufficiency. Present study was conducted on female subjects belonging to different areas of district SAB. In the females, the increased frequency of anemia affects the developmental milestones, routine activities and economical status of patients. Easy fatigability and pallor are common presentation of anemia in females.

Current study illustrates that here in this area of Pakistan there is increased occurrence of IDA (52.7%). A study carried out in Pakistan on the occurrence of anaemia in pregnancy, breastfeeding women, teenager girls and youngsters shown the results as, 83%, 78%, 85% and 82.9% respectively. [20] We had also same observations, most of females with pregnancy had IDA (76.92 %), followed by lactating mothers (73.3%), menopause (41.5%) and in unmarried females (47.3%).

IDA is prevalent in both genders but is more frequent in female subjects reasons could be due to blood loss during menstrual periods, pregnancies and in premenstrual periods. Many reasons as poverty, insufficient knowledge and education, inadequate health facilities could lead to this problem. In addition, the results also reveal that IDA is also more common in reproductive age as well as in rising age groups due to the high nutritional demands. Many studies had found decreased haemoglobin values in the females of reproductive age.

The occurrence of anemia in female subjects was (52.7%) between the age from 18 to 72 years in district SBA (Figure 1). Nutritional deficiency of iron in diet is considered major factor for increased prevalence of anaemia in this age group.

In taluka Sakrand and Kazi Ahmed (SBA) the occurrence of anaemia in children was 14.6% and 15.0% respectively as found by Niaz et al in their study. The incident of anaemia in children was more in taluka Sakrand as in comparison to taluka Qazi Ahmed. In male gender, the Hb level ranged between 10.3 g/dl and 15.4 g/dl that were elevated in comparison to female gender respectively. They also had shown that the haemoglobin levels were higher in urban population as compared with rural population where haemoglobin level ranged between 9.4 g/dl, to 15.3g/dl. Hb level of 9.4 g/dl was observed in low socioeconomic class. [21] Current study also had shown that IDA was more common in rural community (111/228) in comparison to urban (92/157) as well as more common in poor (71/116) and uneducated subjects (111/209).

WHO in 2008 declared IDA in Pakistan as a serious health issue mostly in youngsters followed by pregnancy and non-pregnant subjects of reproductive age. In current study IDA was found to be most prevalent problem in adult females of this region with frequency of 52.7%, many of the studies done all over the world had also cited IDA as the most frequent type of anaemia.[3]

Current study shows that 54.06% of female subjects of child bearing age had IDA ranging from mild to moderate and few cases of severe anaemia were also seen, our results are supported by WHO report (in

2016) which declared that in Pakistan there was 52.1% incidence of anemia among females of reproductive age, while in 2001 this was 48.8%. [3],[22]

Present study results also supported by studies from Gulf and Saudi Arabia, in Gulf 15 to 48% of reproductive age females had anaemia, similarly 30.0 – 56% of child bearing females in Saudi Arabia had anaemia. [23]

In unmarried female subjects, mild to moderate anaemia was noted from 32.1% to 50.9%. [22] Current study had also analysed the prevalence of anaemia in unmarried women as 47.32%.

Worldwide the frequency of anaemia in pregnancy is round 55.5% as reported by WHO. In 2016 frequency of anaemia in Pakistani pregnant women was 51.30% whereas it ranged up to 47.40% in year 2002.[3] A study conducted in different districts of India analysed 61.0% -96.8% anaemia during pregnancy.[22] Results of current study also show a prevalence of anaemia in 76.9 % of pregnant women that is matching with the above study.

Various studies from different areas of Pakistan had shown that IDA ranged from 48.2% minimum to 90.5% in pregnant woman. [24]

Insufficient dietary supply of essential nutrients, multiple pregnancies, unhealthful food practices are mainly related with occurrences of IDA in susceptible subjects. [25][26][27] In 1990, 2002 and 2016 the prevalence of anaemia between non-pregnant females were 54.10%, 48.9% and 52.2% respectively, [3] these study data are matching with the findings of current study in which it was observed that 51.9% of the non pregnant subjects had IDA. About half of subjects with IDA were between the ages of 20 to 30 years, 53.0% had moderate category of anaemia while, 12.5% had severe anaemia. [28] Children born to anaemic mothers were found to have anaemia ranging from moderate to severe. [29]

In Bangladesh during an assessment, it was observed that about 70% of population had anaemia (mean Hb 9.4g/dl). Bhatia et al. concluded in their study that 75% of the school going female up to the age of 14 years had anaemia. [30] Current study had also shown that a large number (52.7%) of female subjects in our population were with anaemia. The occurrence of anaemia in school going female students of urban Punjab was 51.1% as reported by Verma M. et al. In districts of Banglore (India) where nutritional programs were launched at school level, it was observed that the prevalence of anaemia was decreased but still female subjects had increased incidence in comparison to male gender. [31] This also supports the current study analysis in which anaemia was near to the observations of that study.

