Introduction:-

“Though quieter than famine, persistent under nutrition kills many more people slowly in the long run than famine do” (Dre’ze and Sen Amartya 1998)

Malnutrition is an alarming health challenge. Every country in this world is facing any form of malnutrition as public health challenge. In this world, one out of three people is facing any form of malnutrition. Especially in developing countries like India, malnutrition has been considered as serious public health agenda which has irreversible impact on the lives of children. The consequences are destructive as it is linked as causal factor of 45% of child death under 5 years of age.

India is a union of diversity. Diversified food intake based on culture and geographical context has been present since history. Kaleidoscopic change in the global economy and thus in Indian societal practices transformed living pattern of the common people.

In a civil society we expect that children, the most critical citizen of the state, needs to be brought up in the spirit of peace, dignity, tolerance, freedom, solidarity and most importantly with equality. We must recognize the fact that we the adult society perhaps have fallen short to respond adequately to fulfill the promises we made to the children to ensure proper education, health opportunities, nutritious food and safe environment. Hence, accessibility to quality health care and education, water and sanitation facility, nutritious food and housing are the basic requirement of a developed society.

Today’s children represent tomorrow’s world. Indian constitution and international treaties have made number of commitments for the well being of the children. Adoption and ratification of United Nations Convention on the Rights of the Child (UNCRC) in 1992, by the Government of India also mandated the nation state to ensure education, health services and nutrition for children. Children account for almost 40% of the population of India, with children between 0-6 years of age accounting for over 13%. As citizens of India, they have fundamental right to be free from diseases and hunger. India is the second most populous country of the world and
has a changing socio-political-demographic pattern that has been drawing global attention in recent years.

Status of nutrition amongst children has been recognized as a key health indicator to understand and assess the health status of the population. It has been recognized as one of the important health agenda globally. The problem of malnutrition is very widespread amongst the disadvantaged communities living in developing countries like India.

Malnutrition means “bad nourishment”, “under nutrition” “over nutrition” etc and is used interchangeably. The impact of malnutrition is severe and long lasting. “Malnutrition is a common and widely used term to refer to suboptimal nutritional health. In international health, malnutrition generally refers to under nutrition (poor growth) rather than over nutrition” (eg- Obesity). (Dirk G. Schroeder in ed by R. D Samba, M.W. Bloem 2000). The quality health care encompassing availability of food and nutrition is the cornerstone of development of the society and growth of children in particular.

“Uneducated, malnourished, poor children are likely to become tomorrow’s uneducated, malnourished, poor adults” (UNDP, 2004; Bradbury, Jenkins, and Micklewright, 2005). Despite the enthralling news of economic boom and wealth creation in the world, a particular section of the society i.e child is victim of deprivation and exclusion and struggling to survive in this social world. Malnutrition is one of the key issues faced by children and it has tremendous bearing on their lives.

Nutrition may be defined as the science of food and its relationship to health. Another concept, which has emerged in recent years is that, nutrition is cornerstone of socio-economic development. We know that, malnutrition is closely linked with the socio-economic factors of the population and has indivisible links. We also identify that population’s attitude, domestic food practices and knowledge are also important factors for nutritional level amongst the children in the society.

The human rights concept strongly believes in equal access to right to food and improved nutritional ingredients for each and every individual of the society and thus
Millennium Development Goals adopted in 2000 are aiming towards reduction of malnutrition and poverty and increased access to public goods.

Therefore, we can construe that malnutrition is a global public health and development concern having greater bearing on the lives of the children and community with linked health and socio-economic consequences. Nutrition plays an important role in maintaining health of the children in the community. It is indispensable for optimal growth and development to reduce the diet related chronic related diseases and thereby reducing child mortality and morbidity.

Malnutrition is not just about the lack of food but it is the summing factor of food, health and care. Malnutrition status of children is highly influenced by the nutritional status of mother and thus status of domestic food intake, household food security, poverty and other cultural factors.

In the nutrition study there are few terms which are frequently used. These are hunger, undernourishment, under nutrition and malnutrition. Hunger is generally understood as discomfort associated with lack of food. Undernourishment has been defined as “Consumption of fewer than 1800 Kcal a day.”(FAO, 2012).

Under nutrition has been understood as “ it is the deficiency or intake of energy, protein, essential vitamins or minerals, in terms of quantity, quality, poor utilization of the nutrients due to infections or other illness, or a combination of these factors. These in turn are caused by household food insecurity, inadequate maternal and child health care practices or inadequate access to health services, safe water and sanitation.”

Malnutrition has been defined as “it refers more broadly to both under nutrition (problems of deficiencies) or overeating (Unbalanced diet, such as consumption of too much calories in relation to requirement with or without low intake of micronutrient rich food.” (FAO, 2013)
Evolution of Nutrition science:-

Nutrition is the science of food values. Comparatively it has recent origin and evolved from chemistry and physiology. It is the “science of food, nutrients and other substances and action, interaction and balance in relationship to health and diseases, the process by which the organism ingests, digests, absorbs, transports and utilizes nutrients and dispose off their end products”(Robinson,1965).

Modern nutritional science has early roots in France at the beginning of the 19th century, when ideas surrounding nutrition were subjected to examination by animal experimentation. François Magendie (1783–1855), Professor of Anatomy at the Collège de France, attempted to differentiate between various kinds of food and made a clear distinction between nitrogenous and non-nitrogenous food.

The importance of nitrogenous food was further recognized by Gerrit Jan Mulder (1802–1880), a Dutch physiological chemist, who coined the term protein to describe nitrogenous substances in plants and animal food. The German chemist Justus von Liebig (1803–1873) considered food to be divided into “plastic” food (plant and animal proteins) and “respiratory” food (carbohydrates and fat).

The definition of food was further refined by Carl von Voit (1831–1908), a Physiologist in Munich: “The foodstuffs are those substances which bring about the deposition of a substance essential to the composition of the body, or diminish and avert the loss thereof”.

By the end of the 19th century, the prevailing notion was that food consisted of proteins, carbohydrates, fats, salt and water. Improved nutrition was considered to strengthen resistance to disease. Germain Sée (1818–1896), a French Physician, made dietary recommendations for individuals with specific diseases.

Modern knowledge of nutrition was used to recommend diets for institutions such as schools, hospitals, prisons, and asylums. Special diets like milk, whey, and egg yolk were recommended for certain diseases.
The late 19th and early 20th centuries were marked by emergence of the vitamin theory and the characterization of the vitamins. Although descriptions of scurvy, beriberi, night blindness and keratomalacia and rickets—manifestations of vitamin C, thiamin, vitamin A, and vitamin D deficiencies respectively—and their empirical treatments are known in the older medical literature, it was not until the last quarter of the 19th century that major progress commenced in the characterization of vitamins and vitamin deficiency diseases.

In the early 20th century, influential textbooks on nutrition put heavy emphasis on the caloric value of food for human health. By the 1930s, it was established that vitamin A supplementation could reduce young child mortality and morbidity.

After Second World War, controversy was raised over the issues of contribution of protein deficiency in child health in developing countries. Cicely Williams (1893—1992), an English physician, described the syndrome of kwashiorkor, edema, diarrhea, and peeling of the skin amongst the children of Gold Coast of West Africa. High mortality was noted among these children. Those affected appeared to be mostly 1 to 4 years old who were weaned early and fed entirely on white corn gruel. The importance of calories was realized when children with kwashiorkor recovered from low protein but high energy food. Then the concept of protein-calorie malnutrition was replaced by protein malnutrition.

New knowledge of nutrition and the characterization of vitamins helped to improve the diet in the early 20th century and innovations in agricultural practices helped to increase food production.

**Historical overview of Malnutrition concept:-**
In early 19th century, Latin American health workers first discovered the syndrome that was referred as Distrofia pluricarencial meaning multiple deficiencies. This was similar to the syndrome of Kwashirkor. Nutrition scientist suggested that perhaps amino acid and protein deficiency may be causal factors for this.

Between the 1930s and late 1950s focus was on Kwashirkor as it was the most widespread disorder. In this period, understanding was that, kwashirkor was caused
by protein deficiency and could be treated through protein intakes and thus focus was put on quality of grains. This led to the Green Revolution.

In 1950s, though the focus was concentrated on protein factor as the cause of malnutrition and poor growth but this perspective was challenged. It was observed that severely malnourished children could gain weight through high energy but low protein diets. In this period the concept of protein calorie malnutrition (PCM) was developed. During 1960s, the focus shifted from protein to energy.

During 1970s, international nutritionists concluded that “protein gap” is a myth and they coined the term as food gap and energy gap. Thus, in this period, program focus was on increasing the energy intake.

In the mid-1980s, focus was shifted once again. It was brought into perspective that, high rate of stunting cannot be dealt only by providing energy diet rather it was identified that there were other micronutrients which could play an instrumental role. Thus, the need of Vitamin-A, Iron and Zinc came in.

In the 20th century, the holistic understanding of causes of malnutrition and poor growth was placed by the international nutritionist community. The concept of malnutrition was referred to as consequences of multiple deficiencies.

The term malnutrition is thus employed by the international health and nutrition community in general: to refer to the syndrome of inadequate intakes of protein, energy, and micronutrients, combined with frequent infections, which result in poor growth and body size. (Dirk G Schroeder ;2000)

Table- 1.1 Origin and introduction of some terms describing nutritional deficiency

<table>
<thead>
<tr>
<th>Year(S)</th>
<th>Term</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900–1930</td>
<td>Distrofia Pluricarencial</td>
<td>Term used by early Latin American workers meaning “multiple deficiency state.”</td>
</tr>
<tr>
<td>1935</td>
<td>Kwashiorkor</td>
<td>From the Ga language of West</td>
</tr>
<tr>
<td>Year</td>
<td>Type of Malnutrition</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
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<tr>
<td>1955</td>
<td>Protein deficiency</td>
<td>Translation is “the disease of the deposed child.” Term reflected current thinking on primary cause of Kwashiorkor</td>
</tr>
<tr>
<td>1959–1960</td>
<td>Protein-calorie malnutrition (PCM)</td>
<td>Protein-calorie PCM first introduced late 1950s. Evolved into Protein energy malnutrition (PEM). Used to cover whole range of malnutrition other than states caused primarily by specific nutrients e.g., Vitamin C deficiency, pellagra. PEM still widely used.</td>
</tr>
<tr>
<td>1980s–90s</td>
<td>Energy-nutrient malnutrition (ENM)</td>
<td>In recognition that other nutrients besides protein (e.g., Zinc, Vitamin A) significantly contribute to malnutrition and growth faltering. Not widely used.</td>
</tr>
<tr>
<td>1990s</td>
<td>Micronutrient malnutrition</td>
<td>Used to refer to key micronutrient deficiencies: vitamin A, iodine, and iron</td>
</tr>
<tr>
<td>Late 1990s</td>
<td>Malnutrition</td>
<td>Term used widely by international organizations (e.g., UNICEF) to refer to ENM and growth faltering</td>
</tr>
</tbody>
</table>

(Dirk G Schroeder; 2000)

Thus, the concept is evolving in nature and travels through different trajectories. Malnutrition has been construed as a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients.
Robinson (1965) says “nutrition is the science of food, the nutrients and other substances in their action, interaction and balance in relationship to health and disease; the process by which the organism ingests, digests, absorbs, and utilizes nutrients and disposes of their end products.” Nutrition therefore is a psychological need for human being, physiological and biochemical necessity for human body and social and economic requirement for a state or government.

