

COMPARISON BETWEEN SCHOOLS STUDENTS PERFORMANCE (HIGH AND LOW) IN RELATION TO BMI AND ANEMIA

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Research By.

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STUDY TACKLES

ISSUE OF PERFORMANCE IN RELATION TO BMI & ANEMIA

Field work research by Dr. Somaya Al Jawder Consultant family physician Doctor in-charge of Naiem Health center and Dr. Ali Mohammed Mustafa Diploma of family physician specialist of F.M. about comparison between Schools students performance (High & Low) in relation to BMI & HB (Anemia)

The performance of Schools students depends on many causes as social, psychological, biological, genetics, science & health factors. In this research we cannot include all health factors which effect in performance, but only include small important can effect on health (BMI – HB Anemia) Anemia in Kingdom of Bahrain which responsible for suffering of most of children's the highest percent mainly Iron deficiency which cause by bad behavior of population in used un healthy foods lack of Iron in food and failure of treatment of Iron deficiency Anemia by Iron syrup & tablet also genetic Anemia such G6PD, sickle cell Anemia and Thalathemia. The effect of Anemia in our children's is Psycho-motor development which is irreversible effect which effect on the

performance of children by effect on immune system of the body which make sickness and exhausted, rapid tired and lack of concentration. BMI by measure of height, weight and calculate by percentile used CDC BMI- for-age growth charts (for either girls or boys) to obtain a percentile ranking.

Percentiles are the most commonly used indicator to assess the size and growth patterns of individual children in the United States. The percentile indicates the relative position of the child's BMI number among children of the same sex and age. The growth charts show the weight status categories used with children and teens (underweight Less than the 5th percentile, Healthy weight 5th percentile up to the 85th percentile, At risk of overweight 85th to less than the 95th percentile, overweight Equal to or greater the 95th percentile) obesity is often evident in developing countries with under- nutrition and is a complex condition with serious social and psychological aspects. It is indiscriminate and affects virtually all ages and socioeconomic groups. Obesity rates have risen because of increase consumption of more energy rich, nutrient- poor foods with high levels of sugar and saturated facts, combined with more sedentary lifestyles. Obesity can lead to serious diet-related chronic diseases, including type2 DM, hypertension and stroke, and certain forms of cancer. The health consequences range from increased

risk of premature death, to serious chronic condition that reduces the overall quality of life. A particularly concerning phenomenon is the increasing incidence of child obesity which also affect in performance in Schools by always child busy by eating foods and less-concentration to study and also psychological affect. Societal changes and worldwide nutrition transition are driving the obesity epidemic. Economic growth, modernization, urbanization, globalization of food markets and fast foods are just some of the forces though to underline the epidemic. At the same time, large shifts towards less physically activity has been observed worldwide. These all factors can affect on our children's Schools especially less sport hours and more carbohydrate fat rich food. The Prevalence of childhood obesity in the United States has risen dramatically in the past several decades. Although 25 to 30 percent of children are affected, this condition is under diagnosed and under treated. Hormonal and genetic factors are rarely the cause of childhood obesity; unnecessary diagnostic evaluations can be avoided with a careful history and physical examination. Because obese children may suffer life-long physical and emotional consequences, it is imperative to discuss prevention with parents during examinations. All obese children should be screened for cardiac risk factors, as well as for possible orthopedic,

dermatologic and psychiatric sequelae. Treatment should be initiated when the trend in increasing weight obviously surpasses the trend in increasing height. Treatment plans should include reasonable weight-loss goals, dietary and physical activity management, behavior modification and family involvement, which may include weight loss in the parents. Anorexia medications are not approved by the U.S. Food and Drug Administration for use in pediatric populations.

AIMS:

Evidence of relationship between performance (High & Low) in schools students to BMI and Anemia, prevalence of Anemia between school students, prevalence of obesity between school students & put national programs to treat anemia & Obesity between schools students.

MATERIAL AND THE METHODS

The research cases obtain by take 6Students from each class in 6 Schools which choosing in Manama city. The Schools are Al Adawiya girls, Abu-backer Al Seddique boys primary Schools, Um- Salamh, girls, Salmaniya boys prep Schools and Khawla girls, Naim boys secondary schools. After mid year examination and select from each class the 3 highest good students and the worst 3 student in degree mark. Calculate HB by pricking finger technique in laboratory of health centers and also in the schools and take weight, height to calculate BMI. The agreement of ministry of health, Ministry of Education and parents of the students. Cooperation with some teachers. The data for computers statistics by SPSS.

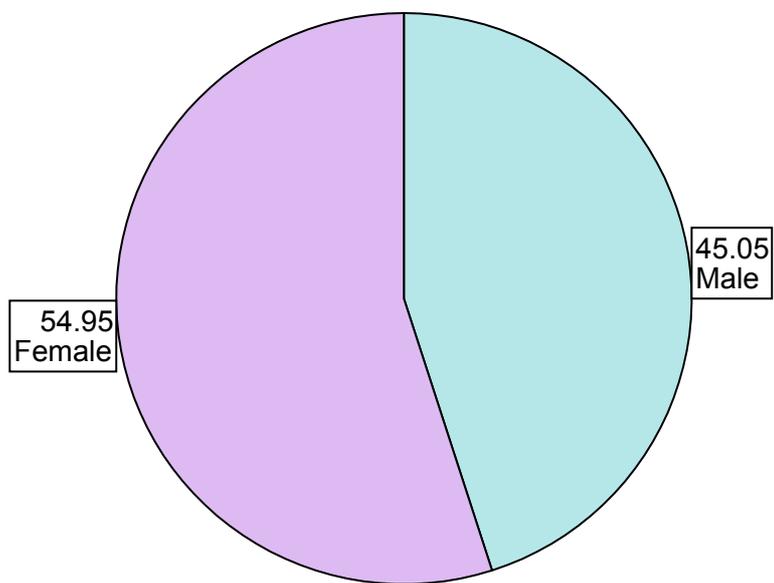
THE RESULTS

This research about 606 cases male 273 (45%) female 333 (55%) this show in table1 Schools which research location are Al Adawiya primary girls 112 case (18.5%) Abu-backer Primary boys 54 cases (8.9%) Um-Salamh prep girls 95 cases (15.7%) Salmania prep boys 65 cases (10.7%) Khawla Secondary girls 126 cases (20.8%) Naim boy secondary school 154 cases (25.4%) also the level of schools are primary Schools 166 (27.4%) prep Schools 160 cases (26.4%) secondary Schools 280 cases (26.2%) show in table2 BMI groups classification according CDC are under weight , healthy weight, at risk of over weight and over weight(means obesity) equal (25.8%) show in table3, HB pattern groups and classification of anemia (Anemia 17%) show in table4&5, BMI groups classification According to levels of schools prep schools more in BMI show in table6, performance: high 306 case (50.5%) low 300 cases (49. 5%) the bio-data of research , sex in relation to BMI groups show in table7 performance for male and female according to bio-data show in table8 A, B & C, performance according to level of schools for Bio-data show in table9, BMI groups classification in relation to performance show in table10, BMI groups according to in relation to sex according to performance show in table11, BMI groups in relation to level of

Schools about performance show in table12, The performance in the relation to hemoglobin pattern groups show in table13, The sex about performance and relation to hemoglobin pattern groups show in table14, sex in relation to Anemia show in table15, classification of Anemia in relation to performance show in table16, classification of Anemia in relation to sex, School levels about performance show in table17, BMI classification in Anemia and non Anemia Show in Table18 ,BMI classification in Anemia patient in relation to performance show in table19 and last show levels, performance, sex in relation to BMI and Anemia classification show in table20.