In a study conducted on adolescents females it was evaluated that the mean hemoglobin value for the females was (12.4 ± 1.6 g/dl), with 28.6% of adolescents having hemoglobin level <12 g/dl, [32][33] our finding shown that in female volunteers the mean values of Hb level were 10.67 ± 1.89 that also are near to the findings of above study.
In current study the most of population included belonged to rural areas. Niaz et al found that in residential area wise (Rural, Urban), in urban region the mean value of Hb level was higher as compared to rural areas. [21]

About (56.5%) were anemic in Rishikesh, Utterakhand, of India in school age children. The findings of current study were comparing able with the above study of India. The high occurrence of anemia was (36.5%) in menarcheal girls, 65.1% anemic females were belonging to lower socio-economic class. The common anemia was microcytic hypochromic type due to deficiency of nutrients. [34] The occurrence of anemia were higher in young age group (18-40 years) (55.66%), in 41-60 years (35.96%) and (8.37%) in age group above 60 years, for the reason that at this age the female are more prone to develop anemia because of many factors, like unavailability of a good and balance diet according to age and sex, male dominancy to eat first, poor sanitation, worm infestations, recurrent illnesses, and lot of other factors are responsible for that because female body requires balance nutrition for growth.

The recent results were in line with the past studies. The analysis conducted in school age students of Dera Ismail khan (Pakistan) (58.8%) males were anemic with maximum at age 06 years and (70.0%) females were anemic with maximum at age 06 years (100%) and 10 years (66.6%) [35] In current research the IDA was 52.7% collectively while in urban area it was 40.8% and in rural it was higher up to 59.2% quite close to above study. Niaz et al concluded that occurrence of anemia (30.2%) were observed in lower class income that was higher occurrence of anemia in lower class children as compared to middle class (10.6%) and upper middle class (2.3%) students.[21]

Similarly findings reported by Villapando et al. preschool and school age children of Mexico in

1999-2006. The occurrence of anemia in 1999 was 28.1%, 24.7% and 22.1% in lower, middle and upper class children respectively therefore occurrence of anemia was low (19.6%) in lower class, middle class (17.2%) and in upper class (16.6%) in 2006 below age 5 - 11 years children. [36] Similar findings reported by Jain and Jain [34], Anemia was more common (90.90%) in the children belonging to the lower socio economic level and 37.5% children of upper and middle class were anemic in Ri-shikesh, Uttrakhand, India. The occurrence of anemia in malnourished children was high (66.89%) and in nourished group were (29.09%) [36] Prevalence of anemia in school age children in age groups (05 - 12 years) was high (46.0%) in developed countries particularly highest rates found in Africa (49.0%) and in South Asia (50.0%). The anemia occurrence among school age children was 35% in mountainous region from Northern Morocco [37].

CONCLUSION:

It was concluded that in present study frequency of anemia is 52.7% it was high in females of district Shaheed Benazirabad. The majority of anemic patients (56. 1%) belongs to lower income class and more anemic were observed in the age of 18-40 years (55.8%). The total frequency of anemic females was 203(52.7%) and non-anemic 182 (47.3%) were observed in adult female patients visiting PMC Hospital Nawabshah. The mean Hb level of anaemic 10.5±3.88 was observed. The highest frequency of anemia was observed in young age group (20-40) years.

