BODY FAT INDICES FOR IDENTIFYING RISK OF HYPERTENSION IN INDIAN CHILDREN

Dissertation submitted for

M.D.DEGREE EXAMINATION
BRANCH VII – PAEDIATRIC MEDICINE

THE TAMILNADU Dr.M.G.R. MEDICAL UNIVERSITY

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INSTITUTE OF CHILD HEALTH AND

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MADRAS MEDICAL COLLEGE

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CERTIFICATE

This is to certify that dissertation entitled "**BODY FAT INDICES FOR IDENTIFYING RISK OF HYPERTENSION IN INDIAN CHILDREN"** submitted by Dr .G.S.Vairamuthu to the faculty of Paediatrics, The Tamilnadu Dr . M.G.R. Medical University, Chennai in partial fulfillment of the requirement for the award of M.D. Degree (Paediatrics) is a bonafide research work carried out by her under direct supervision and guidance.

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DECLARATION

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DATE : **DR.G.S.VAIRAMUTHU**

PLACE :

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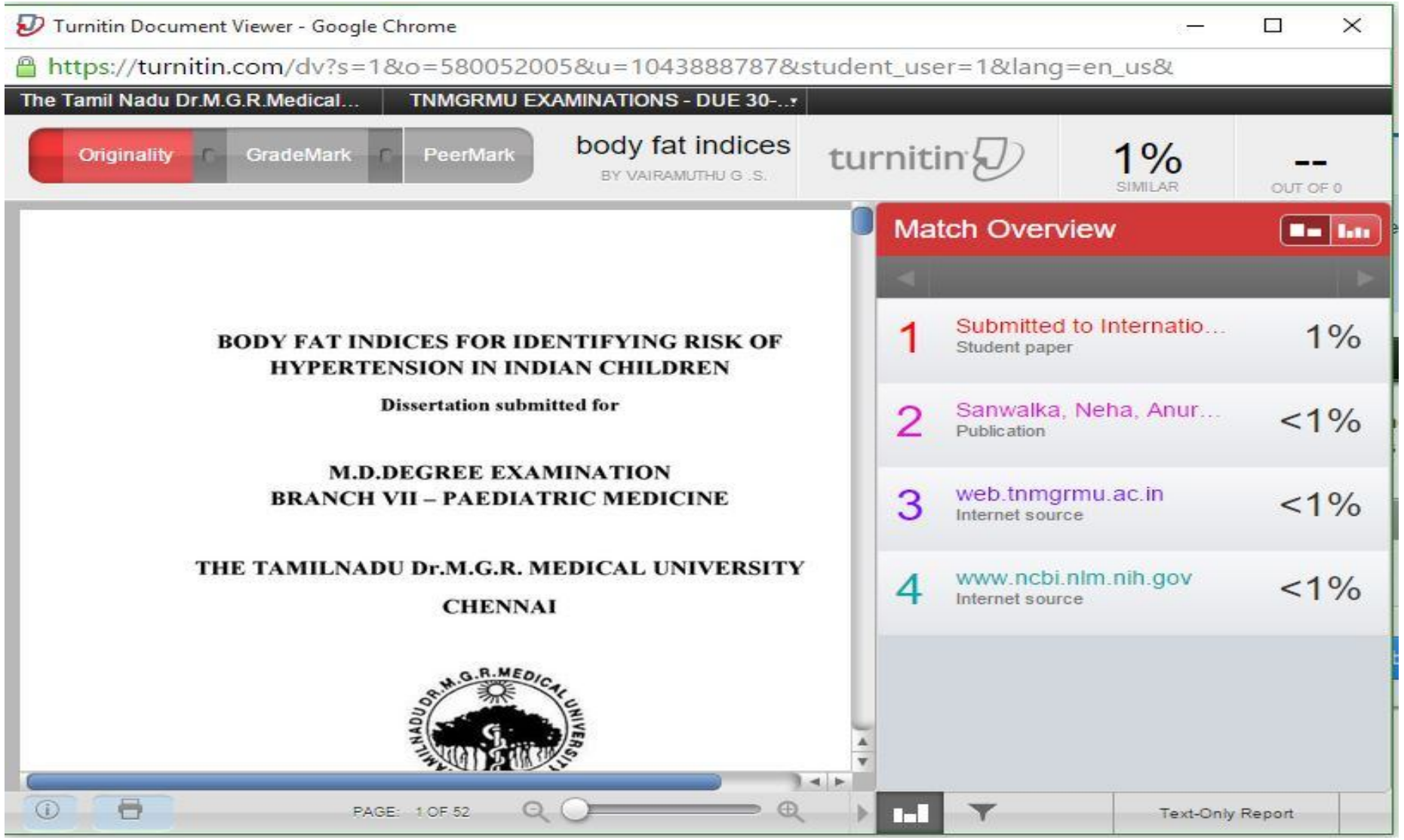
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CONTENTS

ABSTRACT

AIM

The aim is to study **BODY FAT INDICES FOR IDENTIFYING RISK OF HYPERTENSION IN INDIAN CHILDREN.**

METHOD

The study was conducted during July 2015 to October 2015 in urban schools, chennai. 2000 children participated in the study,following 5 basic indices were measured,height using portable stadiometer, weight using electronic scale, waist circumference using resistant tape, TRICEPS SKIN FOLD THICKNESS using harpenden caliper, blood pressure using sphygmomanometer, and set of questions asked to them, with the results BODY MASS INDEX and WAIST TO HEIGHT RATIO calculated. The reading and answers were analyzed together to obtain the results.

RESULTS

The body fat indices like TSFT WAIST TO HEIGHT RATIO, WAIST CIRCUMFERENCE strongly correlated with systolic and diastolic hypertension. Through questionnaire the physical activity food habits and exercise correlates with systolic and diastolic hypertension.

CONCLUSION

To conclude, the measures of adiposity are significantly associated with risk of hypertension in a multicentric sample of Indian children and adolescents. age –gender specific values for, BODY MASS INDEX TRICEPS SKINFOLD THICKNESS,WAIST TO HEIGHT RATIO,WRIST CIRCUMFERENCE collected in this study may be useful in the screening for risk of hypertension.

INTRODUCTION
BACKGROUND

Hypertension in the pediatric population is now commonly observed. Hypertension is known to be a major cause of morbidity and mortality in the United States and in man other countries, and the long-term health risks to children with hypertension may be substantial. In the United States, extensive normative data on blood pressure (BP) in children are available.[1]

The Task Force on Blood Pressure Control in Children, Commissioned by the National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health (NIH), developed standards for BP by using the results of 11 surveys of more than 83,000 person-visits of infants and children (including approximately equal numbers of boys and girls). The percentile curves were first published in 1987 and describe age-specific distributions of systolic and diastolic BP in infants and children, with corrections for height and weight.[2]

The Third Report of the Task Force, published in 1996, provided further details Regarding the diagnosis and treatment of hypertension in infants and children.

In 2004, the Fourth Report added normative data and adapted the data to Growth charts from cdc 2000. In accordance with the recommendations of the Task Force, BP is considered normal when the systolic and diastolic values are less than the 90th percentile for the child's age, sex, and height.

The Fourth Report introduced a new category, prehypertension, which is Diagnosed when a child's average BP is above the 90th Percentile but below the 95th . Any adolescent whose BP is greater than 120/80 mm Hg is also given this diagnosis, even if the BP is below the 90th percentile. This classification was created to align the Categories for children with the categories for adults from the recommendation.

Stage I hypertension is diagnosed if a child's BP is greater than the 95th Percentile but less than or equal to the 95th percentile plus 5 mm Hg Stage II Hypertension is diagnosed if a child's BP is greater than the 99th percentile plus 5 mm Hg. It may be categorized as prehypertension if the BP is between 90th to 95th percentile . If the systolic and diastolic pressures give rise to a discrepancy with respect to Classification, the child's condition should be categorized by using the higher value.

PATHOPHYSIOLOGY

BP is determined by the balance between cardiac output and vascular resistance . A rise in either of these variables, in the absence of a compensatory decrease in the other, increases mean BP, which is the driving pressure. Factors that affect cardiac output include the following [4]:

- Baroreceptors
- Extracellular volume

- Effective circulating volume - Atrial natriuretic hormones, mineralocorticoids, Angiotensin

- Sympathetic nervous syndrome

Factors that affect vascular resistance include the following [3]

- Pressors - Angiotensin II, calcium (intracellular), catecholamines, sympathetic nervous System, vasopressin

- Depressors - Atrial natriuretic hormones, endothelial relaxing factors, kinins, Prostaglandin E_2, prostaglandin I_2

Changes in electrolyte homeostasis, particularly changes in sodium, calcium, and potassium concentrations, affect some of these factors.

Under normal conditions, the amount of sodium excreted in the urine matches the amount ingested, resulting in near constancy of extracellular volume Retention of sodium results in increased extracellular volume, which is associated with an elevation of BP. By means of various physical and hormonal mechanisms, this elevation triggers changes in both the glomerular filtration rate (GFR) and the tubular reabsorption of sodium, resulting in excretion of excess sodium and restoration of sodium balance.

A rise in the intracellular calcium concentration, due to changes in plasma calcium concentration, increases vascular contractility. In addition, calcium stimulates release of renin, synthesis of epinephrine, and sympathetic

nervous system activity. Increased potassium intake suppresses production and release of renin and induces natriuresis, decreasing BP.

The complexity of the system explains the difficulties often encountered in identifying the mechanism that accounts for hypertension in a particular patient. These difficulties are the main reason why treatment is often designed to affect regulatory factors rather than the cause of the disease. In a child who is obese, hyperinsulinemia may elevate BP by increasing sodium reabsorption and sympathetic tone.

ETIOLOGY

Hypertension can be primary (ie, essential) or secondary. In general, the younger the child and the higher the BP, the greater the likelihood that hypertension is secondary to an identifiable cause (see Table 2 below). A secondary cause of hypertension is most likely to be found before puberty; after puberty, hypertension is likely to be essential.

Common Causes of Hypertension by Age .

Infants	Children		Adolescents
	1-6 y	7-12 y	
Thrombosis of renal artery or vein	Renal artery stenosis	Renal parenchymal disease	Essential hypertension
Congenital renal anomalies	Renal parenchymal disease	Renovascular abnormalities	Renal parenchymal disease
Coarctation of aorta	Wilms tumor	Endocrine causes	Endocrine causes
Bronchopulmonary dysplasia	Neuroblastoma	Essential hypertension	
	Coarctation of aorta		

A review of the literature revealed that most of the young patients with secondary hypertension had a renal parenchymal abnormality; in the remaining patients, the causes of hypertension (in order of frequency) were renal artery stenosis, coarctation of the aorta, pheochromocytoma, and a variety of other conditions[(4)].

International statistics

Because of differences in genetic and environmental factors, incidences vary from country to country and even from region to region in the same country.

Age-related demographics

Height and weight affect BP. However, these relations do not become evident until children reach school age. The Task Force on Blood Pressure Control in Children considered these factors when they published their normative data in 1987.[1]Numerous investigators have noted a correlation between the BP parents and that of their offspring. Familial aggregation of BP is detectable early in life. Some data relate this association to concomitant obesity in both parent and child(5).

Sex-related demographics

There are no significant differences in BP between girls and boys younger than 6 years. From that age until puberty, BP is slightly higher in girls than in boys. At puberty and beyond, BP is slightly higher in male adolescents and men than in comparably aged female adolescents and women.

Race-related demographics

The Task Force on Blood Pressure Control in Children noted no differences in BP between African American and white children. However, both peripheral vascular resistance and sensitivity of BP to salt intake appear to be greater in African American children than in white children, at any age.

PROGNOSIS

High blood pressure is a precursor of heart attacks and strokes, as has been well established in the adult literature. Obese children have approximately a 3-fold higher risk for hypertension than non obese children.[6] As many as 41% of children with high BP have left ventricular hypertrophy (LVH).[7] Almost 60% of children with persistent elevated BP have relative weights greater than 120% of the median for their sex, height, and age. As in adults, in whom abdominal girth correlates to elevated blood pressure, studies show that this measurement is also to be considered in the assessment of a teenager with suspected BP elevation at an early age.[8]]

PATIENT EDUCATION

Parents, caregivers, and children themselves must be properly advised about restriction of exercise, when appropriate. They must also be informed about the potential adverse effects of medication. Finally, it is vital to educate parents, caregivers, and children about the potential complications of persistent hypertension.

HISTORY

A well-taken history provides clues about the cause of hypertension and guides the selection and sequencing of ensuing investigations. Presenting symptoms and signs are not specific in neonates and are absent in most older children unless the hypertension is severe.

Relevant information includes the following:

- Prematurity
- Bronchopulmonary dysplasia
- History of umbilical artery catheterization
- Failure to thrive
- History of head or abdominal trauma
- Family history of heritable diseases (e.g., neurofibromatosis, hypertension)
- Medications (e.g., pressor substances, steroids, tricyclic antidepressants, cold remedies, medications for attention deficit hyperactivity disorder [ADHD])
- Episodes of pyelonephritis (perhaps suggested by unexplained fevers) that may result in renal scarring
- Dietary history, including caffeine, licorice, and salt consumption
- Sleep history, especially snoring history
- Habits, such as smoking, drinking alcohol, and ingesting illicit substances Signs and symptoms that should alert the physician to the possibility of hypertension in neonates include the following:
- Seizure
- Irritability or lethargy
- Respiratory distress
- Congestive heart failure

Signs and symptoms that should alert the physician to the possibility of hypertension in older children include all of the above, as well as the following:

- Headache
- Fatigue
- Blurred vision
- Epistaxis
- Bell palsy

PHYSICAL EXAMINATION

Measurement and recording of blood pressure:

Best medical care includes yearly measurement of blood pressure (BP) in every child older than 3 years, preferably by means of auscultation with a mercury gravity manometer. Doppler and oscillometric techniques can be used in children in whom auscultatory BP measurements are difficult to obtain. Measurements obtained with oscillometry that exceed the 90th percentile should be repeated with auscultation. Measurements repeated over time are required to obtain meaningful information.

Proper cuff size is essential for accurate measurement of BP(9). The width of the rubber bladder inside the cloth cover should cover at least 40% of the patient's arm circumference at a point midway between the olecranon and the acromion. The length of the bladder in the cuff should cover 80-100% of the circumference of the arm. If a cuff is too small, the next larger cuff size should be used, even if it appears too large.

The child should be relaxed and in a comfortable, preferably sitting, position with the feet on the floor and the back supported. The patient's right arm should be resting on a supportive surface at the level of the heart. Infants and young children can be examined while supine. The cuff should be inflated at a pressure approximately 20 mm greater than that at which the radial pulse disappears, then allowed to deflate at a rate of 2-3 mm Hg/s. The first Korotkoff sound (i.e., appearance of a clear tapping sound) defines the systolic pressure, whereas the fifth Korotkoff sound (i.e., disappearance of all sounds) defines the diastolic pressure. The fourth (low-pitched, muffled) sound and the fifth sound frequently occur simultaneously, or the fifth sound may not occur at all. Diastolic BP must be recorded. When Korotkoff sounds can be heard down to 0 mm Hg, the BP measurement should be repeated with less pressure applied to the head of the stethoscope than was applied before. Systolic BP in the lower extremities must be measured when elevated systolic BP in the upper extremities is first noted, regardless of whether the amplitude of the arterial pulse seems lower in the legs than in the arms. Increased systolic pressure in the arm suggests coarctation of the aorta. If found, systolic pressure must also be measured in the left arm and leg. With the patient in the supine position, place a cuff on the calf. The cuff should be wide enough to cover at least two thirds of the distance from knee to ankle. Doppler sonography can be used to detect onset of blood flow, which reflects systolic BP, in the posterior tibial or

dorsalis pedis artery. The value should be compared with similarly obtained Doppler systolic BP in the arm, again with the patient supine.

Remember that the artifact of distal pulse amplification causes the measured systolic BP at the brachial artery to be less than that at the posterior tibial or dorsalis pedis artery. This difference may be only a few millimeters of mercury in the infant but can rise to 10-20 mm Hg in the older child or adult. The magnitude of this artifact is directly proportional to the pulse pressure. In a patient with chronic aortic regurgitation, for example, the difference in measured systolic pressure may exceed 40 mm Hg. At no time should the systolic pressure in the arm exceed that in the foot. If it does, pressures in both arms and legs should be measured. Consistent recording of higher arm systolic pressure indicates aortic coarctation. High pressure in only the right arm suggests that an obstruction is present proximal to the origin of the left subclavian artery.

Interpretation of blood pressure values

Hypertension is defined as an average systolic or diastolic BP above the 95th percentile. Any child with a BP exceeding the 90th percentile requires scrutiny. Patients with severe hypertension and target-organ damage require immediate attention. For other patients, several measurements of BP should be made at weekly intervals to determine if the elevation is sustained.

The average of multiple measurements should be plotted on an appropriate percentile chart. If the average measurement is between the 90th and 95th percentiles (ie, the patient is prehypertensive) the child's BP should

be monitored at 6-month intervals. If the average BP is greater than the 95th percentile, the child should be evaluated further and therapy considered. Patients with stage I hypertension should be seen again in 1-2 weeks. Those with stage II hypertension should be reevaluated in 1 week or sooner if the patient is symptomatic.

So-called white-coat hypertension is diagnosed in a patient who has a BP above the 95th percentile when measured in the physician's office but who is normotensive outside the clinical setting. Ambulatory monitoring of BP usually is required to diagnose white-coat hypertension.(10)

Identification of signs of secondary hypertension

A primary objective of the physical examination is to identify signs of secondary hypertension. The following should be evaluated to assess for potential causes of the hypertension

WORKUP

CBC

RFT

URINE ROUTINE URINE CULTURE

BLOOD HORMORE LEVELS

URINE SODIUM

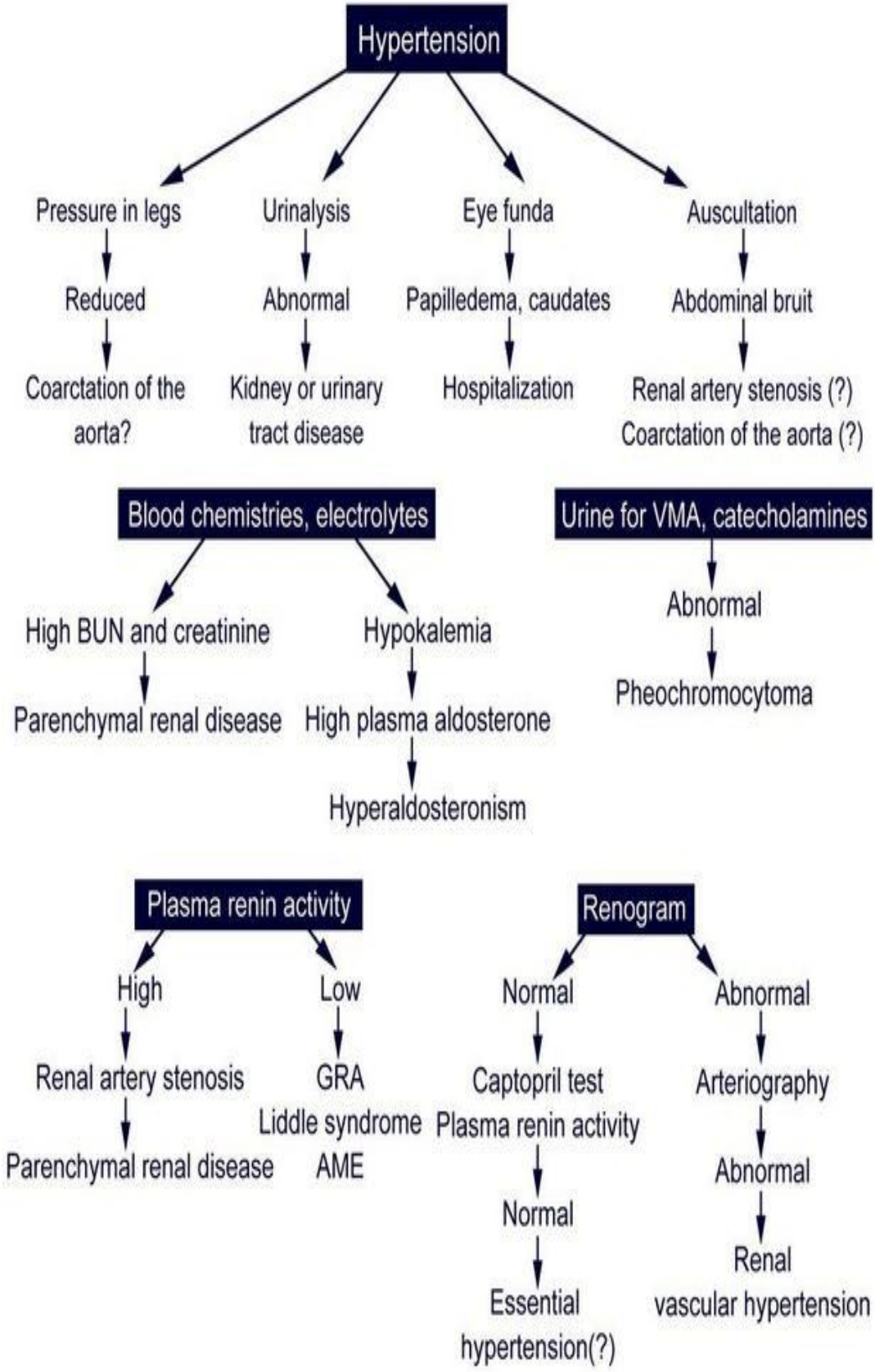
ECHOCARDIOGRAPHY

ULTRASONOGRAPHY

ANGIOGRAPHY

CT AND MRI ANGIOGRAPHY

CARDIAC CATHETERISATION


Hypertension
Pressure in legs
Reduced
Coarctation of the aorta?
Urinalysis
Abnormal
Kidney or urinary tract disease
Eye funda
Papilledema, caudates
Hospitalization
Auscultation
Abdominal bruit
Renal artery stenosis (?)
Coarctation of the aorta (?)
Blood chemistries, electrolytes
High BUN and creatinine
Parenchymal renal disease
Hypokalemia
High plasma aldosterone
Hyperaldosteronism
Urine for VMA, catecholamines
Abnormal
Pheochromocytoma
Plasma renin activity
High
Renal artery stenosis
Parenchymal renal disease
Low
GRA
Liddle syndrome
AME
Renogram
Normal
Captopril test
Plasma renin activity
Normal
Essential hypertension(?)
Abnormal
Arteriography
Abnormal
Renal vascular hypertension

NON PHARMACOLOGIC THERAPY

In children with mild or moderate hypertension, non pharmacologic therapy may suffice to lower blood pressure (BP) to within normal limits This approach avoids the need for drugs that have adverse effects and that require a degree of compliance difficult to achieve in children

Weight reduction should be a goal in all overweight children with hypertension, regardless of etiology. Obesity and hypertension are closely correlated, particularly in adolescents.[11]Aerobic and isotonic exercises have a direct beneficial effect on BP[12]. They help in reducing excess weight or maintaining appropriate body weight. Encourage participation in sports[13]. Only patients with severe uncontrolled hypertension or cardiac abnormalities that require exercise restriction are exempt from aerobic and isotonic exercises. Potassium supplementation can decrease BP and reduce ventricular hypertrophy in adults. How potassium supplementation affects children with hypertension remains to be determined. However, avoiding potassium depletion (eg, from diuretic therapy) and prescribing a potassium-rich diet in patients without renal insufficiency appear reasonable.

