Review Of Literature
2. REVIEW OF RELATED LITERATURE

The problem of malnutrition in Indian infants exists despite 60 years of independence. Unfortunately, most of the undernourished children belong to either rural areas or come from urban slums which are equally underprivileged. A wide gap exists in the health and nutritional status between the privileged and underprivileged groups, due to poverty which is stated to be the ‘deadliest disease’ of the world. Horwitz (1995) has stated that ‘poverty breeds malnutrition and in turn malnutrition increases poverty’ forming a vicious cycle.

Social and economical factors have been identified to be the major determinants of malnutrition particularly in the developing countries.

The educational level, employment, health and nutritional status of the caregiver i.e., the mother is central to the quality of life and is a key determinant of her child’s health, nutritional status, behavioral and other aspects of child welfare in developing countries.

Although the importance of infant care is realized now more than before, very few Indian studies are available for review. With a sincere effort the researcher has carefully gathered literature which is briefly accounted for under the following headings:

2.1. Malnutrition and its prevalence

2.2. Causes of malnutrition

2.3 Importance of nutrition in infants
2.4. Nutritional status

2.5. Importance of anthropometric measurements in the assessment of nutritional status

2.6. Care giving practices of mothers

2.6.1. Care for mothers

2.6.2. Food preparations

2.6.3. Hygiene practices

2.6.4. Home health care

2.6.5 Psychosocial care

2.6.6. Breast feeding and supplementary feeding practices

2.7. Effect of care giving practices of mothers on nutritional status of infants

2.8. Effect of infant care giving practices of mothers on the mental and motor development of infants

2.1. MALNUTRITION AND ITS PREVALENCE:

India has one of the highest rates of malnutrition in the world. Nearly one in every two of India’s 120 million children is under weight, almost double the prevalence in Sub-Saharan Africa. An undernourished child will fail to reach her human potential in her adult years in terms of educational attainment, health and productivity – perpetuating a vicious cycle of poverty and malnutrition (Gragnolati, Bredenkamp, Shekar, Gupta and Lee, 2006).
Infants play a vital part in national development. Among the various factors influencing their mental and physical development the role of nutrition is critical (Devadas, 1992). The problem of malnutrition is increasing in developing countries because of the rapid growth of population (IJND, 1971). As per the 1991 census India has around 150 million infants constituting 17.5 percent of India’s population, who are below the age of six years (ICDS, 1995).

Hospital statistics in India indicates that malnutrition is the underlying cause of deaths in 10 percent and an associated cause in 75 percent deaths in the age group of 0-5 years. Infants in the age group of 0-6 years requires greater attention than at present, as a large percentage (15-25 percent) become malnourished by the time they are six months old (Jayashree, 1990).

Infants under six are the most vulnerable group of the population for they lay the foundation for future healthy status of the nation (UNICEF, 1985). Hence all developmental efforts should focus attention on this age group. In order to develop any scientifically sound and economically feasible nutrition strategy, a knowledge and understanding of the nutritional problems of infants of this age group is imperative (Swaminathan, 1985).

Malnutrition may be defined as a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients (Jelliffe, 1973). The dictionary meaning of malnutrition is ‘imperfect or faulty nutrition’. It can be simply defined as a precipitated (or even latent) stage of disproportion between demands of the body for a certain nutrient and its intake (Shukla, 1982).
Malnutrition is the state of impaired functional ability or development caused by an inadequate intake of essential nutrients or calories to provide for long-term needs (Read, 1973). Robinson, (1972) asserts that malnutrition is a state of disease caused by deficiency, excess or imbalance of the supplies of calories, nutrients or both that is available for use in the body.

Malnutrition is prevalent in the vulnerable section of the community. It has become a problem of huge dimension affecting infants in many developing countries. Most of the victims of malnutrition are infants (Devadas, Chandrasekhar and Doddhy, 1973).

Malnutrition is a pathologic state resulting from a relative or absolute deficiency or excess of one or more essential nutrients sufficient to produce disease. Disease may be clinically manifested or it may be detectable only by biochemical or physiological test (Scrimshaw, Tayla and Gorden, 1968).

2.2. CAUSES OF MALNUTRITION:

PEM is still highly prevalent in developing countries due to 1. Decline in breast feeding, 2. Early introduction of over diluted and often contaminated commercial milk products, 3. Use of weaning foods which are low in energy and nutrients and 4. A high prevalence of diarrhea and infection (Aberdeen, 1991).

The unfortunate state of nutrition in countries like India is attributed to several factors. Poverty and low purchasing power are no doubt major factors contributing to malnutrition. Lack of awareness regarding nutritional needs can aggravate the problem (IJND, 1989).
To combat such problems several low-cost interventions have been suggested—growth surveillance of small children, oral dehydration therapy, breast-feeding, and better weaning practices, immunization, food supplements, family planning and female literacy (Giant, 1987).

It is an established fact that India is no longer deficient in food grains. But malnutrition is primarily because the majority of the population does not have the purchasing power to satisfy their daily food requirements (Vijayaraghavan, 1985; ICMR, 1986).

Subramanian (1983) observes that poverty, malnutrition, lack of immunization, improper sanitation, lack of knowledge of the mother, non-availability of maternal and infant health services are some of the causes responsible for the infant mortality rate (IMR) and under-five mortality rates in India today.

Malnutrition is one of the most important causes for the high rate of morbidity and mortality amongst the pre-school infants (Mohan, 1982). Malnutrition is associated with lack of surpluses, population expansion, poor weaning practices, lack of suitable infant food substances, failure to use available foods, poverty, ignorance, social injustice, traditional beliefs and customs (Gopalan 1973, Devadas, 1977 and W.H.O., 1981).

Social and cultural factors influence the food consumption patterns of our population, which in turn have a significant impact on nutritional status. A study on the influence of family income and parent’s education on the nutritional status of infants revealed that the lower the socio-economic status and educational status of the parents, the higher was the number of infants
who were malnourished (Devadas, Rajalakshmi and Kaveri, 1980). Hence it is necessary to educate the mothers about the nutritional foods and cheap supplementary foods, so as to enable them to bring up a healthy child.

