

# HOW EARLY ARE VASCULAR CHANGES IN OBESE CHILDREN AMONG NORTH INDIAN POPULATION?



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NO CONFLICT OF INTEREST. NO FUNDING.

## INTRODUCTION

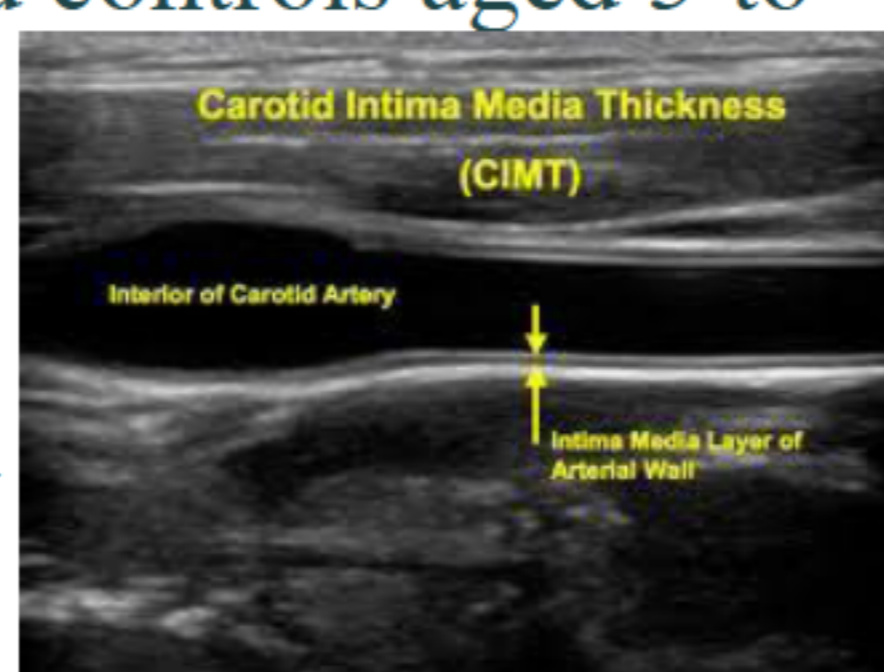
- Obese children are known to be at high risk for vascular complications.
- There is paucity in Indian literature regarding the onset and magnitude of vascular complications.
- Carotid intima media thickness (cIMT) and Brachial artery distensibility (FMD) are known to predict future atherogenesis.

## OBJECTIVES

- **Primary:** To compare vascular parameters of obese children aged 5 -18 years with age and sex matched controls.
- **Secondary:** To correlate vascular changes with pubertal onset in obese.