Faber and Wenhold (2007) and Labadarios (2005) defined that “malnutrition can be defined as a lack of proper nutrition. The nutritional status of a child, as with any individual, is assessed through dietary, anthropometric, biochemical and physical observation for signs of malnutrition. These methods of measurement are usually done in combination, for more accurate results. When there is a deficiency in the amount and nutritional value of the food consumed, the growth pattern of a child becomes disrupted owing to nutrient deficiencies”.

World Food Program (2000) defines malnutrition as “a state in which the physical function of an individual is impaired to the point where he or she can no longer maintain adequate bodily performance process such as growth, pregnancy, lactation, physical work and resisting and recovering from disease.”

Thus, we can argue that nutrition is the foundation of society which affects all people. It paves the way for us to grow, develop, work, play, resist infections and aspire to realization of our fullest potential as individual and societies (ICMR, 2005). Better nutrition means stronger immune system, less illness and better health for all ages (WHO 2008). Conversely, malnutrition makes people more vulnerable to disease and premature death (ICMR 2005). Malnutrition is a silent killer. It is under reported, under-addressed and under prioritized.

**Prevalence of Malnutrition in the world and in India:**

Prevalence of malnutrition in the world is challenging and almost every country is facing malnutrition as a serious health issue.
Each year, more than 10 million children under 5 years of age die, with almost 4 million within first 4 weeks of life (Black RE et al, 2003, Lancet and Bryce J et al 2005, Lancet). Globally under nutrition is an underlying cause for at least half of all childhood deaths (de Onis et al 2004).

Adequate nutrition is essential in early childhood to ensure healthy growth and proper organ formation and function, for a strong immune system and neurological and cognitive development. The Millennium Development goals were introduced by United Nations to eradicate poverty and hunger by 2015 in various countries, as one agenda.

It has been recognized that malnutrition and hunger is a global health agenda. Children with malnutrition die as they are much more susceptible to other diseases and infection.

Save the Children (2012) recorded that; “chronic child malnutrition is an ongoing, permanent emergency affecting 170 million children. It occurs on an even greater scale than the devastating emergency food crises that follow crop failure, climate disaster or conflict – such as the emergency in East Africa in 2011 that affected more than 6.5 million children”.

Save the Children (2012) report elucidates the vital statistics of prevalence of malnutrition in the world. The significant facts are,

- One in four of the world’s children are stunted.
- In developing countries, one in three children are stunted
- Malnutrition is an underlying cause of death of 2.6 million children each year
- One-third of the global total of children’s death are due to malnutrition
- In the world , 80% of total stunted children live in 20 countries
- It is also estimated that, 450 million children will be affected by stunting in the next 15 years, if current trends continue.

(A Life Free from Hunger, Tackling Child Malnutrition; report of Save the Children; 2012)
Since 1990, the global prevalence of stunting, wasting and underweight has decreased, but the reduction rate of malnutrition has been slow. There are millions of children in developing countries who are at risk of lower chances of survival.

**Stunting around the world:-**

The burden of malnutrition is not same around the world. UNICEF (2013) reported that Sub – Saharan Africa and South Asia are the worst affected region in the world. The report quoted that “in Sub-Saharan Africa, 40 per cent of under five children are stunted, followed by South Asia with 39 per cent of stunting”. Fourteen countries like India, Nigeria, Pakistan, China, Indonesia, Bangladesh, Ethiopia, Congo, Philippines, United Republic of Tanzania, Egypt, Kenya, Uganda and Sudan have 80 per cent of the World’s stunted children. (Improving Child Nutrition- The achievable imperative for global progress, UNICEF, 2013)

UNICEF, WHO, World Bank (2012) report recorded that the number of stunted children under five years of age declined from an estimated 253 million in 1990 to 165 million in 2011.
Figure-1.1 Estimation of prevalence of stunting among children under five years in different countries (UNICEF, WHO, World Bank, 2012)

Underweight children in the world:-

South Asia has the highest prevalence of underweight children which is 33%, followed by Sub-Saharan Africa (21%). UNICEF (2013) report noted that, 30 countries were on track to meet the MDG 1 target, 25 countries made insufficient progress, and 12 countries made no progress.

UNICEF, WHO, World Bank (2012) report also recorded the underweight status of children under 5 years of age. This report indicated that, there was a decline of underweight figure from 25% in 1990 to 16% in 2011.

Figure-1.2 Estimation of prevalence of underweight among children under five years in different countries (UNICEF, WHO, World Bank, 2012)

Status of wasting under five children:-

In 2011, it was observed that Sub-Saharan Africa had 1 in 10 children who are wasted. UNICEF, WHO, World Bank, (2012) reported that highest prevalence of
wasting is in South Asia. Sixteen percent (16%) children who are moderately to severely wasted live in South Asia. India has the highest burden of wasting, with more than 25 million wasted children. The other countries having higher prevalence of wasting are Nigeria, Pakistan, Indonesia, Bangladesh, China, Ethiopia, Congo, Sudan and Philippines.

![Figure-1.3 Estimation of prevalence of wasting among children under five years in different countries (UNICEF, WHO, World Bank, 2012)](image)

**Figure-1.3** Estimation of prevalence of wasting among children under five years in different countries (UNICEF, WHO, World Bank, 2012)

**Table-1.2** Figures pertaining to global prevalence of malnutrition

<table>
<thead>
<tr>
<th>Stunting(height for age)</th>
<th>Underweight(weight for age)</th>
<th>Wasting(weight for height)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• In 2011, globally, 165 million under-five year children (26%) were stunted and in 1990 the estimated figure was 253 million. It means 35%</td>
<td>• Globally, 101 million under-five year children were underweight in 2011. In 1990, the estimated figure was 159 million. Thus there was a decrease of 36%</td>
<td>• Globally, 52 million under-five year children were wasted in 2011. In 1990, the estimated figure was 58 million. Thus there was a decrease by 11% in 2011.</td>
</tr>
<tr>
<td>Reduction globally.</td>
<td>Progress is insufficient as millions of children are living at risk.</td>
<td>70% of world wasted children live in Asia particularly in south central Asia.</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>In 2011, Asia and Africa records high level of stunting among children under 5 years of age which is 27% and 36% respectively.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90% of stunted children live in Asia and Africa.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


**Prevalence of Low Birth weight (LBW) around the World:-**

Low birth weight children refer to those who weigh less than 2500 grams at the time of birth. Low birth weight leads to increased risk of mortality and morbidity. It is a key indicator of pre-term birth and nutritional status. Birth weight measurement and its monitoring is a challenging task especially in case of non-institutional child birth. In India, the major challenge is resource gaps in terms of skilled outreach worker with adequate equipments and institutional arrangements. Due to absence of birth weight records in rural India, data collation becomes a daunting task.

UNICEF (2013) data reports that South Asia has the largest regional prevalence of low birth weight with one in four new born. India has almost 30% global burden of low birth weight. Children with Low Birth Weight (LBW) are susceptible to recurring illness, growth faltering and subsequent irreversible damage in their development and cognitive abilities (Black et al., 2008). The latest released Global Nutrition report (2016) has noted that in 2014, total 20 million individuals were born with low birth weight.
Facts from Global nutrition report:-

Global Nutrition Report (2015) recorded that malnutrition affects all countries and can be treated as health threat which is growing gradually. The report also noted that one out of three people is affected by malnutrition. This report also indicates that, stunting rate is gradually declining while anaemia rate in reproductive age women is stagnant. However overweight and obesity rate is growing.

This report comes up with these following observations,

- In the world there are 2 billion people who are experiencing micro nutrient malnutrition.
- Globally there are 1.9 billion adults who are overweight.
- In the world, 161 million children under the age of 5 years are stunted, 51 million children are wasted and 42 million are overweight.
- It is also estimated that, 45% of mortality of children under 5 years of age is linked to malnutrition.
- This report also carries that, 49% of countries in the world do not have data evidences related to malnutrition.

Global Nutrition Report (2016) recorded that “malnutrition results from the interaction of poor quality diets and poor quality health and care environments and behaviors, which are shaped in part by a host of underlying factors, such as political instability, poor economic development, conflict, inequality and some dimensions of globalization”. It has been documented that,

- 2 billion people out of 7 billion world population are suffering from micronutrient malnutrition.
- Nearly 800 million world population suffer from calorie deficiency.
- Nearly 159 million under 5 year children are stunted out of total 667 million globally.
- In the world, there are 50 million under 5 year children who are wasted and 41 million children who are overweight.

The latest report released by UNICEF, WHO and World Bank in September 2015 reveals the picture of stunting, wasting, severe wasting and obese children less than 5 years of age. This report narrates the following picture,
In 2014, globally there are 159 million stunted children under 5 years of age in comparison to 255 million in 1990.

In 2014, 50 million children are wasted and 16 million are severely wasted

It was also recorded that, 20 million children in 2014 are low birth weight babies.

Thus, we can argue that, globally degree of intensity of malnutrition, be it stunting, underweight or wasting, has reduced from 1990 but still the present situation calls for serious attention and unified action.

**Prevalence of Malnutrition in India- evidences from National Family Health Survey and other reports:-**

Children are future of the country but they do face uphill challenges. India is the second most populous country in the world with one third of the country’s total population consisting of children.

Over half of Indian children live in poverty and are disadvantaged to access the opportunities for equitable growth. Undoubtedly in last two decades, India has achieved a huge progress for children such as child mortality rate has decreased significantly, status of nutrition has improved, immunization status has improved and prevalence of education accessibility has increased a lot.

In India, the issue of hunger and malnutrition has remained unanswered and has escalated due to lack of political commitment and implementation will. Releasing Hunger and Malnutrition report 2011 in India, our Prime Minister Dr. Man Mohan Singh commented (10th Jan 2012) “almost as shocking as the prevalence of malnutrition in India is the country’s failure to reduce it much, despite rapid growth. Since 1991, GDP has more than doubled, while malnutrition has decreased a few percentage points. The problem of malnutrition is matter of national shame.”