Many surveys have been made but few of them can identify the multifarious causes that lead to the malnourished state of failure to thrive. Investigation of the causes of malnutrition provides the best indications for treatment and for prevention. Malnutrition in many parts of the world probably depends less on the shortage of foodstuffs than on the failure of individuals to select, to prepare and to give available foods to children at the right ages and the right way (Williams and Jelleffè, 1976).

The infant’s immunity remaining low, the surroundings remaining intolerably filthy, contact with disease spreading domestic animals remaining unchecked, food availability no better and active immunization a dream, it is not long before he is down again with some other infective condition, e.g., whooping cough, bronchitis, pneumonia, measles or gastroenteritis which tend to pursue a more severe course (Gordon, Chitkava and Wyan, 1963 and Scrimshaw, 1965).

2.3. IMPORTANCE OF NUTRITION IN INFANTS:

Good health is the pre-requisite for good “Quality of life” and adequate nutrition is the key to good health. Good nutrition throughout life serves as a sound insurance for health in the years of old age.

Children constitute one of the important segments of the population. They account for over 20 percent of the population. The pre-school age is a dynamic period of growth and development as children undergo physical,
mental, emotional and social changes. Malnutrition is a common problem during the pre-school period (NIN, 2000).

Good nutrition is the fundamental basic requirement for positive health, functional efficiency and productivity. Nutrition science provides abundant evidence of the importance of nutrition in not only promoting proper physical growth and development, but also in ensuring adequate immune competence and cognitive development. Recent advances point to the far-reaching effects of good nutrition in early life (intra-uterine infancy and childhood) on prevention of degenerative diseases in late adult life. For a nation to be healthy, strong and productive, the nutritional status of its people must be good (NIN, 1998).

Nutritional adequacy is one of the key determinants of the quality of human resources everywhere. Despite the rapid progress that has been made in the technology of food production and processing, global malnutrition continues to be a major area of concern for public health (Seshadri, 1997).

Malnutrition during critical phases of early growth can lead not only to the stunting of physical growth, but also to suboptimal intellectual development and poor neurointegrative competence in children (Kakkar, Hooda and Vidyasakar, 1987).

The welfare of a nation rests on the health of its people. The foundation for health is laid in early infants. Infants are in a stage of rapid growth and hence their nutritional needs are proportionately higher than those of other segments in the community (Swaminathan, 1970). The rapid rate of growth during infancy and early childhood including pre-school age,
calls for intake of greater amounts of nutrients. If these needs are not adequately met both qualitatively and quantitatively signs of malnutrition will manifest themselves and result in long term deficiencies in physical, mental and all-round development (Devadas, 1984).

Nutrition is of paramount importance in infant health. The important characteristic that differentiates a child from an adult is that of constant growth and development. It plays a significant role in the process of the development of the human baby from conception to birth, and hence through infancy to childhood and adolescence. Due to this feature an infant is vulnerable to malnutrition, if it fails to get an adequate quantity of the required nutrients (Das, 1982).

“As the twig is bent so the tree is inclined”. It is now increasingly believed that many conditions, which plague adults, have their origin in infancy. These include malnutrition, defective brain development, nutritional dwarfism and even obesity in adults (Muthayya, 1979). Nutrition is especially important for the optimum growth and development of the young. Therefore, achievement of adequate nutrition cannot and should not be taken for granted. Good nutrition and malnutrition are the end results of many interacting factors operating simultaneously and concurrently on the individual in the physical, ecological and cultural environment of the community (Devadas, 1972).
2.4. NUTRITIONAL STATUS:

In India, nutritional status of infants varies from region to region, due to differences in breast feeding and weaning practices, socio-cultural attributes, irrational practices and economic status (IJND, 1999).

One’s level of nourishment – his state of nutrition – is called his “Nutritional Status”. Nutritional status should be viewed as an essential element in the total concept of health, a broader term that encompasses not only physical well – being but mental and emotional fitness as well. Excellent health cannot be achieved unless one is well nourished, that is, in good nutritional status. It has therefore become important to understand the components of nutritional status and to develop scientific methods of measuring those components. As a result of progress along these lines, it is now possible to obtain an estimate of the nutritional standing of individuals and groups in relation to various accepted goals for adequacy (Martin, 1971).

Nutritional status means state of health of the individual or group as conditioned by choice and amount of foods, or more accurately nutrients eaten. Nutrients are the chemical constituents of foods required by the body for normal growth and function. These are the proteins, carbohydrates, fats, vitamins and minerals that make up the diet and that are needed everyday for our continued well being (Swaminathan, 1975).

Diet, infections and parasitic diseases influence the nutritional status of a population profoundly. Malnutrition and under nutrition affect adversely the growth and health of infants. The incidence of malnutrition is high
among pregnant women and weaned infants among the low-income groups in the developing countries.

2.5. IMPORTANCE OF ANTHROPOMETRIC MEASUREMENTS IN THE ASSESSMENT OF NUTRITIONAL STATUS:

Measurements of height and weight are the most common indices of growth. Each part of the body grows and develops with a rate and timing of its own (Martin, and Virginia, 1978). Weight is a highly sensitive indicator.

In the context of widespread prevalence of malnutrition and scarcity of resources in the country, it becomes imperative to accord priorities in the matter of nutrition programmes. In drawing up such priorities, criteria which would be helpful in assessing the severity of malnutrition are important. It has been generally agreed that nutritional anthropometry may be a useful tool in the assessment of the magnitude of malnutrition (Sastry, and Vijayraghavan, 1975).

