CHAPTER 2

LITERATURE REVIEW

2.1 The cause of malnutrition:

From the practical point of view, the question of malnutrition should be approached on the basis of modern epidemiological concept of multiple causation. The specific factor ultimately responsible for developing of nutritional deficiency disease, is the lack of an essential nutrition necessary for cells. Many events and influences leading to the appearance of the diseases are complexly interrelated. The epidemiology, knowledge of the etiology of any disease, can be conveniently classified as related to agent host and environmental factors. Literature concerning effects of some host, agent, environmental factors used in this study.

2.2 Health status:

It is well recognized that the health status has an ultimate effect on nutritional status and visa versa. A WHO expert committee on the methodology of the nutrition surveillance has summarized that health and dietary indicator were the most useful factors in the surveillance system. The health indicators included various nutritional status as shown by the physical examination, mortality, morbidity, and health care facilities. Many infection condition such as diarrhoea may have an effect

on the nutritional observation process. A variety of vital statistic such as mortality and morbidity rate of pre-school children have been suggested by Gelliffe (1955) as indicators of nutritional problems. The interaction between infection and malnutrition was considered to be the major source of mortality in children. The consequences of infection were likely to be more severe in a malnourished individual. Health indicators, which were the combination of scores from health status, were utilized in multiple regression analysis by Stoecker (1979) The result revealed that there was a significant effect on the nutritional status of children.

2.3 Child care practice:

Mothers have the main responsibility in child-rearing, but many factors may influence the time allocation of the mothers in taking care of their children . Popkin (1980) reported the effect of labor force that included mothers; his study showed mothers' absence affected the diet and time input into child care resulting in poor nutritional status of children in a rural village in the Philippines. The working mothers, especially those who breastfed, when remained away from their children, affected the nutritional status of children. Even, the mothers doing housework has no sufficient time to take care of their children. A big family has also effect on how much time mothers can allocate for their children care. The old beliefs that children take care in old age also affects in the rearing of the children. So in this study the age of the family, children's parents are taken into account as factors affecting child care practices. From the study of **Wray and Agiurre** (1969) in columbia the result was shown that only 38 % of children their mother's age below 35 years were found malnourished and also shown p.value < 0.001. The writer has shown the another factors of significant result of the mother's work part time job, full time job p.value was < 0.05, respectly lower income of the family group has shown statistical significant p.value < 0.02 in comparison with higher income group.

2.4 Socioeconomic status:

Several studies compared the diets of different socioeconomic groups as characterized by different income, occupation, and parents education. **Rao and Satyanarayan (1976)** showed that when they assessed nutritional status of 1350 individuals of all ages, both sexes and classified into three income groups in rural area in **Andra Pradesh**, deficiencies was found among the low income group of the children. Maternal education plays an important role in the nutritional status of pre-school children. **Macavinta (1991)** studied 253 malnourished patients in a paediatric hospital in the **Philippines**. They found that their parents had low educational attainments and were employees as manual laborers or tenant farmers. Since a majority of population in the rural area are farmers, and the distribution of their produce is independent of the marketing system, the farmers always exchange their produce with other foods. The yield of production is used as one of the socioeconomic factors here.

2.5 Food habit:

The pattern of food consumption and food taboo are considered as food habit and has some effects on nutritional status. In the rural area where the people are less educated, there are some traditional beliefs or prejudices in food consumption. **Gopalin (1966)** observed that the custom and traditional prejudices are also the source of faulty feeding habits, which have a role on nutritional status of infants and pre-school children. **(Gopalin 1966).**

2.6 Food Supplement:

There is a relationship between food habit and supplementary food. The breastfeeding practice and the age of introducing supplementary foods may have some influence on the nutritional status of children. **Aree Valyasevi (1967)** reported the high percentage of breastfeeding, but these mothers also started supplementary food with glutinous rice at an early age. This practice remarkably reduced breastfeeding of children. Some kinds of foods, such as fat or oil and legumes were not regarded as supplements or supplemented late. In many cases when the mother could not breastfeed their children, sweetened condensed milk was found to be the popular food for children. The introduction of various kinds of supplementary foods at the proper age may improve the nutritional status of children.