Sex		
	Frequency	Percent
Male	273	45.0
Female	333	55.0
Total	606	100.0

Table 1: show sex



Graph1: show sex

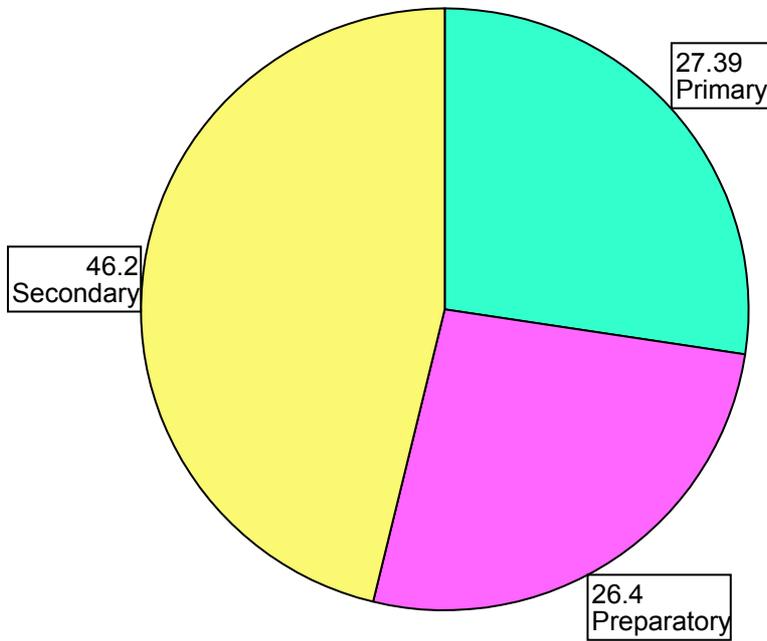
school

	Frequency	Percent
Khawla	126	20.8
Um salamh	95	15.7
Abu Baker	54	8.9
Al Dwia	112	18.5
Salmania	65	10.7
Al Naim	154	25.4
Total	606	100.0

Level

	Frequency	Percent
Primary	166	27.4
Preparatory	160	26.4
Secondary	280	46.2
Total	606	100.0

Table2: show schools and level

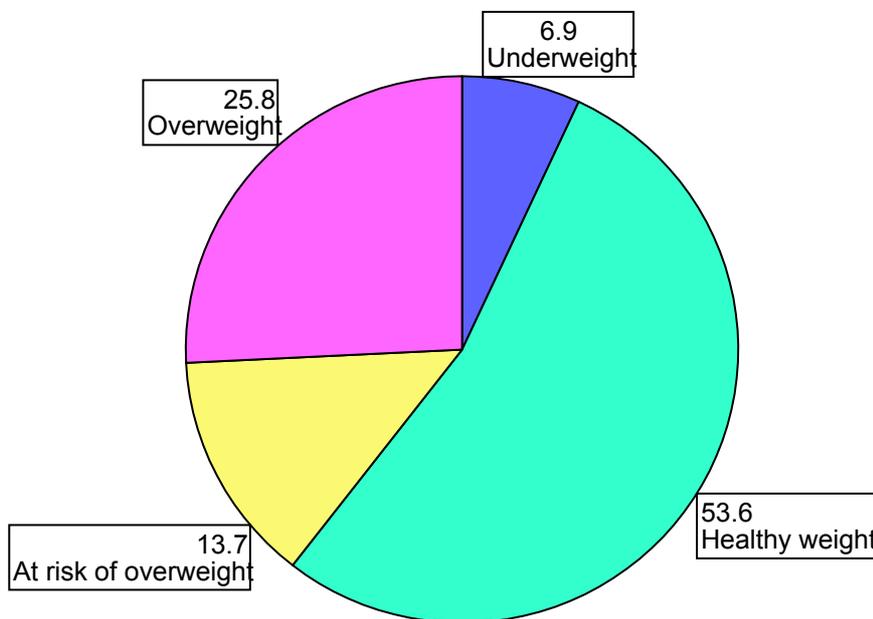


Graph2: show schools and level

BMI_group

	Frequency	Percent	Cumulative Percent
Underweight	38	6.9	6.9
Healthy weight	293	53.6	60.5
At risk of overweight	75	13.7	74.2
Overweight	141	25.8	100.0
Total	547	100.0	

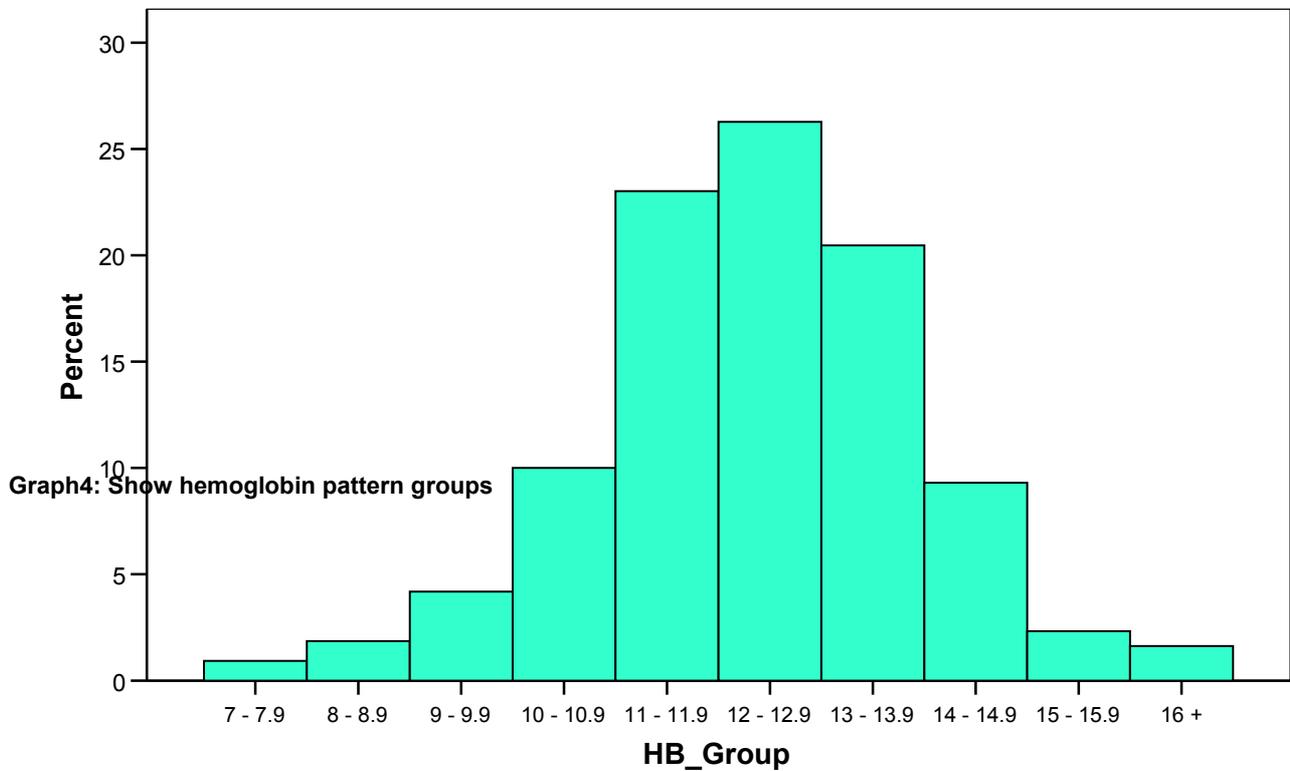
Table3: show BMI classification. Over weight 25.8%



Graph3: show BMI classification. Over weight 25.8%

	Frequency	Percent	Cumulative Percent
7 – 7.9	4	.9	.9
8 – 8.9	8	1.9	2.8
9 – 9.9	18	4.2	7.0
10 – 10.9	43	10.0	17.0
11 – 11.9	99	23.0	40.0
12 – 12.9	113	26.3	66.3
13 – 13.9	88	20.5	86.7
14 – 14.9	40	9.3	96.0
15 – 15.9	10	2.3	98.4
16 +	7	1.6	100.0
Total	430	100.0	

Table4: Show hemoglobin pattern groups



HB_anemia

	Frequency	Percent	Cumulative Percent
Anemic	73	17.0	17.0
Non-anemic	357	83.0	100.0
Total	430	100.0	

