A STUDY OF THE EFFECT OF PREGNANT WOMAN'S DIET ON THE RATE OF WOMAN'S WEIGHT GAIN AND BIRTH WEIGHT AT DELIVERY

Thesis

Presented By

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TO

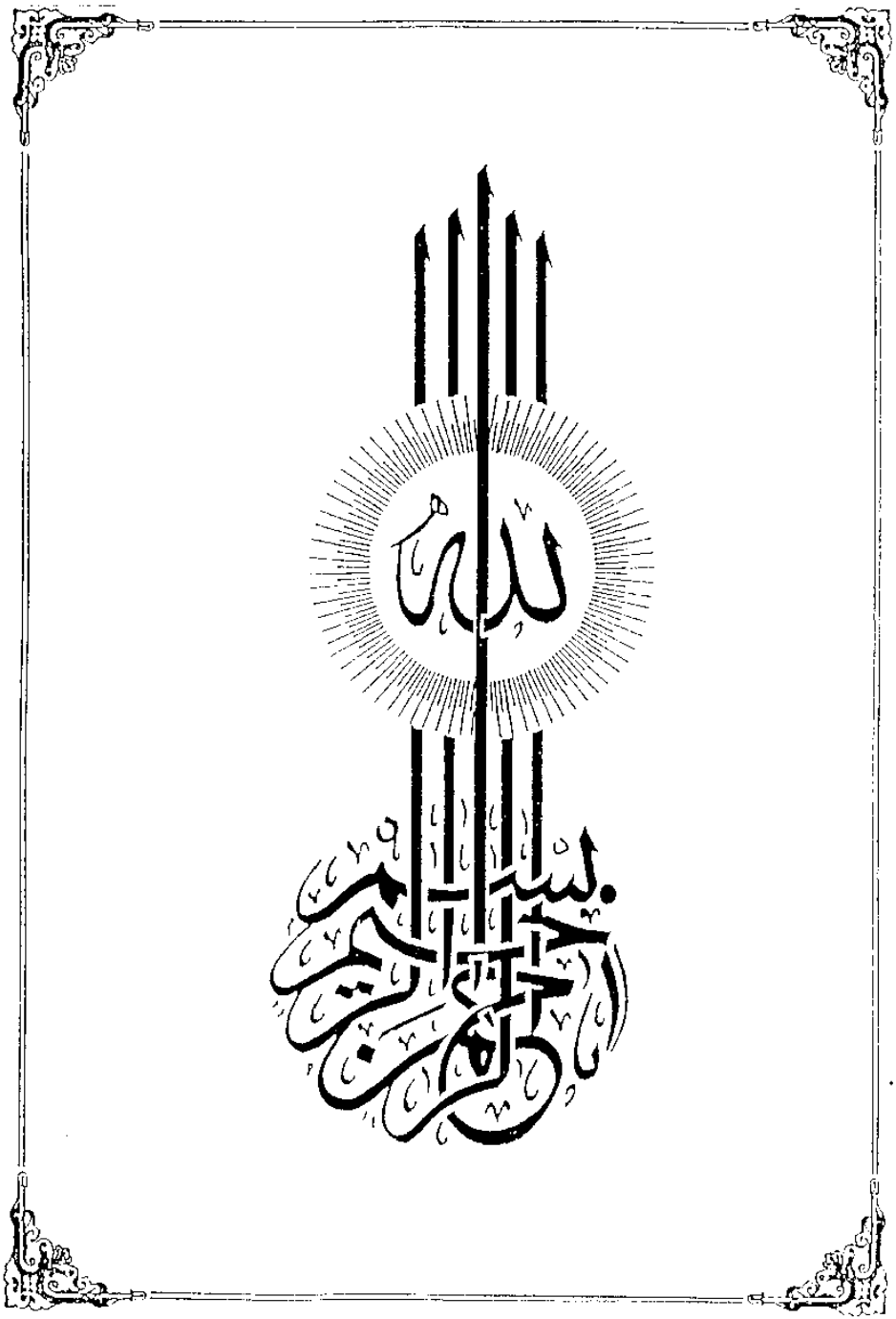
MY BELOVED MOTHER

TO

THE MEMORY OF MY BELOVED FATHER

I PRESENTED THIS WORK

NASRAH
1986



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S U M M A R Y

This study was done at Bortus Village (Osaem District, Giza Governorate) on women attending Maternal and Child health Clinic of Bortus Hospital.

A sample of 114 pregnant women of low socio-economic status were picked out in a systematic random way irrespective of the period of gestation. Each woman was interviewed at least two or three times with an interval of two or three weeks in between. Those who were in the last month of gestation were followed until the birth of the child.

The aim of the study is to find out the possible relationship between the nutritional status of the mother, the rate of her weight increase during pregnancy, and the birth weight of the child, and to recommend possible measures to improve the diet of pregnant women.

The nutritional status of the women was assessed by a quantitative study of the food intake using 24 hour recall method, anthropometric measurements together with haemoglobin and haematocrit determination. For the group of women who were followed during the last period of gestation (25 cases), the impact of their nutritional status on the outcome of pregnancy as determined by the weight of the newly born, was studied.

The results showed that nutrients intake by women varied in the various periods of gestation. The mean calorie intake was found to be less than the estimated requirement in all periods of gestation. It was found that only 5% of the pregnant women who satisfy 90% or more of the estimated requirement of calorie, while 78.1% were found to consume less than 70%. However, 13.4% of the women were found to satisfy 90% or more of the RDA of protein, while 63.0% were found to consume less than 70.0% of the RDA. The intake of calcium, iron and vitamin A was found to be very low, especially for iron, it was found that all women consume less than 50.0% of the RDA.

