I INTRODUCTION

The 20th century has witnessed tremendous technical progress culminating in man's conquest of space and his landing on the moon. However, despite these achievements, some of the worst forms of malnutrition are haunting mankind even today. Therefore providing reasonably low cost diets, adequate in quality and quantity, to the teeming millions is the crucial challenge facing scientists, economists and planners (Davadas, 1975).

No form of human deprival is more tragic, morally distasteful and inhibitive of change than pervasive chronic malnutrition. The most serious immediate effect of malnutrition in early childhood is death. Even if the child survives, physical stunting, deteriorating health, susceptibility to disease, reduced capacity for work and learning and possibly even irreversible brain damage would be the long term harassing effects. (Samuel, 1975).

Malnutrition is not merely a reflection of underdevelopment, but also a barrier to development, affecting human capabilities, productivity and even willingness of families to practise family planning. The World Health Organisation (WHO, 1976) views malnutrition, not only as a public health problem of undeniable quantitative importance, but also very difficult to measure. High mortality, lessened physical capacity, impaired
learning and social adaptation including mental stunting, which are the manifestations of various nutritional deficiencies, are impediments to creativity and fulfilment. The social and economic costs of these maladies are enormous. The worst part of the tragedy is that mothers and young children are the most affected by these deficiencies (Gopalan, 1979).

Dietary data obtained from low income families show that the expectant and nursing mothers suffer heavily, rather disproportionately. The human consequences of maldistribution of food consumption are disastrous. While a variety of deficiency diseases exist among expectant and nursing mothers and other population groups, the major types observed are protein Energy Malnutrition, hypovitaminosis A and anaemia (Nagarajan, 1977 and Devadas et al., 1980).

Toxemia in expectant mothers, which is characterised by high blood pressure, swelling of face and limbs and loss of protein in urine is an important cause of maternal deaths. It affects adversely foetal growth and development (Bhaskaran, 1975). A higher prevalence of eclampsia is reported in mothers of low socio economic groups than in mothers from the upper income groups.
According to Reddy (1978), dietary intake of vitamin A is low among expectant mothers of poor income groups. Serum vitamin A levels in expectant mothers have been found to be low especially during the third trimester. This, in turn, affects the foetal stores of vitamin A (Srikantia, 1976). The most lamentable consequence of such poor vitamin A status of the infant is blindness. About one million children go blind every year in India (Gopalan, 1977). Hence improving the vitamin A status of the expectant mother will go a long way in preventing her child from losing his eyesight.

The WHO (1976) has defined nutritional anaemia as the condition that results from the inability of the erythropoietic tissues to maintain a normal haemoglobin concentration due to an inadequate supply of nutrients. Nutritional anaemia is the end result of a severe nutrient deficiency, specially iron, less frequently folate and rarely vitamin $B_{12}$. Anaemia poses a threat to the life and health of the mother at the time of delivery and contributes to the low birth weight and poor viability of the infant (Food/Nutrition Bulletin, 1979). Anaemia is also a contributory factor to the increased incidence of genitourinary infections during pregnancy, still births and premature births.
Maternal anaemia is seen in at least 40 to 60 per cent of the expectant mothers in developing countries (Raman, 1977). Surveys on haemoglobin levels of expectant mothers carried out in different parts of the country by the Indian Council of Medical Research (ICMR, 1975) indicate that while 15-20 per cent are anaemic at the onset of pregnancy, the incidence increases alarmingly to 60-70 per cent in the last trimester of pregnancy.

Poorly nourished mothers give birth to small infants whose neonatal, perinatal and infant mortality is much higher than that of infants of normal weight (ICMR, 1977). These nutritional problems are so serious, that very few children whose mothers are pregnant again within a year of their birth, survive (Fullam, 1978).

