

Study on Inflammatory Markers and Hematological Alternation Associated Consequences in Obese Teenagers and the Adulthoods

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Abstract - Obesity associated with long term complication of inflammatory disease in adult. The study was conducted between 15 to 60 years adults selected on obese categories by measured BMI and waist and Hip circumference and ratio. The inflammatory associated markers ESR, CRP, ASO, RA factor and hematological parameters tested among the obese cases. The age groups of 25 to 40 Years were found in overweight category. The age groups 35 to 50 years were found in higher values in ESR test. In the age group of 25 to 50 years were found CRP positive. In the age groups of people 20 to 40 Years were found RA factor positive. In the age group of people 20 to 50 Years were found ASO test positive. Based on the Hematological results in the age group of people 15 to 50 Years were affected anemia found in low HB, RBC, PCV count and high RDW count. In the age group of people 40 to 60 Years were found high value in WBC Total count in associated with infection.

Key Words: (BMI, Waist and Hip circumference and ratio, obese, inflammatory marker, C-reactive protein, ASO titer, RA factor, Hematological parameters)

1. INTRODUCTION

This study observes obese patients to easily analyze the inflammation markers to determine the inflammation with low cost. Obesity makes increases blood pressure and abnormal cholesterol levels which cause heart disease, arthritis and reduces lifespan. The inexpensive test ESR test use to detect infective and inflammation state, which considering with the specified markers of CRP, ASO, RA factor assays elevation and comparing with the hematological parameters alteration among 15-60 years of teenagers & adulthood obese cases. The Lifestyle factors of physical activity, smoking, and alcohol consumption of obesity related metabolic syndrome may also influence ESR values. The higher C-reactive protein and erythrocyte sedimentation rate in women associated with rheumatoid arthritis RA.

2 MATERIALS AND METHODS

Sample size: 50 number of obese teenagers & adulthoods.

2.1 Place of study: Super lab services & ECG in Ambur, chennai where the research work is to be conducted.

2.3 Study design: Total of (50) Obese between the age-group 15 - 60 was selected as study group. The relevant data regarding this study parameters are age, height, weight will be collected. Signature from subjects was collected through informed consent form (ICF).

2.4 Study duration: Three month period of January to march 2021.

2.5 Inclusion criteria: Teenagers & adulthoods obese inducted in the study.

2.6 Exclusion criteria: Non-obese adults, children and old age not are inducted in the study.

2.7 Selection of obese: BMI, waist hip circumference & waist-hip ratio were measured 15 -60 years of age groups to categorize the obese.

2.8 Collection of samples: Whole blood was collected in Each 3ml blood sample in K2 EDTA tube (Hematological parameters and ESR) and Clot activator tube (CRP, ASO, RA factor) samples collected by phlebotomist. All blood samples delivered to the referral laboratory within 2hrs of collection.

2.9 Sample analysis procedure: The samples analyzed in Super lab services and ECG, Ambur for to Estimate the sample of ESR test Westergren (Manual) Method, the Serological Test of ASO, CRP and RA test done by Immunoassay Technique (MISPA i2). the Complete blood count (CBC) hematological parameters of HB, TC, DC, PLATELET, RBC, PCV, RDW, MPV, MCV, MCH and MCHC done by Fully Automated Hematology Analyzer (MINDRAY - 5PART).

3. RESULTS

Table -1: Gender Wise Distribution

NUMBER OF CASES		
AGE GROUP (YEARS)	MALE	FEMALE
15 to 20	2	4
21 to 30	6	4
31 to 40	5	9
41 to 50	5	10
51 to 60	1	4
TOTAL	19	31

Table -2: Distribution of BMI Cases - Overweight

AGE WISE DISTRIBUTION	GENDER	
	MALE	FEMALE
15 – 20 Years	0	0
21 – 30 Years	2	1
31 – 40 Years	1	1
41 – 50 Years	0	0
51 – 60 Years	0	0
TOTAL	3	2
P VALUE	0.0064	0.0001