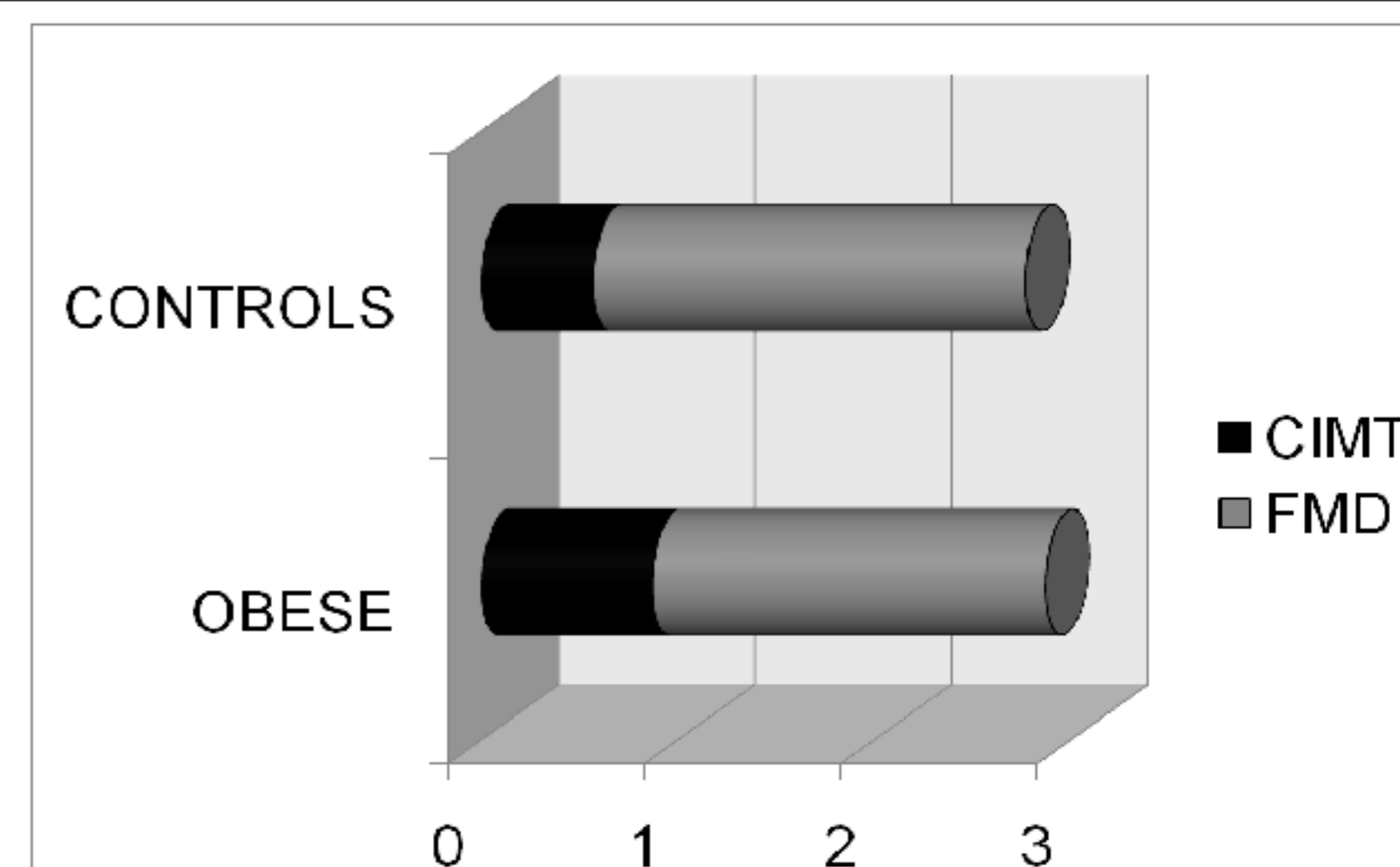
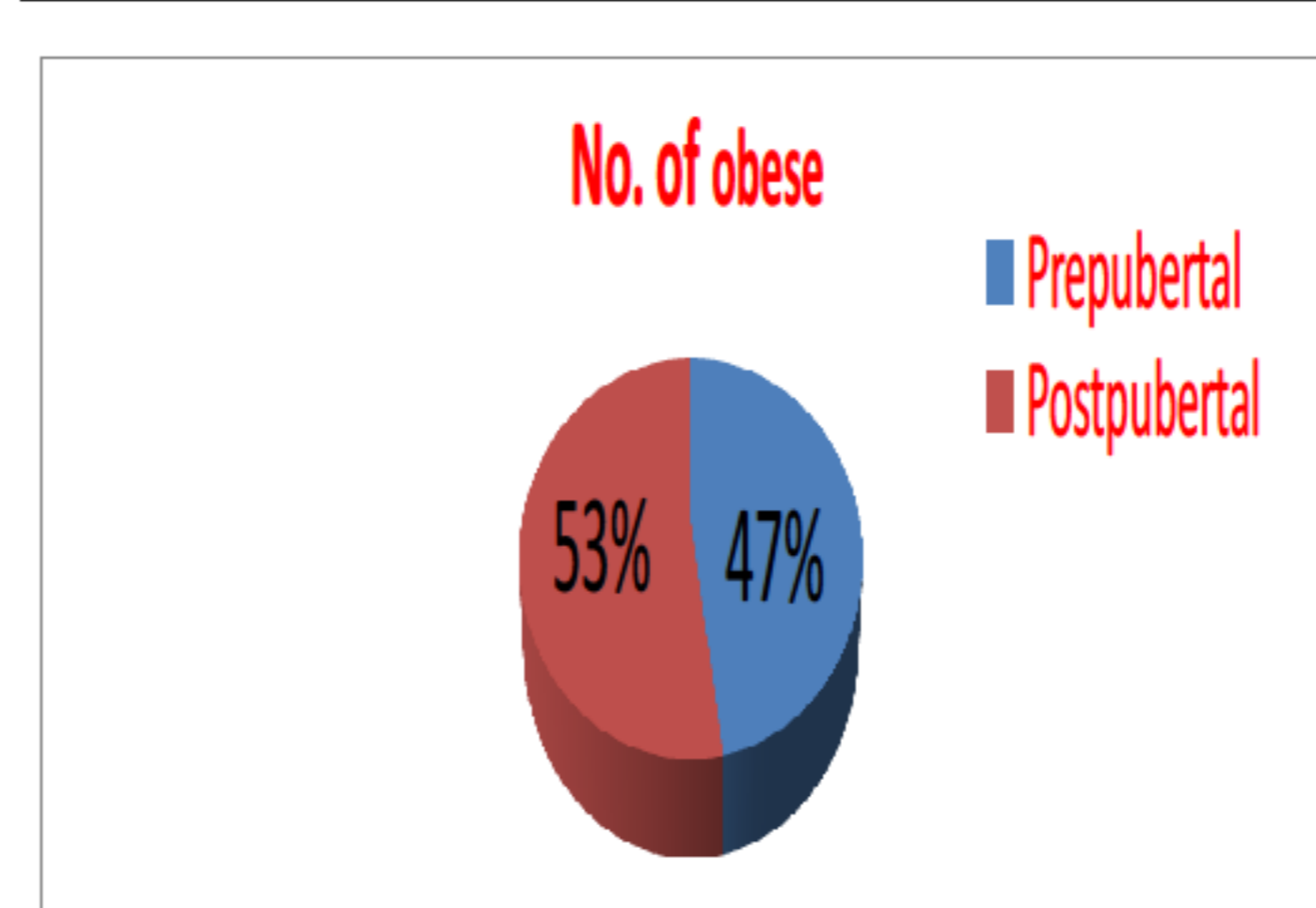
## METHODS