2.6. CARE GIVING PRACTICES OF MOTHERS:

Every year many women die from problems linked to pregnancy and childbirth. For every woman who dies, approximately 30 more develop serious, disabling problems. A girl is not physically ready to begin bearing children until she is about 18 years of age. Childbirth is more likely to be difficult and dangerous for an adolescent than for an adult. Babies born to very young mothers are much more likely to die in the first year of life. The younger the mother, the greater the risk to her and her baby.
Marriage among adolescent girls younger than 18 years often has significant negative consequences for them and their newborns. Early marriage often leads to high risk of health and nutrition deficiency, maternal mortality, school dropouts, domestic violence, sexual abuse and malnourished children; Child marriage is prevalent in many developing countries. 48% of the women in India are married before the age of 18 years.

The dangers of childbearing can be greatly reduced if a woman is healthy and well nourished before becoming pregnant. All pregnant women need particularly nutritious meals and more rest than usual throughout the pregnancy. Smoking, alcohol, drugs, poisons and pollutants are especially harmful to pregnant women and young children. Salt used should be iodized. Women who do not have enough iodine in their diet are more likely to have miscarriages and risk having an infant who is mentally or physically disabled.

During pregnancy and lactation, the family should support the women in obtaining extra and higher quality foods, reducing workloads, attending antenatal clinics and obtaining safe birthing, and receiving adequate postpartum rest. Workload during pregnancy has a significant effect on birth weight. Family support is also important in reproductive health, including helping the adolescent girl delay her age at birth, and supporting women in their use of family planning. Physical health, including provisions of a fair share of the family food and protection of girls and women from abuse. Mental health, stress, and self-confidence are domains which families can support or undermine depending on their attitudes and behaviors. Women need support in having adequate autonomy in decision-making when needed, and access to the family’s income and assets. Support in sharing the
workload is also a domain of care for girls and women. Finally, the family’s ability to assure girls’ equal access to school and women’s access to continuing education is extremely important both for the current and for the subsequent generation.

2.6.1. CARE FOR MOTHERS:

Age of Mother and its effect on the care of their infants:

Kurz and Kathleen (2006) stated that by delaying age at marriage to beyond adolescence and by improving the reproductive health of young married women is likely to improve the nutritional status of young women, young mothers and their infants.

Infant Care with respect to Gender of the Infant:

According to the CIA World Factbook (2010) Infant mortality rate: total: 50.78 deaths/1,000 live births male: 49.33 deaths/1,000 live births; female: 52.4 deaths/1,000 live births.

Khanna (2003) determined whether the imbalance in the sex ratio in India can be explained by less favorable treatment of girls in infancy. Diarrhea was responsible for 22% of deaths overall, though twice as many girls died from diarrhea. Three out of every four deaths were girls. The excess number of unexplained deaths and deaths due to treatable conditions such as diarrhea disease in girls may be because girls are regarded and treated less favorably in India.

Kulkarni (2000) Examined whether a gender gap existed with respect to various child health indicators. The study reported that India has the
world’s largest child survival gaps between boys and girls. The study also found progress in child survival and reduction in female mortality, but this was counterbalanced by female infanticide and sex-selective abortions.

**Maternal Education and Infant Care:**

James, and Subramaniam (2004) Neonatal Mortality was less among highly educated mothers compared to mothers with low education.

The educational level of the mother is central to the quality of life and is a key determinant of her child’s health, nutritional status, behavioral and other aspects of child welfare in developing countries. (Leslie, 1995) Nationwide as well as micro studies clearly show that incidence of under nutrition among children fell monotonically with the maternal education.

This is of particular concern for India due to a low literacy level of 53 per cent for women. This figure is still lower for the women from underprivileged sections which account for highest level of undernourished children.

Upadhyay and Sikdar (2009) studied the relationship between women’s educational level and their attitudinal difference towards infant and personal care. The statistical analysis reflects mothers with higher educational status have positive attitude towards mother (personal) and infant care.

Sharma and Sharma (2003) studied the effect of feeding practices on a random sample of 100 infants. It was revealed that health status of lactating mothers, malnourishment, environmental insanitation and lack of education
in the area of infant affected the feeding practices among rural women of Kangra district. However, prevalence of superstition was quite common in Kangra district irrespective of education and other related factors.

Smith and Haddad (2000) analyzed the contributions of varying factors in their study of underlying determinants for reducing child underweight in developing countries. The study involved 63 developing countries within a time frame of 1970 to 1995. They found that women’s education was the largest determinant of child underweight. This was followed by food availability and health environment.

Kaul and Abrol (1997) found that educated mothers had better knowledge of hygiene and health needs and practices. Lack of proper facilities like basic education, income, and access to mass media might affect their knowledge and practices.

Cleland and Ginneken (1988) said that education facilitates mother’s learning about the causation, prevention, recognition and cure of disease as well as nutritional requirements that can subsequently affect the infant health behavior.

**Maternal Employment and Infant Care**

Child rearing continues to be the job of the mother in India and importance of breast-feeding is stressed, all the more, these days. Although many factors are involved, the decline in breast feeding both in developed and developing countries is attributed to the large number of women working outside the home, the availability of large number of infant weaning foods and the lack of nutrition counselling. (Yegammai and Chitra, 2004).
Yegammai and Chitra, (2004) studied the association of maternal employment on the feeding practices and the nutritional status of their infants 0-12 months). The findings of this study indicate that the employment may not be an important factor affecting the infants’ growth pattern. The other attributing factor is that the infants were looked after by their own grand parents and the employed mothers took special efforts in feeding / caring the infants despite their additional burden of employment.

James and Subramaniam, (2004) reported higher incidence of neonatal mortality was higher among working mothers compared to non-working mothers. High neonatal mortality among children of working mothers confirmed that it was merely the poverty factor and not the lack of sufficient attention paid to the child due to work.

Kishore, (1998) states that mothers who are employed have a 10 percent higher infant mortality rate and a 36 percent higher child mortality rate than mothers who are not employed. Male child mortality increases more than female child mortality if mothers work. Employment of women outside the home for cash, perhaps the most empowering form of employment for women, does not lower the risk of mortality for girls, but it increases the risk for boys. A further finding is that employment of mothers in urban areas has more detrimental effects on infant than employment of mothers in rural areas. These findings do not imply that mother’s employment should be discouraged. Instead, they indicate the need for viable child-care alternatives for women who work and for a renegotiation of gender roles and gender relations.
Women play a dual role both at home and at the work place. There is a sustainable increase among women who go out for work due to economic compulsion, searing price rise, preference for modern living and to utilize the acquired education. In India, one in three of all adult women aged 15-49 are in the workforce and engaged in almost every economic activity. (Narayanan, 1997).