2.7 Food Availability:

As mentioned earlier, the economic situation does not depend on the marketing system. The available of a variety of food depends on different seasons of the year. Preservation can serve the availability of certain food during off season. The availability of food is also considered as a representing of food availability of family (WHO, Geneva 1976 Technical Report).

2.8 The Goal of Health for All by the Year 2000

is a great challenge to all governmental health professionals and communities in developing countries. The primary health care approach has been undertaken as a basic health care strategy to meet this goal. Factors affecting the health of the children are the parents, socioeconomic condition, educational background, food habit. The World Health Day slogan in 1984 entitled that "Child Health is Tomorrow's Wealth".

The UNICEF entitled 1992 state of the world's children says that the voice of the poor must be heard and point out that one billion people still lack adequate food, safe water, primary health care and basic nutrition

(UNICEF1992)

UNICEF\WHO\FAO\Export committee on nutritional surveillance recommended the use of weight and height as the primary indicators of nutritional status of the children and analysis report in such a way that it can be possible for the analysis data from cross sectional surveys. It is a part of regular health care services. (UNICEF 1992)

2.9 The Related Studies in Global Situation:

Factors affecting nutritional status of under five children

Family size:

Gupta and Mwambe (1976) , in their study in Tanga , Tanzania showed that the"family size is recognized to be significant in etiology of malnutrition ". Their study revealed that 60.8 percent of malnourished children came from families of three children or more. Wary and Aguirre (1969) also showed in their study in Colombia that the rate of PEM in children in families of four or fewer was lower than the rate of families with five or more children; the rate increased with the increasing number of children (the difference was significant $p < 0.05$ and $x^2 = 4.08$). Mamarbachi et al.,(1980) also found the same result in their study in Tripoli, Libya. They stated that 84 percent of marasmic children came from families which had more than 8 persons. Large family size aggravates almost all factors that affect nutrition. Riley (1972) in his study mentioned that the lower the per capita food consumption the lesser they receive a fare share of family food supply.

Rao and Gopalan (1971) studied the calorie and protein content of diets of 500 Indian families from one socio-economic group whose family income was below Rs. 250.00 per month. They found that families with three or less children have better intakes of calories and proteins than families with four or more children.

The effect of family size on nutrition was also found by Mudhedkar and Shah (1975) in Bombay. As the size of the family increased lesser number of children had normal nutrition.

Income of the family:

Poverty is one of the key causes of PEM (Gupta and Mwambe – 1976; PELLET– 1981; Ifekwunigwe – 1976; Masanganise and Waterson – 1983). Economic factors play a significant role in the expenditure on food, its quantity and quality. Economic factors affect accommodation and other components contributing to the general cost of living. Rao and Satyanarayana (1976) revealed that the proportion of persons having one or more signs of nutritional deficiencies was the highest in the low income group. In their study they assessed the nutritional status of 1,350 individuals of all ages and both sexes in a rural area in Andra Pradesh , India.

Breast feeding:

Wary and Aguirre (1969) reported that there was less PEM in children receiving breast milk than those not breastfed, and the difference is quite significant. Their study in Candelariya, Colombia found that only 17.9 percent of

breast fed children aged 0 - 5 months developed **PEM** compared to 30 percent children of who were not breastfed in the same age group.

Supplementary feeding:

Poor supplementary foods for children cause major nutritional deficiencies in diets. **Anusith (1981)** on assessing eight Thai supplementary foods for quality, reported that the calorie intake of all foods was unacceptable even with breast milk supplementation, soft rice mashed with banana being graded the lowest.