- Approval from Institutional Ethics Committee taken
- Eighty children, 40 obese and 40 age & sex matched controls aged 5 to 18 years recruited.
- Informed assent/consent taken.
- Cross sectional observational study
- Vascular parameters measured by echocardiography (Philips iE 33 Xmatrix Sys)
- Anatomical variable - **Carotid intima media thickness (cIMT)** - measuring near and far wall thickness of the artery as the difference between two echogenic lines of the vessel wall (luminal- intimal interface and upper layer of adventitia).
- Physiological variable - Brachial artery scanned in longitudinal section 2-15 cm above elbow. Scans taken at rest, during reactive hyperemia, again at rest, and after sublingual glyceryltrinitrate (GTN) spray.
- **Endothelium dependent dilatation-** Reactive hyperemia by inflating BP cuff of 300 mm Hg for 4 minutes, then deflating it. 2nd scan was taken after 45-60 sec of cuff deflation. After 10 minutes, a resting scan was recorded.
- **Endothelium independent vasodilatation-** GTN sublingual spray (0.4mg) given and artery scanned 3 minutes later. Images of vessel recorded after drug administration and difference in diameter noted.
- This measured difference was indicator of arterial distensibility.
- The mean intra observer error of cIMT measurements was 0.041 ± 0.025 mm. The inter observer intraclass correlation coefficients (ρ) and coefficients of variation (CV) were excellent and comparable between FMD, GTN and cIMT.



## RESULTS

- Mean age of study population =  $11.15 \pm 2.52$  years.
- Mean age of prepubertal =  $8.84 \pm 1.17$  years
- Mean age of postpubertal =  $13.24 \pm 1.22$  years
- M : F ratio = 23 : 17