Freedom from Hunger and Malnutrition of India 2011 for Children Under-Six report (HunGama 2011) revealed that “India is among the countries where childhood malnutrition/under-nutrition is severe - it continues to feature in the list of 20 countries with the highest burden of under-nutrition.”
The Hunger and malnutrition survey report (2011) has been an eye opener report in India. The report covering 100 focused districts revealed that,

- Child malnutrition is widespread across states and districts.
- In the 100 focus districts, 42% children are underweight and 59% children are stunted under 5 years of age.
- Almost half of stunting children are severely stunted.
- By age 24 months, 42 per cent of children are underweight.
- It has also observed the decrease of underweight children in 100 focus district. The report reveals that DLHS (2004) reported 53% of children as underweight but in 2011 it was recorded as 42%.
- Household socio-economic status has come up as a significant contributor on children’s nutrition status.
- The prevalence of malnutrition is significantly high in low-income groups. This report has also recorded that, children from Muslim community, Scheduled caste and scheduled tribe families are more vulnerable in terms of malnutrition.
- Mothers’ education level is an important factor responsible for children’s nutrition status.
- This report also concluded that, colostrums feeding and exclusive breast feeding practices are not common amongst the mothers. It came out with the evidence that, 52% mothers from 100 focus districts provide colostrums to their new born babies after birth and 58% mothers provide water within 6 months to their babies.
- Anganwadi Centres are widespread but their effectiveness is questionable.

**Prevalence of malnutrition in India: Evidences from National Family Health surveys-I, II, III & IV:**

India is home of 40 per cent of the World’s malnourished children and 35% of the developing world’s low birth weight infants (IFPRI, 2008). In the recent past, the country has made considerable progress on social and economic fronts, as indicated by improvements in indicators such as life expectancy, IMR and MMR, under five mortality and literacy rate (Planning commission, 2012). Despite India’s accelerating
economic growth, India is still lagging behind to achieve the goal of eradicating extreme hunger and poverty as mentioned in the Millennium Development Goal.

National Family Health Survey in India is the most comprehensive and reliable data source to understand the country’s position in the field of health and nutrition. The consecutive surveys held in the country in span of 3 decades starting from 1992-93 to 2015-16, give us a comparative figure of progress in health nutrition outcome indices.

In this research work, researcher has obtained data from National Family Health Survey-I (1992-93), NFHS-II (1998-99), NFHS-III(2005-2006) and the latest NFHS-IV (2015-16) in India.

The major findings and analysis of NFHS-I (1992-93) had been very critical in the field of child malnutrition and its corresponding relationship with multiple factors.

The analysis of NFHS-I reflects the following fact,

- 25% of infants and 64% of children between 24 months to 47 months are stunted
- Prevalence of stunting is the same for boys and girls. In Bihar too, it was found that prevalence of stunting for boys and girls are same.
- This report also indicates that, higher birth order child is at more risk than lower birth order child. Children of birth order 4 or high are at higher likelihood of stunting.
- Hindus and Muslims have same prevalence of stunting but in other religion stunting prevalence is low.
- Prevalence of stunting, underweight and wasting in Scheduled caste and scheduled tribes, is higher.
- Mothers who have taken IFA and administered TT injections during pregnancy have lower prevalence of stunting and underweight.
- Rural India has more underweight and wasting children than urban area.
- 31% of infants and more than 61% of children in the age of 12-47 months are underweight.
- Mothers education has been identified as critical contributor for all forms of malnutrition in India.
- But in case of wasting, it was found that boys are more subject to wasting than girls.
In contrast to prevalence of stunting and underweight, the prevalence of wasting does not vary based on birth order.

Children living in urban areas have slightly lower prevalence of wasting than those in rural areas.

**National Family Health Survey-II** was conducted in India in 1998-99. This report reveals the fact that 47% of children under the age of three years are underweight and 46% children are stunted. This report also indicated that, 18% of children under three years are severely underweight (weight for age) and 23% are severely stunted (height for age). This data also reveals that, 16% of Indian children under three years are wasted.

This data also recorded the progress of 5% underweight children from NFHS-I. In NFHS-I, we can see 52% of children under 3 years were underweight where as NFHS-II recorded 47% children are underweight. The severely underweight data decreased from 20% in 1992-93 to 18% in 1998-99. This study also reflected that both boys and girls are equally malnourished. But girls reported higher underweight and stunting measures than boys. Children in families with six or more are nutritionally vulnerable.

According to the **National Family Health Survey (NFHS-III) carried out in 2005-06**, child malnutrition rate in India are disproportionately high. The NFHS-III is the third pan-India survey, which revealed the following facts,

- More than half (54%) of under 5 deaths in India are related to malnutrition.
- It was measured that, 42.5% children below five years of age were underweight (weight for age).
- This report also corroborates the fact that rural areas have greater prevalence than urban areas.
- Girls are more prone to underweight than boys. Data shows that prevalence of underweight is higher among girls (43.1 per cent) than boys (41.9 per cent).
- Caste wise data corroborates the fact that, prevalence of underweight children is higher among Scheduled Castes (47.9 per cent) and Scheduled Tribes (54.5 per cent).
There is variation amongst the states. Bihar, Madhya Pradesh, Uttar Pradesh and Rajasthan has recorded more than 43 per cent of all underweight children in India.

Madhya Pradesh (60%) has recorded highest prevalence of underweight children followed by Bihar (56%), Jharkhand (57%), Chhattisgarh (47%), Uttar Pradesh (43%), Orissa (41%), West Bengal (39%), Gujarat (45%) and Maharashtra (37%).

Madhya Pradesh has recorded 35% of wasting children and Jharkhand 32%

It has also documented that, 23% children are born with low birth weight.

In case of anaemia among pregnant women, the report recorded a increase from 49.7% to 57.9 % in comparison to the last report.

Almost half of the children in the age group of 6-59 months in Uttar Pradesh, Bihar, Chattishgarh, Andhra Pradesh, Madhya Pradesh, Rajasthan and Haryana are moderately or severely anaemic.

The NFHS-III survey elucidated the fact that, poverty alone does not explain the health nutrition outcome indices. Instead of that, education of mothers is a critical contributor in malnutrition case. The women who are denied education stay in vicious cycle of malnutrition. Decision making ability of women in domestic front is reported as a concern area. Women from northern, western, and central India, have little say pertaining to health and nutrition of their children.

Therefore, we may conclude that, that prevalence of malnutrition in the form of stunting, wasting and underweight among children under 5 years of age as featured in National Family Health Survey-III data (2005-2006), is very high in India and calls for comprehensive action.

The recently published National Family Health Survey phase IV conducted in 2015-16 exhibits insignificant improved figure in the field of women and child health. Data of malnutrition is still alarming.

The NFHS-IV( 2015-16) data shows that, in India 38.4 % children under 5 years of age are stunted and 21% children are wasted. India has progressed in case of stunting and underweight prevalence. Our country has witnessed a progress of almost 10% in
terms of reducing the stunting figure. In NFHS-III, stunting of children under 5 years was recorded as 48% but the figure of NFHS-IV shows 38% prevalence among children under 5 years.

Interestingly the proportion of wasted and severe wasted amongst children under 5 years has increased from NFHS-III. In India, wasting was recorded 19.8% in NFHS-III but it escalated to 21% in NFHS-IV. The severe wasting figure also escalated to 7.5% in 2015-16 which was in tune of 6.4% in NFHS-III.

With regard to prevalence of underweight children, India has registered a progress in tune of 7% in last 10 years span. It records that, 35.7% of Indian children under 5 years of age are underweight in comparison to 42.5 % recorded in NFHS-III.

The recently released data also shows that in India, 58% of children in age group of 6-59 months are anemic and half of the pregnant women in the age group of 15-49 years are also anemic.

Figure-1.4 Comparative Analysis of NFHS-III and NFHS-IV
But there are some positive trends also in the field of women and child health. The trends of infant mortality in India show a sharp decline in last consecutive four NFHS surveys. The recent data reports that, 41 infant deaths recorded in India against 1000 live births. Below mentioned Figure 1.5 explains India’s achievement in the field of infant mortality. But the distressing fact is that, India is still behind Bangladesh, Nepal, Rwanda on infant mortality rate.

Figure 1.5- Trends of Child mortality

In case of, under five mortality, India has achieved a sharp decrease from 74 to 50 in NFHS-IV data. But India still lags behind Nepal, Bangladesh and Bhutan in case of under five mortality.

In terms of institutional child birth, we can also see an upward direction. Data shows that, India has achieved institutional child birth from 39% to 79% in this NFHS conducted in 15-16. Immunization has been another successful area in the country as it reported sharp increase of 18.5% in comparison to NFHS III conducted in 2005-06. As of now, India has achieved 62% of children in the age group of 12-23 months who are fully immunized.

The Global Hunger Index (GHI) is a statistical tool that measures countries’ hunger situation as hunger is an underlying factor of malnutrition. Global Hunger Index is based on three important indicators,

- the proportion of undernourished as a percentage of the population
- the prevalence of underweight children under the age of five years
- the mortality rate of children under the age of five.

This index is done in 119 countries in the world on a 100 point scale. Lower the value reflects no hunger situation in the country and the value goes up indicates the alarming state of hunger in the country. The score value exceeding 30 points denoted as extremely alarming hunger problem. The Challenge of Hunger; Global Hunger Index; Facts, determinants and trends report published in October 2006 placed India in 96th rank with a score value of 25.73.

The GHI combines three equally weighted indicators:

- the proportion of the undernourished as a percentage of the population;
- the prevalence of underweight children under the age of five; and
- the mortality rate of children under the age of five.

Similarly, the India State Hunger Index (ISHI) was measured to understand the issue of hunger and malnutrition at the regional level. It has used the same criteria used in Global Hunger Index (GHI) 2008. The India State Hunger Index was done in 17 states in India, covering more than 95 percent of the population. This report was developed based on the data of NFHS-III, NSSO data of 2004 and 2005. India State Hunger Index was also calculated based on the same indices used in Global Hunger Index.

The key findings and facts of India State Hunger Index 2008 are

- India is the world’s largest food insecure country and more than 200 million people live with hunger.
- Based on the value score, it was found that all Indian states have “serious” level of hunger.
- There is not a single state with low or even moderate score value levels.
- Twelve states of our country scores as “alarming” category and Madhya Pradesh is considered as “extremely alarming” state
- India’s poor performance on the GHI is due to high level of child malnutrition.
- The value scores are closely linked with poverty of the state.
Finally, ISHI 2008 recommends that improving child nutrition is of utmost urgency in most Indian states because of its large contribution to the ISHI scores. All states also need to improve strategies to facilitate inclusive economic growth, ensure food sufficiency, and reduce child mortality. (International Food Policy Research Institute, 2008)

**Prevalence of Malnutrition in Bihar:**
As the researcher has taken up Bihar as the field of research, therefore it is imperative to examine the status of the state. Bihar is one of the fast developing states in India after curbing in 2001 but child malnutrition is a critical problem in Bihar.

Bihar is one of the key states in Indian politics with 38 districts and having population of 10,38,04,637 comprising of 5,41,85,347 male members and 4,96,19,290 female (as per census data 2011). This state is one of the most densely populated states in India and ranks 3rd. It constitutes 8.6% of national population. Keeping in mind its health, education, nutrition and protection outcome indicators, the state has been kept in the group of Empowered Action Group (EAG) states in India along with Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, Rajasthan, Uttarakhand and Uttar Pradesh. The degree of infant mortality and demographic transition has been considered as two key indicators.