Knowledge of the mother on nutrition:

The knowledge of mothers on nutrition plays an important role in the nutrition of a child because it can affect the duration of breast feeding; the timing of weaning period, the types of supplementary food and other factors as well. Many studies of children on malnutrition have all found a relationship between knowledge on nutrition and **PEM** . In Lagos and Nigeria, Gans (1963) found that the average weight of children whose mothers had higher knowledge on nutrition was higher than those of lower knowledge. **PEM** was least common in children whose mothers had higher knowledge of nutrition.

Prabhakar Roa 1988 conducted a study of the prevalence of malnutrition in group of the slum children of India ranging from 0 to 10 month.Results revealed that grade 1 was 39 % grade 2 was 38 % grade 3 was 15% and 67 % of

children had found single or multiple parasite infections. Also 76 % of the children suffered from cough and 53 % had suffered from fever. **(Prabhakar Roa 1988)**

Sunkngom, Piyalampone 1992 did a study of prevalence and risk factors of protein energy malnutrition **(PEM)** in pre-school children at Klong Toeys Slum. Anthropometric assessment were carried out: weight for age and height for age, among the age group of under 5 years children. Results revealed that in the year 1970 - 1971, approximately 60-75 % of pre-school children in the slum areas had a certain degree of malnutrition 30% suffered from **(PEM)**. Several intervention measures had been taken including nutrition surveillance, provision of supplementary food, subsidizing school lunch, promotion of high nutritional food, improvement of sanitation and environmental health, expanded program of immunization, nutrition education and nutrition related research and training extension. The prevalence of **PEM** decreased from 53 % at the beginning of the fifth plan in the year 1981 to 28 % in 1984. In 1970 to 1971, approximately 60 to 75 % of pre-school children in the slum areas had a certain degree of **PEM**, of which approximately 30 % of them suffered from **PEM**. They did not explain any direct reasons for the decreased **PEM**, but indicated family planning programs, is one of the successful programs in Thailand. He had given another possible reason for the decreased **PEM**, the reduction of family size in most of his study mothers had found only 2 children.

(Sungkom, Piyalamporn 1992)

Health statistic of Nepal

Nepal has rapid growth of population until 1990, it was 2.6 per 1000

Fertility rate	5.8 per 1000.
Crude death rate	13.8 per 1000.
Literacy rate	33 per 1000.
Infant mortality rate	37.5 per 1000.
Maternal mortality	8.5 per 1000.

(M.P. shrestha 1991).

Related study done in Nepal:

There are many nutritional survey done in Nepal from the beginning of 1975 up to now, but the result of the study shown in only prevalence of the malnutrition in percentage. There were no study conducted about the associated factors of malnutrition among pre - school children in Nepal Some of the nutritional surveies result of the studies conducted in the Nepal are shown below:

Table 1. Distribution of height for age in Nepal (NNS'75) %

	Normal	Mildwasted	Moderatewasted
Total nepal(rural)	48.2	34.9	17.0
Special group(urban	81.2	16.8	2.0
Far West	44.6	37.9	17.5
west	54.7	26.0	19.3
central	50.5	34.3	15.2
East	51.6	32.2	16.2
Hills	44.9	36.8	18.3
Terai	54.9	31.7	13.4

(R.K.Adhikari)

The Academy of Paediatrics has modified this classification to suit local needs. It accepts a lower weight range as for normal children, the same standard has been taken as a cut-off point to assess the nutritional status of the children in Nepal

(Waterlaw's classification 1974)

Wt\Ht ratio expressed as % of standard	grade or wasting
> 90 %	Normal
80-90 %	grade 1
70-79 %	grade 2
< 70 %	grade 3

This system of classification grades of malnutrition following ways:

1. Mild wasted: if weight for height ratio is less than < 90 % of the standard.

2. Moderate wasted: if weight for height < 80 percent of the standard.

3. Severe wasted : if Weight for height < 70 percent.

Anthropometric assessment: (Tontisiric,k and Wintchagnl)