Table5: Show Anemia classification. Anemia 17%

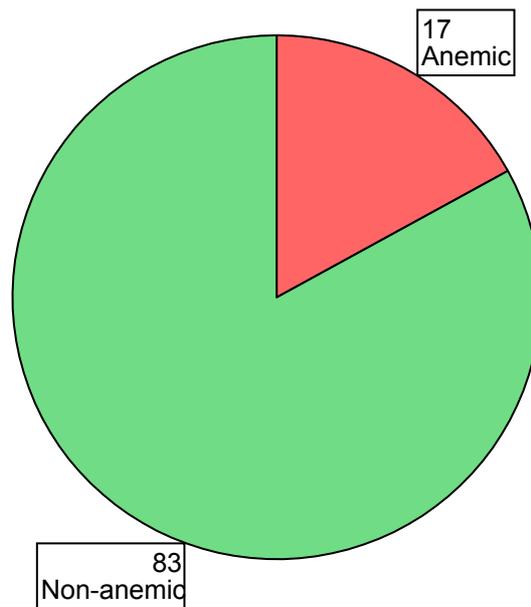


Table5: Show Anemia classification. Anemia 17%

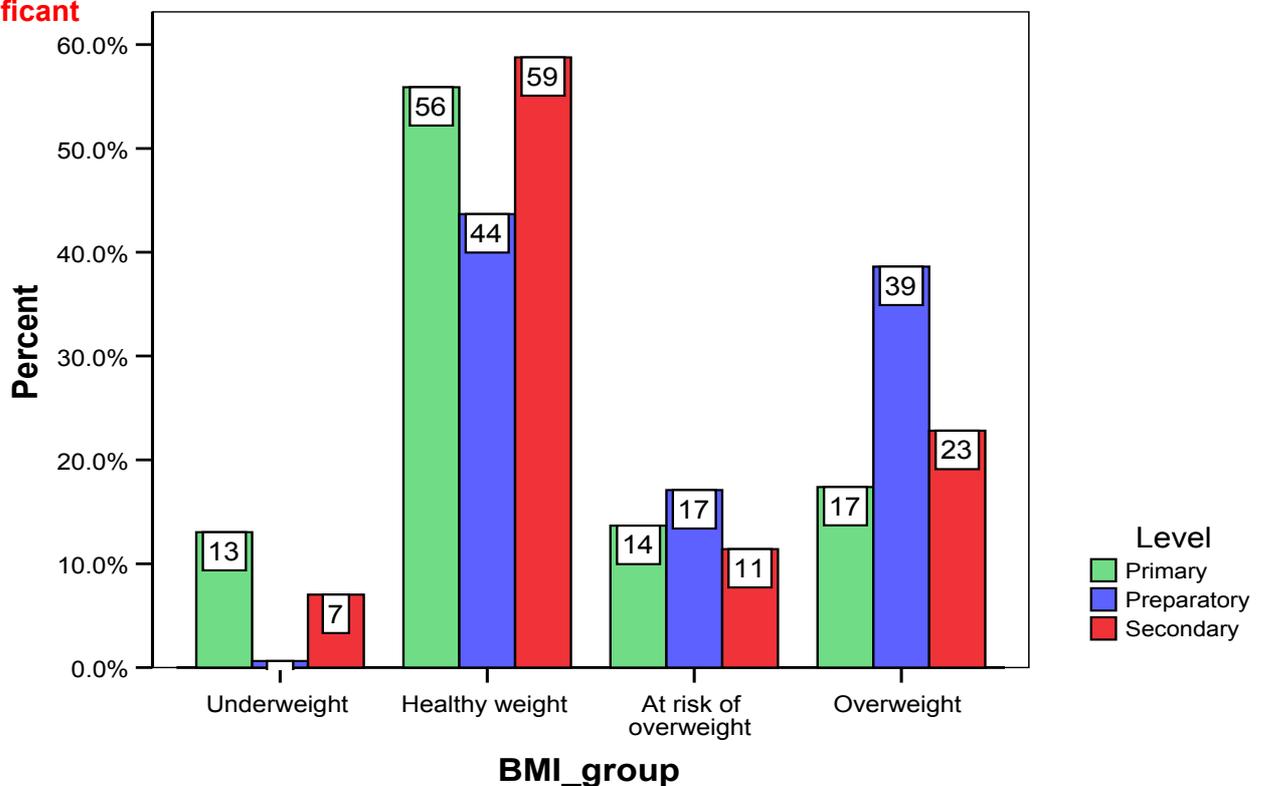
Level		BMI group				Total
		Underweight	Healthy weight	At risk of overweight	Overweight	
Primary	N	21	90	22	28	161
	%	13.0%	55.9%	13.7%	17.4%	100.0%
Preparatory	N	1	69	27	61	158
	%	.6%	43.7%	17.1%	38.6%	100.0%
Secondary	N	16	134	26	52	228
	%	7.0%	58.8%	11.4%	22.8%	100.0%
Total	N	38	293	75	141	547
	%	6.9%	53.6%	13.7%	25.8%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	39.351(a)	6	.000
Likelihood Ratio	43.030	6	.000
Linear-by-Linear Association	.939	1	.333
N of Valid Cases	547		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.98.

Table6: Show BMI classification in School level. Prep Schools more in BMI and relation is significant



Graph6: Show BMI classification in School level. Prep Schools more in BMI and relation is significant

BMI_group * sex Crosstabulation

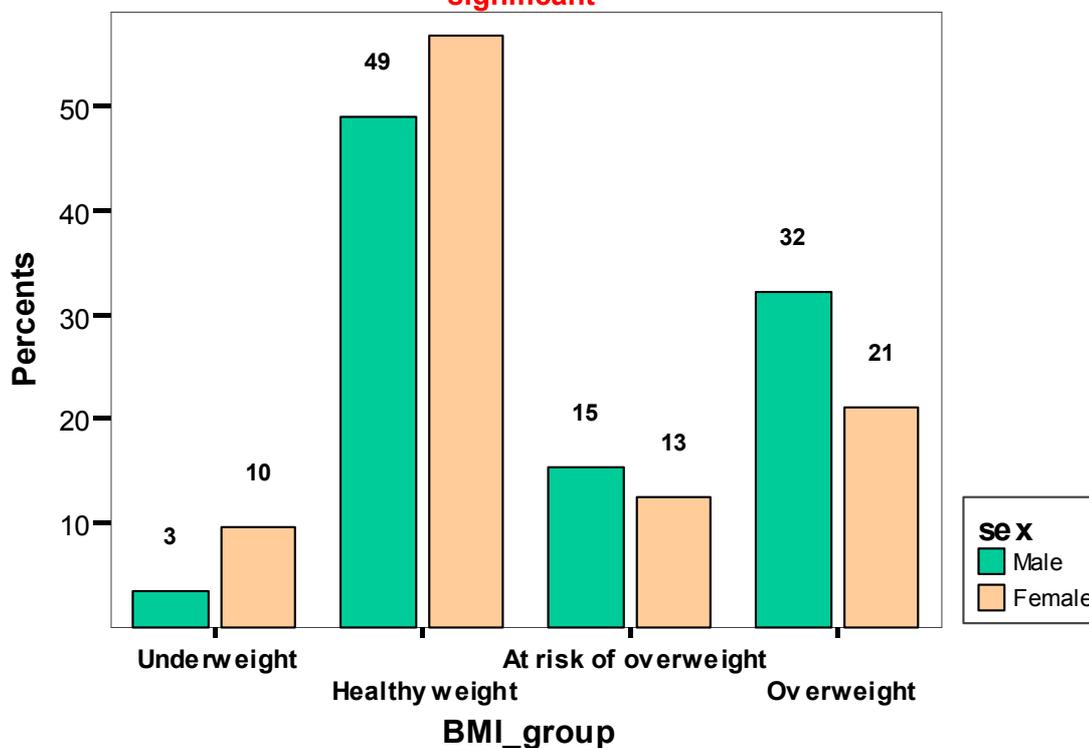
		sex		Total
		Male	Female	
Underweight	N	8	30	38
	%	3.4%	9.6%	6.9%
Healthy weight	N	115	178	293
	%	49.1%	56.9%	53.6%
At risk of overweight	N	36	39	75
	%	15.4%	12.5%	13.7%
Overweight	N	75	66	141
	%	32.1%	21.1%	25.8%
Total	N	234	313	547
	%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.900(a)	3	.001
Likelihood Ratio	16.463	3	.001
Linear-by-Linear Association	14.329	1	.000
N of Valid Cases	547		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 16.26.