A low-fat diet is recommended for all patients with a high BP; a low-salt diet is also recommended for all such patients, though it may yield only a 4% reduction of the elevated pressure([14])(see Dietary Measures). Stress-reducing activities (e.g., meditation, yoga, biofeedback) can reduce BP when performed on a regular basis. However, this effect is lost when the activity is discontinued.

When sleep-disordered breathing is discovered, weight loss, tonsillectomy and adenoidectomy, or use of continuous positive airway pressure may improve the patient's sleep and secondarily improve BP.

PHARMACOLOGIC THERAPY

Many of the antihypertensive agents available for adult use may also be used to manage hypertensive children and adolescents, even though only limited data are available to support this practice. Angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor blockers (ARBs),[15] and calcium-channel blockers have the strongest data to support their use in pediatric patients. Nevertheless, there is a need for more trials in pediatric populations, especially comparative trials of different agents.Indications for pharmacologic treatment include symptomatic hypertension, secondary hypertension, hypertensive target-organ damage, diabetes, and hypertension that persists despite non pharmacologic measures.

Pediatric clinical trials have focused on the ability of each drug tolower BP, but the effects of these drugs on clinical endpoints have not been compared. Therefore, the choice of drug is the clinician's.

Children are becoming overweight and obese at progressively younger ages throughout the world, both in high-income as well as middle and low-income populations.

Obesity is identified as the most important risk factor affecting blood pressure (BP) distribution in children .Increasing evidence suggests that adult BP is correlated with childhood BP and body size.

Normal range of BP in childhood varies with age and gender. Identifying risk of hypertension becomes difficult for want of easy access to age- and gender-specific values.

Considering the strong correlations of anthropometric parameters such as body mass index (BMI) and waist circumference (WC) with BP, an indirect assessment of high BP using these indices may be an efficient strategy in the community setup. Excess body fat or adiposity is an important cardio metabolic risk factor than excess body weight *per se*. Since BMI does not differentiate between fat and lean Other surrogate measures of body fat distribution such as WC, triceps skin fold thickness (TSFT), waist to height ratio (WHTR) are presently being evaluated for their association with metabolic risk . While WC is a crude measure of intra abdominal fat, TSFT [(16)]is predictive value of body fat and metabolic risk in children and adolescents

. Measurement of Wrist circumference (WRC) is also an easy-to-detect clinical marker to identify at risk in children. Although there are ethnic-specific definitions for general and central obesity, few studies have compared ability of various adiposity indices and provided age-gender specific cut offs for screening children and adolescents for the risk of hypertension.

Therefore, the objectives of the present study were to investigate relationships of BMI,[(17)] WC, WHTR, TSFT and Wrist circumference with BP;

.

REVIEW OF LITERATURE

Claire Friedemann, et al describe the association ,and its magnitude between body mass index category ,sex ,and cardiovascular disease risk parameters in school aged children in highly developed countries. Associations between groups in diastolic and 24 h ambulatory systolic blood pressure. Obesity adversely affected concentrations of all blood lipids; total cholesterol and triglycerides were higher in obese children.

Abdishakur Abdulle et alJanuary 20, 2014 To estimate the prevalence of high bloodpressure (BP) and its relationship with obesity among children and adolescents The prevalence of elevated BP, notably systolic was significantly high. High BP was strongly related to body weight, and appears more strongly associated with BMI than WC.

Monyeki1,*,doi et al The association between different adiposity

indicators and elevated blood pressure in a huge population-based study7.4% of boys and 6.4% of girls had elevated blood pressure association between high diastolic BP and high BMI.

The association of fat patterning with blood pressure in rural South African children: the Ellisras Longitudinal Growth and Health Study.The prevalence of hypertension is evident from the age 6Years for girls, while that of overweight was low. Overweight became evident from the age 10 to 13 years for both sexes. A significant BMI was noted.

ChiplonkarIndian Pediatr 2012To develop age and sex specific cutoffs for BMI to screen for overweight and obesity in Indian children linked to an adult BMI of 23 and 28 kg/m2 respectively, using contemporary Indian data. Contemporary cross sectional age and sex specific BMI cutoffs for Indian children linked to Asian cutoff sof 23 and 28 kg/m2 for the assessment of risk of overweight and obesity, respectively are presented..

Anju Seth Department of Pediatrics, Lady Hardinge Medical College, New Delhi, India Indian Body mass index has been validated as a simple, low cost tool to assess body fatness for routine clinical evaluation in children and adolescents [1], and is found to be strongly correlated with adiposity [2]. Increasing BMI is also shown to be associated with higher risk of metabolic complications.

Brian Torrance,et alVasc Health Risk Manag. 2007 aim of this review is to provide clinicians and clinical scientists with an overview of the current state of the literature describing the negative influence of obesity on blood pressure and it's determinantsin children. After reviewing a number of physical activity intervention

studies performed in children, it appears as though 40 minutes of moderate to vigorous aerobic based physical activity 3–5 days/week is required to improve vascular function and reduce blood pressure in obese children.

Jonathan Sorof, Stephen Danielshyper. ahajournals. org Hypertension. Obesity is also the most common nutritional problem among children in

developed countries. This epidemic of pediatric obesity has resulted in great concern regarding the management of obesity and its complications. Surveys from the 1960s to the 1990s, the prevalence of overweight in children grew from 5% to 11%

Morrison et al showed that much of the increase in body mass index (BMI) in grade school–aged children between the 1970s and 1990 occurred in children between the 50thto 100th percentiles. This increase in the severity of obesity has also translated intoan increase in the prevalence of outcomes such as type 2 diabetes mellitus and hypertension. A hospital-based study by Pinhas-Hamiel et al reported a 10-fold increase in the prevalence of newly diagnosed type 2 diabetes mellitus in adolescents from 1982 to 1994. The average BMI in this group was 37 kg/m .Similarly, Leupker et al found a concordant increase in BMI and systolic blood pressure in middle school students, aged 10 to 14 years, from 1986 to 1996.

Rosner et al pooled data from 8 large US epidemiological studies Involving over 47 000 children to describe the blood pressure differences between black and white children in relation to body size. Irrespective of race, gender, or age, the risk of elevated blood pressure was significantly higher for children in the upper compared with the lower decile of BMI, with an odds ratio of systolic hypertension ranging from 2.5 to 3.7.

Freedman et al reported that overweight children in the Bogalusa Heart Study were 4.5 and 2.4 times as likely to have elevated Systolic blood pressure and diastolic blood pressure, respectively.

Sorof et al recently reported a 3 times greater prevalence of hypertension in obese compared with non obese adolescents in a school-based hypertension and obesity screening study.

In the school-based screening for hypertension and obesity by Sorof et al, the prevalence of isolated systolic hypertension among adolescents who were obese and had blood pressure above the 95th percentile on a single set of measurements was 94%. Because isolated systolic hypertension has been shown to be a major risk factor for cardiovascular morbidity and mortality in adults, further investigation of the causes and interventions for this pattern in children is clearly needed.

Lughetti et al studied 350 obese children who were categorized as hypertensive or normotensive. Although insulin was significantly higher in hypertensive than in normotensive children, the difference was not clinically relevant. Furthermore, insulin explained only a small amount of systolic and diastolic blood pressure variance, which disappeared after accounting for the confounding effects of age, weight, or other anthropometric dimensions. Weight loss in obese adolescents has also been shown to result in reductions in serum insulin levels and blood pressure ⇓and to render previously salt-sensitive individuals insensitive to the hypertensive effects of salt-loading. Based on these data, it has been suggested that the insulin resistance associated

with obesity may prevent insulin-induced glucose uptake but leave the renal sodium retention effects of insulin relatively preserved, thereby resulting in chronic volume overload and maintenance of blood pressure elevation.,

Csabi et al found no relationship between insulin levels and reduced sodium excretion in obese children. Thus, a causal role of insulin resistance in the pathogenesis of obesity hypertension remains uncertain.

Obesity in children has been associated with the development of early myocardial changes and coronary and carotid artery pathology. Kortelainen evaluated the autopsies of 210 children aged 5 to 15 years who had suffered a violent death. Ponderal index was a significant predictor of heart weight and the presence of coronary artery intimal fatty streaks.

Berenson et al demonstrated in the Bogalusa Heart Study that children and young adults who died primarily of trauma showed an association between BMI, systolic blood pressure, diastolic blood pressure, and the presence of fatty streaks and fibrous plaques in the aorta and coronary arteries at autopsy.

Gidding et al studied by electron beam computed tomography 29 patients aged 11 to 23 years with familial hypercholesterolemia to evaluate the presence of coronary artery calcium. Coronary artery calcium deposits were found in 7 of 29 subjects and were associated with increased body mass index.

Sorof et al measured carotid intimal-medial thickness by duplex vascular ultrasound in children and adolescents with essential hypertension to assess for

evidence of early arterial changes. Carotid intimal-medial thickness was positively correlated with weight, BMI, and left ventricular mass index, but not with height overage.

In a study of adolescent girls, Morrison et al found that almost 11% of overweight white girls and 65% of overweight black girls had three cardiovascular risk factors compared with an expected frequency of 0.8%.Similar findings were reported for boys.

The most compelling evidence of cardiovascular risk factor clustering in youth\ comes from the Bogalusa autopsy study, in which subjects with 0, 1, 2, and 3 or 4risk factors had, respectively, 19.1%, 30.3%, 37.9%, and 35.0% of the intimal surface covered with fatty streaks in the aorta.

A Chiolero Institute of Social and Preventive Medicine (IUMSP), Lausanne University Hospital, Lausanne, Switzerland Journal of Human Hypertension(2015) obesity is a major risk factor for elevated blood pressure in children. For instance, in a school based study of 5207 children aged 10–12 years, the prevalence of hypertension, which is sustained elevated blood pressure over several visits, was 1.5%, 3.9% and 17.5% in normal weight, overweight and obese children, respectively.

OBJECTIVES OF THE STUDY

AIM

To identify prevalence of obesity and hypertension in urban school going children.

PRIMARY OBJECTIVE

To examine relationship of BODY MASS INDEX(BMI), WAIST CIRCUMFERENCE (WC) WAIST TO HEIGHT RATIO (WHTR),TRICEPS SKIN FOLD THICKNESS (TSFT) and WRIST MEASUREMENTS with blood pressure values in children and adolescents.

SECONDARY OBJECTIVE

To identify risk factors associated with obesity and hyper tension.

STUDY JUSTIFICATION

1. Various studies have shown significantly high body mass index(BMI), waist circumference (WC), waist to height ratio (WHTR), triceps skin fold thickness (TSFT) and wrist measurements were significantly associated with risk of hypertension in a multi-centric sample of Indian children and adolescents
2. In Institute of child health and hospital for children for the past 8yrs no study on risk factors for Hypertension in children .
3. The study will bring out the reasons for prevalence of childhood obesity and hypertension in school going population of 10-18 years of age.
4. This study will bring out the risk factors for obesity and hypertension.

MATERIALS & METHODS

METHODOLOGY

- **Study design**

  Cross sectional study

- **Study setting**

  Urban schools in Chennai

- **Study period**

  June 2015 to August 2015.

- **Study population**

  Sample size- 2000 children (Convenient sampling)

- **Inclusion criteria**

  Urban school going children aged 10 to 18 yrs.

- **Exclusion criteria**

  Pre existing serious illness.

CASE DEFINITIONS

Hypertension is defined as

1) Blood pressure -

a) Systolic -

1) Normal <90th percentile

2) Prehypertension 90 to 95th percentile

3) Hypertension >95th percentile

b) Diastolic –

1) Normal <90th percentile

2) Prehypertension 90 to 95th percentile

3) Hypertension >95th percentile

2). Height (in cm)

1) <3rd centile-stunted

2) 3-97 centile-normal

3) >97th centile- tall

3)Weight (in kg)

1) <3rd centile-wasted

2) 3-97 centile-normal

3) >97th centile-obese

8. BMI; Actual (according to IAP classification)

1) Underweight

2) Normal weight

3) Over weight

4) Obese.

9**.** Waist circumference (in cm)

1.<90 percentile-normal

2.>90 percentile-adipose

10. Waist to height ratio ;

1.<0.44 - normal

2.>0.44-adipose

11. Triceps skin fold thickness (in cm)

1. Normal <85th percentile

. **2**. Moderate 85th to 95th percentile-

3. Excess >95th percentile-

MANOEUVRES

All apparently healthy children from 10 to 18 years of age from the selected urban schools were included after informed written consent from parents and assent from children. The exclusion criterion is children with pre-existing serious illnesses. A single team led the data collection at each site and equipments were calibrated daily. Height (Ht), Weight (Wt), Waist Circumference (WC)[18], Triceps Skin fold Thickness (TSFT), Wrist circumference (WRC)[19] and Blood Pressure measurements Z were taken and differences between observers if statistically significant noted.

Anthropometric measurements

Standing height was measured using a portable stadiometer (Leicester Height Meter, Child Growth Foundation, and UK). Weight will was measured using electronic scales (Salter, India measuring up to 100 g. BMI[20] categories were defined as (*a*) Normal weight, (*b*) Overweight and (*c*) Obese using IAP growth chart [17] and height for age, weight for age and BMI for age z-scores were computed using Indian reference data

WC was measured in standing position, by a stretch resistant tape which was applied horizontally just above the uppermost lateral border of the right ileum using NHANES protocol [21] WC above 90th centile of available reference population [was considered as Adipose. Waist to height ratio (WHTR) was computed and optimal cut-off value of 0.44 WHTR for children and adolescents was used to classify children as normal or adipose [22].

TSFT was recorded using Harpenden caliper, on the non -dominant upper arm as per standard protocol [23]. Children were classified as normal (< 85th centile), moderate (85th -95th) and excess fat (>95th centile) with respect to references in centiles. In the absence of Indian reference data for TSFT, Western cut-Offs were used [24]. Similarly, Wrist circumference was measured using stretch resistant tape using NHANES protocol

The most prominent aspect of the radial styloid process waslocated with the middle or index finger of the left hand. Firm pressure was applied and the circumference was recorded to the nearest 0.1 cm [Average of two readings for all parameters was used for analysis.

STATISTICAL ANALYSIS

SPSS version 20.0 (Chicago, 2011) was used for analysis. All results are expressed as mean (SD). Correlations were estimated (unadjusted and after age adjustment) separately for both genders to examine association of anthropometric measurements with BP. Level of significance was set at $P<0.05$. Two separate multiple logistic regression models adjusted for age and gender were used to examine relationship of hypertension with BMI categories, TSFT classes and Wrist with WC categories in the first model, and with WHTR categories in the second model to avoid multi-co linearity. The. Optimal cut-off points for each anthropometric indicator was determined [26,27]. The differences between area under for BMI, WC, WHTR, TSFT and WRC to determine the best predictor for hypertension were tested .

DATA COLLECTION FORM

IDENTIFICATION

l. Study Id :

2. No :

3. Name :

DEMOGRAPHIC CHARACTERISTICS

4. Age a) DOB

b) Actual (in yrs, months)

1) 10-12

2) 12-14

3) 14-16

4) 16-18

5. Sex

1) Male

2) Female

ANTHROPOMETRY

6. Height (in cm)

1)<3rd centile

2) 3-97 centile

3)>97th centile

7. Weight (in kg)

1)<3rd centile

2) 3-97 centile

3)>97th centile

8. BMI; Actual

1) Underweight

2) Normal weight

3) Over weight

4) Obese.

9**.** Waist circumference (in cm)

1.<90 percentile

2.>90 percentile

10. Waist to height ratio ;

1.<0.44

2.>0.44

11. Triceps skin fold thickness (in cm)

1. Normal <85th percentile

. **2**. Moderate 85th to 95th percentile

3. Excess >95th percentile

12. Wrist measurements

CLINICAL EXAMINATION

13. Blood pressure -

a) Systolic -

1) Normal <90th percentile

2) Prehypertension 90 to 95th percentile

3) Hypertension >95th percentile

b) Diastolic–

1)Normal <90th percentile

2)Prehypertension90 to 95th percentile

3)Hypertension >95th percentile

RESULTS AND ANALYSIS

In our study 2000 children were included in this study BODY FAT INDICES measured and blood pressure was measured.

Obtained indices are

BODY MASS INDEX (BMI)

WAIST CIRCUMFERANCE(WC)

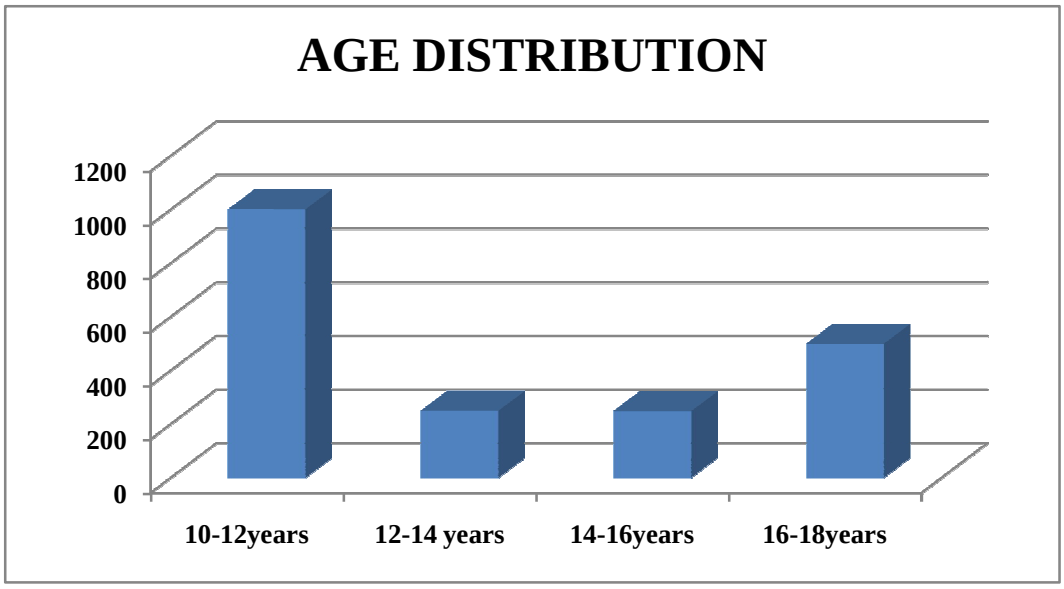
WAIST TO HEIGHT RATIO (WHtR)

TRICEPS SKIN FOLD THICKNESS(TSFT)

WRIST CIRCUMFERENCE.