Engle, (1991) examined associations of 293 mothers’ work for earnings and child-care arrangements with the anthropometric status of their children in urban Guatemala. It was hypothesized that during the period of life in which growth often falters (8 through 35 months), maternal employment could be beneficial for children. Informal workers tended to be poorer, less educated, and have more undernourished children than formal workers or nonworkers. When poverty and mother’s education were controlled for, no effects of maternal employment on children’s anthropometric growth patterns were seen. However, the percent of the family income the mother earned was positively associated with all anthropometric indicators, controlling for confounds. Children taken care of by preteen siblings had significantly lower weight for height than those in other situations, even controlling for SES and maternal employment status. These effects were not found in a 36-48 month-old sample.

With increased numbers of women employed in their children’s first year of life and with increased attention being paid by parents and policy makers to the importance of early experiences for children, establishing the links that might exist between early maternal employment and child cognitive outcomes is more important than ever. Negative associations
between maternal employment during the first year of life and children’s cognitive outcomes at age 3 and later ages have been reported.

2.6.2. FOOD PREPARATIONS:

More than half of all child deaths are associated with malnutrition, which weakens the body’s resistance to illness. Poor diet, frequent illness, and inadequate or inattentive care of infants can lead to malnutrition.

Vinod, (1999) indicated that women living in households that use biomass cooking fuels defined in the National Family Health Survey as wood and dung have a much higher prevalence of both partial and complete blindness than women living in households that use cleaner fuels. The effect remains strong even after controlling for several potentially confounding demographic and socioeconomic variables. Among women age 30 and older, 17% of partial blindness and 20% of complete blindness can be attributed to cooking smoke from biomass fuels.

2.6.3. HYGIENE PRACTICES:

More than half of all illnesses and deaths among young children are caused by germs that get into their mouths through food or water or dirty hands. Many of these germs come from human and animal faeces. Many illness, especially diarrohea, can be prevented by good hygiene practices.

A study in India found that the poor parents often lack of knowledge of healthy and hygienic practices. The biggest killers of children worldwide are complications among newborns, pneumonia, diarrohea and malaria. (Save the Children, Westport, USA, 2008).
Ghosh, (2007) conducted a study on safe water, safe waste disposal and health outcomes and found that despite the progressively increasing outlays under plans, universal provision of safe drinking water and improved sanitary facilities is still a distant goal. Only 64% to 74% of the rural population of the country draws its drinking water from protected sources leaving the unserved population exposed to dangers emanating from consuming contaminated water. It was found that the incidence of diarrhea is relatively higher among households with low standard of living.

A study examined the relationship between availability of basic household amenities, household environment and infant and child mortality at district level of Maharashtra, Indicators of household amenities and sanitation had a direct effect on child survival. The availability of safe drinking water, electricity, toilet facility, pucca house and modern cooking methods had strong association with the IMR and CMR level. It was recommended that there should be provision of better basic amenities to ensure household hygiene, and suitable health education programme enlisting community participation to bring down infant and child mortality. (Ram and Usha, 1999)

More than 200 million children in the world under 5 years do not get the basic health care they require, and the poorest children are the most vulnerable. In India 67,127,000 (53%) children do not get basic health care, and a poor child is three times more likely to die than a rich child because of greater exposure to unsafe water, poor sanitation, indoor pollution and inadequate housing conditions. They are more likely to be born with low birth weight, and become malnourished.
2.6.4. HOME HEALTH CARE:

Malnutrition is a leading contributor to infant mortality and morbidity. It has been estimated to play a role in about half of all child deaths (Horton 1999, Pelletier 1995, Pelletier and Frongillo, 2003) and in more than half of child deaths from diarrhoea (61 percent), malaria (57 percent) and pneumonia (52 percent). Malnutrition is also involved in 45 percent of all child deaths from measles (Black, 2003 and Caulfield, 2004).

Nair and Radhakrishnan, (2004) reported from their study that challenging living conditions and work hours undermine the capacity of mothers to provide optimal care for children whereby compromises are sometimes made in keeping the children clean, hygienic preparation of food especially in the absence of reasonably adequate services.

Lyngdoh and Bremley, (2004) stated that health education programmes should be organized by the Government to make people aware about the benefits of immunization.

Sheeba et al.,’s (2003) research on comparative studies related to the home environments of children in deprived urban settings and high socio-economic status reveal that children in deprived settings had poor home environment which contributed to the difference in their developmental status.

Good home health practices help prevent illnesses, and through good treatment reduce the negative impact that illnesses have on children’s and development.
Home management of illness includes the prevention of illness, its diagnosis and subsequent home treatment. Caregivers recognize and diagnose diarrhea and provide home remedies, including oral rehydration solution. Because diarrhea and other illnesses often result in anorexia, caregivers must use their skills to increase feeding during illness and convalescence. Utilization of health services, including growth monitoring and immunization, takes time and effort. Home-based protection includes control of pests (e.g., insects, rats) and avoiding accidents (burns, falls, poisoning). Malaria has a major impact on nutrition of children and prevention of mosquito bites through use of bednets is thus an important care behavior. When a child’s care givers are also a child, protection from dangerous situations and prevention of accidents may be lacking.

Rasania, (2005) studied the knowledge and attitude of mothers about oral rehydration solution in few urban slums of Delhi. The common sources of ORS packets were hospitals, dispensaries, private practitioners and chemist shops. The findings revealed that many others (29.3%) had misconceptions about the use of ORS. Among the ORS users, most of them (89.5%) had correct knowledge regarding the role of ORS during diarrhea and 67.6 knew how to prepare ORS.