Table7 show sex and relation to BMI groups male more than female and **relation is significant**



Graph7 show sex and relation to BMI groups male more than female and **relation is significant**

Performance

	Frequency	Percent
High	306	50.5
Low	300	49.5
Total	606	100.0

Table8A: Show performance

Independent Samples Test

	High		Low		Mean Difference	t	P-value
	Mean	Std. Deviation	Mean	Std. Deviation			
WEIGHT	51.61	19.27	55.41	20.63	-3.81	-2.237	.026
HEIGHT	152.46	15.44	152.17	16.92	.29	.211	.833
HB	12.46	1.52	12.10	1.63	.36	2.345	.019
BMI	21.69	6.54	23.77	8.53	-2.08	-3.214	.001
Age	13.24	3.27	13.24	3.26	.00	-.008	.993

Table8B: Show performance in relation to weight, Height, HB & BMI (relation significant in weight, HB& BMI)

Independent Samples Test

Sex		High		Low		Mean Difference	t	P-value
		Mean	Std. Deviation	Mean	Std. Deviation			
Male	WEIGHT	57.70	19.77	60.19	18.67	-2.49	-.996	.320
	HEIGHT	154.63	17.17	156.48	17.34	-1.86	-.828	.408
	HB	12.93	1.59	12.45	1.62	.48	2.250	.025
	BMI	23.80	7.11	24.86	8.76	-1.06	-1.014	.311
	age	13.91	2.94	13.87	2.96	.05	.132	.895
Female	WEIGHT	47.11	17.65	51.70	21.37	-4.59	-2.074	.039
	HEIGHT	150.85	13.86	148.84	15.86	2.01	1.194	.234
	HB	11.92	1.24	11.74	1.57	.18	.904	.367
	BMI	20.13	5.61	22.95	8.29	-2.82	-3.509	.001
	age	12.68	3.42	12.73	3.41	-.05	-.130	.897

Table8C: Show performance in relation to sex for data(weight, Height, HB & BMI) (relation significant in HB in male ,weight & BMI in Female).

Independent Samples Test

Level		High		Low		Mean Difference	t	P-value
		Mean	Std. Deviation	Mean	Std. Deviation			
Primary	WEIGHT	33.25	11.32	37.09	14.41	-3.84	-1.885	.061
	HEIGHT	136.98	11.86	139.60	13.51	-2.63	-1.313	.191
	HB	11.73	1.18	11.08	1.67	.65	2.493	.014
	BMI	17.37	4.09	18.36	4.52	-.99	-1.461	.146
	age	8.71	1.74	8.72	1.72	-.01	-.019	.984
Preparatory	WEIGHT	54.43	13.67	60.02	16.57	-5.59	-2.318	.022
	HEIGHT	153.07	11.92	150.69	18.54	2.38	.965	.336
	HB	12.47	1.49	12.76	1.65	-.29	-.893	.374
	BMI	23.55	6.89	27.21	8.68	-3.66	-2.943	.004
	age	12.96	.80	12.96	.81	.00	.007	.994
Secondary	WEIGHT	62.96	17.36	64.60	18.76	-1.63	-.686	.493
	HEIGHT	163.21	9.45	161.60	11.15	1.61	1.180	.239
	HB	12.87	1.56	12.41	1.34	.46	2.306	.022
	BMI	23.51	6.29	25.15	8.82	-1.65	-1.621	.106
	age	16.09	.80	16.08	.79	.01	.057	.955

Table9: Show performance and relation to levels of Schools for data. (significant in HB primary & Secondary schools, weight & BMI in prep Schools)

Performance BMI_group Crosstabulation

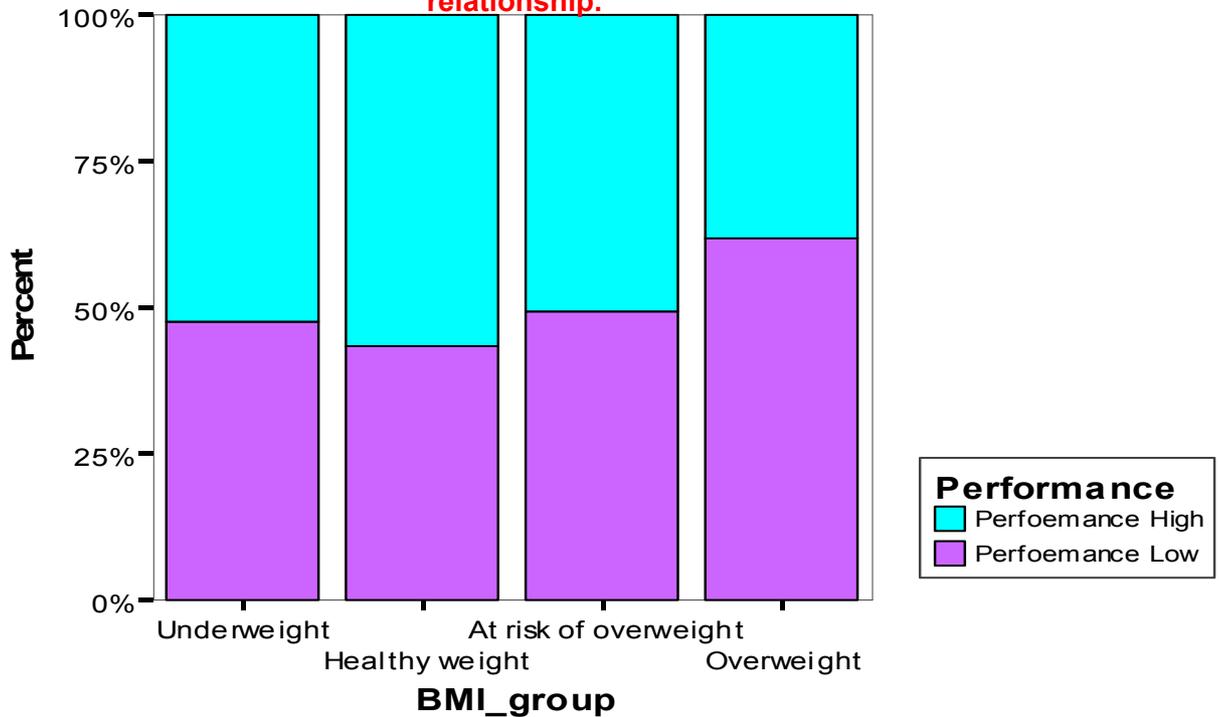
			BMI_group				Total
			Underweight	Healthy weight	At risk of overweight	Overweight	
Performance	High	Count	20	166	38	54	278
		% within BMI_group	52.6%	56.7%	50.7%	38.3%	50.8%
	Low	Count	18	127	37	87	269
		% within BMI_group	47.4%	43.3%	49.3%	61.7%	49.2%
Total		Count	38	293	75	141	547
		% within BMI_group	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.889(a)	3	.005
Likelihood Ratio	12.973	3	.005
Linear-by-Linear Association	10.615	1	.001
N of Valid Cases	547		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 18.69.

Table10: Show BMI groups in the relation to performance (High & Low) Significant relationship.



Grapp8: Show BMI groups in the relation to performance (High & Low) Significant relationship.

				BMI_group							
				Underweight		Healthy weight		At risk of overweight		Overweight	
				N	%	N	%	N	%	N	%
sex	Male	Perform ance	High	5	62.5	61	53.0	18	50.0	34	45.3
			Low	3	37.5	54	47.0	18	50.0	41	54.7
			Total	8	100.0	115	100.0	36	100.0	75	100.0
	Female	Perform ance	High	15	50.0	105	59.0	20	51.3	20	30.3
			Low	15	50.0	73	41.0	19	48.7	46	69.7
			Total	30	100.0	178	100.0	39	100.0	66	100.0
	Total	Perform ance	High	20	52.6	166	56.7	38	50.7	54	38.3
			Low	18	47.4	127	43.3	37	49.3	87	61.7
			Total	38	100.0	293	100.0	75	100.0	141	100.0

Pearson Chi-Square Tests

Male	Performance	Chi-square	1.562
		df	3
		Sig.	.668(a)
Female	Performance	Chi-square	15.872
		df	3
		Sig.	.001(*)

Table11: Show BMI groups in the relation to sex According to performance (High & Low) Significant relationship.