According to census report 2011, the state has significant number of illiterates and is lower than the national average in terms of poverty. The caste ridden state has also reported alarming challenges in terms of low age of marriage, malnutrition, anaemia among adolescent girls and women, availability of sanitation facility and gender discrimination amongst the scheduled caste, extreme backward communities and Muslim communities.

The state economy is mostly dependent on agricultural sources, aqua resources and characterized with flood, water logging and drought in the south and central part of the state. Rivers and its confluent have massive impact in the state’s economy and cultural characteristics. Bihar is in the Empowered Action Group states of India and lag behind in social and health indicators. The state is also facing conflicting situations which also have negative impact on health indicators.
The key health indicators i.e infant mortality, maternal mortality rate, total fertility rate and underweight is higher than national average and many developing states in India. The NFHS-III Report in 2005-2006 has indicated improvement in immunization coverage, institutional child birth, usages of family planning methods etc but the prevalence of water borne diseases, communicable diseases is very high in the state (Special Task Force on Bihar, Government of India;2007)

As far as access and availability of health services is concerned there are substantial gaps in infrastructure, manpower, equipments, drugs etc. In the state, there are huge gaps of sub-centers, primary health centers, community health centers and human resources in comparison with the Indian Public Health standard. The other key factors affecting the health status of its population is prevalence of high fertility rate, low level of institutional child birth, low coverage of completion of routine immunization and also accessibility of ICDS services which is the key for nutrition and health services for under five children in the state and women.

Child malnutrition is a critical problem in Bihar. The prevalence of underweight children is worse than the national average and higher than any country in the world. (India State Hunger Index, 2008). Bihar has the 3rd highest prevalence of underweight children (56.1%) among Indian states, after only Jharkhand (57.1%) and Madhya Pradesh (59.8%).(World Bank ,2012. World Development Indicators).

Let us have a look at the status pertaining to malnutrition of children under 5 years as reported in the NFHS data conducted by the Government of India in last four consecutive phases of India and Bihar,

**Table-1.3 Underweight status of children through NFHS figures**

<table>
<thead>
<tr>
<th></th>
<th>NFHS-I(92-93)</th>
<th>NFHS-II (98-99)</th>
<th>NFHS-III(05-06)</th>
<th>NFHS-IV(15-16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bihar</td>
<td>62.6 %</td>
<td>54.4%</td>
<td>55.9%</td>
<td>43.9%</td>
</tr>
<tr>
<td>India</td>
<td>53.4%</td>
<td>47%</td>
<td>42.5%</td>
<td>35.7%</td>
</tr>
</tbody>
</table>
Table-1.4 Stunting status of children through NFHS figures

<table>
<thead>
<tr>
<th></th>
<th>NFHS-I(92-93)</th>
<th>NFHS-II (98-99)</th>
<th>NFHS-III(05-06)</th>
<th>NFHS-IV(15-16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bihar</td>
<td>60.9%</td>
<td>53.7%</td>
<td>55.6%</td>
<td>48.3%</td>
</tr>
<tr>
<td>India</td>
<td>52%</td>
<td>45.5%</td>
<td>48%</td>
<td>38.4%</td>
</tr>
</tbody>
</table>

Table-1.5 Wasting status of children through NFHS figures

<table>
<thead>
<tr>
<th></th>
<th>NFHS-I(92-93)</th>
<th>NFHS-II (98-99)</th>
<th>NFHS-III(05-06)</th>
<th>NFHS-IV(15-16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bihar</td>
<td>21.8%</td>
<td>21%</td>
<td>27.1%</td>
<td>20.8%</td>
</tr>
<tr>
<td>India</td>
<td>17.5%</td>
<td>15.5%</td>
<td>19.8%</td>
<td>21%</td>
</tr>
</tbody>
</table>

Based on the consecutive four phased study of NFHS in India, we can construe that it is most leading health problem. Particularly in eastern region the data manifests an alarming level.

The below table 1.6 compares the magnitude of underweight data through four phased NFHS data in eastern regions states.

Table-1.6 Comparative illustration of underweight through NFHS figures in the Eastern states of India

<table>
<thead>
<tr>
<th>State</th>
<th>NFHS-I</th>
<th>NFHS-II</th>
<th>NFHS-III</th>
<th>NFHS-IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bihar</td>
<td>62.6%</td>
<td>54.4%</td>
<td>55.9%</td>
<td>43.9%</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>-</td>
<td>-</td>
<td>56.5%</td>
<td>47.8%</td>
</tr>
<tr>
<td>Odisha</td>
<td>53.3%</td>
<td>54.4%</td>
<td>40.7%</td>
<td>34.4%</td>
</tr>
<tr>
<td>West Bengal</td>
<td>56.8%</td>
<td>48.7%</td>
<td>38.7%</td>
<td>31.6%</td>
</tr>
<tr>
<td>India</td>
<td>53.4%</td>
<td>47%</td>
<td>42.5%</td>
<td>35.7%</td>
</tr>
</tbody>
</table>

In 2007, World Bank came up with a ranking of 200 districts in India and called them as “most in need” district. The variables that they took up weight-for-age of children in the age group 0 to 71 months and anaemia levels among pregnant women (age group 15 to 44 years). These 200 districts were spread in 21 states in India.

The most interesting fact, that the report revealed was, better performing states based on economic growth like Punjab, Maharashtra and Gujarat has higher number of
districts in the bottom of the list in comparison to Odisha which is economically deprived. Bihar recorded that, 19 districts out of 38 districts come under this list.

Though several initiatives have been initiated to address malnutrition in the state, particularly among children, adolescent girls and pregnant women, it seems either the schemes presently running in the state are not reaching the beneficiaries or they are flawed (Freedom from Hunger for Children under six; a report published by Save the Children in April 2009).

**Prevalence of Malnutrition in Darbhanga :-**
Darbhanga is one of the underdeveloped districts in the state of Bihar. Geographical characteristics of the district make it vulnerable in terms of retarded growth. The NFHS-IV (2015-16) data reveals the startling fact in the facet of malnutrition among under five children. The underlying indicators and correlates of malnutrition have higher magnitude in this district, which has been critically reflected in various Government data base.
The below mentioned table is a comparative illustration of national, state and research district figure.

**Table 1.7 Comparative illustration of malnutrition status-National, State and District**

<table>
<thead>
<tr>
<th>Indicators</th>
<th>NFHS-IV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>India</td>
</tr>
<tr>
<td>1. Children under 5 Years who are stunted</td>
<td>38.40%</td>
</tr>
<tr>
<td>2. Children under 5 Years who are wasted</td>
<td>21%</td>
</tr>
<tr>
<td>3. Children under 5 Years who are severely wasted</td>
<td>7.50%</td>
</tr>
<tr>
<td>4. Children under 5 Years who are underweight</td>
<td>35.70%</td>
</tr>
</tbody>
</table>

(NFHS-IV, 2015-16)
Annual health survey 2014, conducted by Government of India places the district under the category of 100 districts with highest prevalence of child wasting, stunting and underweight. The district has also been placed as 3rd highest district with highest prevalence of undernourished in rural areas in the age group of 5-18 years (AHS, 2014). According to Annual Health Survey, 2014 report launched by the Government of India the district stands in the rank of 198 amongst 274 in the category of Child Nutrition Deprivation Index (CNDI) with CNDI value of 0.699.

Thus, we can conclude that, malnutrition in Bihar and in Darbhanga district is a serious health concern. Presence of its higher magnitude demands for consolidated and multi faceted actions.

**Causes and Consequences of Malnutrition in India:-**
Children’s nutrition requires particular emphasis. Lack of nutrients in diet put children in vulnerable position and increase the risk of physical and mental impairment. In developing countries like India, children die due to infectious disases because of poor
immune systems. The immune systems gets weakened due to poor intake of vitamins, minerals and energy diet.

Malnutrition in India is multi–causal and multi-factorial and it also demands multi-faceted intervention. The socio-economic conditions of the community, cultural practices and accessibility of health care services are the key aspects while understanding the malnutrition issue in India. It is the resultant of food insecurity in terms of quality and quantity, repeated infections and vulnerability of diseases, standard of living etc. Thus, malnutrition is not merely an issue related to food and diet rather it encompasses a large spectrum of health outcome indices.

High incidence of malnutrition among children is caused due to several factors, which include low intake of nutritious food, non-availability of quality health care services, poor health and hygienic practice. Social practices such as early marriage, early pregnancy, food taboos and lack of breastfeeding contribute to higher malnutrition rate. There are other hindrances too, like low-birth weight babies, non-spacing of children and anaemia among women. High prevalence of gender discrimination is another important issue behind malnutrition. Girls lack equal attention, care and good practices in comparison to the boys.

With a population of over 1.21 billion (Census 2011), the nutritional problems in India are diverse and location specific. The traditional diet of Indian varies from culture to culture and ecological habitat. It is also influenced by the indices of education, poor standard of living, food taboos and beliefs. There are some critical factors that influence malnutrition in the society.

Therefore, we can argue that malnutrition is a man made problem and multi dimensional. It starts in the womb at the time of conception and ends in the grave. The first 1000 days of a child’s life from conception to second year is most critical in terms of growth and development of nerves.

K. Park (2013) asserted that malnutrition must be understood from the perspectives of conditioning influences, cultural influences and socio-economic factors.
**Conditioning Influences** embrace the fact that infectious diseases are responsible factors for malnutrition particularly in the early age of childhood. Environmental condition directly impacts the nutritional level of the children. The common diseases directly contribute to nutrition level.

The **cultural influences** are most critical in the rural society. Lack of food is not only the cause of malnutrition. People choose poor diet because of cultural influences like food habits, customs, beliefs, traditions and attitudes. The family plays an important role towards food habits for children. Unfortunately, many customs and beliefs are applied on children and expectant and lactating women. Religion also plays a key role in defining the food habits in India. The cooking practices and child rearing practices largely influence the nutritional level in India.

**Socio-economic** factors must be understood in a holistic manner. Malnutrition is largely understood as the by-product of poverty, ignorance, insufficient education, lack of knowledge, lack of sanitation facility, large family size etc. The health indicators like birth weight, family size, ante-natal check up, nutrition level of mothers, age of child birth, concept and use of birth spacing, proneness to disease of mother, availability and accessibility of the Government services and health seeking behaviour also need to be included while understanding the malnutrition issues of a community.

Historically, nutritionists’ communities have focused on increasing food availability, while the medical community has emphasized on the availability of health care services. Over the centuries through studies and researches, the determinants of malnutrition has been understood from interconnecting factors like

1. Health and nutritional status of mother during pregnancy- it has been an established fact that nutritional status and health status of mother during pregnancy has been key factor while determining the status of children. Malnourished mothers have higher probability of giving birth to low birth weight baby.