REFERENCES:

1. WHO (2011) Hemoglobin Concentrations for the Diagnosis of Anemia and Assessment of Severity. Vitamin and Mineral Nutrition Information System. World Health Organization,Geneva.
2. Stoltzfus, R.J. (2007) Iron Deficiency: Global Prevalence and Consequences. Food Nutrition Bulletin, 24, S99-S103. https://doi.org/10.1177/15648265030244S206
3. WHO (2008) Worldwide Prevalence of Anemia. 1993-2005 WHO Global Databases on Anemia. World Health Organization, Geneva.
4. Al-Mekhlafi, H.M., Mahdy, M.A., Sallam, A.A., Ariffin, W.A., Al-Mekhlafi, A.M., Amran, A.A. and Surin, J. (2011) Nutritional and Socio-Economic Determinants of Cognitive Func-tion and Educational Achievement of Aboriginal Schoolchildren in Rural Malaysia. British Journal Nutrition, 106, 1100-1106. https://doi.org/10.1017/S0007114511001449
5. Kapil, U. and Bhavna, B. (2002) Adverse Effects of Poor Micronutrient Status during Childhood and Adolescence. Nutrition Review, 60, S84-S90. https://doi.org/10.1301/00296640260130803
6. Phiri, K.S., Calis, J.C.J., Faragher, B., et al. (2008) Long Term Outcome of Severe Anaemia in Malawian Children. Plos ONE, 3, 0002903. https://doi.org/10.1371/journal.pone.0002903
7. World Health Organization Scientific Group (1977-1978) Nutritional Anaemia. WHO Tech. Rep. Series, 1968; 405, 5. Micro-Nutrient Survey of Pakistan, Nutritional Cell Isla-mabad Planning and Development Division, Government of Pakistan, 54-57.
8. [National Nutrition Survey (1988) Nutrition Division. National Institute of Health, Gov-ernment of Pakistan, 35.
9. World Health Organization (2001) 55th World Health Assembly. Agenda Item 13.10: Infant World Health Organization. Iron Deficiency Anaemia. Assessment, Prevention, and Control. A Guide for Programme Managers, WHO/UNICEF/UNU, Geneva.
10. Bakhtiar, U., Khan, Y. and Nasar, R. (2007) Relationship between Maternal Related He-moglobin and Perintal Outcome. Rawal Medical Journal, 32, 102-104.
11. Christofides, A., Schauer, C. and Zlotkin, S.H. (2005) Iron Deficiency Anemia in among Children: Addressing a Global Public Health Problem within a Canadian Context. Paedia-trics and Child Health, 10, 597-601.
12. Looker, A.C., Dallman, P.R., Carrol, M.D., Gunter, E.W. and Johnson, C.L. (1997) Preva-lence of Iron Deficiency in the United States. JAMA, 277, 973-976. https://doi.org/10.1001/jama.1997.03540360041028
13. Dallman, P.R., Siimes, M.A. and Stekel, A. (1980) Iron Deficiency in Infancy and Child-hood. American Journal Clinical Nutrition, 33, 86-118.
14. Foy, H. and Kondi, A.A. (1953) Case of True Red Cell Aplastic Anaemia Successfully Treated with Riboflavin. Journal Pathology Bacteriology, 65, 559-564. https://doi.org/10.1002/path.1700650228
15. Clayton, P.T. (2006) B6-Responsive Disorders: A Model of Vitamin Dependency. Journal Inheritance Metabolism Diseases, 29, 317-326. https://doi.org/10.1007/s10545-005-0243-2
16. Thompson, R.B. (1975) A Short Textbook of Hematology. 4th Edition, Pitman Medical Publishing Company.
17. UNICEF, UNU and WHO (2001) Iron Deficiency Anaemia. Assessment, Prevention and Control. A Guide for Programme Managers. IDA Consultation, World Health Organization.
18. US Department of Health and Human Services (2010) Healthy People 2010: Understanding and Improving Health. 2nd Edition, Government Printing Office, Washington DC.