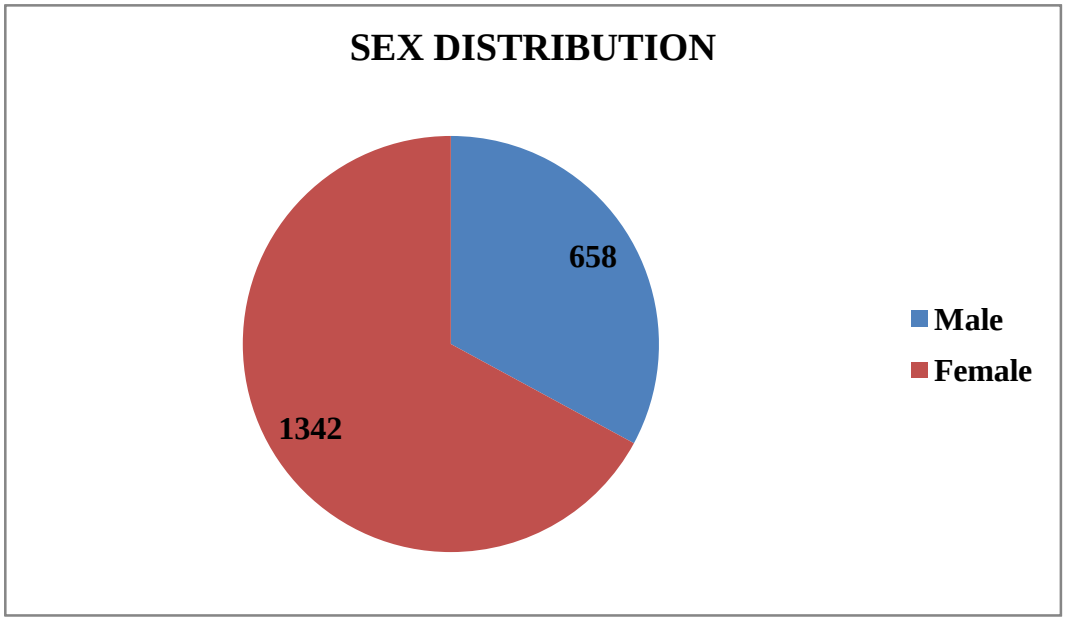
Body fat indices were correlated with systolic and diastolic blood pressure and analysed

CHART 1



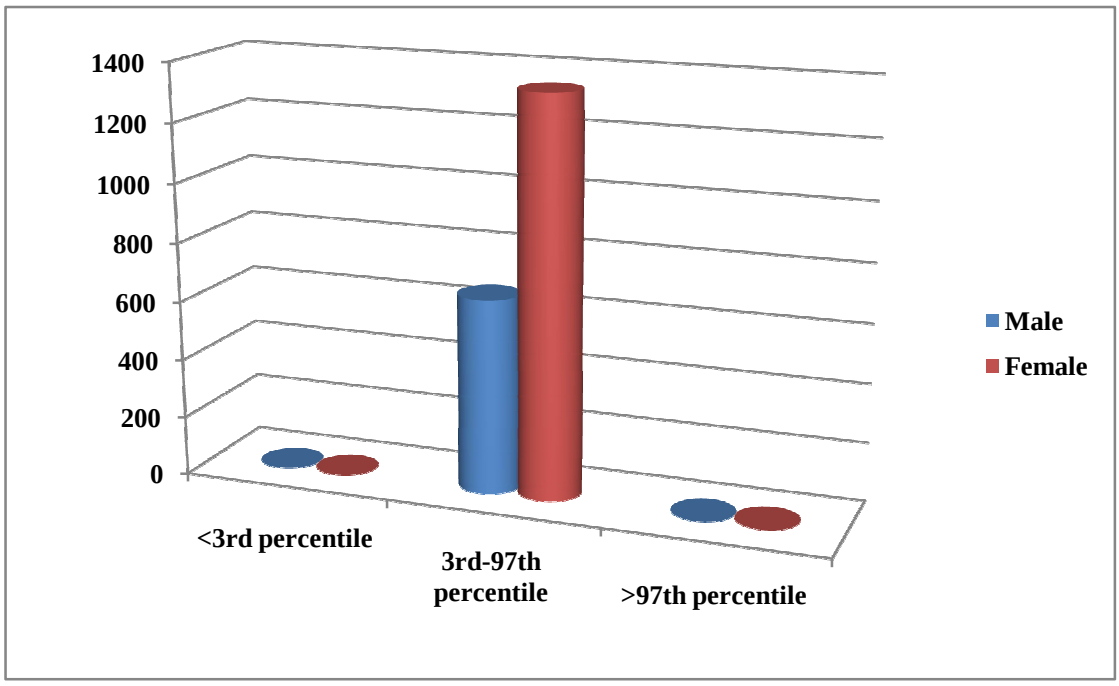
Bar chart representing number of children participated in 10 to 18 years of age.50.1 %of children are coming under 10to 12 years of age.12.5% from12 to 14 years 12.5%in 14to 16 years.

CHART 2



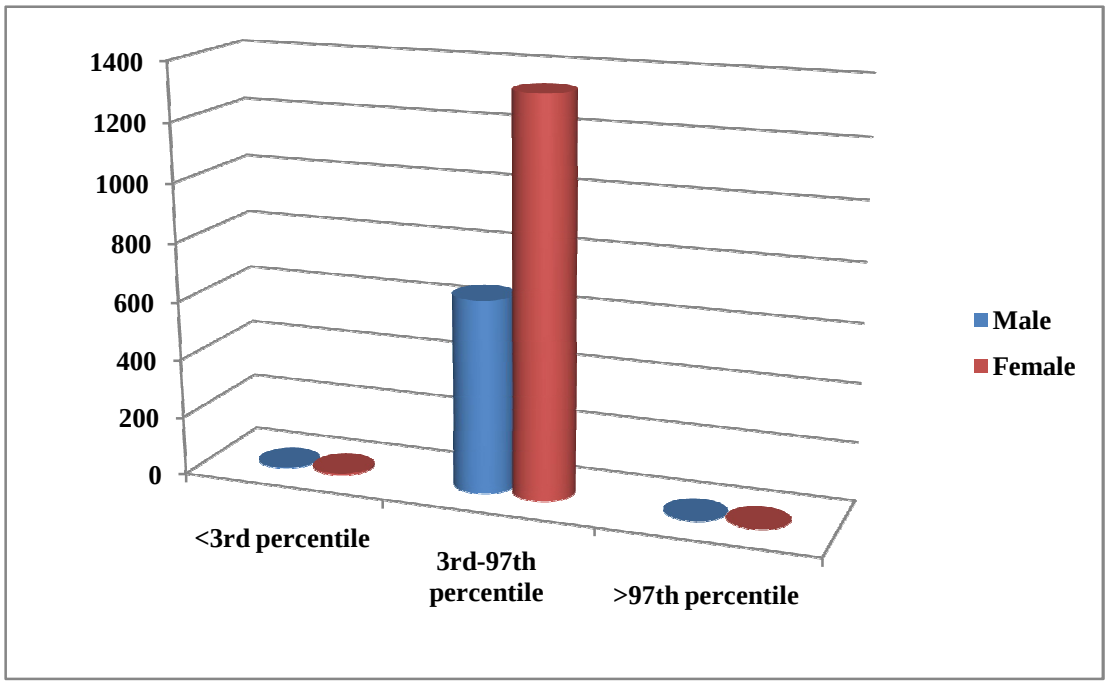
HEIGHT DISTRIBUTION OF STUDY POPULATION

CHART 3



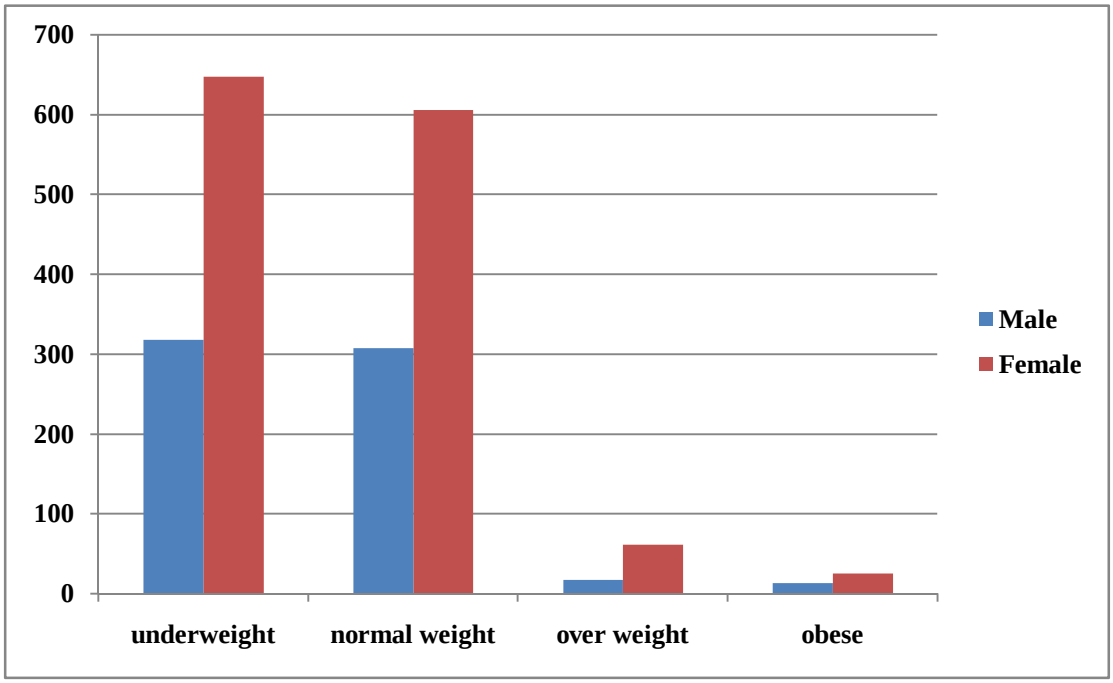
WEIGHT DISTRIBUTION OF STUDY POPULATION

CHART 4



BMI OF STUDY POPULATION

CHART 5



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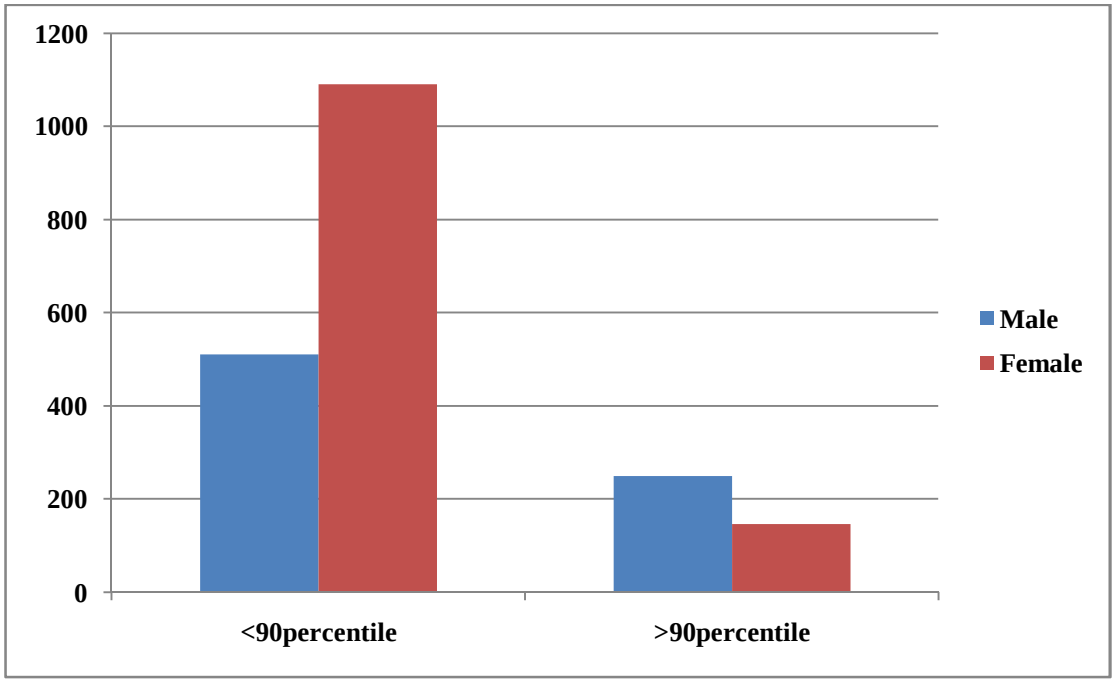
WAIST CIRCUMFERENCE OF STUDY POPULATION

CHART 6



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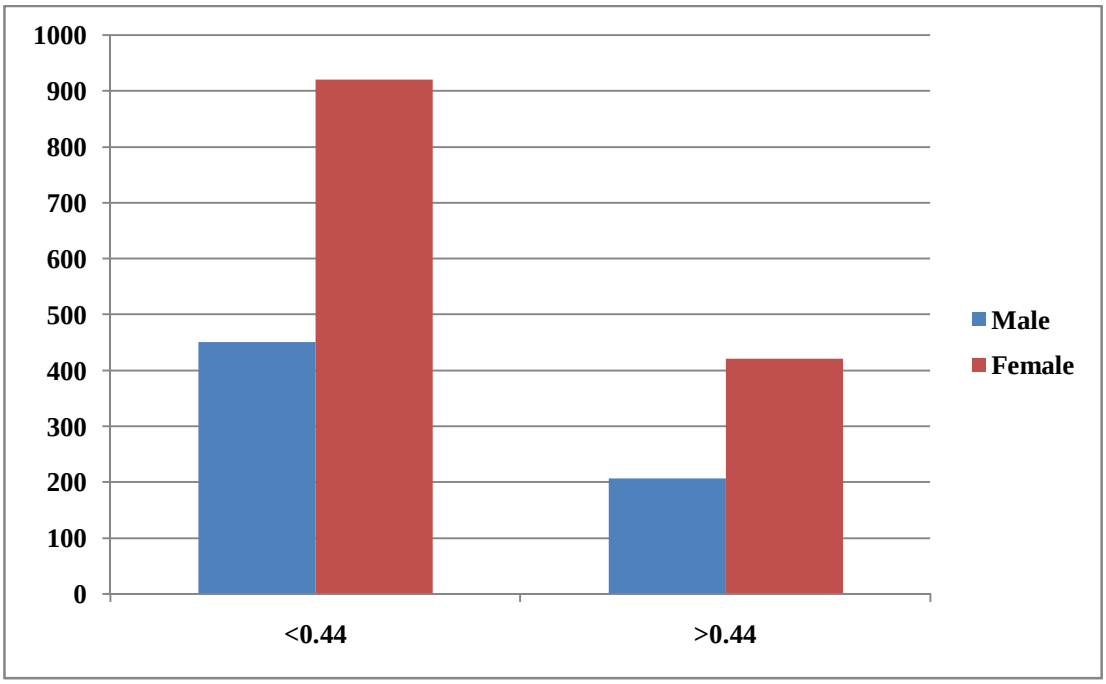
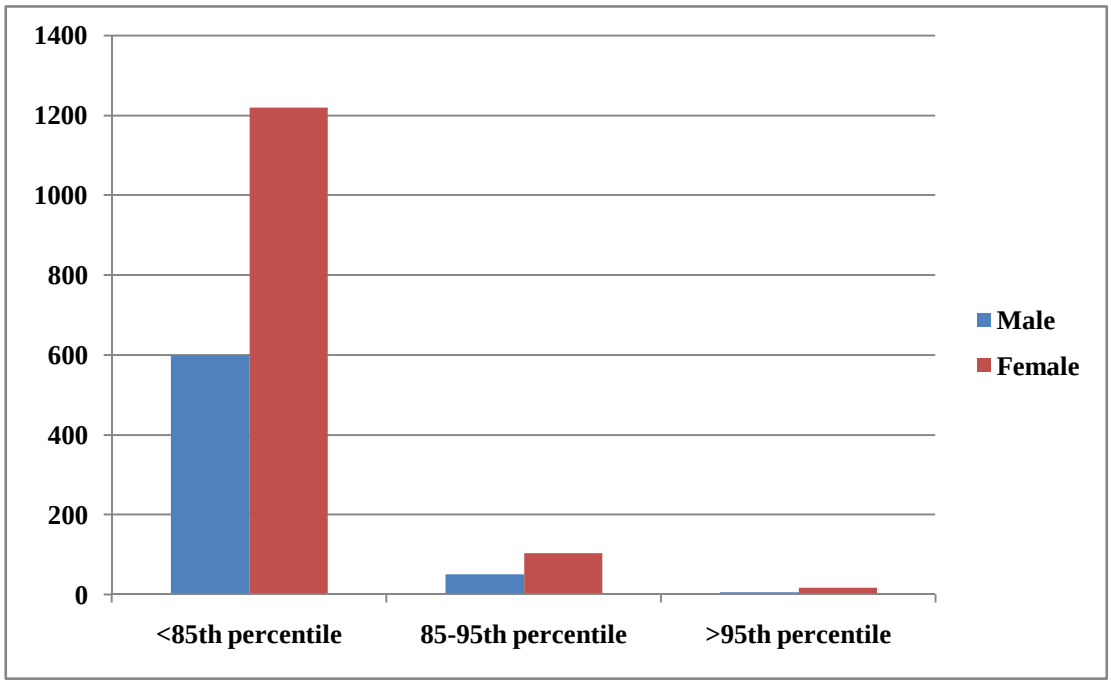
WAIST HEIGHT RATIO OF STUDY POPULATION

CHART 7



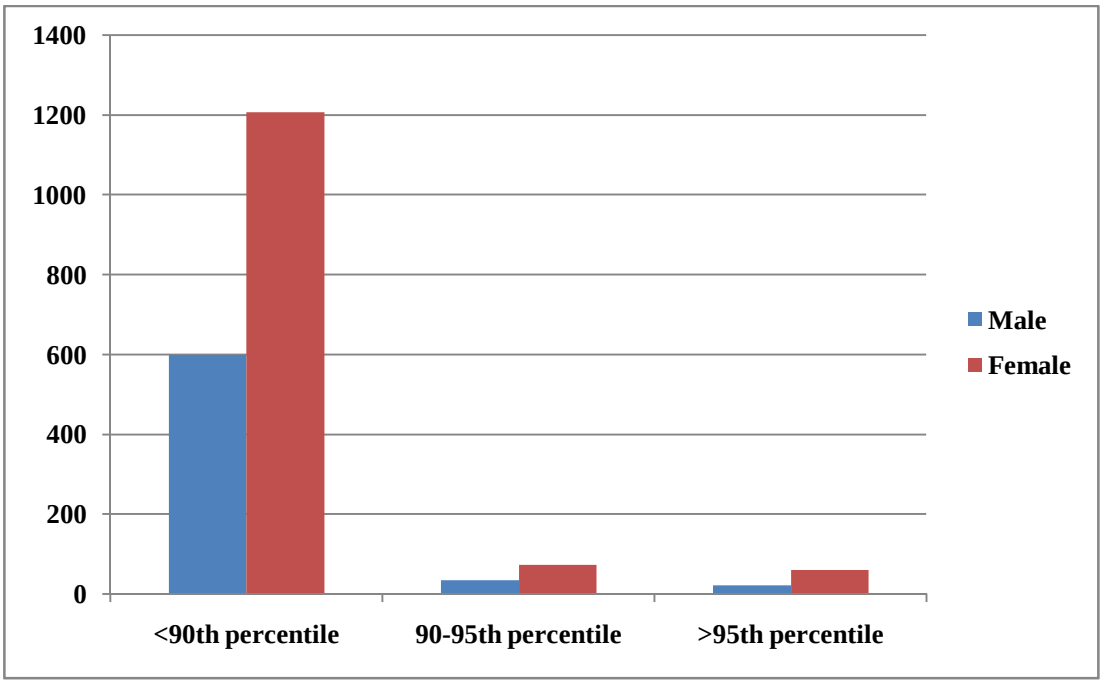
TRICEPS SKIN FOLD THICKNESS

CHART 8



SYSTOLIC BLOOD PRESSURE

CHART 9



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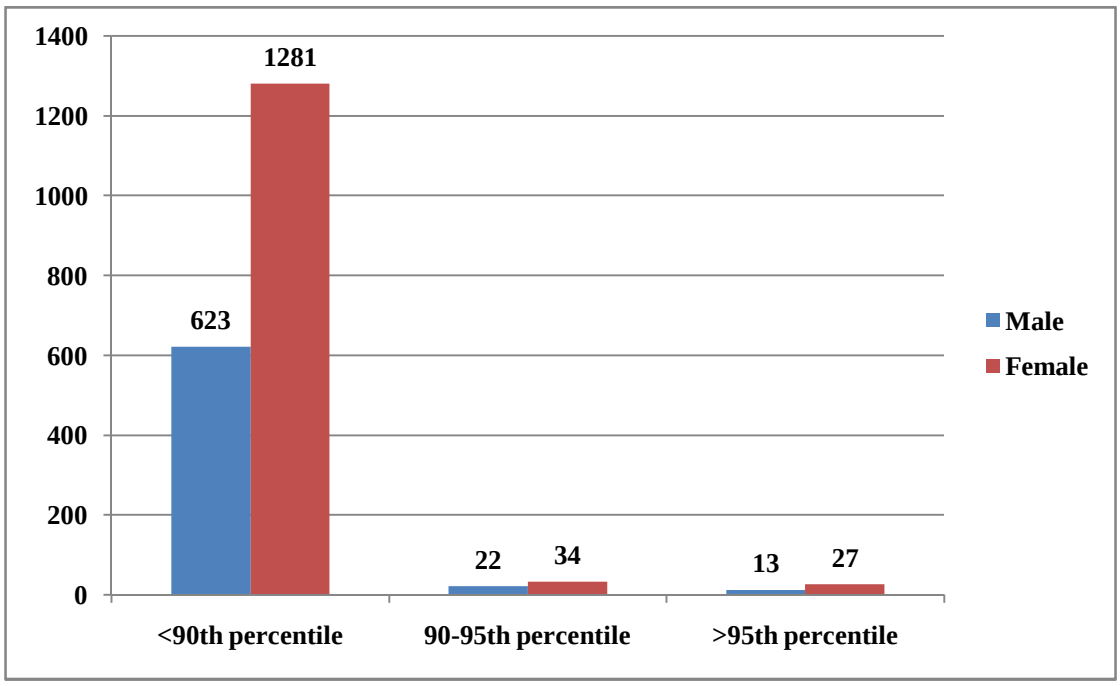
DIASTOLIC BLOOD PRESSURE

CHART 10



LIFE STYLE PATTERNS

CHART 11

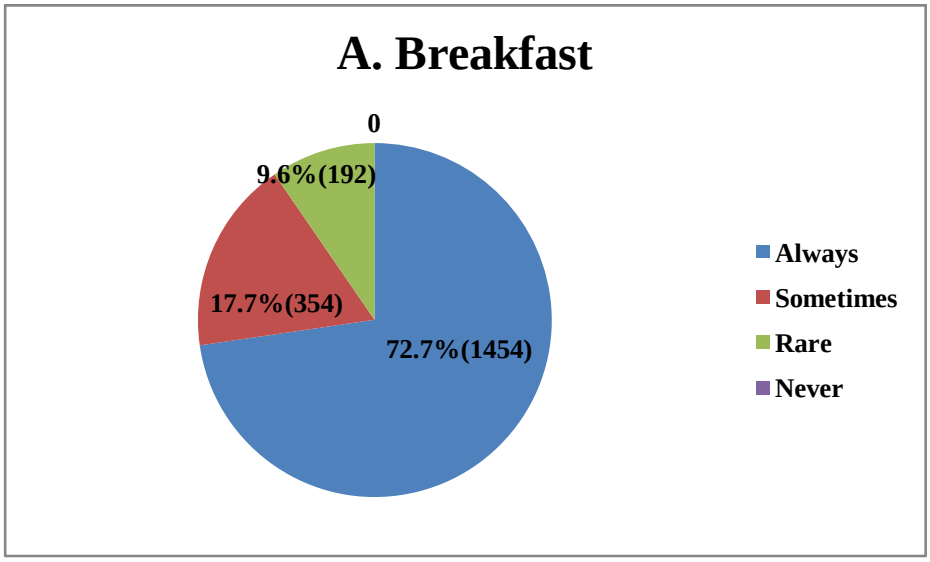
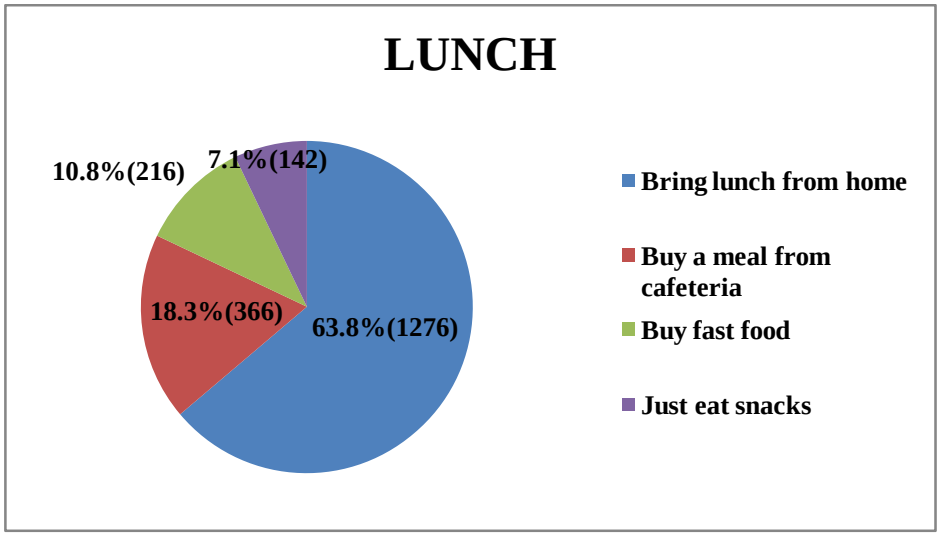