The results showed also that the increase in body weight was found to be 632g/week in the period of 16^{th}- 19^{th} week, and this value was found to be decreased gradually by the progress of gestation till it reaches 399g/week during the period of 32^{nd}-35^{th} week, where no increase in body weight was observed during the last period of gestation (36^{th}-40^{th} week). No significant correlation between energy or protein intake and body weight gain of prgnant women was obtained at any of the periods.

The study showed also that the prevalence of anemia among the investigated pregnant women was 82.5%. The mean Hb content in all periods of gestation was less than 11.0g/100ml blood and the mean Hct value was less than 33.0%. This may be due mainly to inadequate intake of protein, vitamins as well as iron.

The results obtained showed that the tendency for the increase in birth weight is proportional to the increase in woman's age.

In this study, it was found that the birth weight was higher among infants whose mothers were characterised by low parity versus high parity, and also who have long prepregnancy interval versus those who have short interval and the difference was significant.

There was a positive correlation between birth weight and woman's weight for height, both before and after delivery, also there was a significant correlation between birth weight and calorie intake during the last month of gestation, but no correlation was noticed between birth weight and protein intake.

INTRODUCTION

From the nutritional point of view the nine months of pregnancy, although physiologically normal, must be considered a period of stress during which the nutrient demands of the developing fetus are superimposed on those for normal maintenance of the adult woman.

The pregnant woman experiences a series of physiological adaptation that result in improved utilization of nutrients either through increased absorption, decreased excreation, or alterations in metabolism. In addition, the mother who has been well nourished prior to conception enters pregnancy with a reserve of several nutrients that can meet the need of the growing fetus without jeopardizing her health.(Guthrie,1983)

Physiological change that happen during pregnancy.

Pregnancy from the physiological point of view can be divided into three main phases, each with specific nutrient needs.

1- Implantation:

The first two weeks of gestation is a period during which the fertilized ovum becomes embedded in the wall of the uterus. At this time the fetus is nourished from the outer layers of the germ plasm and from the secretion of uterine glands, known as uterine milk. (Guthrie,1983)

2- Organogenesis:

The next six weeks are known as the period of organogenesis, when the developing fetal tissue known as the embryo, undergoes differentiation into functional units. During this period, nourishment is obtained from the blood and degenerating cells in the space between the embryo and maternal tissue. The beginning of the individual organ and the various aspects of skeletal formation are established. The presence or absence of specific nutrients may be very important for the continued growth of a normal fetus. (Guthrie,1983)

3- Growth:

The remaining seven months of pregnancy are known as growth period. During this time the differentiated tissues continue to grow until they reach a functioal size capable of supporting extrauterine life. The needs for nutrients at this time are high both quantitatively and qualitatively. A deficiency will usually result only in a premature or smaller infant, rather than in the serious deficiency symptoms observed as a result of a dietary lack during organogenesis. (Guthrie, 1983)

The placenta is the tissue to which the fetus is attached by means of the umbilical cord, and by which the transfer between the two circulatory systems of the mother and fetus occurs.

Nutrients are transported to the fetus, and the metabolic wastes of the fetus are carried to the maternal circulation. Undernourishment leads to a smaller placental size. There will be fewer cells available for the transfer of nutrients and oxygen to the fetus, thus leads to lower birth weight. (Robinson&Lawler, 1982)

Change in blood:

During pregnancy there is a gradual increase in the volume of intracellular and extracellular fluid which account for several pounds of total increase in mother's body weight. (Robinson& Lawler, 1982)

The maternal blood volume starts to increase during the first trimester, expands most rapidly during the second trimester, and then rises at a much slower rate during the third trimester, attaining a plateau during the last several weeks of pregnancy.(PRichard & Macdonald,1980)

The increase in blood volume results from an increase in both plasma and erythrocytes. The usual pattern is that of an initial rise in the plasma volume, followed by an increase in the volume of circulating erythrocytes. The increase in the volume of circulating erythrocytes in pregnancy is accomplished by accelerated production, rather than by prolongation of life span of the erythrocytes.(PRichard & Macdonald,1980)

The total blood volume is increased by as much as one third by the end of pregnancy. With the increase in blood volume, the concentration of serum albumin, haemoglobin and other blood constituents are reduced. The average haemoglobin level of 13.7g/100ml blood for healthy nonpregnant woman drops to about 12.0g/100ml blood throughout pregnancy, despite the ingestion of supplemental Iron.(Committee on Maternal nutrition, 1970). The increasing plasma volume, however, produces an apparent reduction in haemoglobin. This apparent reduction continues throughout pregnancy until the last four weeks, when there may be a slight rise. The fall in haemoglobin could be detected by the 12^{th} week, and the minimum value is reached at 32^{nd} week. (Garry, et al,1977). A level of 11.0g haemoglobin per 100ml blood is considered to be the border line, below which true anemia exists. (Robinson & Lawler, 1980)

Fetus weight gain:

The gain in weight of the fetus is not uniform. It takes 2 months to reach a weight of one gram, after 3 months it reaches thirty gram, after 6 months it reachs one kilogram, and at full term its weight is about three to three and half kilograms. A large part of the gain in weight occurs during the last trimester, hence accumulation of nutrients takes place during the last 3 months. (Widdowson, 1982)