Table -3: Distribution of BMI Cases – Obese I

AGE WISE DISTRIBUTION	GENDER	
	MALE	FEMALE
15 – 20 Years	2	1
21 – 30 Years	3	1
31 – 40 Years	6	4
41 – 50 Years	2	1
51 – 60 Years	0	2
TOTAL	13	9
P VALUE	0.0001	0.0001

Table -4: Distribution of BMI Cases – Obese II

AGE WISE DISTRIBUTION	GENDER	
	MALE	FEMALE
15 – 20 Years	0	3
21 – 30 Years	1	2
31 – 40 Years	0	4
41 – 50 Years	0	9
51 – 60 Years	0	1
TOTAL	1	19
P VALUE	0.0001	0.0001

Table -5: Distribution of BMI Cases – Obese III

AGE WISE DISTRIBUTION	GENDER	
	MALE	FEMALE
15 – 20 Years	0	0
21 – 30 Years	0	0
31 – 40 Years	1	0
41 – 50 Years	0	1
51 – 60 Years	1	0
TOTAL	2	1
P VALUE	0.0001	0.0001

Table 6: Distribution of Erythrocyte Sedimentation Rate (ESR)

AGE WISE DISTRIBUTION	ESR – LOW		ESR – NORMAL		ESR – HIGH	
	M	F	M	F	M	F
15 – 20 Years	1	0	1	1	0	2
21 – 30 Years	3	0	1	2	2	2
31 – 40 Years	0	0	4	3	1	6
41 – 50 Years	1	0	2	1	2	10
51 – 60 Years	0	0	0	1	1	3
TOTAL	5	0	8	8	6	23
P VALUE	0.0001	0.0000	0.0375	0.0001	0.0197	0.0001

Table 7: Distribution of C – Reactive Protein Test (CRP)

AGE WISE DISTRIBUTION	CRP TEST (NEGATIVE)		CRP TEST (POSITIVE)	
	M	F	M	F
15 – 20 Years	2	2	0	2
21 – 30 Years	5	1	1	3
31 – 40 Years	4	2	1	7
41 – 50 Years	5	4	0	6
51 – 60 Years	1	3	0	1
TOTAL	17	12	2	19
P VALUE	0.0001	0.0001	0.2297	0.0001

Table 8: Distribution of RA Factor Test

AGE WISE DISTRIBUTION	RA TEST (NEGATIVE)		RA TEST (POSITIVE)	
	MALE	FEMALE	MALE	FEMALE
15 - 20 Years	1	0	0	1
21 - 30 Years	1	0	1	0
31 - 40 Years	1	4	0	0
41 - 50 Years	0	3	0	1
51 - 60 Years	0	1	0	0
TOTAL	3	8	1	2
P VALUE	0.0001	0.0001	0.0001	0.0392

Table 9: Distribution of Anti - Streptolysin O Test (ASO)

AGE WISE DISTRIBUTION	ASO TEST (NEGATIVE)		ASO TEST (POSITIVE)	
	M	F	M	F
15 - 20 Years	0	0	3	1
21 - 30 Years	1	0	-	0
31 - 40 Years	0	2	0	2
41 - 50 Years	0	2	0	2
51 - 60 Years	0	1	0	0
TOTAL	1	5	3	5
P VALUE	0.0001	0.0001	0.0001	0.0001

Table 10: Distribution of Hemoglobin

AGE WISE DISTRIBUTION	HB (LOW)		HB (NORMAL)	
	MALE	FEMALE	MALE	FEMALE
15 - 20 Years	1	1	1	3
21 - 30 Years	0	2	6	2
31 - 40 Years	1	1	4	8
41 - 50 Years	1	3	4	7
51 - 60 Years	0	1	1	3
TOTAL	3	8	16	23
P VALUE	0.0001	0.0001	0.0001	0.0001

Table 11: Distribution of Red Cell Count (RBC)