CHART 12



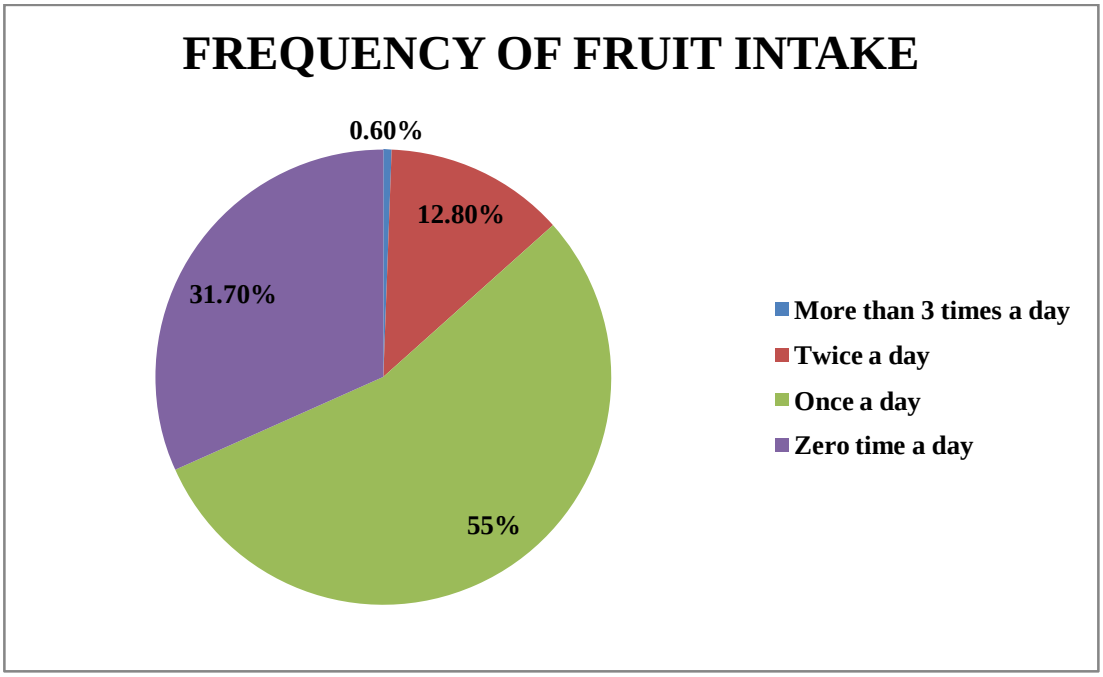
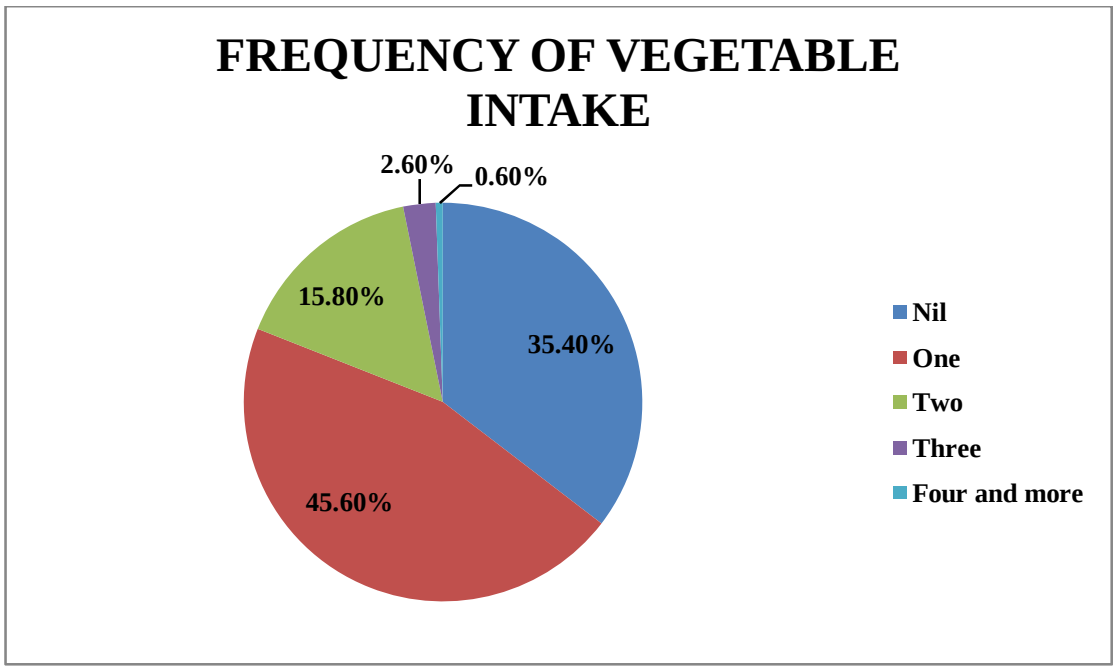


CHART 13



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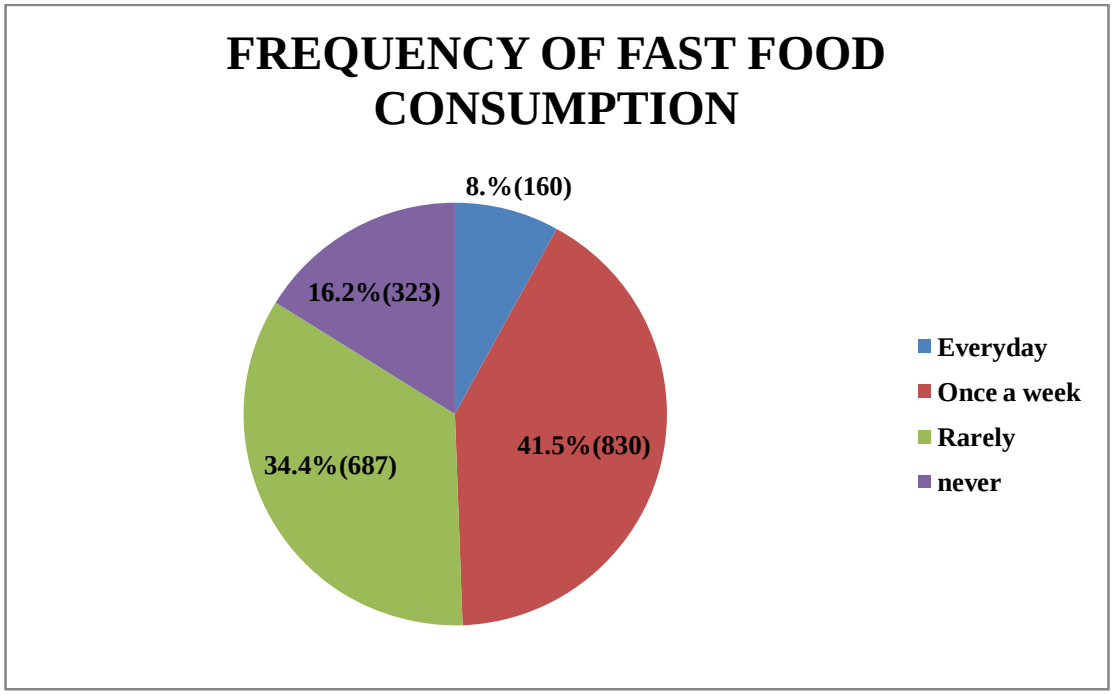

CHART 15

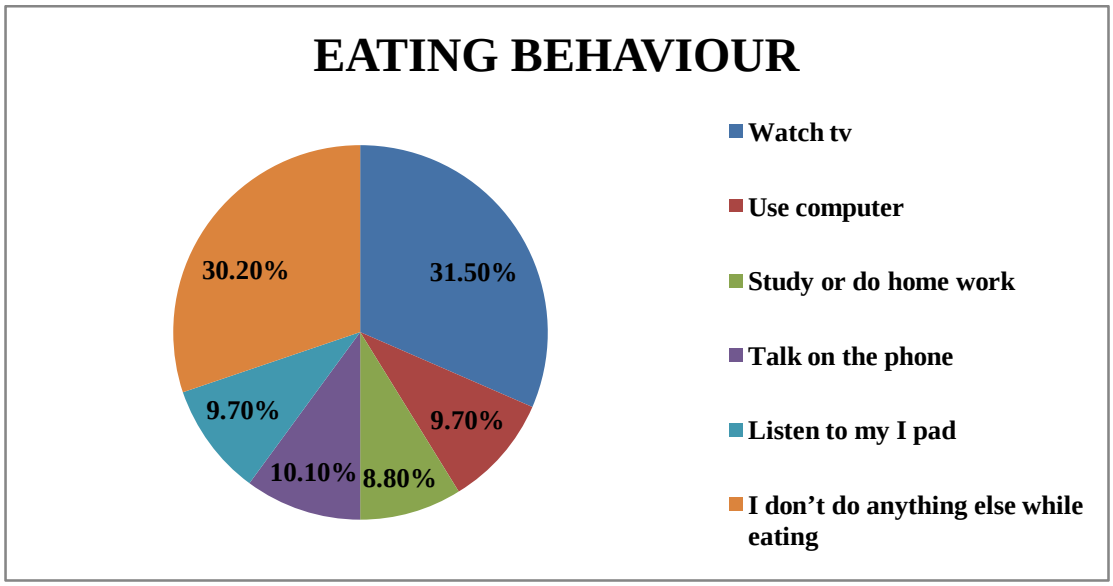

CHART 16

The above 8 pie charts showing eating behaviour of school going children

PHYSICAL ACTIVITY

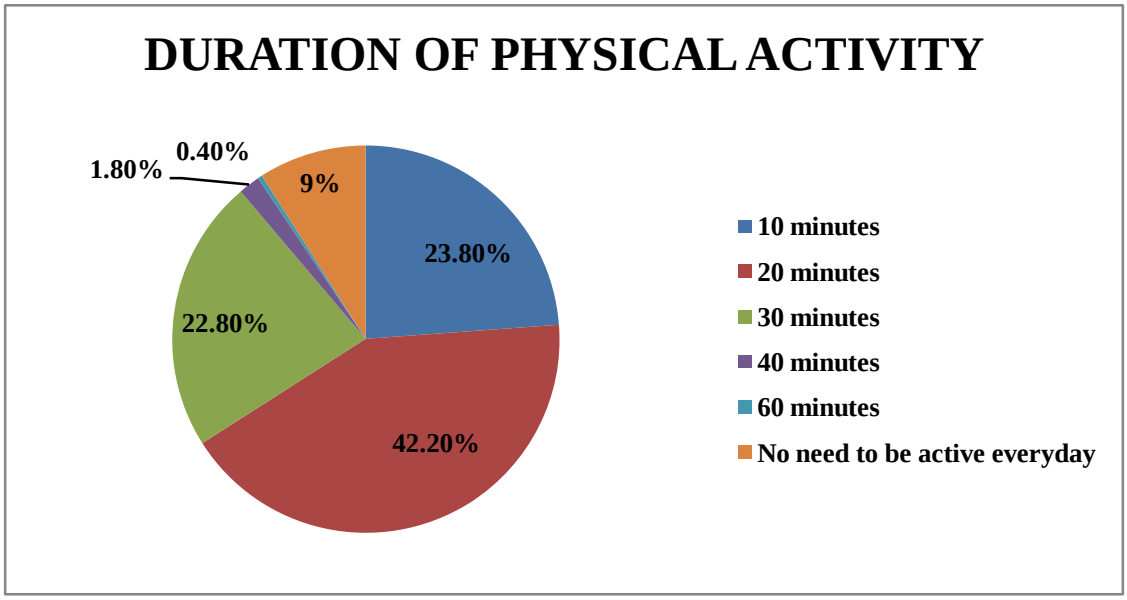

CHART 17

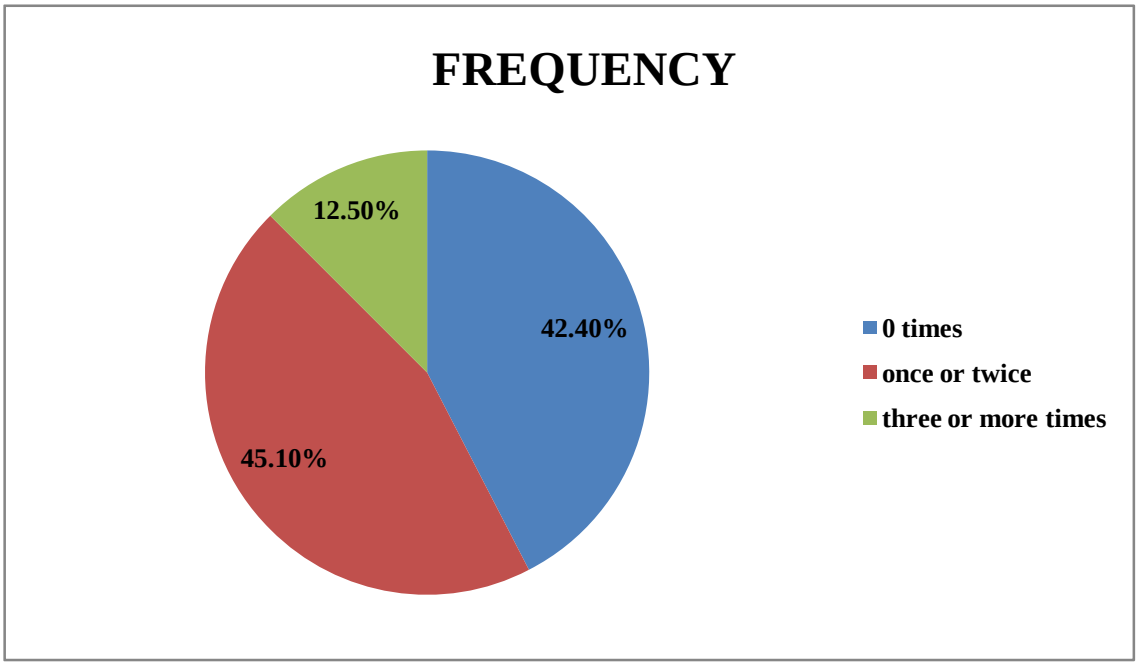

CHART 18

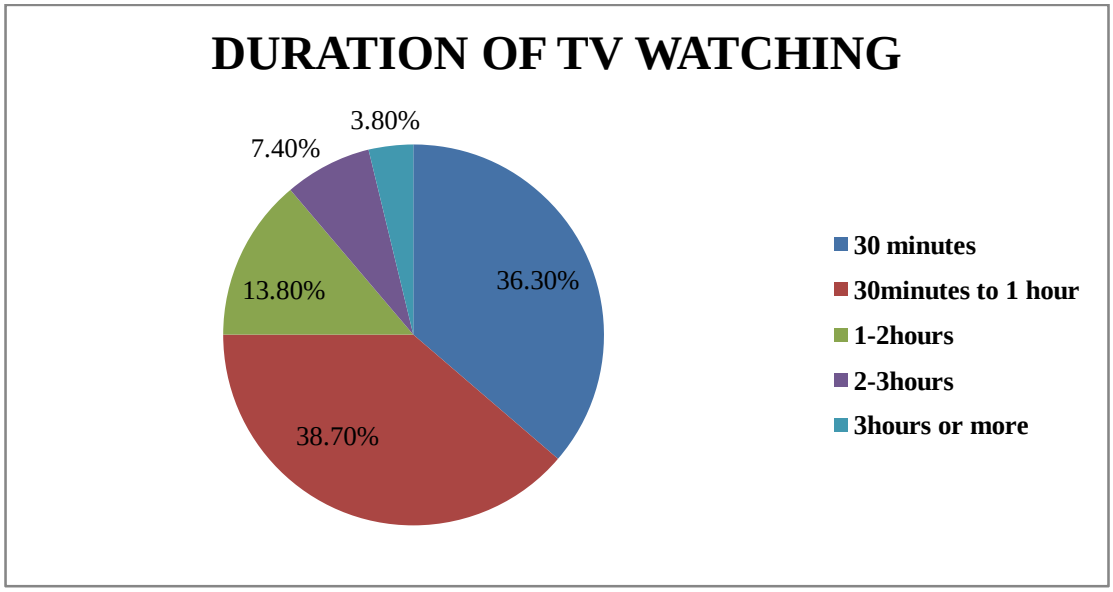

CHART 19

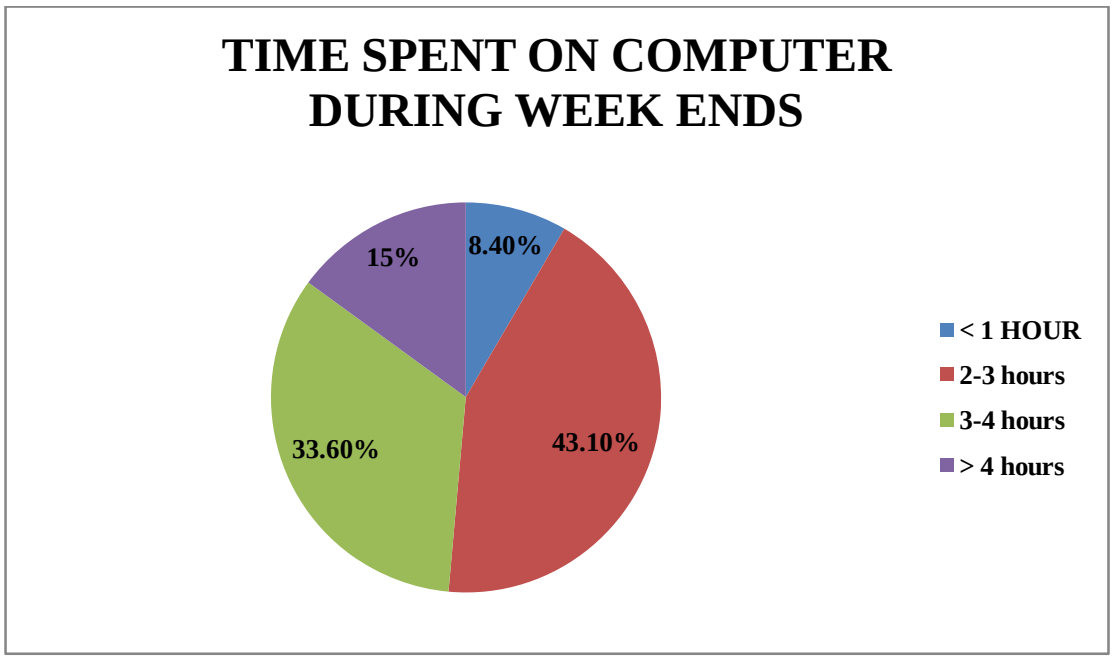

CHART 20

AGE WISE PREVALANCE OF HYPERTENSION IN STUDY POPULATION

AGE	NORMAL BP		PRE HYPERTENSION		HYPERTENSION	
10-12 YEARS	904	952	54	28	42	20
12-14 YEARS	237	236	11	8	2	6
14-16 YEARS	213	243	17	2	19	4
16-18YEARS	453	472	26	18	21	10

CORRELATION OF HEIGHT WITH BLOOD PRESSURE

	Systolic blood pressure				**Diastolic blood pressure**			
	Normal	**Prehypertension**	**Hypertension**	**p value**	**Normal**	**Prehypertension**	**Hypertension**	**p value**
<3rd percentile	**8**	**0**	**0**	**0.653**	**8**	**0**	**0**	**0.818**
3rd – 97th percentile	**1800**	**108**	**84**		**1896**	**56**	**40**	
>97th percentile	**0**	**0**	**0**		**0**	**0**	**0**	

CORRELATION OF WEIGHT WITH SYSTOLIC BP

Systolic	Weight (in kg)			Statistical Inference
	Below 3rd centile (n=8)	3 to 97 centile (n=1992)	Total (n=2000)	
Normal	8(100%)	1800(90.4%)	1808(90.4%)	X^2=.853 Df=2 .653>0.05 Not Significant
Pre hypertension	0	108(5.4%)	108(5.4%)	
Hypertension	0	84(4.2%)	84(4.2%)	

Study indicates that though children with increased weight correlated with hypertension it was not significant.