2. Infant care and feeding- practice of breast feeding immediately after birth to six months, is most vital in determining the health outcome indices of the child. Colostrums feeding in rural parts of the country is prohibited and thus
new borns become vulnerable to diseases. NFHS –III(05-06) data prevails that only 46% children below the age of six months received exclusive breastfeeding. This status also escalated in NFHS-IV figure which records that 54.9% children under 6 months are exclusively breast fed. In terms of colostrums feeding India registered a sharp progress in the last one decade. In NFHS-III, the data was just 23.4% and in NFHS-IV data climbed up to 41.6%, who received breast milk within one hour of birth. After six months, supplementary food is also important.

3. Prevention of communicable diseases- Frequent diseases like diarrhoea, fever, pneumonia, vaccine preventable diseases like measles and other illnesses, aggravate poor nutritional status. Complete routine immunization, safe water and sanitation facility, personal health and hygiene situation is also a very important factor that creates difference in the lives of the children.

4. Management of health diseases- rational management of childhood illness by ensuring and accessing quality health care services is another critical factor.

5. Perpetual Poverty, seasonal food shortage, hunger and workload of the mother- the last one is most critical and important in nature. The determinant of nutritional status is poverty, food shortages throughout the year or in particular season with higher complexity of mother’s workload impacting inadequate time for proper care.

(Save the Children, April 2009)
Thus, malnutrition is self–perpetuating. In most extent, the nutritional status is linked with mother’s health.

The diagram describes how malnutrition travels through generation,

**Cycle of Malnutrition**

![Cycle of Malnutrition Diagram](image)

**Figure 1.7 Cycle of malnutrition**

UNICEF (1990) developed a conceptual model as part of their nutrition intervention strategy worldwide. This model explains malnutrition issue as multisectoral and multi layered. It encompasses food, health and care aspects of the child. This multi layered causes are basically analyzed in terms of immediate, underlying and basic causes. This framework also presents malnutrition as manifestation of a larger development problem. In this conceptual framework, factors at different level influences other level and thus calls for a comprehensive holistic action.

The immediate causes are inadequate diet intake and infectious diseases; the underlying causes are inadequate access to food, inadequate maternal and childcare and inadequate health services and health environment. As per the framework the
basic causes are political and ideological factors, economic structure and access to resources.
**Figure 1.8 UNICEF Conceptual framework on malnutrition**

(UNICEF 1990)

**Poverty and Nutrition – the NFI Framework**: Relationship between household poverty and malnutrition was developed by Prema Ramchandran (2007). This is popularly known as poverty – nutrition framework. She argues that poverty intensifies malnutrition. Domestic poverty compels women to engage in hard physical labour, living in unsanitary conditions leading to frequent infections, low income resulting in low food intake and the well known cycle of frequent pregnancies and large families. Malnutrition caused direct loss in productivity, poor cognitive development and schooling and increased the health care costs.

Therefore, from these two hallmark conceptual frameworks we can argue that, the causes for malnutrition are various and are multi-dimensional. To sum up, it includes these following causal factors of malnutrition:

- Age old beliefs and cultural practices like prohibition in colostrums feeding
- Social taboos like much food during pregnancy is harmful
- Gender preferences while serving the food
- Household food insecurity
- Illiteracy specially in women
- Poor access to Government welfare services meant to address food insecurity
- Non-universalization of the ICDS services and poor quality of the SNP provided by the ICDS
- Poor access to health services
- Lack of availability of safe drinking water
- Poor sanitation and environmental conditions and low purchasing power etc.
- Early marriages of girls
- Teenage pregnancies resulting in low birth weight of the newborns
- Poor breastfeeding practices and poor complementary feeding practices
- Lack of knowledge about nutritional needs of infants and young children and repeated infections further aggravate the situation.
Therefore it is widely recognized that a multi-sectoral approach is necessary to tackle the multi-dimensional problem of malnutrition in India.

**Consequences of Malnutrition:**
The impact of under nutrition or malnutrition is long lasting and irreversible. It affects the overall development and growth of the children. The cognitive and motor development at early infancy is largely dependent on quality nutritional care and health access. It is considered as contributing factor for high mortality and morbidity amongst children under 5 years. Malnutrition during childhood affects the growth potential and push factor as morbidity and mortality in later stage of life.

Poor child growth is the consequence of a range of factors that are closely linked to the overall standard of living such as access to food, housing, and health care. Nutritionally deprived children are more susceptible to common diseases and have weak immune systems. The consequences of impaired growth and development in children can be long lasting and compromise academic performances and the ability to contribute in the society. (Onis de Mercedes, 2000).

**Child Mortality:**- Approximately 12 million children under 5 years of age die each year in developing countries. (The state of the world’s children, UNICEF; 1998). The causes of deaths were due to diarrhoea, pneumonia, vaccine preventable diseases and focus was not given to malnutrition. Thus, child death in the developing countries are not only from an infectious disease or starvation, but from the simultaneous presence of malnutrition and infection that increases the child’s risk of death (Dirk G.Schroeder; 2000). During 2007, UNICEF recorded 9.2 million child deaths under the age of five, globally. Child mortality and poverty are linked with one third of child deaths caused by malnutrition.

**Infection and Disease:**- Other impact of malnutrition has been observed in the association with infection and diseases. Malnourished children tend to suffer more due to infectious diseases. It has also been established fact that initial nutritional status has strong correlation with the severity of disease episode and duration of suffering.
**Functional Outcomes:**- Malnutrition impairs functional performances like reduced physical activity, work capacity, cognitive and behavioral development. Poorly nourished children may be less physically active and therefore less likely to interact with his or her environment which may lead to impaired learning.

**Low Birth Weight:**- Malnourished mothers give birth to low birth weight babies. LBW is defined as birth weight of a live born infant of less than 2500 gms (5.5 Pounds) regardless of gestational age. LBW is a major public health problem in India and other developing countries. LBW is caused by pre-term birth and slow pre-natal growth. LBW children are at high risk of death than the normal infants. However, the causes of LBW is not established so far, but maternal malnutrition and anaemia are the significant factors of LBW. Hard physical labour during pregnancy, infection induced illness, short birth intervals, young age of the mother, smoking are also associated with LBW. Thus, the LBW is multi-factorial and required multi-pronged approaches.

![Diagram](image)

**Figure 1.9 Malnourished mother-malnourished child-the perpetual cycle**

Low birth weight can be diminished through proper intervention for pregnant women, micro-nutrient supplementation, education and better health care facilities (UNICEF, 2007). In India specially in rural areas where non-institutional child birth is high, the new born baby’s weight measurement is not done after birth by the outreach health worker. Thus, in India most of LBW is under reported or not reported and miss the proper care and treatment.
Classification of Malnutrition:-
There are various forms of malnutrition. The nutrition problems have been categorized in three broad categories. These are

a) Protein Energy Malnutrition ( Macronutrient deficiencies)
b) Micro-nutrient deficiencies
c) Prevalence of Chronic diseases

a)The Protein Energy Malnutrition(macro nutrient deficiency) - It is identified as a major health and nutrition problem in India. It occurs particularly in children in first years of life. It is not merely the cause of child mortality and morbidity but also leads to permanent impairment in mental growth. It is now regarded as a lethal form of malnutrition basically caused by lack of energy and protein. PEM is associated with poor weight gain, slow linear growth and behavioral changes such as irritability, anxiety and attention deficit (Grigsby 2003). The term protein-energy malnutrition (PEM) has a sound physiological basis involving the interrelationships of energy metabolism (Beaton and Patwardhan, 1976).

The current concept of PEM has clinical forms, kwarshiorkar and Marasmus which are two different clinical pictures at opposite poles. Kwashiorkar is characterized with fair calorie intake but inadequate protein intake. Marasmus involves lack of energy and protein in diet.

PEM is due to inadequate food intake both in quantity and quality; infections like diarrhoea, respiratory infections, measles and worms increase the requirement of calories, decreasing the absorption and utilization.

There are other multiple factors of PEM. It includes poor environmental conditions, large family size, poor maternal health, failure of lactation, premature termination of breastfeeding, adverse cultural practices relating to child’s rearing and weaning. Delayed supplementary feeding, discarding the cooking water from cereals are also reasons. Protein-energy malnutrition plays a major role in half of all under-five deaths each year in developing countries (WHO, 2000).
b) **The Micro nutrient deficiencies** are related to poor intake of vitamins, minerals and can be identified by clinical signs. Multiple micronutrient deficiencies such as Iron, Zinc are affecting the lives of many children in the developing countries. These nutrients are required in small amount but it plays a key role in the metabolic process. If the micronutrients are not sufficient from food then significant health problems can start.

**Iron Deficiency Anaemia (IDA)** - When people do not get enough iron in their diet, their blood becomes weak and cannot carry enough oxygen around the body and results in fatigue, inability to concentrate, impaired physical and cognitive development. Iron Deficiency Anaemia affects women and children in particular, as well as adolescents. It also causes problems during the pregnancy and increases the risk of preterm babies. It is the most prevalent nutritional deficiency in the world. Infections, stomach and digestive diseases and heavy blood loss during menstruation may degenerate the anaemia. Iron deficiency anaemia is the most widespread micronutrient deficiency affecting all age groups irrespective of gender, caste and religion. In India, it has been the silent killer and is still rampant among women belonging to reproductive age group (15-49 years) and children (6-35 months) and low socio-economic strata of Indian population.

Iron deficiency is caused by inadequate intake or poor bio-availability of iron. Some other factors are malaria, hookworm infections, close intervals of child birth and loss of blood during pregnancy delivery. Anaemia increases the risk of maternal and foetal mortality and morbidity. In India, 19% maternal mortality is due to high level of anaemia. It reduces work capacity, immunity systems and increases the susceptibility to infection.

**Vitamin A Deficiency (VAD)**- Vitamin A deficiency can occur when people do not eat enough food containing vitamin A or fat. Vitamin A deficiency can cause night blindness and permanent damage to the eyes, blindness and even death. Actually, it affects the functioning of retina, bone growth and immune responses. People at risk from vitamin A deficiency are mostly pregnant and breastfeeding mothers and
children. It also increases risk of death during pregnancy for both mother and foetus. In India, to eradicate Vitamin-A deficiency, Government has launched Vitamin-A supplementation amongst the pre-school children.

**Zinc Deficiency:**- It is caused by low intake of bio-available zinc. It impacts poor immune system functioning and growth retardation. Diet, low in meat and fish increases the risk of zinc deficiency, because zinc is poorly bio-available in cereals.

**Iodine Deficiency Disorders (IDD):**-It starts before birth and jeopardize children’s mental health. It impacts in the form of deafness, mental retardation, still birth, spontaneous abortion etc. Iodine is found in fish that live in the sea or iodised salt. Iodine deficiency can cause growth problems in children as well as hinder brain development. Iodine Deficiency can lead to different grades of Goitre and cretinism. Goitre (Grade 2) is characterized by a palpable and visibly enlarged thyroid with neck in normal position.