The demand and supply side of immunization services; and the problems faced by Government and Non-Government health personnel in implementing these programmes were examined. The demand levels are very low as also the immunization coverage. (Rao, 2003).

A longitudinal study was conducted in Durgarampur village of District Hooghly to determined the Acute Respiratory Infection (ARI)
morbidity among all 63 under-five rural children. Results revealed that there were 1.17 episodes of ARI per child during six months. The study findings strongly point towards the importance of basic health promotional measures like proper infant feeding practices, proper nutrition of the child, and improved general conditions of living in prevention and control of ARI. (Mitra and Kumar, 2001)

Singh and Yadav, (2000) assessed the immunization status of children in BIMARU states, i.e. Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh. Results revealed that about one-third of the children were immunization partially immunized. The coverage levels were lower for children of illiterate mothers. Information, Education and communication (IEC) activities are recommended to educate the mothers in rural, tribal and inaccessible villages.

The prevalence and pattern of minor injuries among under five children of Dadu Majra Colony, Chandigarh was studied. Results revealed 67% prevalence rate of minor injuries among under fives. Overall maximum injuries took place at home (62.6%), and majority of the injuries were self sustained (60%) and while playing inflicted. Head, trunk and fingers were documented as the most common site of injury. The injury rate was higher among children of working mothers and illiterate mothers. (Tiagi, 2000).

Torres, (2000) examined the association of infectious diseases with child growth among Bangladeshi children aged 5 to 11 years. The most frequent infections were respiratory followed by non-dysentery diarrhea and
dysentery diarrhea. Results revealed that diarrhea morbidity showed growth in children.

A study was carried out in 18 districts of Uttar Pradesh to assess diarrhea management practices used by mothers. ORS was used only in 21.9 per cent diarrhea episodes. Availability of ORS was also poor as it was available only in 15 per cent villages. Feeding was continued in 72.5 per cent of the episodes and more fluids were given in 21.9 per cent episodes. (Chandra, 2000).

Amy, (2000) examined the relation between malnutrition and child mortality due to diarrhea, acute respiratory infection, malaria, measles, etc. which account for over 50% deaths among children. Malnutrition measures as poor anthropometric status, is associated with about 50% of child mortality. The strongest and most prominent relation between malnutrition and child mortality was observed for diarrhea and acute respiratory infection. A less consistent association was observed between nutritional status and death from measles. The risk of malnutrition related mortality varied for different diseases.

Subramanian, (1983) observes that poverty, malnutrition, lack of immunization, improper sanitation lack of knowledge of the mother, non availability of maternal and child health services are some of the causes responsible for the infant mortality rate (IMR).

Infant mortality and morbidity is still prevalent in developing countries due to the following reasons. 1. Decline in breast feeding 2. Early introduction of over diluted and often contaminated commercial milk
products 3. Use of weaning foods which are low in energy and nutrients and 4. High prevalence of diarrhea and infection.

The child’s immunity remaining low, the surroundings remaining intolerable filthy, contact with disease spreading domestic animals remaining unchecked, food availability no better, and active immunization a dream, it is not long before he is down again with some other infective condition, eg., whooping cough, bronchitis, pneumonia, measles or gastroenteritis which tend to pursue a more severe course.

To combat such problems several low-cost interventions have been suggested. Growth surveillance of infants, oral dehydration therapy, breast-feeding, and better weaning practices, immunization, food supplements, family planning and female literacy.

2.6.5. PSYCHOSOCIAL CARE:

Under nutrition in infancy is associated with poor mental and motor development. Nutritional deficiencies and a lack of stimulation create a vicious cycle in which deprivation in one can result in further deprivation in other. For example, a malnourished infant may show reduced psychomotor activity such as crawling and engagement in creative play. As the child becomes more apathetic and less demanding, parents often provide less stimulation. The combination of malnutrition and a lack of psychosocial stimulation are particularly harmful.

Social, emotional, and cognitive interactions between caregivers and children influence both growth and development of children. Of late there is an increasing realization that the issue of Malnutrition and opportunities for
a stimulating environment for a young child has to be addressed together. Interventions that combine both strategies for physical and psychological development have been found to have the maximum impact on growth and development of infants.

Hossain et al., (2009) conducted a randomized study in Bangladesh provided psychosocial stimulation for 12 months to undernourished children attending community nutrition centers. Children receiving stimulation had improved mental development and behavior and their mothers’ knowledge regarding child care practices increased as compared with the control group children.

The first year of the infant’s life is critically important. It is the foundation of future health, growth and development. During this period, infants learn more quickly than at any other time. They develop more rapidly and learn more quickly when they receive love and affection, attention, encouragement and mental stimulation.

Every child needs to be provided with rich and integrated sensory motor experiential learning environment for attaining his/her optimum development. The optimum environment for the child is the one in which the child is cared for in his/her own home by their family members with the warm and continuous relations along with varied inputs of sensory motor experiences.

Thukral, (2008) studied the effect of kangaroo mother care (KMC) i.e., the premature infant is kept warm in the maternal pouch and close to the breasts for unlimited feeding on preterm babies. Observational studies have
shown reduction in mortality after institution of KMC. Preterm babies exposed to skin to skin contact showed a better mental development and better results in motor tests.

In developing countries, caring for the large number of babies in orphanages is a very hard work. Whereas the physical needs of most of the children are met, play often gets neglected. Studies have repeatedly shown that babies in such institutionalized settings suffer from severe psychomotor retardation.

Taneja, (2002) studied the effect of an intervention programme of structured play on 30 children in the orphanage aged 6 months to 2.5 years. They were assessed for their Motor, Mental and Social Quotients, using the Indian adaptation of Bailey's Scale of Infant Development (DASII) and the Vineland's Social Maturity Scale. The mean Motor Quotient, Mental Quotient, and the Social Quotient improved after the intervention. This study shows that short daily sessions of play can significantly improve the development of children in such institutions. It is vital to remember that children grow 'Not by Bread Alone'.

