AIN-SHAMS UNIVERSITY
INSTITUTE OF POSTGRADUATE
CHILDHOOD STUDIES.
MEDICAL AND PSYCHOMEDICAL DEPARTMENT.

"BLOOD PRESSURE IN RELATION TO WEIGHT, HEIGHT AND SOCIOECONOMIC LEVEL AMONG APPARENTLY HEALTHY SCHOOL CHILDREN"

THESIS

SUBMITTED FOR PARTIAL FULFILMENT OF MASTER DEGREE IN CHILDHOOD STUDIES.

BY

HUSSIEN ABDEL LATIF SARHAN

(M.B. B.CH.)

SUPERVISORS

PROF. DR. DIAIY M. HUSSEIN
PROF. OF PEDIATRICS
MILITARY MEDICAL ACADEMY

DR. OMAR E. EL-SHORBAGY
LECTURER IN POSTGRADUATE CHILDHOOD STUDIES (MEDICAL DEPARTMENT)

INSTITUTE OF POSTGRADUATE CHILDHOOD STUDIES
AIN-SHAMS UNIVERSITY

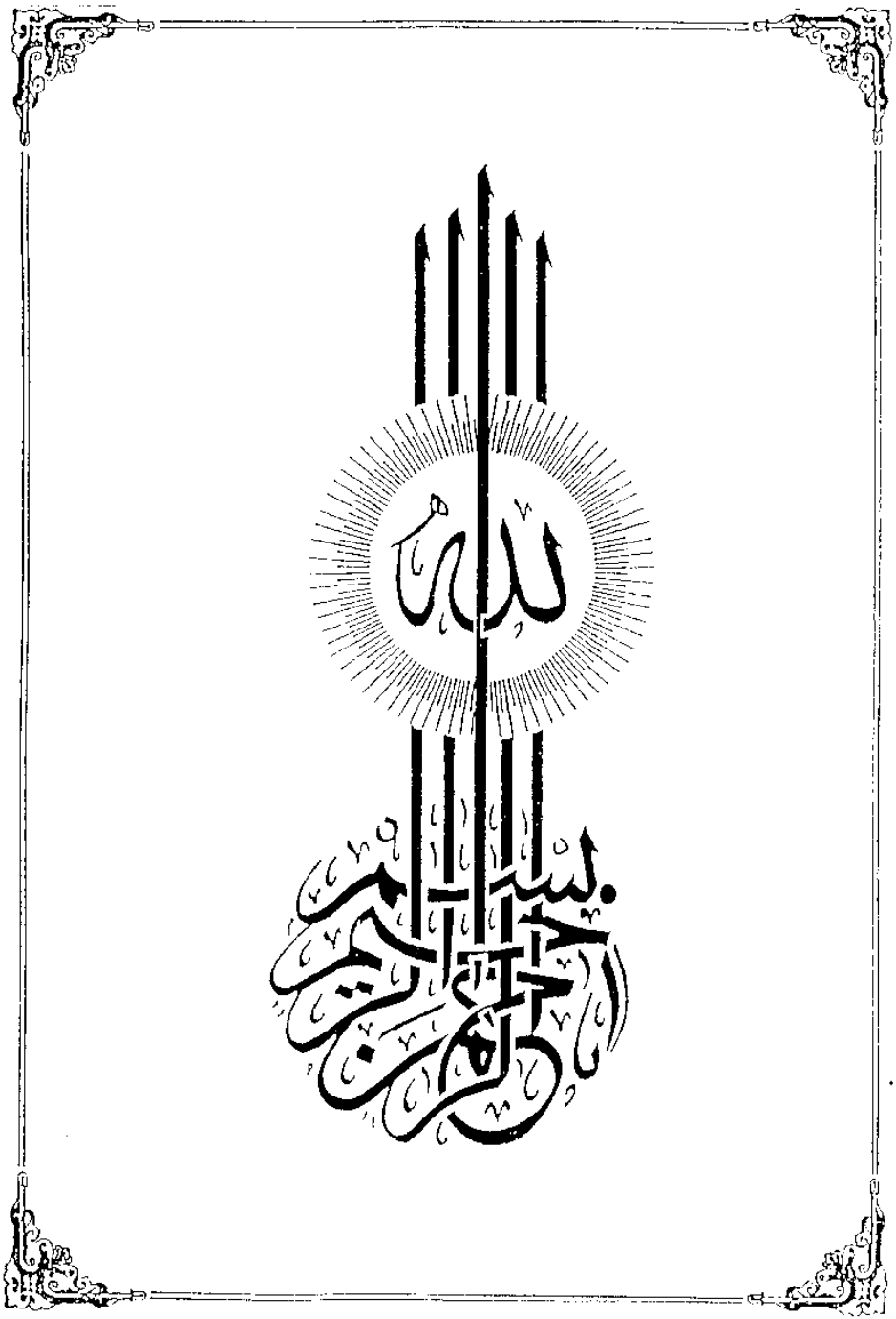
1988

ACKNOWLEDGEMENT

I wish to express my supreme gratitude and respect to my eminent Prof. Dr. Diaiy M. Hussein Professor of pediatrics in Military Medical Academy for his kind guidance, constant supervision and constructive criticism of the study.

I should say my sincere gratitude and thanks to Dr. Omar EL-Shorbagy, Lecturer in Postgraduate Childhood Studies (Medical Department), for his generous help, honest assistance and marvellous attitude in guiding me.