CORRELATION OF WEIGHT WTH DIASTOLIC BP

Diastolic	Weight (in kg)			Statistical inference
	Below 3rd centile (n=8)	3 to 97 centile (n=1992)	Total (n=2000)	
Normal	8(100%)	1896(95.2%)	1904(95.2%)	X^2=.405 Df=2 .817>0.05 Not Significant
Pre hypertension	0	56(2.8%)	56(2.8%)	
Hypertension	0	40(2%)	40(2%)	

Study indicates children with increased weight correlated with hypertension which was not significant

BMI CORRELATED WITH SYSTOLIC BP

Systolic	BMI					Statistical Inference
	Underweight (n=966)	Normal weight (n=914)	Over weight (n=80)	Obese (n=40)	Total (n=2000)	
Normal	870(90.1%)	830 (90.8%)	72 (90%)	36 (90%)	1808 (90.4%)	X^2=6.166 Df=6 .405>0.05 Not Significant
Pre hypertension	54 (5.6%)	50 (5.5%)	4 (5%)	0	108 (5.4%)	
Hypertension	42 (4.3%)	34 (3.7%)	4 (5%)	4 (10%)	84 (4.2%)	

Study indicates even in underweight children 5.6% had prehypertension and 4.3% had hypertension but compare with overweight and obese children prehypertention and hypertension was less .

BMI CORRELATED WITH DIASTOLIC BP

Diastolic	BMI					Statistical Inference
	Underweight (n=966)	Normal weight (n=914)	Over weight (n=80)	Obese (n=40)	Total (n=2000)	
Normal	912 (94.4%)	876 (95.8%)	76 (95%)	40 (100%)	1904 (95.2%)	X^2=7.608 Df=6 .268>0.05 Not Significant
Pre hypertension	32 (3.3%)	20 (2.2%)	4 (5%)	0	56 (2.8%)	
Hypertension	22 (2.3%)	18 (2%)	0	0	40 (2%)	

Diastolic BP increased in normal weighed and obese ,over weighed children, the incidence is more deviated towards obese and over weighed children in the given study group of 10 to 18 years of age

CORRELATION OF WAIST CIRUMFERENCE WITH BLOOD PRESSURE

	Systolic blood pressure				Diastolic blood pressure			
	Normal	**Pre hypertension**	**Hypertension**	**p value**	**Normal**	**Prehypertension**	**Hypertension**	**p value**
<90th percentile	**1463**	**74**	**66**	**0.003**	**1549**	**32**	**22**	**0.000**
>90th percentile	**345**	**34**	**18**		**355**	**24**	**18**	

Study indicates waist circumference is significantly correlated with sytolicBP $p<0.003$.And also correlated with diastolic BP $p<0.000$

CORRELATION OF WAIST TO HEIGHT RATIO WITH BLOOD PRESSURE

	Systolic blood pressure				Diastolic blood pressure			
	Normal	**Prehypertension**	**Hypertension**	**p value**	**Normal**	**Prehypertension**	**Hypertension**	**p value**
<0.44	**1250**	**78**	**44**	**0.003**	**1324**	**24**	**24**	**0.000**
>0.44	**548**	**30**	**40**		**518**	**32**	**16**	

Our study shows significant correlation of waist ti height ratio $p<0.003$ with systolic and $p<0.000$ for diastolic BP

CORRELATION OF TRICEPS SKIN FOLD THICKNESS WITH BLOOD PRESSURE

	Systolic blood pressure				Diastolic blood pressure			
	Normal	**Prehypertension**	**Hypertension**	**p VALUE**	**Normal**	**Prehypertension**	**Hypertension**	**p VALUE**
<85th percentile	**1682**	**84**	**54**	**0.000**	**1756**	**34**	**30**	**0.000**
85th – 95th percentile	**122**	**24**	**10**		**132**	**18**	**6**	
>95th percentile	**4**	**0**	**20**		**16**	**4**	**4**	

Our study shows significant correlation of triceps skin fold thickness $p<0.003$ for systolic and $p<0.000$ for diastolic BP

MULTIVARIATE ANALYSIS FOR SYSTOLIC BP

	B	S.E.	Sig.	Exp(B)
WAIST CIRCUMFERENCE	**0.023**	**0.203**	**0.911**	**1.023**
WAIST TO HEIGHT RATIO	0.186	0.181	0.304	1.204
TRICEPS SKINFOLD THICKNESS	-4.259	0.583	0.00	0.014
TRICEPS SKINFOLD THICKNESS	-3.001	0.596	0.00	0.05
CONSTANT	1.606	0.549	0.003	4.981

MULTIVARIATE ANALYSIS OF DIASTOLIC BP

	B	S.E.	Sig.	Exp(B)
WAIST CIRCUMFERENCE	-0.851	0.232	0.00	0.427
WAIST TO HEIGHT RATIO	-0.43	0.229	0.06	0.65
TRICEPS SKINFOLD THICKNESS	-1.817	0.488	0.00	0.162
TRICEPS SKINFOLD THICKNESS	-0.448	0.506	0.376	0.639
CONSTANT	-0.571	0.438	0.192	0.565

In multivariate analysis with systolic blood pressure and diastolic blood pressure shows very strong correlation with waist cicumferance and also significant correlation with waist to height ratio and triceps skin fold thickness

SEX WITH. BMI

Sex	BMI					Statistical Inference
	Underweight (n=966)	Normal weight (n=914)	Over weight (n=80)	Obese (n=40)	Total (n=2000)	
Male	318(32.9%)	308(33.7%)	18(22.5%)	14(35%)	658(32.9%)	X^2=4.263 Df=3 .234>0.05 Not Significant
Femalee	648(67.1%)	606(66.3%)	62(77.5%)	26(65%)	1342(67.1%)	

As per data collected comparing sex of the children to BMI, female preponderance of Increased BMI is noted.

	Systolic								Statistical inference
	Normal		Pre hypertension		Hypertension		Total		
	(n=1808)	(100%)	(n=108)	(100%)	(n=84)	(100%)	(n=2000)	(100%)	
How often do you eat breakfast?									
Always	1316	72.8%	82	75.9%	56	66.7%	1454	72.7%	X^2=9.596 Df=2 .048<0.05 Significant
Sometimes	310	17.1%	22	20.4%	22	26.2%	354	17.7%	
Rare	182	10.1%	4	3.7%	6	7.1%	192	9.6%	
At school you usually									
Bring your lunch from home	1136	62.8%	72	66.7%	68	81.0%	1276	63.8%	X^2=16.419 Df=6 .012<0.05 Significant
Buy a meal from the cafeteria	338	18.7%	18	16.7%	10	11.9%	366	18.3%	

Buy fast food	196	10.8%	14	13.0%	6	7.1%	216	10.8%	
Just eat snacks	138	7.6%	4	3.7%	0	.0%	142	7.1%	
How often do you eat fast food ?									
Everyday	144	8.0%	6	5.6%	10	11.9%	160	8.0%	X^2=7.486 Df=6 .278>0.05 Not Significant
Once a week	750	41.5%	48	44.4%	32	38.1%	830	41.5%	
Rarely	621	34.3%	42	38.9%	24	28.6%	687	34.4%	
Never	293	16.2%	12	11.1%	18	21.4%	323	16.2%	
How often do you usually eat fruit ?									
More than three times a day.	10	.6%	2	1.9%	0	.0%	12	.6%	X^2=8.913 Df=6 .179>0.05 Not Significant
Twice a day	236	13.1%	14	13.0%	6	7.1%	256	12.8%	
Once a day	985	54.5%	66	61.1%	48	57.1%	1099	55.0%	
Zero times a day	577	31.9%	26	24.1%	30	35.7%	633	31.7%	
On average, how many of your meals or snacks each day usually contain some type of vegetable?									
Nil	638	35.3%	38	35.2%	32	38.1%	708	35.4%	X^2=3.209

One	830	45.9%	48	44.4%	34	40.5%	912	45.6%	Df=8 .921>0.05 Not Significant
Two	282	15.6%	18	16.7%	16	19.0%	316	15.8%	
Three	46	2.5%	4	3.7%	2	2.4%	52	2.6%	
Four and more	12	.7%	0	.0%	0	.0%	12	.6%	
Would you say you sometimes eat when you're not really hungry?									
Yes	983	54.4%	56	51.9%	46	54.8%	1085	54.3%	X^2=.270 Df=2 .874>0.05 Not Significant
No	825	45.6%	52	48.1%	38	45.2%	915	45.8%	
Would you say you sometimes overeat, past the point of being full?									
Yes, most of the time	113	6.3%	4	3.7%	2	2.4%	119	6.0%	X^2=8.111 Df=4 .088>0.05 Not Significant
Yes, sometimes	769	42.5%	42	38.9%	28	33.3%	839	42.0%	
No, never	926	51.2%	62	57.4%	54	64.3%	1042	52.1%	
When you're eating, which of the following do you do? (Check all that apply.)									
Watch TV	568	31.4%	40	37.0%	22	26.2%	630	31.5%	X^2=39.285

Use the computer	166	9.2%	6	5.6%	22	26.2%	194	9.7%	Df=10 .000<0.05 Significant
Study or do homework.	166	9.2%	4	3.7%	6	7.1%	176	8.8%	
Talk on the phone	180	10.0%	18	16.7%	4	4.8%	202	10.1%	
Listen to my iPod	176	9.7%	10	9.3%	8	9.5%	194	9.7%	
I don't do anything else while I eat	552	30.5%	30	27.8%	22	26.2%	604	30.2%	
How often do you exercise each week?									
Zero times	756	41.8%	40	37.0%	52	61.9%	848	42.4%	X^2=15.797 Df=4 .003<0.05 Significant
Once or twice	820	45.4%	54	50.0%	28	33.3%	902	45.1%	
Three or more times	232	12.8%	14	13.0%	4	4.8%	250	12.5%	
How much physical activity should you get each day?									
10 minutes	436	24.1%	24	22.2%	16	19.0%	476	23.8%	X^2=30.927 Df=10 .001<0.05 Significant
20 minutes	766	42.4%	52	48.1%	26	31.0%	844	42.2%	
30 minutes	414	22.9%	22	20.4%	20	23.8%	456	22.8%	
40 minutes	34	1.9%	0	.0%	2	2.4%	36	1.8%	
60 minutes	6	.3%	0	.0%	2	2.4%	8	.4%	
I don't need to be active	152	8.4%	10	9.3%	18	21.4%	180	9.0%	

every day									
Which of the following health problems are linked to being overweight or obese?									
Arthritis	100	5.5%	8	7.4%	2	2.4%	110	5.5%	X^2=24.431 Df=12 .018<0.05 Significant
Depression	114	6.3%	0	.0%	4	4.8%	118	5.9%	
Trouble sleeping	178	9.8%	12	11.1%	6	7.1%	196	9.8%	
Asthma	374	20.7%	26	24.1%	24	28.6%	424	21.2%	
Heart disease	496	27.4%	34	31.5%	26	31.0%	556	27.8%	
High blood pressure	450	24.9%	22	20.4%	12	14.3%	484	24.2%	
Migraines	96	5.3%	6	5.6%	10	11.9%	112	5.6%	
About how much time do you spend on your computer on weekdays?									
30 minutes	402	22.2%	30	27.8%	24	28.6%	456	22.8%	X^2=9.886 Df=8 .273>0.05 Not Significant
1hour	424	23.5%	18	16.7%	22	26.2%	464	23.2%	
2hours	90	5.0%	8	7.4%	2	2.4%	100	5.0%	
3hours	776	42.9%	42	38.9%	32	38.1%	850	42.5%	
More than 3 hours	116	6.4%	10	9.3%	4	4.8%	130	6.5%	

About how much time do you spend watching TV each school day?									
30 minutes	652	36.1%	50	46.3%	24	28.6%	726	36.3%	X^2=33.615 Df=8 .000<0.05 Significant
30 minutes to 1 hour	714	39.5%	32	29.6%	28	33.3%	774	38.7%	
1 to 2 hours	250	13.8%	14	13.0%	12	14.3%	276	13.8%	
2 to 3 hours	120	6.6%	10	9.3%	18	21.4%	148	7.4%	
3 hours or more.	72	4.0%	2	1.9%	2	2.4%	76	3.8%	
About how much time do you spend on your computer on a weekend day?									
1 hour or less	156	8.6%	10	9.3%	2	2.4%	168	8.4%	X^2=26.790 Df=6 .000<0.05 Significant
2 to 3 hours	791	43.8%	48	44.4%	22	26.2%	861	43.1%	
3 to 4 hours	606	33.5%	32	29.6%	34	40.5%	672	33.6%	
4 hours or more	255	14.1%	18	16.7%	26	31.0%	299	15.0%	
How much do you weigh?									
Aware	102	5.6%	6	5.6%	4	4.8%	112	5.6%	X^2=.118 Df=2 .943>0.05 Not Significant
Not aware	1706	94.4%	102	94.4%	80	95.2%	1888	94.4%	

About how tall are you?									
Aware	14	.8%	2	1.9%	0	.0%	16	.8%	X^2=2.198 Df=2 .333>0.05 Not Significant
Not aware	1794	99.2%	106	98.1%	84	100.0%	1984	99.2%	

Lack of physical activity and junk food intake leading to increased systolic BP this relation is brought by the above questions asked to the children of this study.

Tables

	Diastolic								**Statistical inference**
	Normal		**Pre hypertension**		**Hypertension**		**Total**		
	(n=1904)	**(100 %)**	**(n=56)**	**(100 %)**	**(n=40)**	**(100 %)**	**(n=2000)**	**(100 %)**	
How often do you eat breakfast?									
Always	1394	73.2 %	26	46.4 %	34	85.0 %	1454	72.7 %	X^2=46.494 Df=4 .000<0.
Sometimes	320	16.8 %	28	50.0 %	6	15.0 %	354	17.7 %	

Rare	190	10.0 %	2	3.6%	0	.0%	192	9.6%	05 Signifi cant
At school you usually									
Bring your lunch from home	1212	63.7 %	34	60.7 %	30	75.0 %	1276	63.8 %	X^2=12. 263 Df=6 .056>0. 05 Not Signifi cant
Buy a meal from the cafeteri a	348	18.3 %	14	25.0 %	4	10.0 %	366	18.3 %	
Buy fast food	202	10.6 %	8	14.3 %	6	15.0 %	216	10.8 %	
Just eat snacks	142	7.5%	0	.0%	0	.0%	142	7.1%	
How often do you eat fast food ?									
Everyd ay	148	7.8%	6	10.7 %	6	15.0 %	160	8.0%	X^2=10. 986 Df=6 .089>0.
Once a	780	41.0	30	53.6	20	50.0	830	41.5	

week		%		%		%		%	05
Rarely	665	34.9 %	14	25.0 %	8	20.0 %	687	34.4 %	Not Signifi cant
Never	311	16.3 %	6	10.7 %	6	15.0 %	323	16.2 %	
How often do you usually eat fruit ?									
More than three times a day.	12	.6%	0	.0%	0	.0%	12	.6%	X^2=13. 450 Df=6 .036<0. 05 Signifi cant
Twice a day	248	13.0 %	0	.0%	8	20.0 %	256	12.8 %	
Once a day	1049	55.1 %	34	60.7 %	16	40.0 %	1099	55.0 %	
Zero times a day	595	31.3 %	22	39.3 %	16	40.0 %	633	31.7 %	
On averag e, how many of your meals or snacks each day									

usually contain some type of vegetable?									
Nil	664	34.9 %	26	46.4 %	18	45.0 %	708	35.4 %	
One	890	46.7 %	14	25.0 %	8	20.0 %	912	45.6 %	X^2=33.693 Df=8 .000<0.05 Significant
Two	286	15.0 %	16	28.6 %	14	35.0 %	316	15.8 %	
Three	52	2.7%	0	.0%	0	.0%	52	2.6%	
Four and more	12	.6%	0	.0%	0	.0%	12	.6%	
Would you say you sometimes eat when you're not really hungry?									
Yes	1021	53.6 %	36	64.3 %	28	70.0 %	1085	54.3 %	X^2=6.571 Df=2 .037<0.05 Signifi
No	883	46.4 %	20	35.7 %	12	30.0 %	915	45.8 %	

									cant
Would you say you sometimes overeat, past the point of being full?									
Yes, most of the time	111	5.8%	4	7.1%	4	10.0 %	119	6.0%	X^2=4.911 Df=4 .297>0.05 Not Significant
Yes, sometimes	799	42.0 %	28	50.0 %	12	30.0 %	839	42.0 %	
No, never	994	52.2 %	24	42.9 %	24	60.0 %	1042	52.1 %	
When you're eating, which of the following do you do? (Check all that apply.)									
Watch TV	606	31.8 %	14	25.0 %	10	25.0 %	630	31.5 %	X^2=55.241

Use the computer	188	9.9%	0	.0%	6	15.0%	194	9.7%	Df=10 .000<0.05 Significant
Study or do homework.	174	9.1%	2	3.6%	0	.0%	176	8.8%	
Talk on the phone	194	10.2%	8	14.3%	0	.0%	202	10.1%	
Listen to my iPod	178	9.3%	16	28.6%	0	.0%	194	9.7%	
I don't do anything else while I eat	564	29.6%	16	28.6%	24	60.0%	604	30.2%	
How often do you exercise each week?									
Zero times	808	42.4%	28	50.0%	12	30.0%	848	42.4%	X^2=14.418 Df=4 .006<0.05 Significant
Once or twice	850	44.6%	24	42.9%	28	70.0%	902	45.1%	
Three or more	246	12.9%	4	7.1%	0	.0%	250	12.5%	

times									
How much physical activity should you get each day?									
10 minutes	454	23.8 %	4	7.1%	18	45.0 %	476	23.8 %	
20 minutes	816	42.9 %	18	32.1 %	10	25.0 %	844	42.2 %	
30 minutes	438	23.0 %	12	21.4 %	6	15.0 %	456	22.8 %	X^2=95.237 Df=10 .000<0.05 Significant
40 minutes	32	1.7%	0	.0%	4	10.0 %	36	1.8%	
60 minutes	8	.4%	0	.0%	0	.0%	8	.4%	
I don't need to be active every day	156	8.2%	22	39.3 %	2	5.0%	180	9.0%	
Which of the following health problems are									

linked to being overweight or obese?									
Arthritis	110	5.8%	0	.0%	0	.0%	110	5.5%	X^2=34.783 Df=12 .001<0.05 Significant
Depression	112	5.9%	0	.0%	6	15.0%	118	5.9%	
Trouble sleeping	190	10.0%	0	.0%	6	15.0%	196	9.8%	
Asthma	402	21.1%	12	21.4%	10	25.0%	424	21.2%	
Heart disease	530	27.8%	16	28.6%	10	25.0%	556	27.8%	
High blood pressure	456	23.9%	20	35.7%	8	20.0%	484	24.2%	
Migraines	104	5.5%	8	14.3%	0	.0%	112	5.6%	
About how much time do you spend on your computer on weekda									

ys?									
30 minutes	434	22.8 %	16	28.6 %	6	15.0 %	456	22.8 %	X^2=39.825 Df=8 .000<0.05 Significant
1hour	446	23.4 %	18	32.1 %	0	.0%	464	23.2 %	
2hours	98	5.1%	2	3.6%	0	.0%	100	5.0%	
3hours	796	41.8 %	20	35.7 %	34	85.0 %	850	42.5 %	
More than 3 hours	130	6.8%	0	.0%	0	.0%	130	6.5%	
About how much time do you spend watching TV each school day?									
30 minutes	684	35.9 %	22	39.3 %	20	50.0 %	726	36.3 %	X^2=14.522 Df=8 .069>0.05 Not Significant
30 minutes to 1 hour	738	38.8 %	18	32.1 %	18	45.0 %	774	38.7 %	
1 to 2 hours	266	14.0 %	10	17.9 %	0	.0%	276	13.8 %	

2 to 3 hours	140	7.4%	6	10.7 %	2	5.0%	148	7.4%	
3 hours or more.	76	4.0%	0	.0%	0	.0%	76	3.8%	
About how much time do you spend on your computer on a weekend day?									
1 hour or less	160	8.4%	8	14.3 %	0	.0%	168	8.4%	X^2=29.888 Df=6 .000<0.05 Significant
2 to 3 hours	817	42.9 %	26	46.4 %	18	45.0 %	861	43.1 %	
3 to 4 hours	656	34.5 %	8	14.3 %	8	20.0 %	672	33.6 %	
4 hours or more	271	14.2 %	14	25.0 %	14	35.0 %	299	15.0 %	
How much do you weigh?									
Aware	106	5.6%	6	10.7 %	0	.0%	112	5.6%	X^2=5.148

Not aware	1798	94.4 %	50	89.3 %	40	100. 0%	1888	94.4 %	Df=2 .076>0. 05 Not Signifi cant
About how tall are you?									
Aware	16	.8%	0	.0%	0	.0%	16	.8%	X^2=.81 3 Df=2 .666>0. 05 Not Signifi cant
Not aware	1888	99.2 %	56	100. 0%	40	100. 0%	1984	99.2 %	

Diastolic blood pressure related with lifestyle changes and diet is elicited by asking above set of questions.

DISCUSSION

Age-and gender-wise anthropometric characteristics of children aged 10-18 years (total , 658 boys and 1352 girls) are taken for study

Overall prevalence of obesity was higher in girls (67.1%) than boys (32.9%) with higher percentage in the younger age groups than older age group. The higher incidence of overweight and obesity is in younger age group of 10 to 12 years in the given study group.

In girls, prevalence of hypertension amongst overweight/obese was higher .In 10 to 18 years most of the children come under 3^{rd} to 97^{th} percentile .

Statistical inference in comparing age with BMI is significant $p<0.05$. Data collected among 10 to 18 years age, 7.50% of significant BMI occurs in the age group 10-12 years. In observed data female children had increased incidence of overweight and obesity(67.1%) as compared with boys.

Study indicates children with increased weight correlated with systolic hypertension(4.2%) which is not significant. It also indicates that in underweight children prehypertension 5.6% and hypertension 4.3% exists but compare with overweight and obese children incidence of prehypertension, hypertension is less established Gender wise correlations between SBP, DBP and anthropometric indices are presented here. In both genders, correlation coefficients for BMI and WC with SBP were around 0.5 ($P<0.005$). Multiple logistic regression model indicated that odds ratios (OR) for BMIcategories, waist centile classes, TSFT centile classes, and Wrist circumference against high BP were tabulated. . Overweight children showed double risk of

hypertension and obese children 7 times higher risk than normal weight children. TSFT >95th centile showed almost 3 times risk and between 85th-95th double risk than normalweight children. Higher WC (>90th centile) also exhibited 1.5 times risk and high Wrist circumference 1.26 times higher risk of hypertension.