				BMI_group							
				Underweight		Healthy weight		At risk of overweight		Overweight	
				N	%	N	%	N	%	N	%
Level	Primary	Performance	High	11	52.4	50	55.6	13	59.1	9	32.1
			Low	10	47.6	40	44.4	9	40.9	19	67.9
			Total	21	100.0	90	100.0	22	100.0	28	100.0
	Preparatory	Performance	High	1	100.0	44	63.8	13	48.1	23	37.7
			Low	0	.0	25	36.2	14	51.9	38	62.3
			Total	1	100.0	69	100.0	27	100.0	61	100.0
	Secondary	Performance	High	8	50.0	72	53.7	12	46.2	22	42.3
			Low	8	50.0	62	46.3	14	53.8	30	57.7
			Total	16	100.0	134	100.0	26	100.0	52	100.0
Total		Performance	High	20	52.6	166	56.7	38	50.7	54	38.3
			Low	18	47.4	127	43.3	37	49.3	87	61.7
			Total	38	100.0	293	100.0	75	100.0	141	100.0

Pearson Chi-Square Tests

				BMI_group
Level	Primary	Performance	Chi-square	5.307
			df	3
			Sig.	.151
	Preparatory	Performance	Chi-square	9.863
			df	3
			Sig.	.020(*,a,b)
	Secondary	Performance	Chi-square	2.131
			df	3
			Sig.	.546

Table12: Show BMI groups in the relation to level of Schools about performance (High & Low) Significant relationship only in prep Schools.

Performance * HB_Group Crosstabulation

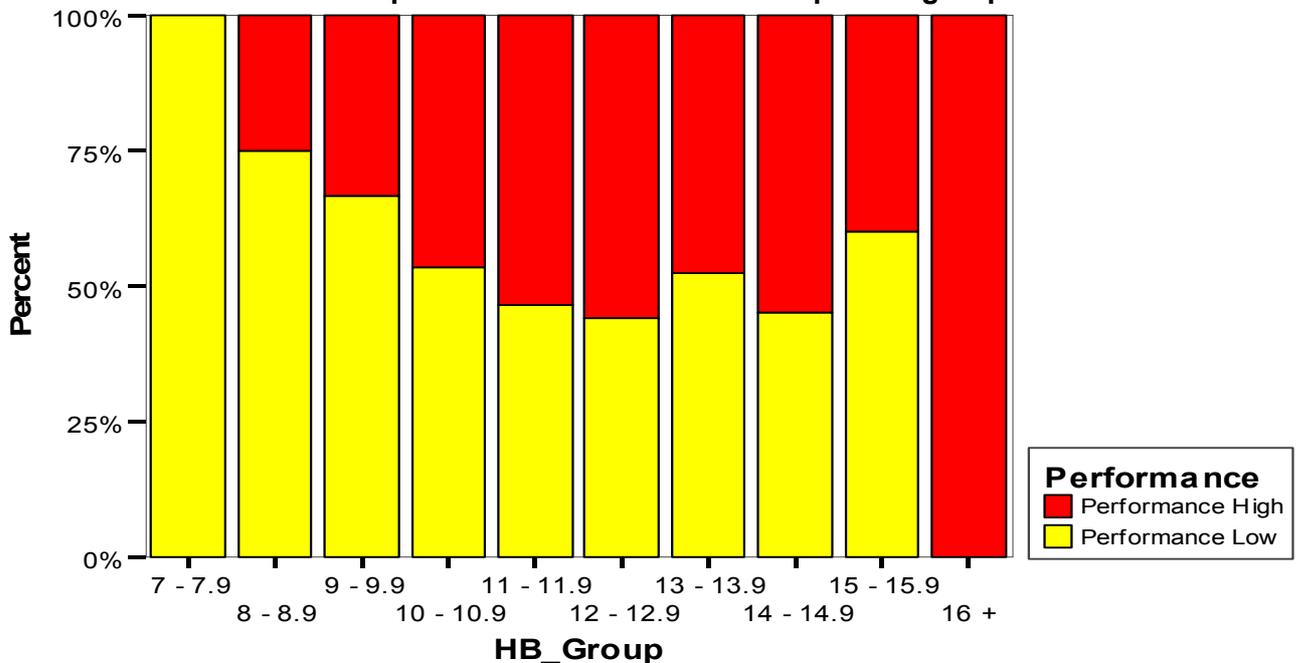
	Performance				Total	
	High		Low			
	Count	%	Count	%	Count	%
HB_Group 7 - 7.9	0	.0%	4	100.0%	4	100.0%
8 - 8.9	2	25.0%	6	75.0%	8	100.0%
9 - 9.9	6	33.3%	12	66.7%	18	100.0%
10 - 10.9	20	46.5%	23	53.5%	43	100.0%
11 - 11.9	53	53.5%	46	46.5%	99	100.0%
12 - 12.9	63	55.8%	50	44.2%	113	100.0%
13 - 13.9	42	47.7%	46	52.3%	88	100.0%
14 - 14.9	22	55.0%	18	45.0%	40	100.0%
15 - 15.9	4	40.0%	6	60.0%	10	100.0%
16 +	7	100.0%	0	.0%	7	100.0%
Total	219	50.9%	211	49.1%	430	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.039(a)	9	.035
Likelihood Ratio	22.421	9	.008
Linear-by-Linear Association	5.831	1	.016
N of Valid Cases	430		

a 7 cells (35.0%) have expected count less than 5. The minimum expected count is 1.96.

Table13: Show performance in relation to HB pattern groups



Graph9: Show performance in relation to HB pattern groups, significant relationship

HB_Group		sex								
		Male			Female			Total		
		Performance			Performance			Performance		
		High	Low	Total	High	Low	Total	High	Low	Total
7 - 7.9	N	0	2	2	0	2	2	0	4	4
	%	.0	100.0	100.0	.0	100.0	100.0	.0	100.0	100.0
8 - 8.9	N	0	1	1	2	5	7	2	6	8
	%	.0	100.0	100.0	28.6	71.4	100.0	25.0	75.0	100.0
9 - 9.9	N	1	5	6	5	7	12	6	12	18
	%	16.7	83.3	100.0	41.7	58.3	100.0	33.3	66.7	100.0
10 - 10.9	N	9	12	21	11	11	22	20	23	43
	%	42.9	57.1	100.0	50.0	50.0	100.0	46.5	53.5	100.0
11 - 11.9	N	22	14	36	31	32	63	53	46	99
	%	61.1	38.9	100.0	49.2	50.8	100.0	53.5	46.5	100.0
12 - 12.9	N	32	28	60	31	22	53	63	50	113
	%	53.3	46.7	100.0	58.5	41.5	100.0	55.8	44.2	100.0
13 - 13.9	N	24	31	55	18	15	33	42	46	88
	%	43.6	56.4	100.0	54.5	45.5	100.0	47.7	52.3	100.0
14 - 14.9	N	18	9	27	4	9	13	22	18	40
	%	66.7	33.3	100.0	30.8	69.2	100.0	55.0	45.0	100.0
15 - 15.9	N	4	6	10	0	0	0	4	6	10
	%	40.0	60.0	100.0	.0	.0	.0	40.0	60.0	100.0
16 +	N	7	0	7	0	0	0	7	0	7
	%	100.0	.0	100.0	.0	.0	.0	100.0	.0	100.0

Pearson Chi-Square Tests

				HB_Group
sex	Male	Performance	Chi-square	19.101
			df	9
			Sig.	.024(*,a,b)
	Female	Performance	Chi-square	7.354
			df	7
			Sig.	.393(a,b)