**Nutritional anaemia**- It is a disease syndrome caused by malnutrition. It has been defined by WHO as “a condition in which the hemoglobin (Hb) content of blood is lower than normal as a result of deficiency of one or more essential nutrients regardless of the cause of such deficiency”. Anaemia is established if the Hb level is less than normal as per the WHO norms. According to the World Health Organization (WHO), anaemia is defined as hemoglobin (Hb) levels <12.0 g/dL in women and <13.0 g/dL in men. Nutritional anaemia is a worldwide problem with the highest prevalence in developing countries.

c) **Prevalence of Chronic diseases**- presence of obesity, hypertension, cardiovascular diseases, diabetic melitus are closely linked to metabolism of human body or linked with excessive intake of energy and fat, particularly low fibre intake.

**Measuring Malnutrition:**-
The degree of malnutrition is measured by comparing food energy intake of persons with the proposed norms. Nutritional assessment is generally conducted through interpretation of data obtained from methods used to identify the population at risk of malnutrition.
Four types of methods are generally being used for the nutritional assessment. These are a) Clinical evaluation b) Diet intake assessment c) Bio-chemical assessment d) Anthropometry (physical growth and body size).

a) **Clinical Evaluation**: - Clinical examination is very important while conducting nutritional survey. It helps to assess the levels of health of individual and groups in relation to their food intake. There are number of specific physical signs and non-specific signs related to malnutrition. Diagnostic significance is greatly enhanced when two or more symptoms of deficiency diseases are present simultaneously.

b) **Diet intake assessment**: - Diet intake assessment is usually estimated with the use of household or individual food consumption surveys. It is done by weighing the raw food items to be used for cooking in the household. It is also done by weighing of cooked foods item in the household.

c) **Bio-chemical assessment**: - This process is time consuming and expensive. It is difficult to apply for a large population rather it is used in a sub-sample size. It helps to assess the present nutritional status and quantify the deficiency.

d) **Anthropometry** – It is the most commonly applied method to measure the nutritional status of population. It is the measurement of proportions of human body. Acute and chronic malnutrition is measured and quantified through anthropometric tools. The basic information and measurements that constitute anthropometric measurements in children are Age, Sex, Length, Height, Weight, head circumference and mid upper arm circumference. These measurements are the key building blocks of anthropometrics and are essential for measuring and classifying nutritional status in children under 5 years.

**Anthropometric Classification:**

Anthropometry test has been the most popular method in the world to assess the nutritional level of children under 5 years. H.P.S Sachdeva (1995) described that “earlier assessments were based on comparison method of the child’s weight with the average weight of reference child population of same sex and age. This index was called as Weight – for-age. Gomez’s calculation (1956) was the first one proposed from Mexico, based on prognostication studies in hospital children. Three grades
were identified based on the comparison with standard Harvard reference population (1950). In these classification, more than 90% reference weight-for-age was called as normal, 90% to 75% termed as grade-I (mild malnutrition), 75% to 60% as Grade-II (moderate malnutrition) and less than 60% were classified as severe malnutrition”.

In 1972, Nutrition Sub-committee of Indian Academy of Paediatrics came up with a different perspective and classification of malnutrition based on the Harvard reference population. They classified more than 80% standard weight for age as normal, 71% to 80% as Grade-I, 61% to 70% as Grade-II, 51% to 60% as Grade-III and less than 50% as grade-IV malnutrition. The Grade-III and Grade-IV was considered as severe malnutrition (Sachdev.H.P.S 1995).

Due to the problem of international recognition and availability, Harvard reference population was replaced by the globally accepted National Centre for Health Statistics data (NCHS) proposed by WHO.

In India, till 1991, nutritional data was presented by periodic survey by the National Nutrition Monitoring Bureau (NNMB). The institutionalization of the National Family Health Survey in 1992, has been working as authentic source of nutritional data in India based on the anthropometric indices.

**Expression of Anthropometric Indices:-**

**Anthropometric indices** are expressed in relationship to the reference population through two different statistical terms. One is Standard Deviation or Z score and other one is Percentage of the median.

Before going in to the detailing of these two terms it is imperative to construe the meaning of Reference Population.

**Reference Population** – Determination of child’s nutritional status is done through comparing the child’s status with a reference for healthy children. It is used to compare the child’s measurement with the median for children of the same sex and age for height for age, weight for age measurement. This concept was developed by CDC and its National Center for Health Statistics (NCHS) using the data collected
from health children population. After that, WHO adopted this NCHS reference curves for international use.

**Standard Deviations or Z score**- It is the difference between the value for an individual and the median value of the reference population for the same age or height, divided by the standard deviation of the reference population. Thus, Z score can be expressed as

\[
Z \text{ score} = \frac{\text{Measured value} - \text{median of the reference population}}{\text{Standard deviation of the reference population}}
\]

**Percentage of median**—percentage of median is the ratio of the child’s weight to the median weight of a child of the same height in the reference data and expressed as percentage. Thus, it can be expressed as,

\[
\text{Percentage of median} = \frac{\text{Measured weight of the child}}{\text{Median weight of the reference population}} \times 100
\]

The three commonly used anthropometric indices are **Height-for-age, Weight-for-age and weight-for-height**.

- **Height for age**: low height-for-age refers to Stunted growth, when a child is short for his/her age but not necessarily thin. Also known as chronic malnutrition, this carries long-term developmental risks. If the Z score value is below the median by more than -2 Standard Deviation then the child will be called as stunted (WHO 2007). If a child is stunted before the age of 2 years then poor motor development and cognitive development occurs. UNICEF (2009) recorded that 33% of world’s children are moderately stunted and 17% are severely stunted. The term chronic malnutrition is used in association with low height for age, but it is misleading and should not be encouraged to use.

- **Weight for height**: low weight-for-height refers to Wasted where a child is thin for his/her height. Based on anthropometric criteria, acute malnutrition can be divided into severe or moderate. Low weight-for-height, known as
wasting, is classified when the Z-score is below the median by -2SD. Low weight-for-height by a percentile lower than -3SD is regarded as severe wasting (WHO 2007). This carries an immediate increased risk of morbidity and mortality. Wasted children have a 5-20 times higher risk of dying from common diseases like diarrhoea or pneumonia than normally nourished children. The terms acute malnutrition, severe malnutrition are commonly used but are less appropriate descriptions than wasting. The advantage of this method is that, it doesn’t require age, which is very often not known by the parents in rural India or inaccurately mentioned by the parents.

- **Weight for age** :- Under-weight refers to low weight-for-age, when a child can be either thin or short for his/her age. This reflects to a combination of chronic and acute malnutrition. Children are classified as moderately underweight when the weight-for-age is below the median by -2SD, when the proportions are below the median by -3SD is called severely underweight. this is regarded as severe underweight (UNICEF, 2009; WHO, 2007). It has been widely used in India’s ICDS programs by the field worker maintaining the growth charts. These charts indicate at a glance whether the children are gaining weight as per the age.

Therefore, to consolidate the concept of classification based on the anthropometric indices we can conclude in this way,

**Table 1.8 - Classification of malnutrition for based on Z-scores amongst children**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Z-score Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate</td>
<td>-2 &lt; Z score &lt; +2</td>
</tr>
<tr>
<td>Moderately malnourished</td>
<td>-3 &lt; Z score &lt; -2</td>
</tr>
<tr>
<td>Severely malnourished</td>
<td>Z score &lt; -3</td>
</tr>
</tbody>
</table>

**Arm Circumference**: There is another method called MUAC (Mid-upper Arm Circumference) to determine the level of malnutrition amongst the children. MUAC has been promoted as an alternative measure which is independent of age and sex. MUAC is a quick and simple way to determine whether or not a child is malnourished using a simple colored plastic strip. MUAC is suitable to use on children from the age of 12 months up to the age of 59 months. However, it can also be used for children
over six months with length above 65 cm. If using a 3-colour tape: measurement in the green zone means the child is properly nourished; measurement in the yellow zone means that the child is at risk of malnutrition; a measurement in the red zone means that the child is acutely malnourished. An arm circumference exceeding 13.5 cm is a sign of a satisfactory nutritional status, between 12.5 to 13.5 cm it indicates mild-moderate malnutrition and below 11.5 cm is severe malnutrition.

**Severe Acute Malnutrition (SAM):**- It is the worst form of malnutrition and demands immediate action. Severely malnourished children with medical complication needs institution based health care and severely malnourished children without medical complication can be treated in a community setting. It is defined as weight for height Z score of -3 or less with presence of Oedema and mid upper circumference is less than 11.5 cm. In India, setting up Nutritional Rehabilitation Center in each district in the premises of Sadar Hospital under the guidelines of National Health Mission has created opportunity for the treatment of SAM children.

**Global organization and Nutrition systems:**

To control international epidemics like cholera and plague, international health organizations came into existence. In 1907, International Office of Public Health was established in Rome to collect information on small pox, plague, cholera and other diseases. The health organization of league of nations was set up in 1923 to promote health products and control of diseases. In 1948, World health Organization came in existence after international ratification. This was historical development. In 1946, United Nations International Children’s Emergency Fund (UNICEF) was created after resolution of UN General Assembly to protect the well being of children around the world. As first footprint, UNICEF started to provide milk powder, vaccination for children, support for vector control and provisioning for equipments for maternal and child health. In 1970, UNICEF focused on malaria eradication in Africa. By the 1970s, UNICEF started to focus on ensuring water supplies through installation of hand pumps and tube wells, most importantly setting up health care institutions. We see watershed development in the sector of food and nutrition while FAO (Food and Agriculture Organization) was founded in 1945. The key focus was raising the
level of nutrition and standard of living, raising the production of food and agricultural products. The FAO (Food and Agriculture Organization) headquarter based in Rome started to cooperate with countries on nutrition, bio-diversity and agricultural commodities. After Second World War, delegates from 44 countries met in Bretton Woods to reconstruct global infrastructures in 1944. A nutrition unit was created under the ambit of World Bank in 1972 keeping focus on developmental work instead of mass food distribution program. This work also encompassed the identification of high risk population of malnutrition, developing food subsidy programs, integrating nutrition assistance program with primary care, promotion of home gardening, improving water and sanitation and delivering the micronutrient supplements. (Richard D Semba; 2000)

At present, the key institutional bodies which are working to address the issues of malnutrition and hunger globally are FAO, UNICEF, WHO and World Food Programme (WFP). The other two important UN committees working on the issue are Standing Committee on Nutrition (SCN) and Committee for World Food Security (CFS). These institutions are complex in nature. Historically, nutrition has been everyone’s burden but no body’s responsibility. In 2008, Lancet described the international system as fragmented and dysfunctional.