Malnutrition in the mother leads to pregnancy wastage. In poor communities the incidence of miscarriages and still births is very high. The still birth rate in India is 11/1000 live births (Gopalak, 1973). A major cause of still birth is prematurity, which may lead also to neonatal mortality. The infant mortality rate is 80/1000 live births (Mohan, 1974; and Vigg, 1975). The estimated maternal mortality rate is 251/10000 live births (Gopalak and Vijaya Raghavan, 1971). The high rate of maternal and child mortality and morbidity is due to poor nutrition, heavy infection and hazardous reproduction (Tripathi et al, 1975).
Approximately one sixth of the live births at term in developing countries, roughly 22 million newborns per year, are below 2.5 kg weight. This, combined with inadequate weaning practices, results in persistently slower growth and development and decreased resistance to infectious diseases. The combination of malnutrition, insanitary environment and poor personal hygiene results in frequent diarrhoeal, respiratory and other infections, which, in turn, worsen further the nutritional status (Food and Nutrition Bulletin, 1978).

Apart from a poor dietary intake resulting in such hazards, the expectant mothers are also subjected to numerous other stresses, such as chronic infections, parasitic infestations repeated and ill spaced pregnancies and prolonged lactation. These aggravate the nutritional deficiencies and drain the maternal stores to a considerable extent.

Another major problem is the alarming rate of population growth, in spite of the high maternal mortality and morbidity (Green, 1979). Devadas (1976) and Ghosh (1976) stated that 15 million children would be added in India every year, if the population growth rate continues to be what it is. One baby is born every 12.5 minutes adding 23 million every year. Of these, for every 1000 babies born alive, 100 die before their first birthday according to the National Institute of Nutrition (MIN, 1979). Srimal et al. (1975) and MIN (1978), point out
that the high mortality becomes a motivating factor for large families, in order to ensure high fertility as an insurance against child loss. In contrast the child survival hypothesis holds that once infant mortality is assessed, parents would perceive that fewer pregnancies only are necessary to achieve the desired family size. From this standpoint also, the need for improving the nutritional status of the expectant mothers is urgent.

There is now a growing concern throughout the world regarding the widespread failure of the development programmes to reach the expectant mothers who are in acute need of their benefits. Most mothers have their babies too soon until too late, resulting in too many pregnancies. As the World Bank President Hé Namara (1973) warns, "Wholly preventable deficiency diseases are injuring infants, killing children and aging adults long before their time. Hundreds of millions of individual human lives with all their inherent potential are being threatened, narrowed, eroded and shortened and finally terminated by malnutrition that degrades and destroys all that it touches".

Any attempt to improve the nutrition and the quality of human life must first aim to reduce the alarming death rates, acute suffering and the tragic loss of human potential caused by malnutrition. The care of the child begins from the moment
of its conception (Devadas, 1980). For, it is during the months of intra-uterine life that the foundations are laid for the development of a normal healthy child, the germ of the future generation. The intra-uterine growth and development of the foetus are influenced by a host of maternal factors, among which, maternal health and nutrition are of prime importance (Ramalingaswamy, 1975). Hence efforts should be made to ensure that the mother bears a child with the desired physical, mental and personality characteristics. Maternal nutrition affects both the newborn and the extra-uterine foetus directly via birth weight, levels of foetal stores of nutrients and laying down of reserves for adequate lactation (Jelliffe, 1976).

Lactation is a unique period in the life of a mammal, when the mother continues to protect her young one with almost the same efficiency as through the placental feeding. Haffenshine (1980) expounds that the biological mother is the ecological focus of the child. The mother-child 'dyadic' interaction and bonding initiated during gestation are maintained after birth through breast feeding. Hence, the declining incidence of breast feeding and its consequences need to be studied with a view to preserve, promote and revitalize breast feeding for nutritional, economic and demographic reasons.
Sehl et al. (1975) point out, in the present era of all round scientific progress, evaluation of the seedlings of human life, the new borns, is essential to help in gaining insight into the quality of the human species produced. The starting point towards improving the nutritional status is to study the existing nutritional deficiencies and adopt suitable measures to alleviate the same.