AGE WISE DISTRIBUTION	RBC (LOW)		RBC (NORMAL)	
	M	F	M	F
15 - 20 Years	0	0	2	4
21 - 30 Years	0	0	6	4
31 - 40 Years	1	2	4	7
41 - 50 Years	0	3	5	7
51 - 60 Years	0	0	1	4
TOTAL	1	5	18	26
P VALUE	0.0001	0.0001	0.0001	0.0001

Table 12: Distribution of Packed Cell Volume (PCV)

AGE WISE DISTRIBUTION	PCV (LOW)		PCV (NORMAL)	
	M	F	M	F
15 - 20 Years	1	2	1	2
21 - 30 Years	0	3	6	1
31 - 40 Years	1	3	4	6
41 - 50 Years	0	4	5	6
51 - 60 Years	0	1	1	3
TOTAL	2	13	17	18
MEAN	31.0	30.1	43.2	36.2
SD VALUE	0.28	2.75	4.75	1.80
P VALUE	0.0001	0.1210	0.0001	0.0001

Table 13: Distribution Of Red Cell Distribution Width (RDW)

AGE WISE DISTRIBUTION	RDW (NORMAL)		RDW (HIGH)	
	M	F	M	F
15 - 20 Years	1	1	1	4
21 - 30 Years	3	0	3	4
31 - 40 Years	3	4	0	7
41 - 50 Years	4	1	3	5
51 - 60 Years	0	2	1	3
TOTAL	11	8	8	23
P VALUE	0.0001	0.0001	0.0001	0.0001

Table 14: Distribution of Wbc – Total Count

AGE WISE DISTRIBUTION	WBC (NORMAL)		WBC (HIGH)	
	M	F	M	F
15 – 20 Years	2	3	0	1
21 – 30 Years	6	4	0	0
31 – 40 Years	5	7	0	2
41 – 50 Years	5	7	0	3
51 – 60 Years	1	2	0	2
TOTAL	19	23	0	8
P VALUE	0.0001	0.0001	0.0001	0.0001

Chart -1: Gender Wise Distribution

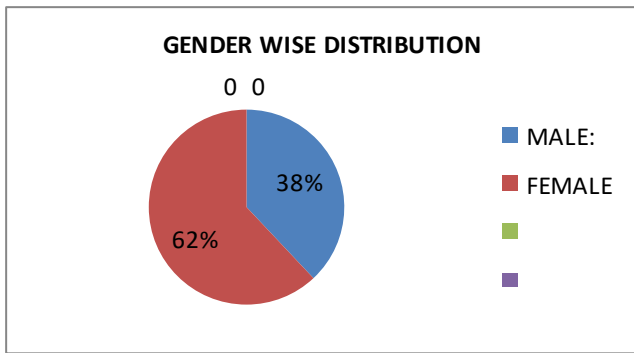


Chart -2: Distribution of ALL BMI cases

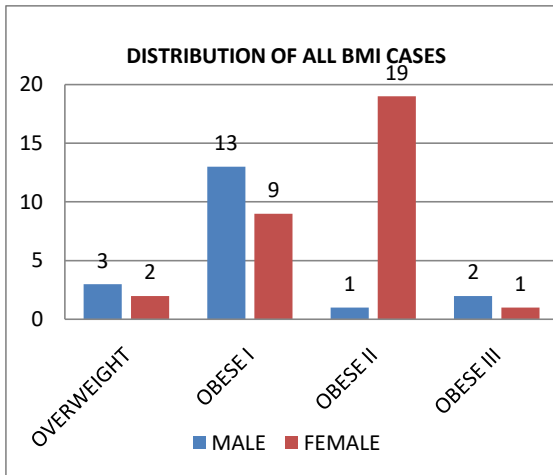


Chart -3: Distribution of Erythrocyte Sedimentation Rate (ESR)