**Table 1.9 Evolution of United Nations Nutrition development programme**

<table>
<thead>
<tr>
<th>Year</th>
<th>Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>1945</td>
<td>The Food and Agriculture Organization was constituted to emphasize on food security and ensuring people’s access to enough high-quality food. It works as knowledge network encompassing experts from agriculture, forestry, fisheries, livestock, nutrition and economics. It analyses and disseminates data. FAO has projects across the countries and they</td>
</tr>
<tr>
<td>Year</td>
<td>Event</td>
</tr>
<tr>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>1946</td>
<td>UNICEF (the United Nations Children’s Fund) was set up as a child rights organization with a mandate to ensure education, protection, health rights to every child. UNICEF also supports nutrition sensitive programs and intervenes to promote health nutrition outcomes of the country. It also provides vitamin A supplements in the developing countries along with immunization programme.</td>
</tr>
<tr>
<td>1948</td>
<td>The World Health Organization became the UN’s authority for health. It got leadership role on public health, shaping the research agenda, setting standards, and monitoring health trends, including disease outbreaks. Annually held assemblies are the principal forum for discussing malnutrition issue globally.</td>
</tr>
<tr>
<td>1961</td>
<td>The World Food Programme was launched as a humanitarian agency. It has significant focus on fighting hunger globally specially in the countries of conflict and disaster emergency.</td>
</tr>
<tr>
<td>1974</td>
<td>The Committee on World Food Security, an intergovernmental body hosted by FAO, was created. The objective of this forum was to review food security policy in member countries.</td>
</tr>
<tr>
<td>Year</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>1977</td>
<td>The Standing Committee on Nutrition (SCN) was placed to improve the effectiveness and coordination of the UN response to nutrition.</td>
</tr>
</tbody>
</table>
| 2008 | The High Level Task Force on the Global Food Security Crisis (HLTF) was established to co-ordinate the UN response to the food price. It has since become a permanent body and is currently led by the UN Secretary- General’s special representative on food security and nutrition.  
In 2008, Renewed Efforts Against Child Hunger (REACH) process was placed by UN, to strengthen the programme. It is now a coordinating system for WFP, UNICEF, WHO, and FAO, and is supporting the SUN (scale up of nutrition) activities in 13 countries. |

(Save the Children, 2012)

Recognizing the gravity of this situation, FAO and the World Health Organization (WHO) convened the first global conference (International Conference on Nutrition) to address the world's nutrition problems, at FAO Headquarters in Rome in December 1992.

The World Declaration on Nutrition and Plan of Action for Nutrition (Rome, 1992) also serve as a guide to the technical issues of nutrition policy and programme development. Nine priority themes are elaborated in the Plan of Action for Nutrition:
incorporating nutritional objectives, considerations and components into development policies and programmes;

- improving household food security;
- protecting consumers through improved food quality and safety;
- preventing and managing infectious diseases;
- promoting breast-feeding;
- caring for the socio-economically deprived and nutritionally vulnerable;
- preventing and controlling specific micronutrient deficiencies;
- promoting appropriate diets and healthy lifestyles;
- Assessing, analysing and monitoring nutrition situations.

The **Millennium Development Goals (MDGs)** are eight international development goals that were set following the Millennium Summit of the United Nations in 2000, following the adoption of the United Nations Millennium Declaration. All 189 United Nations member states at the time (there are 193 currently) and at least 23 international organizations committed to help achieve the following Millennium Development Goals by 2015:

- eradicate extreme poverty and hunger
- achieve universal primary education
- promote gender equality and empower women
- reduce child mortality
- improve maternal health
- combat HIV/AIDS, malaria, and other diseases
- ensure environmental sustainability
- develop a global partnership for development

The latest one is, World Health Organization made an initial proposal to reduce 40% reduction in childhood stunting by 2022. The WHO has recently published an implementation plan to improve the status of Maternal, Infant and Young child nutrition. This plan is a sign of coordinated approach and commitment to tackle the malnutrition in the developing countries.
Response, Policy and Programs in India to address the malnutrition:-

In 1947, independent India had faced many critical challenges. One of the major tasks was managing the threat of famine and starvation due to poor agricultural production and absence of a systematic food distribution system.

Adoption of Indian constitution (1952) which explicitly mentioned in article 47 that “State shall regard the raising of the level of nutrition and standard of living of its people and improvement of public health among its primary duties” was the first commitment to address the issue of health and nutrition for its citizen.

Keeping in mind the magnitude and severity of crisis, the state has renewed its focus and put attention to address the issue in India. The adoption of multi-sectoral, multi-pronged approach to combat the malnutrition and health issues in India needs importance of discussion.

The first Five Year plan (1951-55), considered that economic growth would ameliorate the issue of poverty in India and thus under nutrition would be solved.

The fourth Five Year Plan (1966-70) took up specific programs for improving the nutritional status of vulnerable mothers and children and different poverty eradication programs were also taken up.

The Fifth Five Year plan (1974-79) has been historical in the field of child development in India as it placed the National Policy for children in 1974 and took up other special measures to improve the condition of education, water supply, health and sanitation and nutrition for the vulnerable sections. The landmark was taking up ICDS.

To improve maternal and child health and nutrition status, Government of India introduced the world’s largest flagship program called Integrated Child Development Service (ICDS) on 2nd Oct in 1975 in 33 CD block in the country as Pilot program.

The main objectives of the program are as follows:

- To improve the nutritional and health status of children in the age-group 0-6 years;
- To lay the foundation for proper psychological, physical and social development of the child;
- To reduce the incidence of mortality, morbidity, malnutrition and school dropout;
➢ To enhance the capability of the mother to look after the normal health and nutritional needs of the child through proper nutrition and health education.

➢ To achieve effective co-ordination of policy and implementation amongst the various departments to promote child development;

In order to achieve the above objectives, a coherent service delivery mechanism of services are facilitated from each Anganwadi Centres as:

**Table 1.10 - Six core services of ICDS**

<table>
<thead>
<tr>
<th>Services</th>
<th>Target Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Supplementary Nutrition</td>
<td>Children below 6 years; Pregnant &amp; Lactating Mother</td>
</tr>
<tr>
<td>2 Immunization*</td>
<td>Children below 6 years; Pregnant &amp; Lactating Mother</td>
</tr>
<tr>
<td>3 Health Check-up*</td>
<td>Children below 6 years; Pregnant &amp; Lactating Mother</td>
</tr>
<tr>
<td>4 Referral Services*</td>
<td>Children below 6 years; Pregnant &amp; Lactating Mother</td>
</tr>
<tr>
<td>5 Pre-School Education</td>
<td>Children 3-6 years</td>
</tr>
<tr>
<td>6 Nutrition &amp; Health Education</td>
<td>Women (15-45 years)</td>
</tr>
</tbody>
</table>

*Note: Three of the six services namely Immunization, Health Check-up and Referral Services are delivered through Public Health Infrastructure under the Ministry of Health & Family Welfare.

Integrated Child Development Services Scheme, the first village outpost for health care and early childhood development program was launched in 1975 and has expanded to all villages with its service delivery modification, universalization agenda, augmenting and restructuring measures in the past three decades. The ICDS scheme is centrally sponsored program with state share. This scheme is being implemented by the Ministry of Women and Child Development. It is a well poised, well designed and world’s largest community based child development service delivery mechanism to address the issues of early child development needs like supplementary nutrition, health check up, health and
nutrition education, growth monitoring, referral services, pre-school education of 0-6 years children and mothers.

In its journey, ICDS received utmost attention from the policy makers, executives and in recent past from the judiciary too. It has adopted multi-sectoral approaches to address various underlying socio-cultural factors of child and maternal malnutrition. The Honourable Supreme court’s order in 2001, 2004 and 2006, made the six services of ICDS, universal to all children, pregnant and lactating mothers in India. The apex court also ordered an ANGANWADI ON DEMAND (AOD) in rural communities and slum settlement where it has atleast 40 children under six years and no ICDS services. Thus, it has been a right of all 0-6 year’s children to access quality services rendered by the ICDS in India. In this long journey it has achieved a lot through a decentralised, participatory manner in India to curb the rate of malnutrition, child and maternal mortality. However, with in its potential framework, there have been key operational challenges and implementation bottlenecks in the field.

Along with its much success, it has several operational bottlenecks and has not been able to bridge the gap as it was intended. In 2007, Prime Minister of India expressed his agony writing the note to all Chief Ministers “A number of reports and surveys, including the National Family Health Survey( NFHS-III)....... Seem to indicate a noticeable decline in the qualitative aspects of the ICDS programme. There is strong evidence that the programme has not led to any substantial improvement in the nutritional status of children under six”(Save the Children;2009).

The 10th Five Year Plan (2002-2007) termed ICDS as the foundation for child development and recommended convergence with Reproductive and Child Health Program and Sarva Siksha Abhiyan to ensure survival, growth and development of young children, adolescent and pregnant women.

The 11th Five Year Plan (2007-2012) entails the component of ICDS restructuring and promising to reach out to all children in the 0-6 year’s age group. This plan document puts ICDS on Mission Mode and took up the component of young children feeding practices, reduction in IMR and malnutrition.
ISSNIP- ICDS System strengthening and Nutrition Improvement Project:
To augment the ICDS services and to value add, Government of India has taken up 162 districts in eight developing states. It is a World Bank assisted project in India and operational since 2012. It is a seven year program and will be concluded in 2019. The goal of this programme is to improve the child development outcomes encompassing nutrition status of children under 5 years and early child education. This project is planned for execution in two phases with specific objectives. Strengthening policy framework and capacities of the ICDS functionaries for quality delivery of services and strengthening coordinated and convergent actions between center and eight states for better nutrition outcome are two fold objectives of this project.

In the state of Bihar this project is functional since November 2012 to strengthen the ICDS services in 19 districts. This initiative has been planned for 7 years in the cost sharing ratio of 90:10 between GOI and Government of Bihar. The key components of this project are:
1> Institutional and system strengthening
2> Community mobilization and behaviour change communication
3> Piloting convergent nutritional actions
4> Project management, technical assistance, monitoring and evaluation

In these 19 districts of Bihar all ICDS projects, AWC are operational under ISSNIP.

**Table 1.11 ISSNIP districts of Bihar**

<table>
<thead>
<tr>
<th>District</th>
<th>District</th>
<th>District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhagalpur</td>
<td>Buxar</td>
<td>Darbhanga</td>
</tr>
<tr>
<td>East Champaran</td>
<td>Gopalganj</td>
<td>Jahanabad</td>
</tr>
<tr>
<td>Jamui</td>
<td>Lakhisarai</td>
<td>Madhubani</td>
</tr>
<tr>
<td>Madhepura</td>
<td>Munger</td>
<td>Muzaffarpur</td>
</tr>
<tr>
<td>Purnea</td>
<td>Saharsa</td>
<td>Samastipur</td>
</tr>
<tr>
<td>Sitamarhi</td>
<td>Supaul</td>
<td>Vaishali</td>
</tr>
<tr>
<td>West Champaran</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
It is important to mention that, locale district for this research i.e Darbhanga has also been taken up for this program.