While some studies have been carried out in India on the types of foods consumed by the expectant mothers, studies relating the income levels, food intake of the mother and the resulting health conditions of the new born are scanty. A study of the influence of dietary protein level on the body weight gain and birth weight of babies will be useful in assessing the protein requirement during pregnancy. As regards the iron requirement during pregnancy, a direct approach is determining the minimum dietary iron intake to sustain iron nutritional status (Gopalan and Marasinga Rao, 1977). Information regarding folic acid intake and requirements is also scanty. Therefore these aspects should receive special attention.

Allem Berg (1973) has pointed out that yardsticks for maternal malnutrition and metabolic profile of normal healthy mothers are not available. A high incidence of pregnancy
wastage appears to be the usual finding among undernourished populations. Hence the possible role of malnutrition in contributing to the high incidence of pregnancy wastage in the lower socio-economic sectors of the population needs consideration.

Studies designed specifically to define the nutritional costs of pregnancy and lactation in terms of any nutrient have rarely been made in such a manner as to quantify the costs precisely. Published works on nutrition in relation to pregnancy are generally short term investigations restricted to one or other particular facet. For instance, nutritive value of diets consumed by mothers has been reported without reference to the clinical and metabolic context; data on milk yields and its composition have been presented without reference to the growth and health of the babies. While there is scientific evidence for the favourable effects of birth spacing and reduced family size on child health and survival, there is no knowledge regarding the role of nutrition on the reproductive capacity, foetal wastage, and the ability of the mother to breast feed her baby successfully. More complete, coordinated, cumulative, and comprehensive information is required on every aspect of the subject, so that isolated fragments of information could be built up to understand human reproduction in all its complexity.
The task of preventing malnutrition among the vulnerable groups is engaging the attention of the central and state governments and voluntary agencies. Great effort is being geared towards increasing food production and supplementary feeding programmes. High priority has been assigned to nutrition intervention programmes for expectant mothers and young children to provide immediately or eventually an adequate intake of nutrients. The impact of these interventions needs to be studied in depth to help choose the right kind of interventions. In the course of the implementation of nutrition programmes, it is necessary to effect mid-course corrections. For, some of the assumptions may not be valid in the light of subsequent experiences. Gopalan (1976) opines that there are several instances of expensive nutrition programmes which had ultimately languished for lack of proper machinery for monitoring and evaluation. Also, in the absence of provision for evaluation for the beneficial impact of nutrition programmes, it cannot be assessed and quantified. Hence, an attempt has been made in this study to bring out the impact of socio-economic conditions and nutritional interventions on expectant mothers and their offsprings. The main objectives of this study are fourfolds:

To
1. Compare the existing nutritional status of selected expectant mothers in two income brackets in terms of food and nutrient intake, clinical picture, bio-chemical profile, weight gain during pregnancy and other parameters.

2. Correlate the maternal nutritional status with that of the infant.


and 4. Study the impact of specific intervention programmes, namely, the Applied Nutrition Programme (ANP) Pyrophylaxis against anaemia programme and Massive dose of Vitamin A supplementation to expectant mothers in addition to iron supplementation.

The study was undertaken essentially in the urban hospitals and maternity centres in Coimbatore city, and in two villages. It covered a total of 2063 expectant mothers over a period of 5 years, of whom 799 mothers belonged to high income and 1264 to low income families. All the 799 mothers in the high income group and 983 in the low income group were studied for various details without altering their existing diets. Also 196 mothers in the low income group who were
participating in three different intervention programmes were studied against a group of 83 mothers who were not receiving any supplement.

It is hoped that the study will throw light on the impact of maternal nutrition on the health of mother and on the foetus as indicated by the nutritional status of the mother and outcome of pregnancy, success of subsequent lactation and growth performance of the infants. It is also hoped that the study will make a beginning for developing yardsticks for identifying maternal malnutrition and the metabolic profile of normal healthy expectant mothers.