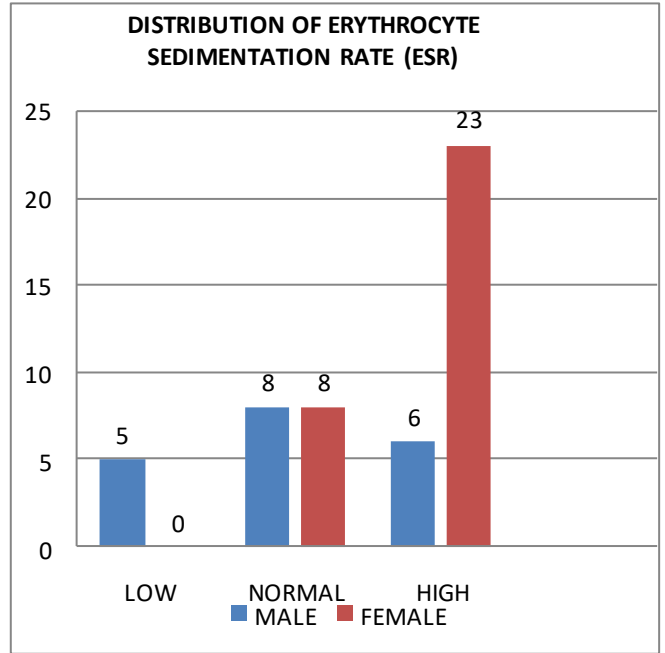


Chart -4: Distribution of C – Reactive Protein Test (CRP)

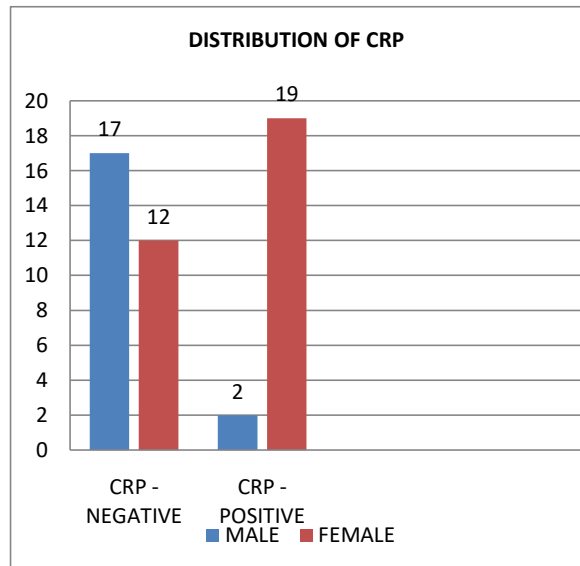


Chart -5: Distribution of RA Factor Test

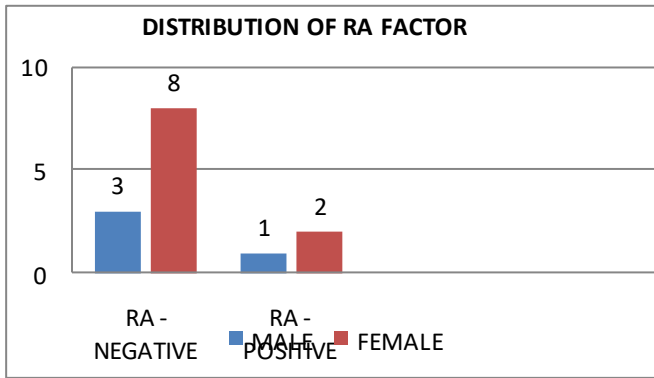


Fig -3: Height measurement in subjects

Chart -6: Distribution of Anti - Streptolysin O Test (ASO)