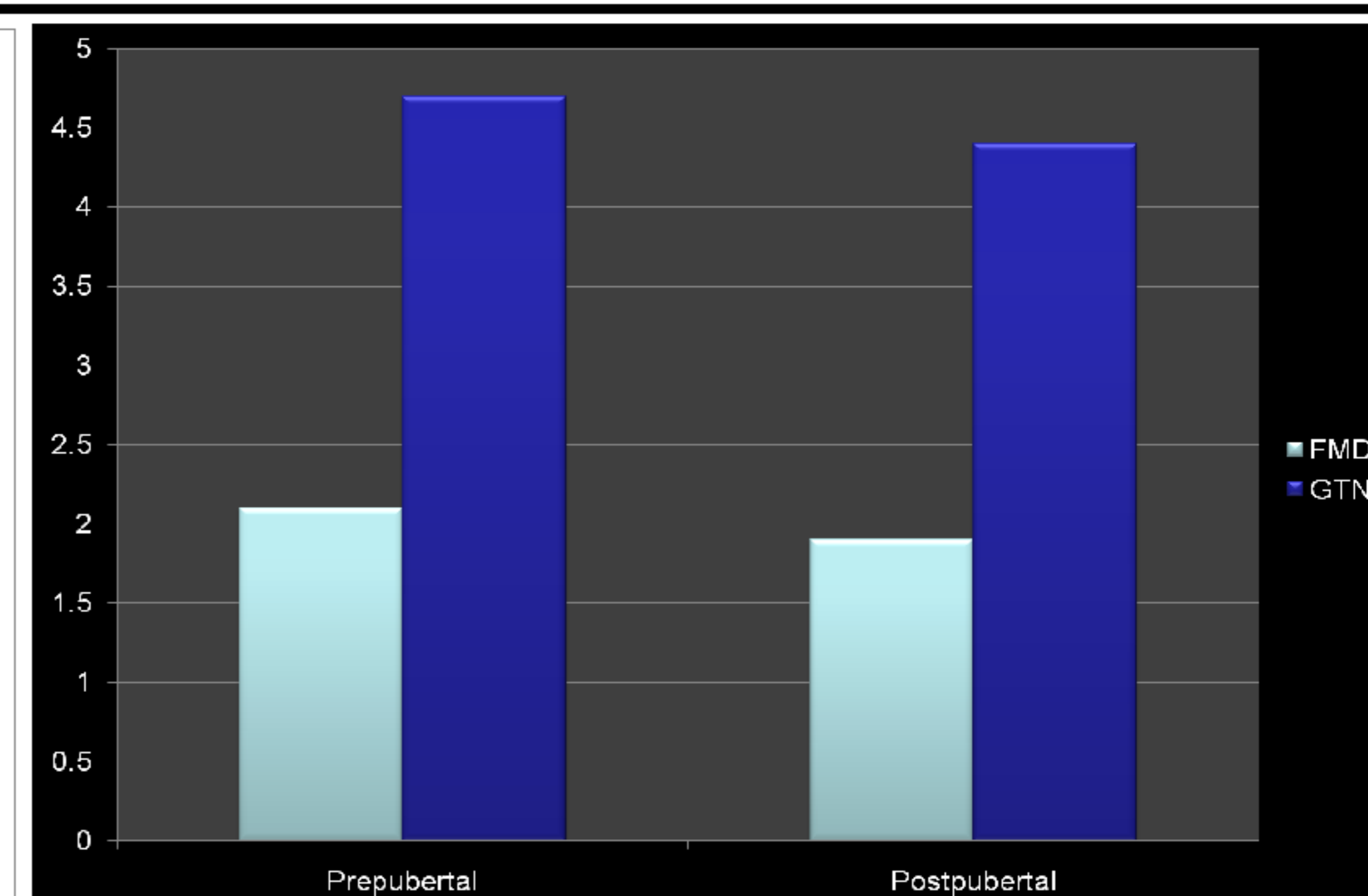
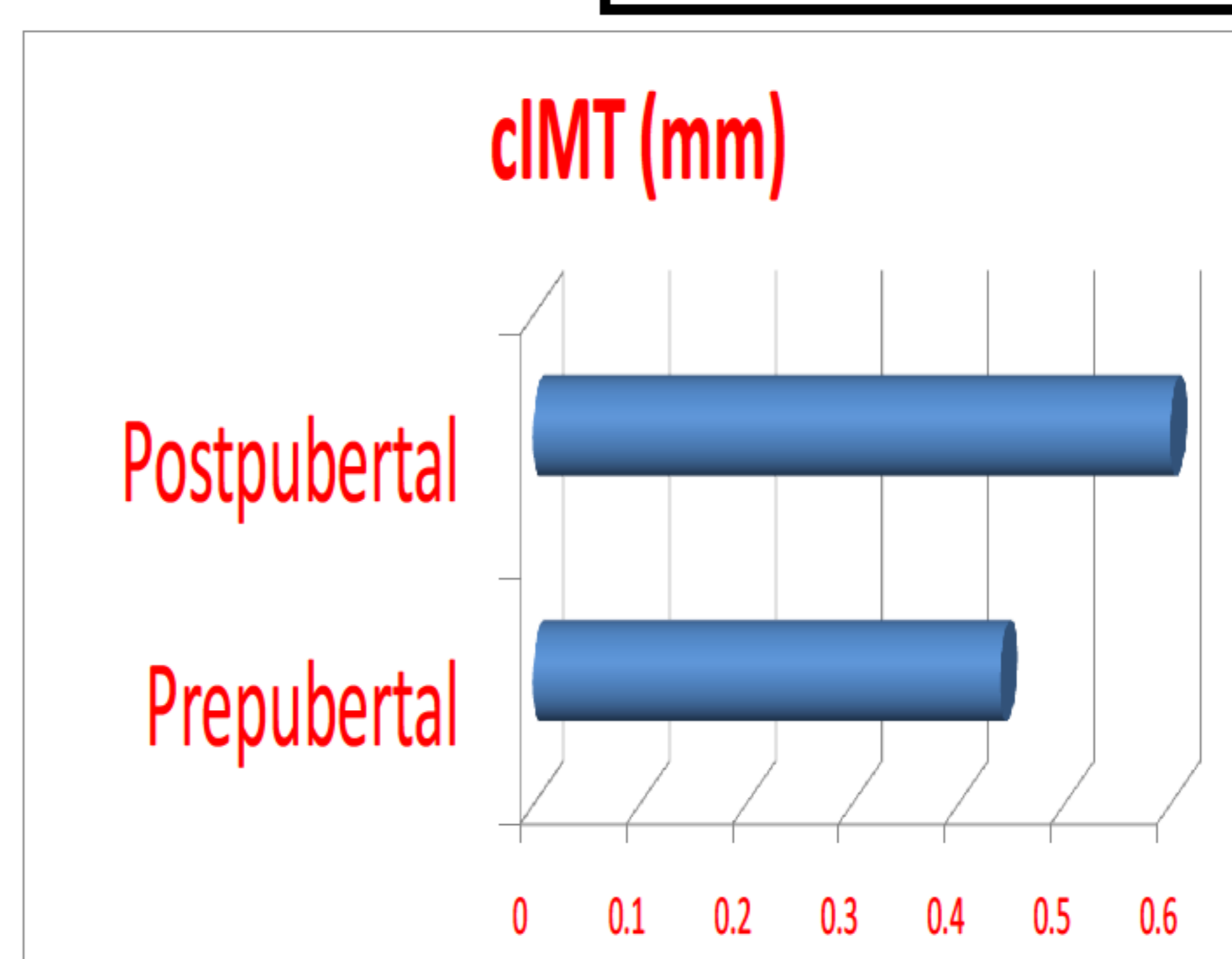