Parmar, (2000) studied infants from 10 cities in the United States were from birth to age 3 years to determine how experiences in child care related to cognitive and language development. Multiple assessments of family and child care environments and of cognitive and language competence were collected. Analyses revealed that the overall quality of child care, and language stimulation in particular, was consistently but modestly related to cognitive and language outcomes.
Boom, (1994) studied the influence of temperament and mothering and it was found that after giving intervention, mothers were significantly more responsive, stimulating and controlling of their infants behaviour than control group mothers.

Jaya and Ratna, (1992) studied the effect of a home stimulation programme on mental development of infants 12-18 months of slums of Hyderabad. Results revealed that though the performance of both the control and experimental groups were same at the time of pre-testing, due to exposure of stimulation programme, experimental children’s rate of improvement in mental age was higher than that of control group.

2.6.6. BREAST FEEDING AND COMPLEMENTARY FEEDING PRACTICES:

In India, until recently, food insecurity has been viewed as the primary or even sole cause of child malnutrition. By contrast, research indicates that high levels of exposure to infection and inappropriate child feeding and caring practices, especially during the first two to three years of life, are salient (Gragnolati, Bredenkamp, Shekar, Gupta and Lee, 2006).

Infancy is one of the critical periods in the development of an individual. However insufficient attention has been paid to the child’s growth during the period between 4 and 24 months. It is a fact that there are underlying causes of malnutrition are inadequate food, inadequate health and inadequate care. Of these dietary intake and health status are the immediate determinants of good nutrition and of course care giving ultimately determines the quality and quantity of food ingested and health.
care available to infants which in turn determines the growth and development.

One of the major parameters used for measuring the adequacy of breast milk is the growth of the infant. The occurrence of growth faltering is taken as an indicator of the need complementary foods.

Introduction of complementary feeding may be desirable from as early as the fourth month. But must be kept in mind that it is strictly related to maternal nutrition on one hand and social and cultural and economic conditions of the family on the other. Besides, there are several factors like type of infant foods available, facilities to prepare and sanitary conditions in which food is prepared and fed. Several workers have demonstrated association between early introduction of complementary feeding and intestinal infections in children.

Giugliani, (2007) studied the factors associated with introduction of water/herbal teas or non-breast milks during the first month of life and determine the impact of this supplementation on breastfeeding duration on 220 infant mother pairs Introduction of water/herbal teas was associated with maternal age less than 20 years. Introduction of non-breast milks negatively influenced breastfeeding duration. Priority should be given to preventing the early introduction on non-breast milks, especially in mother-infant pairs with associated risk factors.

Another study was done in Uttarakhand to assess infant and young child feeding practices, and understand the barriers to optional breastfeeding practices. The percentage of exclusively breastfed children for 0-6 months
was as low as 21%. Plain water was the major other supplementary feed given to infants aged 0-3 months. In the 4-6 months age group, other feeds were started in the case of 98% infants. 37% infants were bottle fed 61% infants got top milk of cow, buffalo or goat, and 47% of them also received gripe water. It is that to be successful in breastfeeding, women need “breastfeeding education and counseling” as a mandatory service. (Uttarakhand, Dept of Women and Child Development, Dehradun, 2006).

Yadav and Singh, (2004) Undertook a study in Bihar on 8000 mothers to assess the knowledge, attitude and practices of mothers related to breastfeeding and introduction of supplements. The study revealed that about 29% of the mothers started breastfeeding within 24 hours. About two third mothers discarded colostrums. Cereal preparations and milk formed the major food item as a supplement for breastmilk. The main reasons for starting supplements were mother’s insufficient milk, child’s demand, and mother’s opinion that supplements were required for proper growth.

James and Subramaniam, (2004) conducted a study on Neonatal mortality in all the major states of India. It was found that neonatal Mortality was less among highly educated mothers compared to mothers with low education. The incidence of neonatal mortality was higher among working mothers compared to non-working mothers. High neonatal mortality among children of working mothers confirmed that it was merely the poverty factor and not the lack of sufficient attention paid to the child due to work. Standard of living and urban residence were not significantly associated with neonatal mortality. The health behavior of mother in terms of smoking, drinking alcohol and chewing tobacco, and injury variables was found to be significant. Health seeking behavior of the mother was significantly
associated with neonatal mortality, as also a proper medical check-up and immunization which showed positive relationship with neonatal mortality.

The barriers to optimal breastfeeding practices was examined in another study. Some of the barriers to optimal feeding practices were found to be the practice of giving pre-lacteal feeds, long working hours in office, lack of knowledge regarding exclusive breastfeeding, and misconception in the mind of some mothers that breastfeeding would reduce their beauty. (Gupta, Arun and Gupta, 2003).

A study of studied the care practices of sixty mothers having infants in the age range of 0 to 18 months. The results of the study suggest the need of mother education in infant feeding. (Nandwana and Ranga, 2002)

In another longitudinal study on 81 rural children (44 Boys & 37 Girls) of Ranga Reddy district, Hyderabad revealed that all the mothers completely discarded the colostrums. Instead, wet nursing, honey and castor oil were given to the newborns as per lacteal foods. All the children were breast fed only on third day after birth. Breast feeding continued up to one year. Delayed weaning and inadequate number of supplementary foods were observed. The common ailments reported were cold, cough, diarrhea and fever. The study results indicate the crucial need for nutrition and health awareness programmes. (Nagamani, Devi, and Rayalu, 2002).

The cultural beliefs and practices of Puerto Rican families that influence feeding practices and affect the nutritional status of infants were studied. The cultural belief that big is healthy was found to be integrally related to cultural feeding practices. (Higgins, 2000).
2.7. EFFECT OF CARE GIVING PRACTICES OF MOTHERS ON NUTRITIONAL STATUS OF INFANTS:

Lutter, (2007) studied the effect of infant feeding practices on the nutritional status of infants and young children between ages 6 and 24 months. Infants who were growth retarded had a total energy deficit compared with requirements; upto 25% of food offered was not consumed. This indicates that dietary quality rather than quantity is the key aspect of complementary food diets that needs to be improved.