The age- and gender-specific optimal cut-off values and for each of the five anthropometric indices in detecting the risk of high BP.

With growing age, all the body measurements showed increasing trend which is reflected in higher cut offs for BMI, WC, WHtR, TSFT and WrC in older age groups in both genders. Sensitivity and specificity of all the indices were similar ranging from 60 to 90%. The Area under curve was also significantly high, different from 0.5 for BMI, WC, WHtR, TSFT and Wrist for both genders indicating the ability of these anthropometric indices for detecting the risk of high BP. Overall comparison of the five indices in different age-gender groups suggests that BMI, WC and TSFT,WHtR,WC are better indicators of risk of hypertension.

All five indices showed significant positive association with BP and indicated that obese children were seven times at risk of hypertension than normal-weight children. For boys, BMI, WC and TSFT showed similar predictive power while in girls all five indices performed equally well.

The prevalence of hypertension in our study was higher than that reported previously . Further, the prevalence of high blood pressure was more

in girls than in boys. there is no difference of hypertension prevalence found in puberty prepubertal subjects .

Sorof et al [25]recently reported a 3 times greater prevalence of pertension in obese compared with nonobese adolescents in a school-based hypertension and obesity screening study.in our study similar results obtained. appears more strongly associated with BMI than WC.

Anju Seth Department of Pediatrics, Lady Hardinge Medical College, New Delhi, India Indian Pediatr 2013;50: 832833Body mass index has been validated as a simple, low cost tool to assess body fatness for routine clinical evaluation in children and adolescents [1], and is found to be strongly correlated with adiposity [2]. Increasing BMI.

The study by A Chiolero in 2014 reveals that obesity is a major risk factor for elevated blood pressure in children.[1, 2, 3, 4] For instance, in as chool based study of 5207 children aged 10–12 years, the prevalence of hypertension, which is sustained elevated blood pressure over several visits, was 1.5%, 3.9% and 17.5% in normal weight, overweight and obese children, respectively.in our studies prehypertension is 5% and 5.4% respectively with systolic bp in obese children and prehypertension 5% and 2.8% ,with diastolic bp.The hypertension 5% and 10% in systolic BP with over weight and obese children.

CONCLUSION

To conclude, all five measures of adiposity were significantly associated with risk of hypertension in a multi-centric sample of Indian children and adolescents. Age-gender specific optimal cutoffs for BMI, TSFT, WC, wrist circumference and WHtR measurements presented in the study may be useful in screening for risk of hypertension.

LIMITATIONS

1) In this study family history of hypertension was not asked. Family history would have added to the strength of the study

2) Study sample is a convenient sampling not matched with previous data

3) The questionnaire was difficult to understand by 10 to 12 yrs old kids. In future studies it should be simplified.

4) In this study data was not collected from rural school going children if it was done and compared with urban school going children we will get better results

5) Other limitation of the study was non availability of biochemical measurements, therefore utility of these indices for screening other cardio-metabolic risk factors was not possible.

6) A limitation of the study is that children were classified in age groups on consideration of conventional pubertal development years. It was not possible to assess Tanner staging for each child in the present study due to logistic reasons

RECOMMENDATIONS

Lifestyle modifications

Lifestyle changes are recommended for all children with hypertension Interventions based on daily routines are likely to be more successful.

Weight reduction

Achievement of ideal body weight is important, since reduction of weight reduces sensitivity of blood pressure to salt and attenuates ardiovascular risk factors, *e.g.*, dyslipidemia and insulin resistance. Reduction of BMI by 10% is reported to lead to 8 to12 mm Hg fall in systemic blood pressure(4). Weight reduction should be achieved by regular physical activity and diet modification. Prevention of excess weight gain limits future increases in blood pressure.

Increased physical activity

Children are encouraged to be active not only for weight control but for their well being. While they often find defined physical exercises (aerobics, tread mills) boring, they are likely to continue activities incorporated into their routines, *e.g.*,walking or cycling to school, playing with friends outdoors and swimming. The Group supports the recommendations of 3060 minutes or more of physical activity every day that is developmentally appropriate, enjoyable and involving a variety of activities(17). Adolescent girls in our country should

be specifically targeted, since they spend considerably less time than boys in outdoor sport. Participation in competitive sports is avoided in patients with stage 2 hypertension or target organ damage, until blood pressure is controlled satisfactorily. Strength training (isometric) exercises (*e.g.*, weight lifting, gymnastics, karate and judo) should be avoided.

Dietary changes

Direct evidence on the benefits of dietary changes from rigorous, well controlled trials in children and adolescents is sparse. Accordingly, the effect of diet on blood pressure in children is extrapolated chiefly from studies on adults. Recommendations for daily sodium intake in children range between 11.5g (4565mEq sodium, 2.63.8g salt). Dietary sodium restriction is associated with small reductions in blood pressure in children(4,19). A ‘no added salt diet’ is a satisfactory approach to restrict salt intake. Intake of food products high in sodium (processed and canned foods, items prepared in fast food shops including pizzas, pickles and salted potato chips) should be avoided. Increased potassium intake, through vegetables and fruits, is associated with modest reduction of systolic and diastolic blood pressure in adults with essential hypertension(19). Potassium intake should however be restricted in children with chronic kidney disease with glomerular filtration rate (GFR) below 30 mL/min/1.73 m2, adrenal insufficiency, severe heart failure, or those receiving treatment with angiotensin converting enzyme inhibitors (ACEI), nonsteroidal anti inflammmatory agents and potassium sparing diuretics.

Despite suggestions that foods rich in calcium, magnesium, folic acid and fiber are useful in reducing blood pressure, there is limited evidence in this regard. An increased intake of fresh vegetables and fruits, whole grains and nonfat dairy is recommended.

These foods are low in sodium and saturated fat and rich in minerals (potassium, calcium, magnesium) and fiber. The Group endorses the dietary recommendations of the IAP Consensus Committee on Obesity(20). The daily food composition is considered a 'thali', where half (50%) is vegetables, salads and fruits, a quarter (25%) is cereals (rice and/or chapattis), and the remainder is protein based (legumes, milk, egg, animal protein).

The intake of fried foods, snacks and sweet dishes should be. Secondary hypertension. Patients with sustained secondary hypertension require therapy with antihypertensive agents. Physicians should be aware of the risk of hypertensive emergencies in children with stage 2 hypertension. The need to adhere to healthy eating habits and lifestyle is emphasized.

Drug therapy

Drug therapy is indicated in patients with (*i*) acute or chronic complications of hypertension, including evidence of target organ damage, (*ii*) secondary hypertension, (*iii*) stage 2 hypertension, (*iv*) stage 1 hypertension that persists despite 6months' of lifestyle modifications, and (*v*) prehypertension or stage 1 hypertension with comorbid conditions (diabetes, chronic kidney disease or dyslipidemia).

Principles of treatment

► The goal for treatment is reduction of blood pressure to levels <95th percentile, unless comorbid conditions or target organ damage is present, when it should be lowered to <90th percentile.

► Commonly used medications in children include ACEI, calcium channel blockers (CCB), vasodilators, b blockers and thiazide diuretics .

► Therapy is initiated with one agent, at an appropriate dose and the dose is increased until the desired blood pressure is achieved. If the highest dose is not effective or if there are side effects, a drug from a different class is added or substituted.

► Medications with a longer duration of action (once, twice daily dosing) are preferred for better compliance and less side effects.

► Dose adjustment of antihypertensive medications need not be made more frequently than every 23 days. Patients and their families should receive counseling for cardiovascular risk factors and dyslipidemia, and continued emphasis on lifestyle modifications. Blood pressure is monitored every 3 months. Screening for end organ damage and renal dysfunction (proteinuria, serum creatinine) and surveillance for side effects of drugs is required annually.

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ANNEXURE-8

ABBREVIATION

BP-BLOOD PRESSURE

SBP-SYSTOLIC BLOOD PRESSURE

DBP-DIASTOLIC BLOOD PRESSURE

BMI-BODY MASS INDEX

WC-WAIST CIRCUMFERENCE

WHTR-WAIST TO HEIGHT RATIO

TSFT-TRICEPS SKIN FOLD THICKENESS

WT-WEIGHT

HT-HEIGHT

IAP-INDAIN ACADEMY OF PEDIATRICS

APPENDIX

ANNEXURE1

DATA COLLECTION FORM

IDENTIFICATION

l. Study Id –

2. No. -

3. Name -

DEMOGRAPHIC CHARACTERISTICS

4. Age - a) DOB –

b) Actual (in yrs, months) -

1) 10-12

2) 12-14

3) 14-16

4)16-18

5. Sex - **1**: Male

2: Female

ANTHROPOMETRY

6. Height (in cm)

1)<3rd centile

2) 3-97 centile

3)>97th centile

7. Weight (in kg)

1)<3rd centile

2) 3-97 centile

3)>97th centile

8. BMI; Actual;

1) Underweight

2) Normal weight

3) Over weight

4) Obese.

9**.** Waist circumference (in cm)

1.<90 percentile

2.>90 percentile

10. Waist to height ratio ;

1.<0.44

2.>0.44

11. Triceps skin fold thickness (in cm)

1. Normal <85thpercentile

. **2**. Moderate 85th to 95^{th} percentile

3. Excess >95^{th} percentile

12. Wrist measurements ;actual

CLINICAL EXAMINATION

13. Blood pressure -

a) Systolic -

1) Normal<90th percentile

2)Pre hypertension 90 to 95th percentile

3) Hypertension>95th percentile

b) Diastolic–

1)Normal<90th percentile

2)Prehypertension90 to 95th percentile

3)Hypertension>95th percentile

ANNEXURE 2

PATIENT INFORMATION SHEET

Place of study: Urban schools in Chennai.

Name of Investigator: Dr. VAIRAMUTHU

Name of Participant:

A**ge**:

S**ex**:

Study Body Fat Indices for Identifying Risk of Hypertension in Indian Children

We request your child to participate in the study.

Aim of the study-

This study aims at studying the prevalence of metabolic risk factor, high blood pressure and excessive body fat in older children. The study also aims to find out if there is any relation between degree of obesity and future risk of hypertension.

Methods:

In order to find out the answers to the above questions, we will be checking your child's height, weight, waist circumference, wrist circumference, body mass index, triceps skin fold thickness, and blood pressure. .This will take approximately ten minutes.

Can I refuse to participate in the study?

Participation in the study is purely voluntary. You may refuse to participate or withdraw from the study at any time. In both cases the treatment and care your child receives will not be affected in any manner.

Benefits and harms of participating in the study-

Your child will benefit directly by participating in this study. But by way of participating in this study, your child is contributing to updation of science which may benefit her/him and all other patients with this disease in future...

Confidentiality-

The data collected from the study will be used for the purpose of study only. The results of the study will be published. Personal information of the children participating in the study will be kept confidential. There will not be any disclosure about your child's information without your permission.

Subject rights-

If you wish further information regarding your child's rights as a research participant, you may contact the principal investigator in the mobile number or address mentioned below.

Principal Investigator – Dr. VAIRAMUTHU

Mobile number - 9842735015

Contact Address - MD post graduate, Institute of Child Health and Hospital for Children, Halls road, Egmore, Chennai.

Place:

Date: Signature of Parent

ANNEXURE 3

INFORMED CONSENT FORM

Study place: Urban schools in Chennai.

Title of the study; Body Fat Indices for Identifying Risk of Hypertension in Indian Children

Name of the investigator: Dr.VAIRAMUTHU.

Name of the Participant:

Age:

Sex;

1. I have read and understood the patient information sheet provided to me regarding the participation of my child in the study.

2. I have been explained about the nature of the study and had my questions answered to my satisfaction.

3. I have been explained about my rights and responsibilities by the investigator.

4. I will allow my child to cooperate with the investigator and undergo clinical tests subjected during the study whole heartedly

5. I am aware of the fact that I can opt out of the study at any time without having to give any reason and this will not affect my child's future treatment in this hospital.

6. I hereby give permission to the investigators to release the information obtained from my child as result of participation in this study to medical journals/conference proceedings.

8. I understand that my child's identity will be kept confidential if my child's data are publicly presented/published.

9. I have decided my child can participate in the research study. I am aware that if I have any question during this study, I should contact the investigator.

10. By signing this consent form I attest that the information given in this document has been clearly explained to me and understood by me, I will be given a copy of this consent document.

Name and signature / thumb impression of the parent/guardian

Name _____ Signature_____

Date_____

Name and Signature of the investigator

ANNEXURE 4

QUESTIONNAIRE

1) How often do you eat breakfast?
   a) Always
   b) Sometimes
   c) Rare
   d) Never

2) At school you usually..
   a) Bring your lunch from home.
   b) Buy a meal from the cafeteria.
   c) Buy fast food
   d) Just eat snacks.

3)How often do you eat fast food outside ?
   a) Everyday
   b) Once a week
   c) Rarely
   d) Never.

4)How often do you usually eat fruit ?
   a) More than three times a day.
   b) Twice a day.
   c) Once a day.
   d) Zero times a day.

5) On average, how many of your meals or snacks each day usually contain some type of vegetable ?
   a) 0
   b) 1
   c) 2
   d) 3
   e) 4 or more.

6) Would you say you sometimes eat when you're not really hungry?
   a) Yes
   b) No

7) Would you say you sometimes overeat, past the point of being full?

a) Yes, most of the time.
b) Yes, sometimes.
d) No, never.

8) When you're eating, which of the following do you do? (Check all that apply.)

a) Watch TV.
b) Use the computer.
c) Study or do homework.
d) Talk on the phone.
e) Listen to my iPod.
f) I don't do anything else while I eat.

9)How often do you exercise each week?

a) Zero times.
b) Once or twice.
c) Three or more times.

10) How much physical activity should you get each day?

a) 10 minutes
b) 20 minutes
c) 30 minutes
d) 40 minutes
e) 60 minutes
f) I don't need to be active every day.

11).Which of the following health problems are linked to being overweight or obese?
a) Arthritis
b) Depression
c) Trouble sleeping
d) Asthma
e) Heart disease
f) High blood pressure
g) Migraines
h) Diabetes
i) Infertility
j) Irregular periods
k) Breast cancer

12). About how much time do you spend on your computer on weekdays?

a). 30 minutes
b). 1hour
c) .2hours
d). 3hours
e). More than 3 hours
f) Never

13).About how much time do you spend watching TV each school day?

a) 30 minutes.
b) 30 minutes to 1 hour.
c) 1 to 2 hours.
d) 2 to 3 hours.
e) 3 hours or more.

14) About how much time do you spend on your TV on a weekend day?

a) 1 hour or less.
b) 2 to 3 hours.
c) 3 to 4 hours.
d) 4 hours or more.

15. How much do you weigh?

16. About how tall are you?

ANNEXURE5

பெற்றோர் ஒப்புதல் படிவம்

ஆராய்ச்சி நடைபெறும் இடம்:

அரசு குழந்தைகள் நல மருத்துவமனை,
எழும்பூர்,
சென்னை – 8.

ஆராய்ச்சி தலைப்பு:

உடலிலுள்ள கொழுப்புச்சத்து குறியீடுகளை வைத்து இந்திய குழந்தைகளின் எதிர்கால இரத்தக் கொதிப்பு நோய் அபாயம் பற்றி அறிதல். புலனாய்வாளர் : மரு. கோ. சு. வைரமுத்து.

பங்கேற்பவர் பெயர் :
வயது :
பாலினம் :

1) நான் பங்கேற்பாளர் விவர அட்டையை படித்து புரிந்து எனது குழந்தையின் பங்கேற்பை புரிந்துக்கொண்டேன்.

2) எனக்கு ஆராய்ச்சியின் தன்மை விளக்கிக் கூறப்பட்டது

3) எனது உரிமை மற்றும் பொறுப்புக்களை புலனாய்வாளர் மூலம் அறிந்துகொண்டேன்.

4) நான் எனது குழந்தையை ஆராய்ச்சியில் பங்கேற்க முழுமனதுடன் ஒப்புக்கொள்கிறேன்.

5) எந்த நேரத்திலும் ஆராய்ச்சிலிருந்து விலகிக்கொள்ள உரிமை உள்ளது என்பதையும் அதனால் சிகிச்சை பாதிக்காது என்பதையும் அறிவேன்.

6) எனது குழந்தையை வைத்து செய்த ஆராய்ச்சியின் முடிவை பிரசுரிக்கவோ, விவாதிக்கவோ அனுமதி தருகிறேன்.

7) என் குழந்தையின் அடையாளம் இரகசியம் காக்கப்படும்.

8) எனக்கு ஏதேனும் சந்தேகம் இருப்பின் புலனாய்வாளரை எந்த நேரத்திலும் தொடர்பு கொள்ள உரிமை உள்ளது என்பதை அறிவேன்.

9) இந்த படிவத்தில் கையொப்பமிடுவதின் மூலம் எனக்கு இந்த ஆராய்ச்சியை பற்றி தெளிவாக எடுத்துரைக்கப்பட்டது என்றும், ஒரு நகல் கொடுக்கப்பட்டது என்றும் ஒப்புதல் அளிக்கிறேன்.

பெயர் ∴ கட்டை விரல்ரேகை (பெற்றோர் ∴ பாதுகாப்பாளர்)

பெயர் ∴ கையொப்பம் (புலனாய்வாளர்)

சாட்சி கையொப்பம் I

சாட்சி கையொப்பம் II

ANNEXURE 6

பங்கேற்பாளர் விபர அட்டை

ஆராய்ச்சி நடைபெறும் இடம்	:	அரசு குழந்தைகள் நல மருத்துவமனை, எழும்பூர், சென்னை – 8.
ஆராய்ச்சி தலைப்பு	:	உடலிலுள்ள கொழுப்புச் சத்து குறியீடுகளை வைத்து இந்திய குழந்தைகளின் எதிர்கால இரத்தக் கொதிப்பு நோய் அபாயம் பற்றி அறிதல்.
புலனாய்வாளர்	:	மரு. கோ. சு. வைரமுத்து
பங்கேற்பவர் பெயர்	:	
வயது	:	
பாலினம்	:	

தங்களது குழந்தை இந்த ஆராய்ச்சியில் பங்கேற்க வேண்டுமென்று தாழ்மையுடன் கேட்டுக் கொள்கிறேன்.

ஆராய்ச்சியின் நோக்கம்

இந்த ஆராய்ச்சியின் நோக்கமானது வளர்சிதை மாற்றப் பிரச்சனை, இரத்தக் கொதிப்பு மற்றும் அதிகமான கொழுப்புச்சத்து ஆகியவற்றை கண்டறிதல் மேலும் அதிகமான கொழுப்புச்சத்து மற்றும் இரத்தக் கொதிப்புக்குமான தொடர்பை அறிதல்.

செய்முறை:

மேலே உள்ள கேள்விகளுக்கான பதில்களை தெரிந்து கொள்வதற்காக உங்கள் குழந்தையின் உயரம், எடை, இடுப்பு சுற்றளவு, மணிக்கட்டு சுற்றளவு உடல் நிறை குறியீட்டுடெண், கையின் பின்புற சதையளவு இரத்த அழுத்தம் ஆகியவை அளக்கப்படும். இதற்கான கால அளவு 10 நிமிடமே.
இந்த ஆராய்ச்சியில் கலந்துகொள்ள விருப்பம் இல்லை எனலாமா?

ஆராய்ச்சியில் பங்கேற்பது உங்களது விருப்பம். நீங்கள் விருப்பமில்லை எனவோ அல்லது இடையில் விலகியோ செல்லலாம். இதனால் உங்கள் குழந்தைக்கு கிடைக்க வேண்டிய சிகிச்சை கட்டாயம் கிடைக்கும்.

ஆராய்ச்சியின் பயன் மற்றும் பிரச்சனை:

இந்த ஆராய்ச்சியில் உங்கள் குழந்தை பங்கேற்பதால் நேரடி நன்மை உண்டு. உங்கள் குழந்தை இதில் பங்கேற்பதால் அறிவியலில் முன்னேற்றம் ஏற்படும். அதனால் உங்கள் குழந்தைக்கும், வருங்காலத்தில் உள்ள குழந்தைகளுக்கும் நன்மை பயக்கும்.

இரகசிய தன்மை:

ஆராய்ச்சியில் சேகரிக்கப்படும் தரவு, இந்த ஆராய்ச்சிக்கு மட்டுமே பயன்படுத்தப்படும். ஆராய்ச்சியின் முடிவுகள் பிரசுரிக்கப்படும். குழந்தைகளின் சுய தகவல்கள் இரகசியம் காக்கப்படும். உங்களின் அனுமதியின்றி குழந்தைகளின் சுய தகவல்கள் வெளியிடப்படமாட்டாது.

பங்கேற்போரின் உரிமை:

உங்கள் குழந்தையின் உரிமைகள் பற்றி மேலும் தெரிந்துகொள்ள விரும்பினால் புலனாய்வாளரின் பெயர் முகவரி, தொலைபேசி எண்ணை தொடர்பு கொள்ளவும்.

புலனாய்வாளர் பெயர்: மரு. கோ. சு. வைரமுத்து
தொலைபேசி எண்: 9842735015
முகவரி : எம். டி. முதுநிலைபட்டதாரி
அரசு குழந்தைகள் நல மருத்துவமணை
எழும்பூர்
சென்னை – 8.

நாள்:
இடம்: கையொப்பம்

ANNEXURE 7

கேள்வித்தாள்

1) காலை உணவு எடுத்துக் கொள்வது
அ) எப்பொழுதும்
ஆ) சிலநேரம்
இ) எப்பொழுதாவது
ஈ) எப்போதும் இல்லை.

2) பள்ளியில் உட்கொள்வது . . . . .
அ) வீட்டு உணவு
ஆ) கேண்டீனில் வாங்கும் உணவு
இ) துரித உணவு
ஈ) நொறுக்கு தீனி

3) எத்தனை முறை துரித உணவை உண்பீர்கள்
அ) தினமும்
ஆ) வாரம் ஒருமுறை
இ) எப்பொழுதாவது
ஈ) எப்பொழுதும் இல்லை.