	OBESE	CONTROL	p value
BMI	$26.58 \pm 1.88$	$17.58 \pm 1.72$	<b>&lt;0.001</b>
FMD	$2.0 \pm 0.06$	$2.2 \pm 0.05$	0.05
GTN	$4.6 \pm 0.23$	$6.2 \pm 0.31$	0.07
cIMT	$0.87 \pm 0.14$	$0.57 \pm 0.07$	<b>&lt;0.001</b>

- On comparing obese and controls, **cIMT and Flow Mediated Dilatation (FMD) was significantly elevated in obese.**
- However difference in GTN induced vasodilatation was comparable.

## EFFECT OF PUBERTY ON VASCULAR PARAMETERS:

- cIMT was significantly higher in postpubertal ( $p < 0.01$ ) in comparison to prepubertal obese.
- FMD and GTN induced vasodilatation were comparable ( $P = 0.49, 0.22$ ).
- **21/40 (52.5%) obese (17 postpubertal and 4 prepubertal) had cIMT greater than the normal cutoff of 0.59 mm.**



## CONCLUSIONS

- Our obese cohort had evidence of subclinical vascular alterations (**Dec. endothelial dependent vasodilatation and increased carotid intima media thickness (0.87mm) seen in obese.**)
- So the mean age of developing these early vascular changes was  $14.96 \pm 0.84$  yrs.
- **cIMT was higher in 80% of postpubertal obese** indicating that with age and puberty, there is further progression of atherogenesis.
- Thus a need for early screening for cardiovascular morbidities and periodic evaluation in asymptomatic obese children to prevent adverse outcomes of Cardiovascular diseases in adulthood.
- A larger sample size would add to better knowledge on the timing of onset of cardiovascular alterations in obese children.

## REFERENCES

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