In another study the nutritional status of infants were observed and found whether infant feeding practices were associated with under nutrition in anganwadi (AW) areas of urban Allahabad, Uttar Pradesh. The study found that delayed initiation of breastfeeding, deprivation of colostrums, and improper complementary feeding were significant risk factors for under nutrition among under five children. The study suggested that there is need for promotion and protection of optimal infant feeding practices for improving the nutritional status of children. (Kumar, 2006).

Harishankar, (2004) assessed the factors associated with nutritional status of infants. Majority of infants having malnutrition was recorded in age groups 0-12 months and it was found that care practices were associated with the nutritional status of infants.

Studied childcare and the nutritional status of children aged 0-2 years was assessed. Infants who were malnourished (stunted) had less time devoted to them for breastfeeding, food preparation and feeding. (Kamau-Thuita, 2002).
Banerjee and Anindita, (2002) investigated the underlying causes of poor growth and development of 300 infants in Varanasi; Findings of the study indicated that faulty weaning practices were one of the root causes of malnutrition.

The importance of cultural and behavioral factors in infant’s nutrition was studied with renewed interest in care. Research is needed to understand behavioral factors in complementary feeding, and to identify and test intervention strategies designed to improve nutrient intake of young children. (Engle, 2000).

A longitudinal study was undertaken to ascertain the nutritional status of infants with an aim to identify the crucial periods in growth and development during the first five years of life. Anthropometric parameter ‘weight’ was used as a measure to assess the nutritional status. The nutritional status of the children was graded on the basis of weight for age criteria based on the classification recommended by the Indian Academy of Pediatrics (1972). Results indicate a sudden decline in nutritional status of the infants at the age of one year. Most of them attained grade I malnutrition. Those who had born with malnutrition had further deteriorated in their grades. Hence, the rural mothers and child care takers need intensive and extensive education regarding child care particularly with respect to nutrition. (Khadi, 1991).

2.8. EFFECT OF CAREGIVING PRACTICES OF MOTHERS ON MENTAL AND MOTOR DEVELOPMENT OF INFANTS:

Development of the child in early years is most rapid. The nurturing experiences the infant receives in the early years of life serve as the
foundation for his/her subsequent learning. Environmental influences have the
greatest effect on the child during periods of rapid development. Each child
needs an experientially rich environment for his/her optimum development.
Proper opportunities are not available for infants for developing their potentials
to the maximum.

Mental development encompasses such phenomenon as sensation, perception, imagination, retention, recall, problem solving, reasoning and thinking. During infancy the child assimilates information from the world through the senses and acquires abilities through creativity and language. Congenial home environment, good nutrition, educational materials are needed for development of both motor and mental skills.

Studies have demonstrated that the breastfed infants tend to have higher scores in tests of cognitive ability, perform better on standardized tests of reading, mathematics and scholastic ability even during their later years. It also helps in reducing the incidence of infectious diseases, mortality and morbidity. There is considerable information on the effects of severe early malnutrition on the infant’s future intellectual development. Recent studies have indicated that anaemia affects both mental and motor developments. Severe iron deficiency anaemia widely prevalent during the first two years of life when the infant’s brain development is maximal may cause permanent neurological damage.

Kamla and Raj, (2010) conducted a study in rural area of Hisar District of Haryana on 100 children in the age group of 2-3. After intervention programme, the respondents were assessed for their level of motor skills in both the experimental and control groups. It was found that
there was a certain impact of intervention programme on the respondents in experimental group and also observed that the improvement was more in all skills of boys as compared to that of girls.

Zhou, (2009) investigated the relation between duration of breast-feeding in infancy and the intelligence quotient (IQ) of children at 4 years of age in a well-nourished population of an industrialized country. There was no association between duration of breast-feeding and childhood IQ in this relatively well-nourished cohort from an industrialized society. In such settings, the apparent benefit of breast-feeding on cognitive function is most likely attributable to sociodemographic factors. The quality of the home environment, as assessed by the Home Screening Questionnaire, was the strongest predictor of IQ at 4 years.

Yen-Tzu Wu et al., (2008) explored the factors that relate to the mental and motor development of Taiwanese infants from age 6 to 24 months with the help of the Bayley Scales of Infant Development. (BSID-II) at 6, 12, 18, and 24 months of age. Taiwanese infant’s Bayley mental and motor raw scores were lower than the United States norms from age 6 to 24 months. However, the discrepancy gradually declined with increasing age. Gender, intrauterine growth status, birth order, region of residence, maternal education, and paternal occupation were shown to have longitudinal associations with their mental and/or motor scores.

Kulsum, Lakshmi and Prakash, (2008) conducted a study on child care, behavioural knowledge of women from an urban slum with reference to health and nutrition. Results indicate that the child’s overall development including health and nutritional status is solely/wholly dependent on her
mother’s health and nutritional status from in utero to birth and later on her other characteristics as literacy status, awareness and economic status.

Under nutrition – both protein – energy malnutrition and micronutrient deficiencies – directly affects many aspects of children’s development. It retards their physical and cognitive growth and increases susceptibility to infection and disease. Under nutrition also affects cognitive and motor development and it undermines educational attainment (Gragnolati, Bredenkamp, Shekar, Gupta and Lee, 2006).

WHO multicentre Growth Reference Study Group, (2006) examined relationships among physical growth indicators and ages of achievement of six gross motor milestones on the 816 children from 4 until 12 months of age. Sporadic significant associations were observed between gross motor development and some physical growth indicators, but these were quantitatively of limited practical significance. These results suggest that in healthy populations the attainment of these six gross motor milestones is largely independent of variations in physical growth.

Apache, (2005) emphasized on activity based intervention in motor skill development. Significant improvement in both locomotor and object control skills through the activity-based intervention was found compared to direct instruction.

Edwards and Sarwark, (2005) found that the average motor indices of the boys were more than girls after an intervention programme.

Chopra, (2004) attempted to see the impact of all intervention on motor and mental development of rural female infants. Results revealed
heightened performance of experimental group infants in motor and mental development during post test. Significant differences were found in mental and motor development including psychomotor index and mental development index in experimental group after imparting appropriate education to the parents.