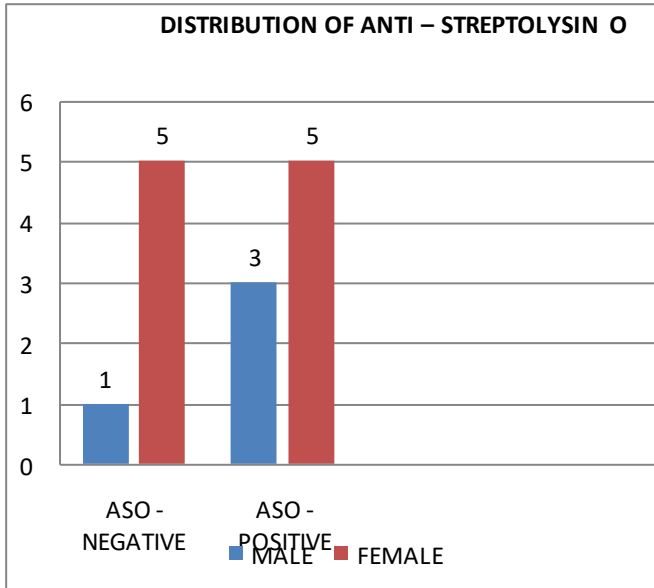


Fig -4: Westergren tube (manual method)

Fig-1: Waist circumference & hip circumference measurement in subjects



Fig -2: Weight measurement in subjects

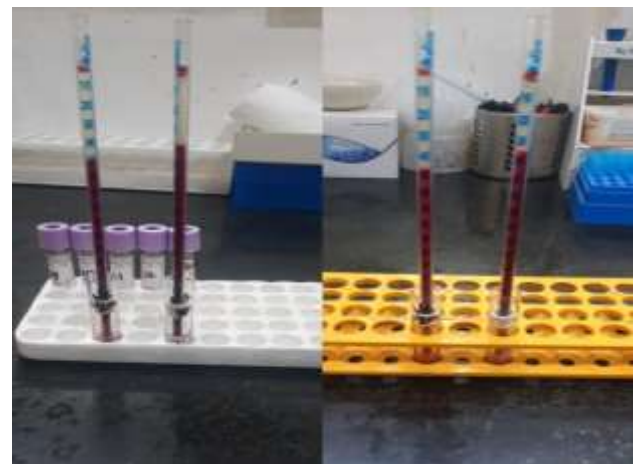


Fig -5: Test of ASO, CRP and RA test done by Immunoassay Technique (MISPA i2).



Fig -6: Mindray (5 Part) – Hematology Analyzer



4. DISCUSSION

From 50 patient population to in the selected studies included in obesity patients. In the selected age group of 25 to 40 Years in overweight, 20 to 55 Years in obese-I, 19 to 50 Years in obese-II, 35 to 45 Years in obese-III.

Based on the results, ESR and CRP reports showed that women were most affected more than comparing with men and most affected in the age group is (15 – 60Years). In this study out of 50 patient 35 to 50 Years in the age group were found higher values in ESR test. In the age group of people 25 to 50 Years were found CRP positive for the inflammatory markers. In the age group of people 20 to 40 Years were found RA factor positive. In the age group of people 20 to 50 Years were found ASO test positive.

Based on the Hematological results, the age groups of people 15 to 50 Years were found in low Hb level. In the age group of people 30 to 50 Years were found in low RBC count. In the age group of people 15 to 50 Years were found in low PCV count. In the age group of people 40 to 60 Years were found high value in WBC Total count. In the age group of people 15

to 60 Years were found in Normal MCV count. In the age group of people 20 to 60 Years were found in High RDW count. The other hematological parameters are normal showed in mean platelet volume; platelets count, and mean corpuscular hemoglobin concentration.

5. CONCLUSIONS

The study revealed that the elevated inflammatory predisposing markers in over obese to leads to causes anemia, infection, arthritis frequently. In the major notification this studies in the age group of 18 to 50 Years (84%) obese I and II among the reason for the risk of obese complications. Obesity associated with raised levels of ESR (58%) and CRP (42%) inflammatory markers in the age group of people 30 to 50 Years got affected. In the age group of people 20 to 40 Years were found RA factor positive. In the age group of people 20 to 50 Years were found ASO test positive. Based on the Hematological results in the age group of people 15 to 50 Years were anemic and 40 to 60 Years people were found high value in WBC count due to infective state.

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