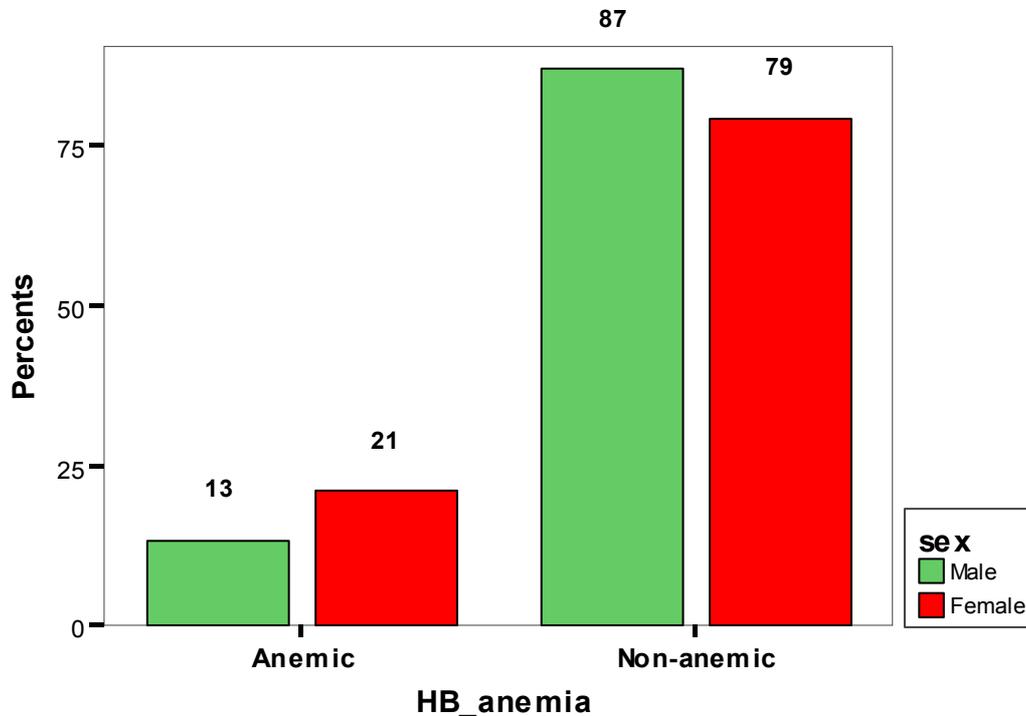
Table14: Show sex about performance and relation to HB Pattern groups, significant relationship male only.

HB_anemia		sex		Total
		Male	Female	
Anemic	N	30	43	73
	%	13.3%	21.0%	17.0%
Non-anemic	N	195	162	357
	%	86.7%	79.0%	83.0%
Total	N	225	205	430
	%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.445(b)	1	.035		
Continuity Correction(a)	3.919	1	.048		
Likelihood Ratio	4.452	1	.035		
Fisher's Exact Test				.040	.024
Linear-by-Linear Association	4.435	1	.035		
N of Valid Cases	430				

Table15 show sex in relation to Anemia female more than male and **relation is significant**



Graph10 show sex in relation to Anemia female more than male and **relation is significant**

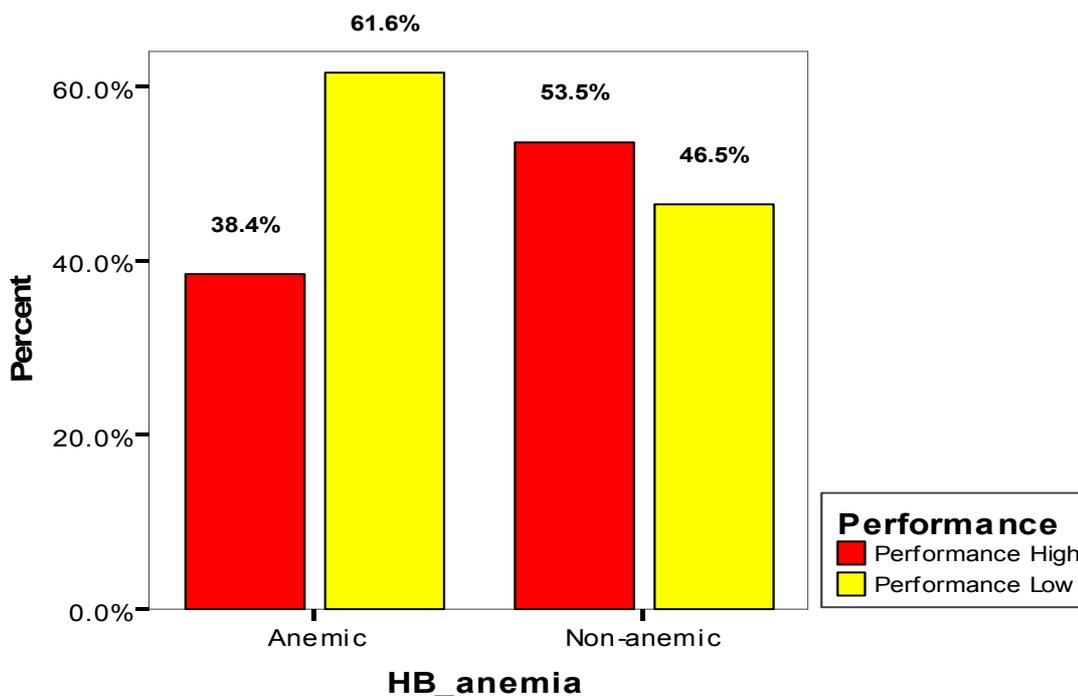
Performance * HB_anemia Crosstabulation

			HB_anemia		Total
			Anemic	Non-anemic	
Performance	High	Count	28	191	219
		% within HB_anemia	38.4%	53.5%	50.9%
	Low	Count	45	166	211
		% within HB_anemia	61.6%	46.5%	49.1%
Total		Count	73	357	430
		% within HB_anemia	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5.563(b)	1	.018		
Continuity Correction(a)	4.973	1	.026		
Likelihood Ratio	5.599	1	.018		
Fisher's Exact Test				.021	.013
Linear-by-Linear Association	5.550	1	.018		
N of Valid Cases	430				

Table16: Show classification of anemia in the relation to performance, significant relationship



Graph11: Show classification of anemia in the relation to performance, significant relationship

				HB_anemia			
				Anemic		Non-anemic	
				N	%	N	%
sex	Male	Performance	High	10	33.3	107	54.9
			Low	20	66.7	88	45.1
			Total	30	100.0	195	100.0
	Female	Performance	High	18	41.9	84	51.9
			Low	25	58.1	78	48.1
			Total	43	100.0	162	100.0
Level	Primary	Performance	High	12	33.3	49	57.6
			Low	24	66.7	36	42.4
			Total	36	100.0	85	100.0
	Preparatory	Performance	High	5	55.6	46	54.8
			Low	4	44.4	38	45.2
			Total	9	100.0	84	100.0
	Secondary	Performance	High	11	39.3	96	51.1
			Low	17	60.7	92	48.9
			Total	28	100.0	188	100.0

Pearson Chi-Square Tests

				HB anemia
sex	Male	Performance	Chi-square	4.832
			df	1
			Sig.	.028(*)
	Female	Performance	Chi-square	1.357
			df	1
			Sig.	.244
Level	Primary	Performance	Chi-square	5.980
			df	1
			Sig.	.014(*)
	Preparatory	Performance	Chi-square	.002
			df	1
			Sig.	.964(a)
	Secondary	Performance	Chi-square	1.352
			df	1
			Sig.	.245

Table17: Show classification of anemia in relation to sex, School level about performance significant relationship in male & Primary School.

		BMI_group									
		Underweight		Healthy weight		At risk of overweight		Overweight		Total	
		N	%	N	%	N	%	N	%	N	%
HB_anemia	Anemic	8	11.4%	42	60.0%	5	7.1%	15	21.4%	70	100.0%
	Non-anemic	22	6.3%	181	51.9%	54	15.5%	92	26.4%	349	100.0%
	Total	30	7.2%	223	53.2%	59	14.1%	107	25.5%	419	100.0%

