

STUDY OF 2 D ECHOCARDIOGRAPHY FINDINGS IN OVERWEIGHT AND OBESE CHILDREN OF 10 TO 18 YEARS.

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Abstract: Background The prevalence of overweight and obesity is increasing globally. Obesity in adults dates back to childhood and adolescence in origin. 2D echocardiography of obese children may disclose some unknown aspects of heart condition thereby preventing unfavourable outcomes in the future. **Objectives-**1) To study echocardiography findings in overweight children of 10 to 18yrs. 2) To study echocardiography findings in obese children of 10 to 18yrs. **Methods-** Study was done in schools of Kolhapur city, schools were selected by systematic sampling, and 10% school population of 10 to 18 year old children were selected. **Results-**In the study there was significant difference in mean LVESD, LVEDD, LVPWT, IVST and EF between overweight and obese children. Mean LVESD, LVEDD, LVPWT and IVST was significantly higher in obese group and EF was significantly lower in obese group compared to overweight group. **Interpretation-**Obese children have significant abnormalities in left ventricular structure and function when compared to overweight children. **Conclusion-** Obese children are more prone for left ventricular structural and functional abnormalities. Hence early intervention by weight reduction through modalities such as physical exercise and diet modification can reverse these changes.

Key Words: Obesity, Overweight, 2 D echocardiography

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Introduction:

The prevalence of overweight and obesity is increasing globally. Obesity in adults dates back to childhood and adolescence in origin. 2D echocardiography of obese children may disclose some unknown aspects of heart condition thereby preventing unfavourable outcomes in the future. It is well established that obesity is a strong risk factor for cardiovascular morbidity and mortality. Echocardiography and vascular ultrasound can identify accurately early obesity-induced abnormalities, such as LV hypertrophy, subclinical LV dysfunction, and preclinical atherosclerosis[8]. Cardiac abnormalities of obese children and adolescents include the echocardiographically revealed early and preclinical LV or septal hypertrophy, and left or right ventricular dysfunction [1, 7]. Most of these abnormalities, which are usually more pronounced in patients with morbid obesity, can be partially reversed after weight reduction [2].

Material and Methods:

Study setting: Study was done in schools of Kolhapur city, schools were selected by systematic

sampling, and 10% school population of 10 to 18 year old children were selected.

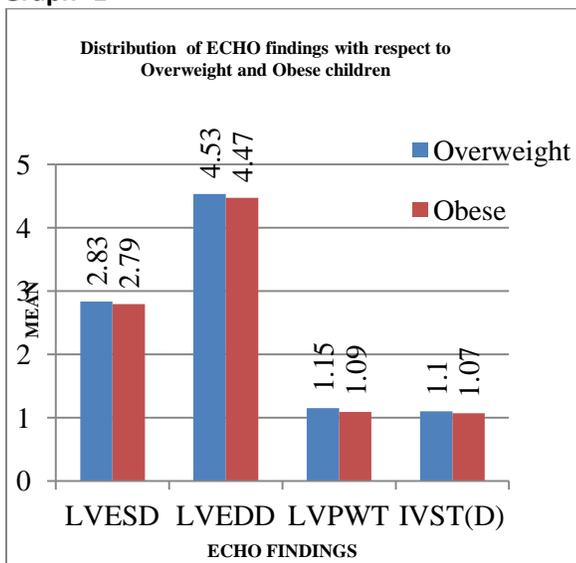
Sampling: Sample size was estimated by using the prevalence of Overweight among children in the age group 10 to 18 years as 11.9% from the study by Adinatesh KV et al. Using the formula height and weight of children were measured as per the standard guidelines of State of Alaska Measuring Height/Weight for Calculating BMI among children. Echocardiography was performed using a commercially available system, GE livid S6, by a trained registered cardiologist following a standard protocol. The left ventricular end diastolic diameter (LVEDD), left ventricular end systolic diameter (LVESD), left ventricular posterior wall thickness (LVPWT), interventricular septum thickness (IVST) and EF (Ejection fraction) was measured.

Result: In the study there was significant difference in mean LVESD, LVEDD, LVPWT, IVST and EF between overweight and obese children. Mean LVESD, LVEDD, LVPWT and IVST was significantly higher in obese group and EF was significantly lower in obese group compared to overweight group. (Table 1)

Table 1

	Group										P value
	Overweight					Obese					
	Me an	SD	Mi n	Ma x	Mea n	SD	Mi n	Med ian	Max		
LVES D	2.6 4	0.1 7	2.2 0	2.6 9	2.8 3.05	0.2 3.05	2.8 4	3.02	5.07	<0.001 *	
LVE DD	4.3 2	0.1 1	4.1 0	4.3 2	4.4 4.72	0.1 4	4.4 8	4.69	4.99	<0.001 *	
LVP WT	0.9 4	0.1 2	0.7 0	0.9 4	1.1 1.35	0.1 8	1.1 0	1.30	1.84	<0.001 *	
IVST (D)	1.0 2	0.0 4	0.9 5	1.0 2	1.0 1.16	0.1 0	1.0 0	1.15	1.39	<0.001 *	
EF	65. 01	4.7 7	51 51	64 64	77 77	63.8 61	5.6 8	46 63	63 78	0.011*	

Graph- 1



Discussion: Various cardiac structural and functional changes occur in childhood obesity and this condition includes important cardiovascular risks. Left ventricular end-systolic and end-diastolic diameter, left ventricular posterior wall thickness, interventricular septum thickness and impaired left ventricular wall function, are useful tests to determine cardiac dysfunctions and potential

arrhythmias even in early stages of childhood obesity.

This study provides evidence that asymptomatic obese children exhibit abnormalities of left ventricular structure and function (consisting of increased left ventricular wall dimensions, mass and alteration of diastolic function) that can be detected by echocardiography [3].

The study has demonstrated that young, obese children and adolescents have early significant changes in left ventricular wall dimensions and early diastolic filling compared with non obese and this changes may be reversible with weight reduction. The study conducted by sabry ghanem et al showed significant increase in LWPWT (P<0.001), LVEDD(P=0.005), IVSD(P=0.013) among obese and non obese children [Sabry Ghanem et al, J Saudi Heart Assoc. 2010] [3]

A study conducted byAyşe Esin Kibar et al, demonstrate a significant positive correlation was detected between BMI, duration of obesity (r=0.527, p<0.001), and the LVM/LVMI (r=0.506, p<0.001) [4].

A study conducted by Shilpa Patil et al, concluded that 2D echocardiographic parameters of individuals with BMI>30 reveal increased Left Ventricular (LV) wall thickness and LV mass, significantly higher risk of LV diastolic dysfunction, evidence of Left Atrial (LA) enlargement associated with diastolic dysfunction, evidence of subclinical LV systolic dysfunction and Right Ventricular (RV) dysfunction[5].

Results of her study also demonstrate that childhood obesity is associated with significant changes in myocardial geometry and function, indicating an early onset of potentially unfavourable alterations in the myocardium. [6].

Conclusion:

Obese children have significant abnormalities in left ventricular structure and function when compared to overweight children. Hence early intervention by weight reduction through modalities like physical exercise and diet modification can reverse these changes.

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