19. Saeed Akhtar, Anwaar Ahmed, Asif Ahmad, Zulfiqar Ali, Muhammad Riaz, Tariq Ismail. Iron status of the Pakistani population-current issues and strategies. Asia Pac J Clin Nutr 2013;22 (3):340-347
20. Jalil F, Khan AM Nutritional anaemia, classification and effect of a therapeutic trial for proposed fortification program. Islamabad, Planning and Development Division, Nutrition Cell, Government of Pakistan, 1986-1988, p. 15.
21. Jamali N H , Mahesar H , Bhutto M A . Prevalence of Iron Deficiency Anaemia in School and College Going Students of District Shaheed Benazirabad Sindh Province, Pakistan. Open Journal of Blood Diseases Vol.6 No.4 Pub. Date: December 20, 2016.p-67-78.
22. S. Toteja, Padam Singh, B. S. Dhillon, B. N. Saxena, F. U. Ahmed, Lt. R. P. Singh,Balendu Prakash, K. Vijayaraghavan, Y. Singh, A. Rauf, U. C. Sarma, Sanjay Gandhi,Lalita Behl, Krishna Mukherjee, S. S. Swami, Viu Meru, Prakash Chandra, Chandrawati,and Uday Mohan. Prevalence of anemia among pregnant women and adolescent girls in 16 districts of India. Food and Nutrition Bulletin, vol. 27, no. 4 © 2006, The United Nations University.
23. Joharah M. Al-Quaiz, MSc, MRCGP, Iron deficiency anemia A study of risk factors. Saudi Med J 2001; Vol. 22 (6): 490-496.
24. Baig-Ansari N, Badruddin SH, Karmaliani R, Harris H, Jehan I, Pasha O et al. Prevalence and risk factors in pregnant women in an urban area of Pakistan. Food Nutr Bull. 2008;29:132-9.
25. NNS (National Nutrition Survey). (2001-2002). Ministry ofHealth, Government of Pakistan, Islamabad, 2002. [cited 2013/2/23]; Available from: http://pakresponse.info/LinkClick.aspx?fileticket=BY8AFPcHZQo=
26. Khalil AK, Jabbar T, Akhtar S, Mohyuddin S. Frequencyand types of A in an antenatal clinic in the third trimester of Pregnancy. Pak Armed Forces Med J. 2007;57:273-8.
27. Abbassi RM, Ansari S, Ram DB, Abbasi S. The prevalence and risk factors of anemia in pregnant women. Med Channel. 2009;15:70-3.
28. Iron Deficiency Anemia in Bahawalpur Region of Pakistan: A Descriptive Study Saeed Ahmad Malik, Muhammad Aurangzeb Saeed Malik, Saadia Aurangzeb Malik. P J M H S Vol. 10, NO. 1, JAN – MAR 2016 89-91.
29. Nestel P, Ritu N. Manual for flour fortification with iron. Guidelines for the development, implementation, monitoring and evaluation of a program for wheat flour fortification with iron. 2000. (Part 1 of 3). Micronutrient Initiative/OMNI/USAID. [cited 2013/2/4]; Available from: http://www.idpas.org/pdf/721MostManual1.pdf
30. BBS (2003) Anaemia Prevalence Survey of Urban Bangladesh and Rural Chittagong Hill Tracts 2003. Bangladesh Bureau of Statistics, Statistics Division, Ministry of Planning, Gov-ernment of the People's Republic of Bangladesh and UNICEF, Dhaka.
31. Muthayya, S., Thankachan, P., Zimmermann, M.B., Andersson, M., Eilander, A., Miquith, D., Hurrell, R.F. and Kurpad, A.V. (2007) Low Anemia Prevalence in School-Aged Child-ren in Bangalore, South India: Possible Effect of School Health Initiatives. European Journal of Clinical Nutrition, 61, 865-869. https://doi.org/10.1038/sj.ejcn.1602613
32. Foo, L.H., Khor, G.L., Tee E.S. and Dhanaraj, P. (2004) Determinants of Iron Status in Ma-laysian Adolescents from a Rural Community. International Journal Food Science Nutri-tion, 55, 517-525. https://doi.org/10.1080/09637480400015786
33. Foo, L.H., Khor, G.L., Tee, E.S. and Prabakaran, D. (2004) Iron Status and Dietary Iron In-take of Adolescents from a Rural Community in Sabah, Malaysia. Asia Pacific Journal Clin-ical Nutrition, 13, 48-55.
34. Jain, N. and Jain, V.M. (2012) Prevalence of Anemia in School Children. Academic Jour-nals, 3, 1-4.
35. Ramzan, M., Ali, I. and Salam, A. (2009) Iron Deficiency Anemia in School Children of Dera Ismail Khan, Pakistan. Pakistan Journal of Nutrition, 8, 259-263. https://doi.org/10.3923/pjn.2009.259.263
36. Villapando, S., Dhamah-Levy, T., Garcia-Guerra, A., Mundo-Rosas, V., Dominguez, C. and Mejia-Rodriguez, F. (2009) The Prevalence of Anemia Decreased in Mexican Preschool and School-Age Children from 1999 to 2006. Salud Pública de México, 51, S507-S514.
37. Zimmermann, M.B., Zeder, C., Chaouki, N., Saad, A., Torresani, T. and Hurrell, R.F. (2003) Dual Fortification of Salt with Iodine and Microencapsulated Iron: A Randomized, Double Blind, Controlled Trial in Moroccan School Children. The American Journal of Clinical Nutrition,