Pearson Chi-Square Tests

		BMI_group
HB_anemia	Chi-square	6.293
	df	3
	Sig.	.098

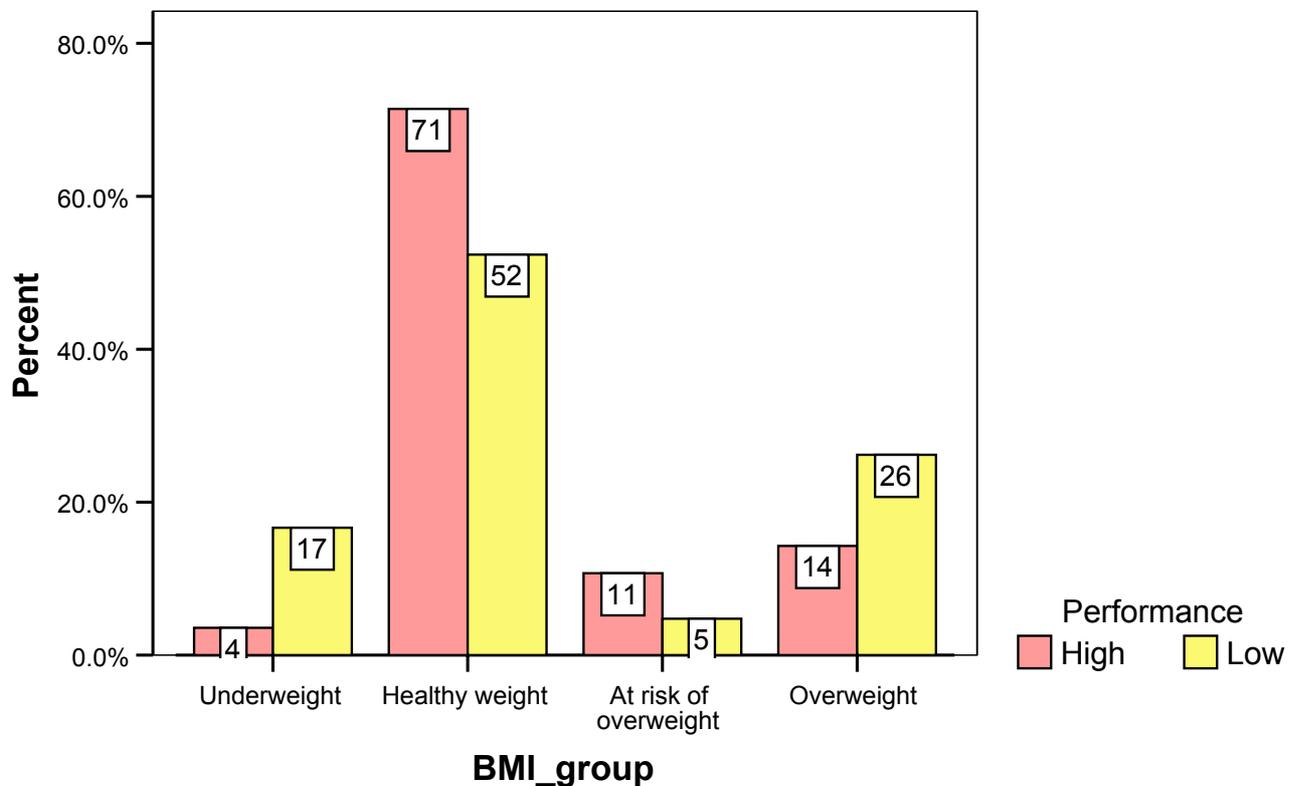
Table18: Show BMI classification in anemia and non-anemia.

Performance		BMI_group				Total
		Underweight	Healthy weight	At risk of overweight	Overweight	
High	N	1	20	3	4	28
	%	3.6%	71.4%	10.7%	14.3%	100.0%
Low	N	7	22	2	11	42
	%	16.7%	52.4%	4.8%	26.2%	100.0%
Total	N	8	42	5	15	70
	%	11.4%	60.0%	7.1%	21.4%	100.0%

Pearson Chi-Square Tests

				BMI_group
HB_anemia	Anemic	Performance	Chi-square	5.481
			df	3
			Sig.	.140(a)
	Non-anemic	Performance	Chi-square	5.980
			df	3
			Sig.	.113

**Table19: Show BMI classification in anemia patient in the relation to performance
HB_anemia: Anemic**



**Graph12: Show BMI classification in anemia patient in relation to performance
(Low performance anemic patient high in BMI)**

BMI_group	Level								Performance				sex			
	Total		Primary		Preparatory		Secondary		High		Low		Male		Female	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Underweight	38	6.9	21	13.0	1	.6	16	7.0	20	7.2	18	6.7	8	3.4	30	9.6
Healthy weight	293	53.6	90	55.9	69	43.7	134	58.8	166	59.7	127	47.2	115	49.1	178	56.9
At risk of overweight	75	13.7	22	13.7	27	17.1	26	11.4	38	13.7	37	13.8	36	15.4	39	12.5
Overweight	141	25.8	28	17.4	61	38.6	52	22.8	54	19.4	87	32.3	75	32.1	66	21.1
Total	547	100	161	100	158	100	228	100	278	100	269	100	234	100	313	100
HB_anemia																
Anemic	73	17.0	36	29.8	9	9.7	28	13.0	28	12.8	45	21.3	30	13.3	43	21.0
Non-anemic	357	83.0	85	70.2	84	90.3	188	87.0	191	87.2	166	78.7	195	86.7	162	79.0
Total	430	100	121	100	93	100	216	100	219	100	211	100	225	100	205	100

Pearson Chi-Square Tests

		Level	Performance	sex
BMI_group	Chi-square	39.351	12.889	15.900
	df	6	3	3
	Sig.	.000(*)	.005(*)	.001(*)
HB_anemia	Chi-square	19.996	5.563	4.445
	df	2	1	1
	Sig.	.000(*)	.018(*)	.035(*)

Table 20 shows levels of Schools, performance and sex in relation to BMI groups and Anemia classification. BMI (prep Schools) more overweight 38.6%, performance (low) 32.8% and sex (male) 32.1% but in Anemia primary Schools more 29.8%, performance (low) 21.3% and female 21.0% the relation are significant in levels, **performance and sex in both BMI and Anemia**

DISCUSSION:

From the result we can comparison between two opposite force of performance high students marks and low students marks in relation to **BMI and HB-Anemia: BMI groups classifications** according to CDC are total 547 cases (100%) under weight 38 cases (6.9%), healthy weight 293 cases (53.6%), at risk of over weight 75 cases (13.7%) and over weight 141 cases (25.8%), **BMI for primary schools** are total 161 cases under weight 21 cases (13.0%) , healthy weight 90 cases (55.9 %) at risk of over weight 22 cases (13.7%) and overweight 28 cases (17.4%), **Prep Schools** are total 158 cases under weight 1 cases (6%) , healthy weight 69 cases (43.7%) at risk of over weight 27 cases (17.1%) and overweight 21cases (38.6%) and **secondary schools** are total 228 cases under weight 16 cases (7.0%) , healthy weight 134 cases (58.8 percent) at risk of over weight 26cases (11.4%) and overweight 52 cases (22.8%), The relation between BMI groups classification and prep Schools are more in obesity (39%) also Primary Schools children's about (13%) underweight, level of schools are **significant strong +ve relationship P- value <0.0005**,**BMI groups in relation to sex** are male underweight 8 case (34%), healthy weight 115 cases (49.1%), at risk of overweight 36 cases (15.4%) and overweight 75 cases (32.1%) but

females under weight 30 cases (9.6%), healthy weight 178 cases (56.9%), over weight 66 cases (21.1%), **the relationship between male and female for BMI more in male and strong significant P-value .001.** otherwise the average weight of high performance (51.61%), the average weight of low performance (55.41%) **significant relationship in weight between high and low performance.** The average BMI of high performance (21.69%), the average BMI of low performance (23.77%) **significant relationship in BMI between high & low performance,**

Performance in relation to sex male not significant in BMI & weight but averageweight of high performance of female (47.11%), the average weight of low performance of female (51.70%) **significant relationship in female weight between high & low performance,** average BMI of high performance female (20.13%) the average BMI of low performance female (22.95%) **significant relationship in female BMI between high & low performance,**

The performance in the relation to levels of the schools Primary & Secondary Schools not significant in weight & BMI but Prep Schools average weight of high performance (54.43%) The Prep Schools average weight of low performance (60.02%) **significant relationship in Prep Schools between high & low performance,** Prep Schools average BMI of high performance (23.55%) The

Prep Schools average BMI of low performance (27.21%)
significant relationship in Prep Schools between high & low performance, The BMI groups in relation to performance total cases 547: High – underweight 20 cases (52.6%) low- underweight 18 cases (47.4%) Total cases of underweight 38 cases, high – health weight 166 cases (56.7%), low – health weight 127 cases (43.3%), total cases 293, high – At risk of over weight 38 cases (50.7%), low – At risk of over weight 37 cases (49.3%) total cases 7, High – over weight 54 cases (38.3%), low – over weight 87 cases (61.7%) total cases 141, **significant strong +ve relationship P- value <0.0005 between BMI groups and performance, BMI groups in relation to sex according to performance** male not significant but female high – underweight 15 cases (50.0%), female low – underweight 15 cases (50.0%), female high – healthy weight 105 cases (59.0%), female low – healthy weight 73 cases (41.0%) female high- At risk of over weight 20 cases (51.3%), female low – At risk of weight 19 cases (48.7%), female high – overweight 20 cases (30.3%), female low – overweight 46 cases (69.7%), **significant relationship in female of BMI between high and low performance.**