Finally I wish to thank all others who helped me in this study.



Contents

List of Tables

Page

Page

List of figures

INTRODUCTION AND AIM OF THE WORK

Measurement of blood pressure is of essential value in diagnosis and follow up of various ailments of infants and children. Children three years of age and older should have their blood pressure measured annually as part of continuing health assessment (Silver et al., 1983).

Blood pressure gradually increases with age and correlates with height and weight throughout childhood and adolescence. Untreated essential or primary hypertension increases the risk of myocardial infarction, stroke and renal failure in affected individuals. In order to increase early detection of hypertension, blood pressure measurement should be a part of the periodic physical examination of children (Pruitt, 1987).

The early school years are a period of relatively steady growth ending in a preadolescent growth spurt by about the age of 10 years in girls and about 12 years in boys. Measurements of weight and height at any given time will indicate the status of a child with respect to other children of the same age (Vaughan and Litt, 1987).

The socio-economic level is one of the most important environmental factors that influence the physiological growth

of the child.

This study aims at finding blood pressure of apparently healthy school children in relation to their weight and height in a high and a low socioeconomic groups of school children.

REVIEW OF LITERATURE

BLOOD PRESSURE

Actually blood pressure means the force exerted by the blood against any unit area of the vessel wall. Blood pressure is almost always measured in millimeters of mercury (mmHg) because the mercury manometer has been used as the standard reference for measuring blood pressure throughout the history of physiology (guyton, 1986).

Basal blood pressure is obtained with the subject in a reclining position in a comfortably warm room, after resting for at least 45 minutes, 6 hours after the last meal and with his mind at ease. The objective is to eliminate all factors; physical, emotional and metabolic known to raise the blood pressure. The term basal in physiology means a condition with the least possible amount of stress. This is regarded as the lowest pressure necessary to maintain a flow of blood sufficient for the needs of the body. (schotteluis and schotteluis, 1978).

Systolic blood pressure is the pressure generated by the contraction of the heart and modified by the elasticity of the arteries. It is the peak value of pressure in the aorta and large arteries during each heart cycle.

Diastolic blood pressure is the pressure in the large

arteries during relaxation of the heart and indicates the degree of recoil of the arteries. It is the minimal value during each heart cycle. (Fleur, 1978).

The mean arterial pressure is the average pressure throughout each cycle of the heart beat. The mean arterial pressure of the normal young adult averages about 96 mmHg, which is slightly less than the average of the systolic and diastolic pressures, 120 and 80 mmHg, respectively. However, for purposes of discussion, the mean arterial pressure is usually considered to be 100 mmHg because this value is easy to remember (guyton, 1986).

Physiological Variations in Blood Pressure

Population studies revealed that blood pressure varies with age, sex, weight, race and socio-economic status. Diet as well as social and economic stresses are other implicating factors. In addition, throughout the course of a day blood pressure varies considerably with physical, mental and physiological activity as well as emotional state. In view of this marked variability, diagnosis should not be made on a single blood pressure estimate (selkurt, 1976).

AGE

During childhood the systolic pressure gradually increases, it ranges from 75 to 90 mmHg during infancy, from 90 to 100 mmHg in childhood and from 100 to 120 mmHg about puberty. The diastolic pressure ranges around 50 mmHg during the first few years of life and that until puberty it remains fairly constant at 60 mmHg. In adults the blood pressure steadily increases with age (wright, 1975).

SEX

The systolic and diastolic pressures vary with the sex, being lower in women below 40 years and higher in those more than 50 years.

WEIGHT :

The systolic and diastolic blood pressures are directly related to weight.

Blood pressure increases regularly during growth and is more closely correlated with height and weight than with age. This association increases strongly during male puberty (Ander et al, 1982).

* RACE AND SOCIO-ECONOMIC STATUS :

The systolic and diastolic pressures are higher in blacks than in whites at all ages and sexes. It has been suggested that genetic factors are responsible for this difference. The blood pressure of Orientals is generally lower than that of Europeans and Americans especially after age of 40. This may by due to genetic, environmental or dietary factors. It has been suggested that the high cholesterol content of the Europeans and Americans favours the incidence of atherosclerosis and may be the cause of these changes. (Hamdi et al, 1981).

* POSTURE :

When a person stands, gravity acts on the venous return leading to decrease in cardiac output and thoracic arterial pressure. Compensatory increase in heart rate and total

peripheral resistance causes a rise in both systolic and diastolic pressures but the diastolic rise is more than the systolic so that the pulse pressure declines (selkurt, 1976).

EXERCISE :

The systolic and diastolic pressures rise with exercise. The systolic increases as a result of the increase in cardiac contractility. The diastolic may decrease initially because of vasodilatation of the skeletal muscle vasculature. However, the increase in heart rate limits run off time and causes diastolic pressure to rise (selkurt, 1976).

EMOTIONS :

Emotional status influence the blood pressure in highly neurotic hypertensive patients under follow up of their pressure and in those measuring their blood pressure for the first time. Among these emotional status are tension, fear and pain (Brode et al, 1959).

Cardiac output may be increased 50 to 100% by anxiety and excitement (Brobeck, 1974).

DIGESTION AND SLEEP :

The systolic pressure may fluctuate with physiological condition such as mental state, sleep or meals (wright, 1975). The blood pressure rises slightly after meals 5-10 mmHg (Talaat 1974).