Black, (2004) evaluated at 6 and 10 months of age the impact of a 9-month supplementation trial of 5 mg of zinc on the development and behavior of Indian infants who were born SGA and to evaluate infants' ability to elicit responsive caregiver using the Bayley Scales of Infant Development II. Caregiver responsiveness, observed on an Indian version of the Home Observation for Measurement of the Environment scale t. Heavier birth weight infants had better scores on all measures of development and behavior at 6 months and on changes in mental and motor development from 6 to 10 months, compared with lighter birth weight infants. Boys had better weight gain and higher scores on mental development and emotional regulation than girls. Infants who were from families of higher socioeconomic status had higher scores on mental development than infants who were from families of lower socioeconomic status. Longer term follow-up studies among zinc-supplemented infants are needed to examine whether early supplementation leads to developmental or behavioral changes that have an impact on school-age performance.

Sharma and Nagar, (2003) attempted to see the effect of an intervention programme on the motor and mental development of rural infants of Kangra district in Himachal Pradesh. The results showed significant differences in the mental and motor development indices of infants, indicating a positive impact of intervention. The experimental group
infants had higher mean scores on developmental indices as compared to the control group.

Paine, Makrides and Gibson, (2002) examined the association between duration of exclusive breast-feeding and mental and motor development of infants. Using the Bayley Scales of Infant development showed that the duration of breast-feeding significantly predicted mental development scores for boys not for girls.

In another study the developmental quotient in sixty-eight three months old infants with Gesell Developmental Schedules was studied. The style for rearing infants was obtained by inquiring their parents. The results showed that the development of adaptive behavior, language and personal – social behavior was better than that of gross motor and fine motor developments; giving infant’s opportunity to move could make the development of adaptive behavior, gross motor and fine motor better. The higher education level of parents always associated with a better mental development of infants. (Ciu, Hou and Ma, 2001).

Zhou, Baghurst, Gibson and Makrids, (2000) conducted a study to evaluate the intellectual level of 260 infants by Fagan Test of Infant Intelligence, in Changsha city and analyze the main factors that affect infant intellectual development. The general intellectual level of infants in Changsha city was good. The data suggests that the main measures to promote infant intellectual development were more attention need to be paid to health care for women and children, prevention of perinatal disease and infant rearing in a scientific way.
Bharadwaj (2000), Chopra (2000) and Katiyar, Sen and Agarwal (1976) showed that infants deprived of proper nutrition care showed delay in achieving milestones in walking, crawling, etc. Psychological tests reveal that those who were malnourished in infancy had a permanent deficit in intellectual functioning.

Saraswathi, (1999) stated that empirical studies reveal the effect of intervention programmes designed within the framework of experimental enrichment, seem to have both short term and long term effects on the mental and motor development infants.

Sit and Young, (1999) studied the growth of Chinese infants and children which had improved since the introduction of economic reforms. In certain industrial centres, infant’s lengths increased up to international standards and overall prevalence of underweight and stunting had declined. Rural children and children of minority nationalities continued to suffer from malnutrition and lower growth as compared to urban children.

Gordan, Huntlywood, Road and Wilmslow, (1997) studied the influence of early diet on the development of preterm infants. Malnutrition during a sensitive period may result in disease in adult life, and strongly suggest that the development of the brain and the retina can be affected. This may be due to the lack of essential fatty acids, and will particularly involve premature babies born at a time when cell membrane development is especially vulnerable.

Florey, Leech and Blackhall, (1995) determined the relationship between type of infant feeding and mental and psychomotor development at
age 18 months. The main outcome measures were the Bayley Scales of Infant Mental and Motor Development. Higher mental development was significantly related to breast feeding the study provides further evidence of a robust association between type of feeding and child intelligence.

Mc. Gregor, (1994) discovered that psycho-social intervention should be an integral part of the treatment of several malnourished children.

Jaya and Ratna, (1992) studied the effect of a home stimulation programme on mental development of toddlers (12-18 months) of slums of Hyderabad, on 60 children who were 13 ± 1 month of age. Results revealed that though the performance of both the groups were same at the time of pre-testing, due to exposure of stimulation programme, experimental children’s rate of improvement in mental age was higher (1.34 months) than that of control groups.

Rayar, Khadi, Gaonkar and Katarki, (1992) studied the motor and mental abilities of 210 urban and rural infants of 8 – 12 months in Dharwar (Karnataka) by administering the Bayley’s Scale of Infant Development. They found that urban infants easily attained motor and mental tasks as compared to rural infants and at most of the age levels urban infants were advanced in their abilities as compared to their rural counterparts.

Mishra and Mohanty, (1991) gave short term intervention training and found significant improvements in cognitive skills of the children of experimental group.

Bradly, (1989) investigated the effects of a year long home intervention of pre-term and full term babies and found significant positive
correlation between increase in their IQ level and maternal involvement in baby care.

Mc gregor (1984) and Salt, Gallu and Ramsay, (1988) reported from their studies that children’s cognitive, motor and behavioral development can be affected by their nutritional and health status. Poor socio-cultural environments including poor physical resources such as overcrowded homes with poor sanitation, low income, little knowledge of play, poor stimulation at home are detrimental to intellectual development.

Allen, (1983); Devi and Sahu (1982) studied infant development in relation to their home environment and concluded that quality of home environment plays a significant role in infant development.

Bronfenbrenner, (1974) also quoted that the family is the most effective and economical child care system for fostering and sustaining child’s overall development.

In summary the care giving practices of mothers in our country is not very encouraging. Infants (0-12 months) are malnourished and show poor mental and motor development. Poor knowledge on the part of mothers is the cause for disastrous results in the field of care giving. A mother has to regulate the child’s behavior, attitudes, outlook and home environment in the family since these are the basic factors that influence the nutritional status, mental and motor development of the infants. The longterm solution to this problem is to educate the mothers to adopt good care giving practices for the welfare of their infants.