Since protein energy malnutrition is the most important problem found in school children, therefore we have to develop some indicators to determine PEM at an early stage. The most important way is measuring the height and the weight. Besides other parts of the body as chest circumference, left arm circumference, and skin fold

circumference should also measured. Simplicity in weight measure makes it favorable to be use for the purpose of nutritional surveillance that reflect current nutritional status. Weight for age stands as Harvard standard that indicate the nutritional status of pre-school children. Weight for age is a simple. Only weight change is recorded. Height for age is another age dependent indicator for nutritional status. Height is affected by long term malnutrition. To measure all this accurately, a trained health worker is needed.

2.10 The theoretical background of a particular place in Nepal:

" Protein Energy Malnutrition (PEM): PEM includes a range of diseases, which are caused by not eating enough protein and energy giving foods. The pathological conditions can range from mild to severe forms. The mild and moderate forms are usually subclinical (obscure in their clinical presentation) and characterized by growth failure and some delay in the achievement of developmental milestones. These conditions are detected by anthropometric and biochemical tests only. The severe forms of **PEM** are marasmus, kwashiorkor." **(WHO)**

The author found that the common causes of a child 1s suffer from PEM include:

- the mother is not given breast feeding enough;

- the child is fed with diluted, contaminated milk to supplement or replace the breast milk;

- weaning food is given to the child too late or the food are not prepared properly;

- the child frequently has diarrhoea because of poor hygienic condition and the mother, and health healers have stopped feeding the child to stop diarrhoea;

- the child has lost appetite due to fever and infection.

Other factors added to the problems of PEM:

- Low birth-weight.

- Twins or multiple births.

- The mother may be illiterate and unaware of the principal of feeding.

- Family may have faulty food habits and beliefs

- Poverty.

- The youngest child in a large family may not get enough attention.

Types of PEM

There are few cases of severe clinical forms of malnutrition. Undernutrition which has been seen detected by measuring methods, is about 10-12 times more common than clinically recognizable severe forms of malnutrition. Mild to moderate forms of undernutrition can be detected by measuring methods; some moderate and most severe forms have definite clinical patterns.

"Runche " (moderate under nutrition)

Moderate undernutrition is culturally diagnosed as "Runche" in and around the Kathmandu valley. It is usually seen in children between 1 to 4 years of age. Adult people can identify a " Runche " child and it is traditionally interpreted to be a spell on the child after being touched by a pregnant woman. The traditional treatment includes a series of early morning bath.
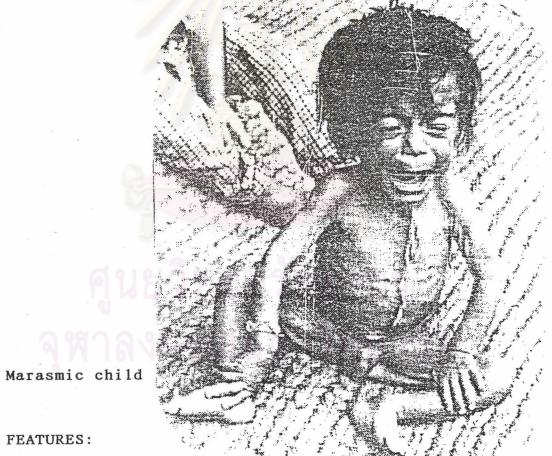
" Runche"

"Runchi"(under nutrition)

The runche child is all the time crying, is hard to live with and who refuses to eat and join in family activities. The condition usually follows an episode of diarrhoea, fever or measles. These children are underweight with poor musculature, have loose folds of skin indicating loss of fat beneath the skin. Loose folds of skin are most marked around the buttocks and these folds may be missed if not specifically looked for. Parents can diagnose runche easily but beliefs about what causes runche must be changed. If the parents are made to understand that the cure lies in

feeding their children properly, an improvement in the overall nutritional status and prevention of severe forms of undernutrition can be achieved.