4) எவ்வளவு முறை பழங்களை உண்பீர்கள்?
அ) மூன்று வேளைக்கு மேல்
ஆ) இரண்டு வேளைக்கு
இ) ஒரு வேளைக்கு
ஈ) தினமும் இல்லை.

4) காய்கறிகள் உங்கள் உணவில் எத்தனை வேளை சேர்த்துக்கொள்கிறீர்கள்? அ) 0
ஆ) 1
இ) 2
ஈ) 3
உ) 4 (அ) மேற்பட்டது.

6) பசியில்லாத போதும் உணவை எடுத்துக் கொள்வீர்களா?
அ) ஆம்
ஆ) இல்லை

7) வயிறு நிரம்பிய உணர்வு ஏற்பட்ட பின்பும் உணவருந்துவீர்களா?
அ) ஆம், எப்பொழுதும்
ஆ) ஆம், எப்பொழுதாவது
இ) எப்பொழுதும் இல்லை.

8) உணவருந்தும்போது தாங்கள் என்ன செய்வீர்கள்?
அ) தொலைக்காட்சி பார்ப்பீர்கள்
ஆ) கணினி பார்ப்பீர்கள்
இ) படித்துக் கொண்டிருப்பீர்கள்
ஈ) தொலைபேசியில் பேசிக் கொண்டிருப்பீர்கள்
உ) பாட்டுக் கேட்டுக் கொண்டிருப்பீர்கள்
ஊ) வேறு எதுவும் செய்வதில்லை.

9) வாரத்தில் எத்தனை முறை உடற்பயிற்சி செய்கிறீர்கள்?
அ) செய்வது இல்லை
ஆ) ஒன்று அல்லது இரண்டுமுறை
இ) மூன்றுக்கும் மேற்பட்ட முறை

.10) ஒவ்வொரு நாளும் எவ்வளவு நேரம் உடற்பயிற்சி தேவை என்று நினைக்கிறீர்கள்?
அ) 10 நிமிடம்
ஆ) 20 நிமிடம்
இ) 30 நிமிடம்
ஈ) 40 நிமிடம்
உ) 60 நிமிடம்
ஊ) தினமும் தேவையென்று நினைக்கவில்லை

11) பின்வரும் எது உடல்பருமனால் வரும் நோயாக கருதுகிறீர்கள்?
அ) மூட்டுவலி
ஆ) மன அழுத்தம்
இ) தூக்கமின்மை
ஈ) ஆஸ்த்துமா
உ) இதய நோய்
ஊ) உயர் இரத்த அழுத்தம்
எ) ஒற்றை தலைவலி
ஏ) சர்க்கரை நோய்
ஐ) குழந்தையின்மை
ஒ) மாதவிடாய் தொந்தரவு
ஓ) மார்பக புற்றுநோய்

12) வார நாட்களில் எவ்வளவு நேரம் கணினியில் செலவழிப்பீர்கள்?
அ) 30 நிமிடம்
ஆ) 1 மணி நேரம்
இ) 2 மணி நேரம்
ஈ) 3 மணி நேரம்
உ) 3 மணி நேரத்திற்கு மேல்

13) வார நாட்களில் எவ்வளவு நேரம் தொலைக்காட்சி பார்ப்பீர்கள்?

அ) 30 நிமிடம்
ஆ) 1 மணி நேரம்
இ) 2-3 மணி நேரம்
ஈ) 3 மணி நேரத்திற்கு மேல்

14) வார விடுமுறை நாட்களில் கணினியில் செலவழிக்கும் நேரம் .....

அ) 1 மணி (அ) அதற்கும் குறைவாக
ஆ) 2-3 மணி நேரம்
இ) 3-4 மணி நேரம்
ஈ) 4 (அ) அதற்கும் மேலாக

15) எவ்வளவு எடை உள்ளீர்கள்?

16) எவ்வளவு உயரம் உள்ளீர்கள்?

INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI 600 003

EC Reg.No.ECR/270/Inst./TN/2013
Telephone No.044 25305301
Fax: 011 25363970

CERTIFICATE OF APPROVAL

To
Dr. Vairamuthu
PG in MD (Paediatrics)
Madras Medical College
Chennai 600 003

Dear Dr. Vairamuthu,

The Institutional Ethics Committee has considered your request and approved your study titled **"BODY FAT INDICES FOR IDENTIFYING RISK OF HYPERTENSION IN INDIAN SCHOOL GOING CHILDREN" No.11072015.**

The following members of Ethics Committee were present in the meeting held on 07.07.2015 conducted at Madras Medical College, Chennai 3.

1. Dr.C.Rajendran, MD	:Chairperson
2. Dr.R.Vimala,MD.,Dean,MMC,Ch-3	: Deputy Chairperson
3. Dr.Sudha Seshayyan,MD.,Vice Principal,MMC,Ch-3	: Member Secretary
4. Dr.B. Vasanthi,MD.,Inst.of Pharmacology,MMC	: Member
5. Dr.P.Ragumani, MS., Professor, Inst.of Surgery,MMC	: Member
6. Dr.Md.Ali, MD., DM.,Prof.&HOD of Medl.GE,MD.MMC	: Member
7. Prof. Baby Vasumathi, Director, IOG, Chennai-8	: Member
8. Prof. K. Ramadevi, Director , Inst.of Bio-Chem.MMC	: Member
9. Dr..Saraswathy,MD.,Director,Pathology, MMC	: Member
10.Prof. Srinivasagalu,MD.,Director, Inst.of Internal Medicine,MMC	: Member
11.Thiru S.Rameshkumar	: Lay Person
12.Thiru S.Govindasamy, BA., BL.,	: Lawyer
13.Tmt.Arnold Saulina, MA., MSW.,	: Social Scientist

We approve the proposal to be conducted in its presented form.

The Institutional Ethics Committee expects to be informed about the progress of the study and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.

MADRAS MEDICAL COLLEGE * CHENNAI-600 003 * 0 OCT 2015

Member Secretary – Ethics Committee

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE
CHENNAI-600 003

study id	no	name	age	sex	height	weight	bmi	whst cir	wthr	tsft	wrist	bp	systolic	diastolic	q1	q2	q3	q4	q5	q6	q7	q8	q9	q10	q11	q12	q13	q14	q15	16
2	1	logeshwari	14	2	2	2	1	1	1	1	13	110/60	1	1	3	1	3	4	2	1	2	1	1	6	5	6	4	4	NO	NO
2	2	PAVITHRA	14	2	2	2	1	1	1	1	16	112/62	1	1	3	1	1	3	2	2	3	1	1	1	1	5	5	4	no	no
2	narmatha14			2	2	1	2	1	1	1	18	110/68	1	1	2	1	3	3	5	2	3	3	1	1	5	6	5	4	no	no
2	4	dinesh	14	1	2	2	1	1	2	1	14	120/70	1	1	1	2	1	2	2	2	2	1	3	4	5	6	2	1	35	150
2	5	mahashwar	14	2	2	2	1	1	1	1	14	112/68	1	1	3	1	3	2	2	1	2	1	1	2	6	5	3	4	NO	NO
2	6	GASUNDA	14	1	2	2	2	1	2	1	12	112/64	1	1	1	2	2	3	4	2	3	1	2	3	7	3	4	4	NO	NO
2	7	KATHKUM	14	1	2	2	2	1	2	1	13	114/64	1	1	1	1	1	1	3	3	2	3	1	1	1	4	5	4	29	126
2	8	ARJUN	14	1	2	2	1	1	1	1	14	114/60	1	1	2	2	1	3	4	2	3	3	3	4	5	4	3	3	no	no
2	9	saranya	14	2	2	2	1	1	1	1	14	110/70	1	1	1	3	2	2	3	1	2	1	2	3	4	2	2	1	34	no
2	10	vasudevan	14	1	2	2	1	1	1	1	13	112/70	1	1	2	2	1	2	1	1	1	2	1	3	4	5	1	2	34	no
2	11	sivakumar	14	1	2	2	2	2	2	2	15	115/62	1	1	3	1	2	3	1	1	3	2	3	4	5	1	2	3	no	no
2	12	celine	14	2	2	2	2	1	2	2	13.6	114/60	1	1	2	2	1	2	3	1	1	2	1	3	4	2	4	3	no	no
2	13	karthiga	14	2	2	2	1	1	1	1	14	113/62	1	1	1	2	2	3	2	2	3	4	2	4	6	5	3	5	no	no
2	14	veera	14	1	2	2	1	1	1	1	13	112/60	1	1	2	2	3	3	2	1	3	4	3	2	5	4	5	4	no	no
2	15	pratheeba	14	2	2	2	2	1	1	1	14	114/62	1	1	3	2	3	2	4	2	2	5	2	3	4	3	1	2	38	no
2	16	kavin	14	1	2	2	1	1	2	1	15	112/64	1	1	2	2	2	4	2	1	2	4	1	3	5	2	3	2	40	no
2	17	aswin	14	1	2	2	2	1	1	1	14	110/62	1	1	3	3	3	2	1	2	3	3	2	2	6	4	2	3	no	no
2	18	guru	14	1	2	2	1	1	2	1	15	100/64	1	1	1	1	2	4	2	1	2	5	1	3	4	5	4	4	no	no
2	19	karthik	14	1	2	2	1	1	1	1	16	124/64	1	1	3	4	2	4	2	1	2	4	2	6	5	3	5	1	no	no
2	20	lokesh	14	1	2	2	2	1	1	1	13	116/70	1	1	2	1	2	4	1	2	3	2	1	3	7	1	2	2	no	no
2	21	parthiban	14	1	2	2	2	1	1	1	12	100/68	1	1	1	1	3	4	2	1	2	6	1	2	6	2	3	3	35	no
2	22	mahendra	14	1	2	2	1	1	2	1	13	114/70	1	1	3	1	3	4	1	2	3	4	1	1	5	6	4	4	no	no
2	23	visnu	14	1	2	2	2	1	2	1	15	116/70	1	1	2	1	1	3	2	1	3	5	2	2	6	2	1	3	no	no
2	24	jegan	14	1	2	2	1	1	1	1	14	112/62	1	1	1	3	2	3	1	2	2	3	1	3	5	4 ±	3	2	no	no
2	25	anand	14	1	2	2	2	1	1	1	14	118/74	1	1	2	1	2	3	2	1	3	4	1	2	6	1	4	3	35	no
2	26	yuvaraj	14	1	2	2	1	1	2	1	13.5	116/68	1	1	1	2	3	4	2	2	2	5	2	3	4	2	5	2	no	no
2	27	wincent	14	1	2	2	1	1	1	1	15	114/64	1	1	2	1	4	2	2	2	2	2	1	6	5	6	2	3	no	no
2	28	bas ahamn	14	1	2	2	2	1	1	1	15	114/68	1	1	2	2	2	4	2	2	3	1	2	3	7	1	4	2	no	no
2	29	arasurama	14	1	2	2	2	1	1	1	13.4	112/60	1	1	2	4	2	3	2	1	3	3	1	2	4	2	3	3	42	no
2	30	viktor	14	1	2	2	2	1	2	1	14.2	120/68	1	1	3	2	4	4	1	2	2	4	2	1	3	2	1	2	no	no
2	31	abu haseen	14	1	2	2	2	1	1	1	14	120/70	1	1	1	4	3	3	2	1	3	2	1	3	5	2	2	1	no	no
2	32	shammedil	14	1	2	1	2	1	1	1	13.6	100/64	1	1	2	3	1	4	2	2	2	5	1	2	6	2	3	2	36	no
2	33	krishna	14	1	2	2	2	1	1	1	14	112/64	1	1	1	1	2	3	2	1	2	4	2	1	7	1	4	1	no	no
2	34	madhu	14	2	2	2	1	1	2	1	14.5	112/66	1	1	1	2	1	2	3	2	3	3	1	2	5	2	3	4	no	no
2	35	meenakshi	14	2	2	2	2	1	1	1	15	112/68	1	1	3	1	2	4	2	2	3	2	1	3	4	3	2	2	no	no
2	36	radha	14	2	2	2	1	1	1	1	16	112/70	1	1	2	4	2	3	1	2	2	4	1	2	4	5	5	3	no	no
2	37	kamala	14	2	2	2	1	1	2	1	13	114/60	1	1	3	2	2	3	1	2	2	5	2	6	3	6	2	4	no	no
2	38	nadhiya	14	2	2	2	1	1	1	1	14	114/64	1	1	1	1	2	3	4	1	3	6	2	3	5	3	2	3	no	no
2	39	poorna	14	2	2	2	2	1	2	1	13.8	117/70	1	1	2	1	2	4	1	1	3	3	1	2	6	2	3	4	no	no
2	40	pavithra	14	2	2	2	2	1	2	1	15	115/70	1	1	3	4	2	3	2	1	2	3	1	1	7	1	4	3	no	no
2	41	pooja	14	2	2	2	2	1	2	1	14	114/64	1	1	2	1	3	3	1	2	2	3	1	3	5	1	3	4	no	no
2	42	pallavi	14	2	2	2	1	1	1	1	15	100/66	1	1	3	2	3	4	1	1	2	2	2	2	6	2	2	2	no	no
2	43	sharmila	14	2	2	2	2	1	1	1	13.8	110/74	1	1	2	3	3	2	2	2	2	5	1	3	2	1	1	4	no	no
2	44	shanthi	14	2	2	2	1	1	1	1	14	115/74	1	1	3	2	4	2	1	1	2	5	1	2	5	2	2	1	no	no
2	45	sanjana	14	2	2	2	2	1	1	1	12	110/66	1	1	2	3	3	4	2	2	3	6	1	1	6	1	4	1	no	no
2	46	saradha	14	2	2	2	2	1	1	1	14	118/70	1	1	3	1	2	4	3	1	2	4	2	3	4	1	3	1	no	no
2	47	savithri	14	2	2	2	1	1	1	1	14.4	120/66	1	1	2	2	1	2	1	2	2	4	1	2	4	1	4	2	33	no
2	48	sathya	14	2	2	2	2	1	1	1	14	110/70	1	1	3	3	3	4	1	2	2	5	1	3	3	6	3	3	no	NO
2	49	sadhana	14	2	2	2	1	1	1	1	15	112/68	1	1	2	4	3	3	1	1	2	5	2	2	6	4	5	2	no	no
2	50	swapna	14	2	2	2	2	1	1	1	13.7	114/68	1	1	1	1	2	3	2	2	2	4	1	2	6	2	2	1	no	no
2	51	jeeva	14	1	2	2	2	1	1	1	13.4	114/70	1	1	2	1	2	3	2	1	3	3	1	1	5	2	2	1	no	no
2	52	kumaravel	14	1	2	2	2	1	1	1	17	114/60	1	1	1	4	2	4	1	1	2	4	2	2	4	3	2	2	no	no
2	53	ranjinathan	14	1	2	2	2	1	1	1	12.6	112/70	1	1	1	1	2	3	1	1	2	5	2	1	5	3	1	3	no	no
2	54	madhavan	14	1	2	2	2	1	1	1	14	112/60	1	1	3	1	2	4	1	1	2	3	2	2	6	2	2	4	no	no
2	55	vivek	14	1	2	2	2	1	2	1	13.9	116/70	1	1	2	1	2	3	1	1	2	3	2	2	5	2	1	1	no	no
2	56	vasanth	14	1	2	2	2	1	1	1	18	124/68	1	1	1	1	2	2	2	1	2	2	1	6	6	1	2	2	no	no
2	57	yogesh	14	1	2	2	1	1	1	1	15.8	11o/60	1	1	3	4	3	3	1	1	2	3	1	2	2	7	2	2	no	no
2	58	aarjith	14	1	2	2	2	1	2	1	16	118/70	1	1	1	1	2	3	2	2	2	3	1	2	6	2	1	3	no	no
2	59	abishek	14	1	2	2	1	1	1	1	14	120/68	1	1	2	1	2	3	1	2	3	2	2	2	7	2	2	2	no	no
2	60	rakesh	14	1	2	2	2	1	1	1	16.6	107/60	1	1	1	2	2	4	3	1	2	6	2	2	6	2	3	4	no	no
2	61	suf ahamn	14	1	2	2	3	2	2	2	17	140/78	2	2	1	2	2	4	1	1	2	5	2	2	5	4	2	2	no	no
2	62	pratheep	14	1	2	2	1	1	1	1	15	120/70	1	1	3	2	2	3	2	1	3	4	2	2	5	2	1	1	no	no
2	63	jranav	14	1	2	2	2	1	1	1	14	106/60	1	1	1	1	3	3	1	2	2	3	2	2	7	2	4	2	no	no
2	64	akilesh	14	1	2	2	2	1	2	1	20	118/68	1	1	2	4	3	4	2	2	1	4	2	3	6	2	1	2	no	no
2	65	vairamuthu	14	1	2	2	2	1	1	1	14	113/60	1	1	1	1	2	2	1	2	2	3	2	3	6	2	2	2	no	no
2	66	anbarasan	14	1	2	2	1	1	2	1	17	104/60	1	1	2	1	2	3	3	2	2	6	2	1	5	3	4	3	36	no
2	67	prabhu	14	1	2	2	2	1	1	1	17	1oo/64	1	1	1	1	2	3	1	1	2	4	2	1	3	3	1	2	no	no
2	68	gajendran	14	1	2	2	2	1	1	1	13	116/68	1	1	3	3	2	4	2	2	2	5	2	2	2	2	2	1	no	no
2	69	nagalingam	14	1	2	2	2	1	1	1	16	102/60	1	1	1	1	2	3	1	2	2	4	2	3	1	2	4	2	no	no
2	70	natarajan	14	1	2	2	2	1	2	1	14.9	1oo/66	1	1	1	4	2	3	3	1	2	5	2	3	6	2	1	2	no	no
2	71	ramesh	14	1	2	2	2	1	1	1	16.7	114/68	1	1	2	1	2	2	1	2	3	4	2	2	5	2	2	4	no	no
2	72	rajiv	14	1	2	2	2	1	1	1	14.5	102/60	1	1	1	1	2	4	2	1	2	5	2	3	3	2	3	2	no	no
2	73	rahul	14	1	2	2	2	1	1	1	16	100/60	1	1	2	1	3	3	1	2	3	5	2	3	5	1	1	4	42	no
2	74	attabirama	14	1	2	2	3	2	2	2	21	140/98	2	2	3	2	1	4	2	2	2	6	2	2	4	2	2	1	no	no
2	75	srinivasan	14	1	2	2	2	1	1	1	15	124/64	1	1	1	1	2	3	1	1	3	2	1	6	4	2	1	2	no	no