BMI groups in relation to levels of Schools primary Schools Primary and Secondary Schools not significant but in prep Schools- high performance under weight 1 cases (100.0%), low – under weight 0 cases (0.0%), high – healthy weight 44 cases (63.8%), low – healthy weight 25 cases (36.2%), high – At risk of over weight 13 cases (48.1%), low – At risk of over weight 14 cases (51.9%) and high – over weight 23 cases (37.7%), low- over weight 38 cases (62.3%) **it is significant relationship in prep Schools.**

About relation of performance and HB- Anemia:- Anemia 73 cases (17.0%), and non Anemia 357 cases (83.0%), the average HB of high performance 12.46 gm/dl but average HB of low performance 12.10 gm/dl **the relation is significant P- value <.019,** **The performance in the relation to sex** male – high HB 12.93 gm/dl but male – low HB 12.45 gm/dl **significant P- value <.025,** The performance in relation to sex female not significant. The performance in relation to HB groups pattern began in low percent to low performance and increase and end to high percent of HB to high performance and **relation is significant P- value <.035** sex about performance in relation to HB pattern **significant in male only P- Value < .024** relation between sex and Anemia: Male (Anemia) 30 cases (13.3%) but female (Anemia) 43 cases (21.0%)

significant relationship female more than male in Anemia P- value $<.024$ HB to sex in relation to performance male – high for Anemia 10 cases (33.3%), male high non Anemia 107 cases (54.9%) and male low for Anemia 20 cases (66.7%), male low non Anemia 88 cases for (45.1%) significant relationship in male but not in female P-value $<.028$ HB to levels of Schools in relation to performance in primary schools high level Anemia 12 cases (33.3%), non Anemia 49 cases (57.6%) but primary school low level Anemia 24 cases (66.7%) non Anemia 36 cases (42.4%) significant relationship in primary Schools but in Prep and Secondary Schools. Finally BMI more in low performance than high performance, more in prep Schools than primary and Secondary and more in male than female. Anemia more in low performance than high, more in Primary, Secondary Schools than Prep and more in female than male.

CONCLUSION

Comparison between high and low performance in schools students in the relation to BMI are significant means that high performance less in BMI than low performance . also performance in relation to HB pattern – anemia are significant means that high performance more in HB % and less in anemia cases than low performance, the male high performance are more in HB % - less anemia case than male low performance and relation is significant but relation not significant between female (high and low performance), the female BMI classification - female high performance more in healthy weight and less in at risk of over weight, over weight than female of low performance which more in at risk of over weight, over weight and also less in healthy weight the relation is significant in female but not significant in male, according to schools levels the prep schools students more obese than students of primary and secondary schools and relation are significant also according to HB % and anemia cases than primary school and secondary schools according to performance the relation are significant but not significant in prep schools, anemia cases of research 17% but in primary schools 29.8% anemia cases more in primary school than prep and secondary schools also anemia more in female 21% than male 13.3 % the relation is significant finally the male in obesity more than female and relation is significant.

RECOMMENDATION

- at the beginning of every new years of schools opening and study become stable must be measure BMI for every students and catch of underweight, at risk of over weight and over weight which responsible for about 46 % of students by national programs and make planning for treatment sharing between Ministry of Health and Ministry of Education also guideline for prevention of disease by more health education, lecture and posters in schools
- Evaluation of obesity of school students are important for several reason. First it offers the best hope for preventing disease progression with its associated morbidity into adulthood , second obesity has negative impact on self steam of children and adolescent which may have significant implication for long term happiness and success in life.
- Obese children must be evaluated for associated morbidity this includes an assessment of cardiac risk factors, weight - related orthopedic problems, skin disorder and potential psychotic sequelae .
- Best way to significant affect of prevalence of obesity in schools are to prevent it, must be issue of obesity will be addressed during every well – students examination.

- Dietary management, physical activity, behavior modification and family involvement.
- Information about health and unhealthy foods and time, type of eating and rules of TV watching and eating and fast foods which rich of calories and fats .
- Schools sports departments increase activity to obese students and offer special time for him.
- Meeting which parents to negotiated the problems and parent meeting not only for discussion school marks but also to discussion the cause which affect these marks such healthy , social , psychological and educational causes.
- Also catch of anemic patient between school students according to performance and treatment (national programs for fighting anemia between school student).
- Anemia mainly iron deficiency due to lack of ironed component in foods must be supplementation by ironed tablet and syrup also supplementation by folic acid tablet to sick cell, G6PD patients every day in schools.
- Biscuits , food rich iron, can be give in schools or small cold stores in schools can buy this foods rich iron.
- Lastly after first examination in schools the low performance students in the examination undergo healthy, and social examination with parents meeting.

REFERENCES:

1. American Family physician A Peer –reviewed journal of the American Academy of Family Physicians January 15, 2003.
2. Williams CL, Campanaro LA, Squillace M, Bollella M. Management of Childhood obesity in pediatric practice. *Ann N Y Acad Sci* 1997;817:225 – 40.
3. Golden MP. An Approach to the management of obesity in childhood. *Pediatr Clin North Am* 1979;26:187-97.
4. Wattigney WA, Harsha DW, Srinivasan SR, Webber LS, Berensons GS. Increasing impact of obesity on serum lipids and lipoproteins in young adults. The Gogalusa Heart Study. *Arch Intern Med* 1991;151:2017-22.
5. McMurray RG, Harrel JS, Levine AA, Gansky SA. Childhood obesity elevates blood pressure and total cholesterol independent of physical activity. *Int J Obes Relat Metab Disord* 1995; 19: 881 -6.
6. U.S. Dept. of Health and Human Services, Public Health Service, National Institute of Health, National Heart, Lung and Blood Institute, National Cholesterol Education Program. Report of the Expert Panel on Blood Cholesterol Levels in Children and Adolescents. Bethesda, Md.: 1991. NIH publication no. 91 -2732.
7. Berenson GS, Srinivasan SR, Wattigney WA, Harsha DW. Obesity and cardiovascular risk in children. *Ann N Y Acad Sci* 1993: 699:93-103.
8. Klesges RC, Shelton ML, Klesges LM. Effects of television on metabolic rate: potential implications for childhood obesity. *Pediatrics* 1993 ; 91:281 -6.
9. Dietz WH Jr, Gortmaker SI. Do we fatten our children at the television set? Obesity and television viewing in children and adolescents. *Pediatrics* 1985 ; 75: 807 – 12.
10. Lerner RM, Gellert E. Body build identification, preference, and aversion in children. *Dev Psychol* 1969: 1:456 – 62.
11. Richardson SA, Boodman N, Hastorf AH, Dornbush SM. Cultural uniformity in reaction I to physical disabilities. *Social Rev* 1961; 26: 241-7.
12. French SA, Story M, Perry CL. Self-esteem and obesity in children and adolescents: a literature review. *Obes REs* 1995;3:479 – 90.
13. Braet C, Mervielde I, Vandercycken W. Psychological aspects of childhood obesity; a controlled study in a clinical and nonclinical sample. *J. Pediatr Psychol* 1997; 22: 59-71.
14. Barness L, ed. Pediatric nutrition handbook. 3d ed. Elk Grove Village, Ill.: American Academy of Pediatrics, 1993.
15. Ray JW, Klesges RC. Influences on the eating behavior of children. *Ann N Y Acad Sci* 1993; 699: 57 – 69

16. <http://www.pitt.edu/super1/lecture/lec0641/005-032htm>
17. iron deficiency anemia in infant and children [http://www.allsands.com/kids/health/anemia in child bsy gn.htm](http://www.allsands.com/kids/health/anemia_in_child_bsy_gn.htm).
18. Principles and practice of clinical pediatric edited by M. William, Edward B. Charney, Thomas A Curry, Stephen Ludwig page 3.3 – 3.5
19. Nelson – Textbook of pediatric problem sixth edition edited by James H. Hutchison and Forrester Cockburn 1986.
20. American Family physician common, uncommon anemia February 15, 1999 – American academy of family page 1 of 10.
21. Arabic health journal spring 2006.