Severe forms of PEM

Marasmus:

This can occur at any age but is more common during infancy and early childhood. It is usually associated with a lack of breast feeding and gastroenteritis but it is complicated by infections such as infective diarrhoea, measles and tuberculosis. If the mother neglects and deprives the child, he may suffer from anorexia resulting in marasmus.

Marasmic child

FEATURES:

Parents may bring the child to the health worker and complain that the child is failing to thrive, is excessively irritable or a pathetic, excessively hungry, or anorexia.

irritable or a pathetic, excessively hungry, or anorexia. Sometimes they bring the child to the health center because he has had prolonged diarrhoea.

On examination:

The child appears shrunken and wasted with "little old person's "expression due to losing fat beneath the skin. Weight less than the 60% of the expected weight.

Weight for height ratio: Not much change in chronic case, but acute cases precipitated by starvation, acute infections and diarrhoea, the child is noticeably underweight for his height.

- The child has loosefold of skin and diminished tone of muscles, showing that his muscles are wasted.

Kwashiorkor:

This term was first used by Dr. Cicely Williams to describe a severe form of malnutrition seen in children who were not breast-fed after younger sibling was born. This is also described as the "syndrome of the displaced child".

Mothers of children suffering from kwashiorkor is gradual in onset and is usually associated with gradual oedema when the mothers bring the child for consultation, the child is already in the advanced stage of undernutrition.

Kwashiorkor   child Feature:

Usually the child has a fat, chubby appearance but there is
wasting of the muscles over the buttocks. Growth
failure: the child is underweight for his age. Gross
irritability or apathy with intermittent crying. Oedema-
initially mild oedema in lower limbs or dependent parts
only. Later on, gross oedema affects every part of the body.
wasting of muscles and diminished skin fold thickness. Skin
changes: diminished or increased pigmentation, shedding of
skin (desquamation) and ulceration can occur. The skin
changes are seen over the buttocks, perineum and upper thighs

mostly but may be seen anywhere in the body in the late stages. Mucous membrane changes such as cracking of the lips, soreness at the corner of the mouth. The child's tongue may be smooth. Gastrointestinal symptoms such as anorexia, nausea, vomiting and diarrhoea are the usual associated features. The child's abdomen is usually distended. Features due to deficiency of other nutrients such as iron and vitamins may be present.

Vitamin "A" Deficiency:

Vitamin A deficiency is responsible for the high incidence of eye disease in children. A survey conducted in 1980-81 concluded almost every day a Nepali child goes blind due to the lack of vitamin A.

The deficiency is caused by a diet lacking in vitamin A or "Carotene" (vitamin A precursor) content. The person is not eating enough dark green leafy vegetables, deep yellow/red fleshed fruits and whole milk and its products. Blindness may occur in infants whose mothers are so deficient in vitamin A that the foetal stores are not build up.

Iron Deficiency:

Iron is one of the most important minerals for human nutrition. Common foods such as green vegetables, whole grains pulses and nuts are good sources of iron.

Iron deficiency leading to anaemia is very common among women and children in Nepal. One survey has reported

that about 20 % of children in the 6 months to 2 years age group and about 26 % of children of 2 to 5 years, suffers from anaemia. Deficiency of folic acid and cyanocobalamine may also cause anaemia. Hookworm infestations, causing loss of blood, also result in anaemia.

Iodine Deficiency:

Iodine is essential for the normal functioning of the thyroid gland. If iodine intake is inadequate, the thyroid gland enlarges. In extreme cases, the child's mental development is affected causing a condition known as cretinism.

Goiter:

Nepal has one of the highest incidence of endemic goiter and cretinism in the world. It has been confirmed that severe environmental deficiency of iodine is the primary factor responsible for endemic goiter in Nepal. The iodine content of water from different areas in Nepal is found to be extremely low.