2	76	sreesha	14	2	2	2	2	1	1	1	12.8	112/66	1	1	2	3	2	3	2	1	2	6	2	2	5	1	2	2	no	no
2	77	sneka	14	2	2	2	2	1	1	1	13	118/66	1	1	2	1	2	2	1	1	3	5	1	6	4	1	1	1	no	no
2	78	dhanapriya	14	2	2	2	1	1	1	1	15.6	120/64	1	1	1	1	3	3	2	1	2	4	1	6	7	2	2	2	no	no
2	79	divya	14	2	2	2	2	1	1	1	14	114/66	1	1	2	1	2	3	1	1	3	1	2	2	5	1	3	2	no	no
2	80	deepa	14	2	2	2	1	1	2	1	12.8	118/64	1	1	1	1	2	4	3	1	2	2	1	6	4	2	1	3	no	no
2	81	dakshayini	14	2	2	2	1	1	1	1	13.3	116/68	1	1	2	3	3	3	1	1	2	3	1	6	7	1	2	3	no	no
2	82	durga	14	2	2	2	2	1	1	1	12	116/64	1	1	3	1	3	2	2	2	3	5	1	6	6	2	1	2	no	no
2	83	elizabeth	14	2	2	2	1	1	1	1	14	118/66	1	1	2	3	2	4	1	2	2	2	2	2	5	1	2	4	no	no
2	84	gowri	14	2	2	2	3	2	2	3	24	140/100	3	3	1	1	1	4	3	2	2	1	1	6	4	4	4	4	no	no
2	85	geetha	14	2	2	2	2	1	1	1	16	120/66	1	1	3	1	2	3	1	1	2	3	1	6	3	1	2	2	44	no
2	86	asrin	14	2	2	2	1	1	1	1	17	112/64	1	1	2	1	2	3	2	2	3	4	1	6	3	2	1	1	no	no
2	87	neena begu	14	2	2	2	2	1	1	1	14	116/68	1	1	1	3	2	4	1	2	2	6	2	3	7	1	2	2	no	no
2	88	anjali	14	2	2	2	1	1	1	1	15	113/64	1	1	2	1	2	3	3	1	2	4	1	6	5	2	3	2	no	no
2	89	archana	14	2	2	2	3	2	2	2	22	138/76	2	2	2	3	2	4	1	2	3	4	2	2	4	3	4	3	no	no
2	90	taniya	14	2	2	2	1	1	2	1	13.4	126/68	1	1	1	4	3	3	2	2	2	5	2	2	6	2	1	1	no	no
2	91	nancy	14	2	2	2	2	1	1	1	14.6	12o/80	1	1	2	3	2	3	2	1	3	2	2	1	7	1	2	2	no	no
2	92	ekkivalakshi	14	2	2	2	1	1	1	1	15.3	110/76	1	1	2	1	2	3	1	1	2	1	1	6	6	2	2	1	no	no
2	93	brindha	14	2	2	2	3	2	2	3	25	148/88	3	2	1	2	1	4	2	1	2	3	1	6	5	4	4	4	no	no
2	94	chitra	14	2	2	2	2	1	1	1	16	100/64	1	1	2	4	4	4	1	2	3	5	2	2	5	2	2	1	no	no
2	95	bindhya	14	2	2	2	1	1	1	1	14.4	120/68	1	1	2	3	2	3	3	1	2	6	1	6	7	1	1	2	no	no
2	96	chandra	14	2	2	2	3	2	2	2	26	139/94	2	2	2	1	1	4	1	1	3	5	1	6	7	4	4	4	no	no
2	97	hanalakshi	14	2	2	2	2	1	1	1	15	113/68	1	1	2	1	2	3	2	2	2	4	2	2	2	1	1	4	no	no
2	98	deepthi	14	2	2	2	1	1	1	1	15	114/68	1	1	2	3	2	4	2	2	3	2	1	6	6	2	1	2	no	no
2	99	rakshitha	14	2	2	2	2	1	1	1	13.7	121/70	1	1	2	3	3	3	2	2	2	4	2	2	5	1	2	4	no	no
2	100	veera fathi	14	2	2	2	1	1	1	1	14	110/66	1	1	3	1	2	3	2	2	3	3	1	6	1	2	1	2	no	no
2	101	babu	14	1	2	2	2	1	1	1	13.5	11o/60	1	1	1	1	2	4	2	1	3	1	1	1	56	6	1	2	NO	NO
2	102	abinav	14	1	2	2	1	2	1	1	14	112/62	1	1	1	1	3	3	2	1	3	6	2	2	56	5	2	3	NO	NO
2	103	aadarsh	14	1	2	2	1	2	2	1	15	113/62	1	1	1	1	2	3	5	1	3	6	1	2	65	6	1	2	NO	NO
2	104	aditya	14	1	2	2	4	2	2	1	14	110/60	1	1	1	2	3	2	2	1	3	6	2	1	65	5	2	3	NO	NO
2	105	aakash	14	1	2	2	2	2	1	1	14.2	110/62	1	1	1	1	2	2	2	1	3	6	3	1	56	6	1	2	NO	NO
2	106	appu	14	1	2	2	2	1	1	1	13.6	11o/64	1	1	1	2	3	3	4	1	3	6	2	1	45	5	2	3	NO	NO
2	107	ajeeth	14	1	2	2	2	1	2	1	14	110/66	1	1	1	1	2	1	3	1	3	6	2	2	56	6	1	2	NO	NO
2	108	anmol	14	1	2	2	3	2	1	1	15	110/68	1	1	1	2	3	3	4	1	3	6	3	3	56	5	2	3	NO	NO
2	109	ahamed	14	1	2	2	1	2	1	1	14.5	148/9o	2	1	1	3	2	2	3	1	3	6	3	3	34	6	1	3	NO	NO
2	110	ansari	14	1	2	2	1	1	2	1	15	112/64	1	1	1	2	3	2	1	1	3	6	2	2	4	5	1	3	NO	NO
2	111	asai raja	14	1	2	2	2	2	1	1	12.8	112/66	1	1	1	1	2	3	1	1	3	6	2	1	24	6		3	NO	NO
2	112	bdul rabee	14	1	2	2	2	2	2	1	14	112/68	1	1	1	2	2	2	3	1	3	6	3	1	2	6	1	2	NO	NO
2	113	alachande	14	1	2	2	2	1	1	1	13	112/69	1	1	1	2	2	3	2	1	3	6	3	1	45	6	2	2	NO	NO
2	114	boopalan	14	1	2	2	1	1	2	1	13.4	113/60	1	1	1	2	2	3	2	1	3	6	2	2	5	6	2	2	NO	NO
2	115	balaganesh	14	1	2	2	1	2	1	1	14	113/62	1	1	1	2	2	2	4	1	3	6	2	2	34	6	2	3	NO	NO
2	116	bakkiyaraj	14	1	2	2	1	2	1	1	14.5	113/64	1	1	1	2	3	4	2	1	3	1	1	3	4	6	2	3	NO	NO
2	117	aranidhara	14	1	2	2	2	1	2	1	15	113/66	1	1	1	3	3	2	1	1	3	1	1	2	42	6	3	3	NO	NO
2	118	bharath	14	1	2	2	4	1	1	1	13.6	113/68	1	1	1	1	3	4	2	1	2	1	1	2	41	6	3	2	NO	NO
2	119	boopathy	14	1	2	2	2	1	1	1	16	113/70	1	1	1	4	2	4	2	1	3	1	2	3	34	6	2	2	NO	NO
2	120	balu	14	1	2	2	1	2	1	1	13.2	114/60	1	2	1	1	2	4	1	1	3	1	2	2	4	6	2	2	NO	NO
2	121	basker	14	1	2	2	2	1	2	1	13.6	114/62	1	1	1	1	2	4	2	1	2	1	2	2	5	1	1	2	NO	NO
2	122	bu jayasee	14	1	2	2	2	2	1	1	16	114/64	1	1	1	1	2	4	1	1	2	1	3	1	54	6	1	3	NO	NO
2	123	chandru	14	1	2	2	2	2	1	2	15	158/99	2	1	1	1	3	3	2	1	2	2	3	1	54	6	1	3	NO	NO
2	124	charles	14	1	2	2	2	1	1	2	15.2	114/68	1	1	1	3	3	3	1	1	2	1	2	3	45	1	2	3	NO	NO
2	125	charan raj	14	1	2	2	2	2	1	1	14.2	114/70	1	1	1	1	1	3	2	2	3	6	2	2	44	6	2	3	NO	NO
2	126	ran thirum	14	1	2	2	1	2	2	1	14.6	116/60	1	1	1	2	3	4	2	1	3	6	2	2	54	1	2	3	NO	NO
2	127	bakravarth	14	1	2	2	2	1	1	1	14.8	116/62	1	3	1	1	1	2	2	1	3	6	2	1	4	6	2	2	NO	NO
2	128	chendoora	14	1	2	2	1	2	2	1	15.2	116/64	1	1	1	2	3	4	2	1	2	6	2	1	43	1	2	2	NO	NO
2	129	chetian	14	1	2	2	2	2	1	1	15.4	139/96	2	1	1	4	2	3	2	1	2	1	3	1	45	6	2	2	NO	NO
2	130	andramoh	14	1	2	2	1	1	1	1	15.6	116/68	1	2	1	2	3	4	1	1	1	1	3	2	44	1	2	2	NO	NO
2	131	bokkalinga	14	1	2	2	2	2	1	1	15.8	116/70	1	1	1	4	2	3	2	1	2	1	3	2	45	6	1	2	NO	NO
2	132	durai raj	14	1	2	2	1	1	2	1	15.7	118/60	1	1	1	3	2	4	2	1	3	1	3	2	5	1	1	3	NO	NO
2	133	dhanagopa	14	1	2	2	1	2	1	1	16.2	118/62	1	1	1	1	4	3	2	2	3	1	3	2	3	6	2	3	NO	NO
2	134	vid roycep	14	1	2	2	1	2	2	1	15	118/64	1	1	1	2	4	2	3	1	3	2	2	1	4	6	2	3	NO	NO
2	135	dinesh	14	1	2	2	1	2	1	1	14	118/64	1	1	1	1	2	4	2	1	2	2	2	1	34	6	2	3	NO	NO
2	136	harmadur	14	1	2	2	2	2	1	1	16	118/66	1	1	1	4	2	3	1	1	2	3	2	3	23	6	2	3	NO	NO
2	137	darshan	14	1	2	2	2	2	1	1	15.2	118/68	1	1	1	2	3	3	1	1	2	3	2	3	45	6	1	3	NO	NO
2	138	daniel	14	1	2	2	2	2	1	1	14.2	12o/80	1	1	1	1	4	3	4	2	2	6	1	2	32	6	1	2	NO	NO
2	139	va sahaya	14	1	2	2	2	2	1	1	13.2	118/64	1	1	1	1	2	4	1	1	1	6	1	1	22	6	1	2	NO	NO
2	140	dharmaraj	14	1	2	2	1	1	2	2	15	118/70	1	1	1	4	1	3	2	1	2	6	1	1	3	6	2	2	NO	NO
2	141	elavarasan	14	1	2	2	1	2	1	1	16	112/72	1	1	1	1	2	3	1	1	2	6	1	2	23	6	2	2	NO	NO
2	142	esakimuth	14	1	2	2	2	1	1	2	13	112/74	1	1	1	2	3	4	1	1	2	1	2	3	34	6	1	2	NO	NO
2	143	eswaran	14	1	2	2	1	1	2	1	15	112/76	1	1	1	3	4	2	2	2	3	1	2	3	45	6	2		NO	NO
2	144	ezhilmathi	14	1	2	2	2	2	1	1	16.2	112/78	1	3	1	2	2	2	1	1	3	1	2	4	45	6	2	3	NO	NO
2	145	zhilarasa	14	1	2	2	1	2	1	1	12.3	114/70	1	1	1	3	3	4	2	1	3	1	2	2	45	6	3	3	NO	NO
2	146	arapandi	14	1	2	2	2	2	2	1	12.6	114/72	1	1	1	1	4	4	3	1	2	1	2	2	5	6	3	3	NO	NO
2	147	ajur rahm	14	1	2	2	2	2	1	1	16	114/74	1	1	1	2	3	2	1	1	2	1	2	2	54	6	2	3	NO	NO
2	148	brick rodre	14	1	2	2	1	1	1	2	15	114/76	1	1	1	3	2	4	1	1	2	1	2	1	34	6	1	3	NO	NO
2	149	hib abdul	14	1	2	2	2	2	1	1	14.3	114/78	1	1	1	4	3	3	1	1	3	1	2	1	24	6	1	2	NO	NO
2	150	reesh rahm	14	1	2	2	2	1	1	1	14	116/70	1	1	1	1	4	3	2	1	1	1	2	1	32	6	2	2	NO	NO
2	151	guru	14	1	2	2	2	2	2	1	16	116/72	1	3	1	1	3	3	2	1	1	1	2	1	56	6	2	2	NO	NO

2	152	anamurug	14	1	2	2	1	1	1	2	12.8	116/74	1	1	1	4	2	4	1	1	3	1	2	2	4	6	3	2	NO	NO
2	153	hithesh	14	1	2	2	2	2	2	1	13.4	116/76	1	1	1	1	1	3	1	1	3	1	2	2	4	6	3	2	NO	NO
2	154	harsha	14	1	2	2	2	2	1	1	13.4	116/78	1	1	1	1	2	4	1	1	2	1	2	3	6	6	2	2	NO	NO
2	155	hari	14	1	2	2	1	1	1	2	13	120/70	1	1	1	1	3	3	1	1	3	1	2	3	64	6	2	2	NO	NO
2	156	ilayaraja	14	1	2	2	3	1	1	1	14.6	148/90	2	1	1	1	4	2	2	1	3	1	2	2	45	6	1	3	NO	NO
2	157	iniyan	14	1	2	2	1	2	2	1	14.7	112/68	1	1	1	4	3	3	1	1	2	1	2	2	54	6	1	2	NO	NO
2	158	jayakumar	14	1	2	2	1	1	1	1	14.9	113/66	1	1	1	1	2	3	2	1	3	1	3	2	43	6	1	3	NO	NO
2	159	ayaprakas	14	1	2	2	2	1	2	1	16	114/70	1	1	1	1	1	3	1	1	2	1	3	2	24	6	1	2	NO	NO
2	160	anarthana	14	1	2	2	2	1	2	1	13.8	116/70	1	1	1	2	2	4	3	1	2	1	3	2	42	6	2	2	NO	NO
2	161	jagan	14	1	2	2	1	1	2	1	14.2	118/70	1	1	1	2	3	4	1	2	2	1	3	2	34	6	2	3	NO	NO
2	162	jesuraja	14	1	2	2	2	1	2	1	15.2	120/70	1	1	1	2	4	3	2	1	2	1	2	2	33	6	2	2	NO	NO
2	163	jaganathar	14	1	2	2	1	1	2	1	14.6	118/60	1	1	1	1	4	3	1	1	3	1	1	2	53	6	3	3	NO	NO
2	164	jagadeesh	14	1	2	2	2	1	2	1	15.4	118/64	1	1	1	4	2	4	2	2	3	6	1	1	2	6	3	2	NO	NO
2	165	jabaseelan	14	1	2	2	1	2	2	1	13.6	118/66	1	1	1	1	1	2	1	1	3	6	1	1	1	1		3	NO	NO
2	166	jacob	14	1	2	2	2	2	2	1	14.5	110/60	1	1	1	1	3	3	3	1	3	5	2	2	24	6	3	2	NO	NO
2	167	kumaran	14	1	2	2	1	2	2	1	13.2	117/62	1	1	1	1	4	3	1	1	3	5	2	3	54	6	2	3	NO	NO
2	168	kannan	14	1	2	2	2	2	2	1	13.6	117/64	1	1	1	3	2	4	2	1	3	4	3	1	5	6	2	2	NO	NO
2	169	kathir	14	1	2	2	2	2	1	1	13.8	117/70	1	1	1	1	1	3	1	1	3	4	3	2	5	6	1	3	NO	NO
2	170	kathiresan	14	1	2	2	2	1	1	1	13.9	117/78	1	1	1	4	2	3	3	1	2	5	2	2	5	6	2	2	NO	NO
2	171	roogabdull	14	1	2	2	2	1	1	1	14.2	168/86	2	1	1	1	2	2	1	1	2	2	2	3	4	6	1	3	NO	NO
2	172	fazil	14	1	2	2	2	1	1	1	14.4	114/68	1	1	1	1	2	4	2	1	3	2	2	3	2	6	2	2	NO	NO
2	173	prakasam	14	1	2	2	2	2	1	1	14.5	116/80	1	1	1	1	2	3	1	1	3	2	2	3	13	6	1	3	NO	NO
2	174	prabakaran	14	1	2	2	2	1	2	2	14.6	115/72	1	1	1	2	3	4	2	1	3	1	1	3	23	1	2	2	NO	NO
2	175	pratheep	14	1	2	2	2	2	1	1	14.7	117/61	1	1	1	1	3	3	1	1	3	1	1	2	43	1	2	3	NO	NO
2	176	angel	14	2	2	2	2	2	1	1	14.9	117/62	1	1	1	3	3	3	2	1	3	1	1	2	35	2	2	3	NO	NO
2	177	ankitha	14	2	2	2	2	1	2	1	15.2	117/64	1	1	1	1	2	2	1	1	3	1	1	3	54	2	3	3	NO	NO
2	178	ananthi	14	2	2	2	2	1	2	1	15.4	117/63	1	1	1	1	2	3	2	1	2	1	1	3	54	3	3	3	NO	NO
2	179	ashmitha	14	2	2	2	2	1	1	2	15.6	117/66	1	1	1	1	2	3	1	2	2	1	1	3	54	3	3	2	NO	NO
2	180	aathmika	14	2	2	2	2	1	1	1	15.7	160/98	1	1	1	1	2	4	3	2	3	1	1	2	54	3	3	2	NO	NO
2	181	advitha	14	2	2	2	2	2	1	1	16.1	117/69	1	1	1	3	2	3	1	2	3	6	2	2	45	1	2	2	NO	NO
2	182	annam	14	2	2	2	2	1	2	1	16.4	118/60	1	1	1	1	2	2	2	1	3	6	2	2	45	1	2	3	NO	NO
2	183	annapoorar	14	2	2	2	2	1	1	1	17	118/62	1	1	1	3	2	4	1	1	3	6	2	1	53	1	2	3	NO	NO
2	184	aadhira	14	2	2	2	2	1	1	1	14	116/70	1	1	1	1	2	4	3	1	2	6	2	1	35	6	1	3	NO	NO
2	185	adhilaksh	14	2	2	2	2	1	2	1	15	115/66	1	1	1	1	3	3	1	1	2	6	2	1	35	6		2	NO	NO
2	186	nees fathi	14	2	2	2	2	2	1	1	16	115/68	1	1	1	1	3	3	2	1	2	6	3	2	3	6	1	2	NO	NO
2	187	habitha	14	2	2	2	2	2	2	2	17	116/64	1	1	1	3	2	4	1	1	3	6	3	2	43	6	1	2	NO	NO
2	188	hargavi	14	2	2	2	2	2	1	1	13	116/66	1	1	1	1	2	3	3	1	3	6	3	2	34	6	1	3	NO	NO
2	189	hackiya	14	2	2	2	2	1	2	1	15	116/68	1	1	1	3	1	4	1	2	2	6	3	2	43	6	2	3	NO	NO
2	190	ackiyashr	14	2	2	2	2	1	1	1	16	114/60	1	1	1	4	1	3	2	1	3	6	3	3	45	6	2	2	NO	NO
2	191	cathreen	14	2	2	2	2	1	1	1	14	114/64	1	1	1	3	1	3	2	1	2	6	3	3	45	6	3	2	NO	NO
2	192	chandrika	14	2	2	2	2	1	2	1	13.6	114/66	1	1	1	1	1	3	1	1	3	6	2	2	54	6	3	2	NO	NO
2	193	chellamma	14	2	2	2	1	2	2	1	14	114/68	1	1	1	2	1	4	2	1	3	6	2	2	45	1	3	2	NO	NO
2	194	daisyrani	14	2	2	2	2	1	1	1	14.2	116/62	1	1	1	4	2	4	1	1	3	6	2	1	56	1	2	2	NO	NO
2	195	deepa	14	2	2	2	2	2	2	1	14.6	116/64	1	1	1	3	2	3	3	1	3	6	2	1	65	1	2	2	NO	NO
2	196	haranishr	14	2	2	2	1	2	1	1	18	116/66	1	1	1	1	3	4	1	1	2	6	2	2	46	1	2	3	NO	NO
2	197	ezhilpriya	14	2	2	2	1	1	1	1	17	116/68	1	1	1	1	3	3	2	1	3	6	2	2	65	1	2	3	NO	NO
2	198	eswari	14	2	2	2	1	2	2	2	17.1	116/64	1	1	1	3	3	4	2	1	2	6	1	2	65	1	1	3	NO	NO
2	199	elamathi	14	2	2	2	1	1	2	1	14	116/70	1	1	1	3	3	3	2	1	3	6	1	2	65	1	1	3	NO	NO
2	200	fathima	14	2	2	2	1	2	2	1	12	117/76	1	1	1	1	3	3	2	1	3	1	1	2	65	1	1	2	NO	NO
2	201	janani	14	2	2	2	2	2	1	1	18	118/70	1	1	1	1	2	4	2	1	3	1	1	1	65	6	1	2	NO	NO
2	202	isaiaruvi	14	2	2	2	2	1	2	1	17.4	112/60	1	1	1	1	2	4	1	2		1	1	1	65	6	1	2	NO	NO
2	203	isaipriya	14	2	2	2	1	1	2	1	17.3	112/62	1	1	1	1	3	3	1	1	3	1	1	1	65	6	1	2	NO	NO
2	204	isabelle	14	2	2	2	2	2	1	1	16.2	112/64	1	1	1	1	3	3	2	2	2	1	1	3	65	6	2	2	NO	NO
2	205	idhayarani	14	2	2	2	2	2	1	2	16.3	112/70	1	1	1	1	4	4	1	1	2	1	2	2	65	6	2	2	NO	NO
2	206	iniyaa	14	2	2	2	1	1	2	1	16.4	112/67	1	1	1	1	4	4	3	1	3	1	2	2	65	6	2	2	NO	NO
2	207	mohini	14	2	2	2	2	1	1	1	17.2	113/64	1	1	1	1	3	3	2	1	3	1	2	1	65	6	1	3	NO	NO
2	208	akila	14	2	2	2	1	1	2	2	17	114/64	1	1	1	1	3	4	1	2	2	1	2	1	65	6	2	2	NO	NO
2	209	sakthi	14	2	2	2	1	1	2	1	13	112/70	1	1	1	1	2	3	2	1	2	1	3	2	65	6	2	3	NO	NO
2	210	gadeeshwa	14	2	2	2	1	2	1	1	13.7	100/60	1	1	1	1	3	4	3	1	3	1	3	3	65	6	3	3	NO	NO
2	211	aarameswa	14	2	2	2	1	2	2	1	13.8	100/62	1	1	1	1	2	3	2	1	3	6	3	3	65	6	3	3	NO	NO
2	212	karunya	14	2	2	2	1	2	1	1	12.8	100/64	1	1	1	1	3	3	1	1	3	6	3	2	56	6	3	3	NO	NO
2	213	madhu	14	2	2	2	1	1	2	1	13.7	100/66	1	1	1	1	2	3	2	1	3	6	3	1	64	1	3	3	NO	NO
2	214	sadhushali	14	2	2	2	1	1	2	1	17.2	100/68	1	1	1	1	2	3	1	2	3	6	3	1	65	1	3	3	NO	NO
2	215	monika	14	2	2	2	1	2	1	2	17.6	100/70	1	1	1	1	3	4	2	2	3	6	2	2	65	1	3	2	NO	NO
2	216	mandhagin	14	2	2	2	1	2	1	1	18	100/72	1	1	1	1	2	4	2	1	3	6	2	2	65	2	3	2	NO	NO
2	217	mariyam	14	2	2	2	1	1	1	1	16.2	100/74	1	1	1	1	3	3	2	1	3	6	2	3	65	2	3	2	NO	NO
2	218	maalya	14	2	2	2	2	2	1	1	16.3	100/76	1	1	1	2	2	4	3	1	3	1	2	2	56	3	2	2	NO	NO
2	219	muthupriya	14	2	2	2	1	1	1	1	16	100/78	1	1	1	1	3	3	1	2	3	1	2	1	56	3	2	2	NO	NO
2	220	mala	14	2	2	2	1	2	2	1	16.7	100/64	1	1	1	2	3	4	1	2	3	1	2	1	56	4	2	3	NO	NO
2	221	megala	14	2	2	2	2	1	2	1	16.8	110/60	1	1	1	2	2	3	2	5	3	1	2	1	65	4	2	3	NO	NO
2	222	muthulaksh	14	2	2	2	1	2	2	1	16.9	110/63	1	1	1	1	3	3	3	2	1	1	2	3	65	5	2	3	NO	NO
2	223	agalaksh	14	2	2	2	1	1	2	2	15.2	110/64	1	1	1	1	2	4	2	2	3	6	2	2	65	5	1	2	NO	NO
2	224	nalini	14	2	2	2	1	2	2	1	15.5	110/66	1	3	1	1	3	4	1	4	3	6	2	2	65	6	1	2	NO	NO
2	225	nathiya	14	2	2	2	2	1	2	1	15.6	150/100	2	2	1	1	3	3	2	3	3	6	2	1	6	6	1	2	NO	NO
2	226	nancy	14	2	2	2	2	1	2	1	15.9	116/69	1	1	1	1	3	3	1	4	3	6	1	2	65	6	1	2	NO	NO
2	227	nesapriya	14	2	2	2	2	1	2	1	15.4	112/60	1	1	1	1	3	4	1	3	3	6	1	1	56	6	1	2	NO	NO