The adoption of the National Nutrition Policy in 1993 and National Plan of Action on Nutrition in India has been an example of nation’s commitment to address the issue. The policy emphasized areas for action were- food supply, education, information, health care, rural development, women and child development, people with special needs and monitoring.

The direct intervention points included the aspects of expanding the nutrition intervention through ICDS, empowering mother with nutrition and health education, reaching out to adolescent girls, ensuring better coverage of expectant mother, controlling micronutrient deficiencies and fortifying essential food with nutrients. The policy also envisaged the institutional changes covering the areas of food security, improving the dietary pattern, purchasing power, public distribution system, land reforms, health and family welfare, nutrition and health education, education and literacy, nutrition surveillance, information and communication and community participation.

Thus, it has adopted sectoral plan (in the field of agriculture, civil supplies, education, Environments and forest, Family welfare, Food processing industries, health, information and broadcasting, labour, rural development, urban development, women and child development) of action to contribute to the National Nutrition Goals to be achieved by 2000 AD.

The goals are

- Reduction in moderate and severe malnutrition among pre-school children by half
- Reduction in chronic under nutrition and stunted growth in children
- Reduction in low birth weight to less than 10%
- Elimination of blindness due to Vitamin-A deficiency
- Reduction in iron deficiency anaemia among women by 25%
- Universal iodization of salt for reduction of IDD to 10%
- Giving due emphasis on Geriatric Nutrition
- Production of 250 million tons of food grains
✓ Improving household food security
✓ Promoting appropriate diets and healthy lifestyles

(DWCD, MoHRD, GOI; 1995)

In 2010, under the leadership of the then Prime Minister, the central Government announced multi-sectoral programme to address maternal and child malnutrition in 200 selected districts of the country. This program has been implemented since 2013 in 100 districts in the first phase and another 100 districts will be scaled up in the next phase.

The recent hallmark development in the field of hunger and malnutrition is the enactment of the National Food Security act 2013. This act is aiming towards providing food and nutritional security to all human beings through life cycle approach, making availability of adequate quantity and quality food at affordable price for dignified lives. This act makes accountable to all state Government to provide rice, wheat and grains in very low cost prices. In the state of Bihar, it has been implemented since 2014, reaching out to all Scheduled caste, backward and scheduled tribe community.

In the above mentioned context, we can construe that malnutrition is a shame for the country and a serious health concern. We should not imagine national economic growth with faltering child health and high prevalence of malnutrition in our country. Thus, it calls for serious action, coordinated effort and political will.

**Gaps in the existing knowledge**

Knowledge about malnutrition, its causes and consequences, linkages with primary and secondary factors like poverty and other human development issues are very scattered. If we wish to identify the gaps in the existing literature then we can compute from structural and its systemic perspectives.

The most important aspect is related to availability of quantitative data on malnutrition in India. The last national survey (NFHS-IV) released its report in 2015-16 after a long decade. Therefore our policy and programs was based on NFHS-III data which was conducted in 2005-2006.
There are ample evidences of huge variances of the status of nutrition in Tribal areas as well as geographically non-accessible areas in rural context. There is enough information on the pattern of growth faltering in developing countries but still there are unknown facts about the causes of growth failure. There is lack of evidence and facts to describe the reasons behind the varied prevalence of malnutrition across the region, state, district and more over in the particular communities.

The structural aspects dealt with Knowledge, Attitude and Practice, socio-economic status of the families and gender inequality. Research has traced patriarchal norms in Indian society responsible for low status of women and thus impacting the lives of the children in perpetual cycle. This fact especially in context of Bihar (which is highly characterized with established patriarchal norms) needs further corroboration and evidences.

The systemic perspectives encompass the aspects of accessibility of the Government services and schemes meant for them towards addressing the issues of malnutrition. There have been studies merely focusing on the effectiveness of the ICDS in context of Bihar but it lacks a holistic view entailing the effectiveness of other services and their accessibility like health and employment guarantee programs.

The changing pattern of life style and struggle for existence has direct relation with the health status of its population. In view of the rapid change in the rural market, economy, exposure, information and overall education has been very much instrumental in deciding the transition of the society. In the context of Bihar and Darbhanga district in specific we don’t get any literature to suffice this aspect.

Information barriers resulting from low awareness levels and lack of women’s education, affect breastfeeding and other child care practices leading to under-nutrition among children but the literature does not explore the reasons for poor information barriers. The existing literature has also thrown limited focus on the gender discrimination based practices and its linkages with the malnutrition issue.

The existing literature has thrown limited perspectives in the facets of Socio-economic and cultural background of the scheduled caste families and the knowledge, attitude and practices. The literature does not provide comprehensive understanding
of the cultural factors behind malnutrition amongst children. The socially vulnerable groups like scheduled castes suffer from higher malnutrition prevalence, which may be due to the economic disadvantages and lack of access to services like improved institutional healthcare, ICDS, Public Distribution Systems etc. Existing literature has also very myopic perspectives in terms of analyzing the availability and accessibility of the Government services meant for addressing malnutrition in the society. Therefore, this study will also give an opportunity to look into those matters.

From both Bihar and district perspective, specific literature is less and thus the study wants to explore those facts and systematically describe the matter. The operational area is characterized with abject poverty and is flood prone as proposed blocks are situated in the basin of Kamla and Koshi. Little literature has accepted the matter of fact of recurrent flood as cause of livelihood degradation, loss of natural sources and thus impact on the nutritional intake. But, this aspect has not been probed in detail.

**Objectives of the study:**

In this context of severity, its long lasting impact in the lives of the children due to multi-faceted, multi-factored malnutrition the research is intending to achieve the following objectives,

- To understand the socio-economic-cultural background of the parents of the malnourished children who are enrolled in the ICDS as beneficiary in age group 6 months to 3 years
- To examine the determinants/factors of malnutrition among children in the community
- To study the available services meant to address the malnutrition in the community and their accessibility
- To understand the perception of parents towards reason and impact of malnutrition amongst the lives of the children
Definition of the key terms:

Table 1.12 Definition of key terms

<table>
<thead>
<tr>
<th>Terms to be used</th>
<th>Theoretical definition</th>
<th>Operational Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malnutrition</td>
<td>“Undernutrition, defined as the outcome of insufficient food intake (hunger) and repeated infectious diseases. Undernutrition includes being underweight for one’s age, too short for one’s age (stunted), dangerously thin (wasted), and deficient in vitamins and minerals (micronutrient malnutrition). The term malnutrition refers to both undernutrition and overnutrition”. (UNICEF, 2006)</td>
<td>In this study, malnutrition refers to the condition of severe underweight as per the anthropometric scale of weight and age (less than 3 SD as per the WHO GMC)</td>
</tr>
</tbody>
</table>

WHO (2016) defined Malnutrition as “deficiencies, excesses or imbalances in a person’s intake of energy and/or nutrients. The term malnutrition covers 2 broad groups of conditions. One is ‘undernutrition’—which includes stunting (low height for age), wasting (low weight for height), underweight (low weight
for age) and micronutrient deficiencies or insufficiencies (a lack of important vitamins and minerals). The other is overweight, obesity and diet-related non-communicable diseases (such as heart disease, stroke, diabetes and cancer)”. World Food Program (2000) defines malnutrition as “a state in which the physical function of an individual is impaired to the point where he or she can no longer maintain adequate bodily performance process such as growth, pregnancy, lactation, physical work and resisting and recovering from disease.”

<table>
<thead>
<tr>
<th>Child</th>
<th>As per the UNCRC 1989, human being till the age of 18 years is defined as child.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In this study, child will be considered as 6 months to 3 years human being irrespective of their caste, religion who are enrolled in the ICDS as beneficiaries.</td>
</tr>
</tbody>
</table>
Significance and Scope of the study:-

A well fed, well nourished child is the edifice of a developed society. But in India, after independence of six decades the fatal issue of under nutrition is hovering over the citizens of the country. Though the Government of India and state Government has renewed its focus by adopting different programs and schemes but still there is long way to go.

Malnutrition follows a perpetual cycle. It is noticed that malnutrition is found higher amongst the children of underweight mothers. Mothers of rural India are largely undernourished which in turn results in birth of low birth weight babies. The entire situation gets compounded if the family is vulnerable and there is no livelihood security and food security. Women’s control over decision making, their rights on their reproductive health, choice making, education and awareness, domestic roles, child care practices are the key determinants of nutrition in the family. Therefore, this study has the potential to explore these areas in a comprehensive and logical manner.

The breast feeding practice, immunization, and care during the pregnancy, order of child birth, birth spacing has got tremendous weight age while analyzing the causes of malnutrition and child death globally. Hence, this study is also intending to explore these aspects in a through manner.

The research, in that sense, is significant and aiming towards exploring the underlying socio, economic and cultural factors of malnutrition, availability and accessibility of the Government services and understands the perception of the parents regarding the causes and impact of malnutrition amongst the children. This research also traces the role of social workers to combat the malnutrition in India.

Poor implementation of the programs, inadequate budget allocation, poor accessibility of the services meant for the children and mothers have been and remain critical factors for the malnutrition in India. It is also important to mention that the awareness level of community, internal structural composition of the family with gender perspectives has larger bearing on child and maternal health.
Today, malnutrition is no longer accounted as the resultant of poor food intake rather discussed with the issue from multi-dimensional perspectives ranging from education, knowledge, access to Government services, access to quality food grains, access to quality health care, levels of poverty, domestic income, purchase parity, environmental sanitation and hygiene.

The nutritional status of a family is thus largely interlinked with these complex factors. Thus, the proposed study will explore those complex relationships of malnutrition with other socio-economic and cultural factors.

This research work has considered malnutrition issue as a critical public health agenda. The state has a major role to combat the high prevalence of malnutrition among the vulnerable communities. The study has attempted to understand the systemic and structural drivers of malnutrition. On one hand the study has looked into the socio-cultural-economic aspect of food intake, access to health care, health and hygiene practice and on the other hand introspection of the effectiveness of program delivery system has been attempted.

In November 2007, a ‘Coalition for Sustainable Nutrition Security in India’ met under the chairmanship of M S Swaminathan. While summing up the proceedings, Swaminathan highlighted the need to take on the silent emergency of malnutrition at a “war footing” pace and involve all political parties, academia, corporate sector, international partners and civil society, including community and self-help groups (Save the Children, 2009). It has also been agreed by nutritionist community, politicians, policymakers that nutrition issue needs tackle on a war footing manner.

It is established fact that first two years in the life of children is most critical in terms of health and nutritional outcome in these formative years. Malnutrition has a long lasting impact on physical and intellectual development of the child.

The multi pronged steps like universalization of ICDS programs, implementation of the Food security program and other Government sponsored multi pronged approach to combat malnutrition amongst children and women needs an audit at the ground
Zero level and further introspection will give direction for future intervention for the state of Bihar. Thus, this study also carries the prospective nature for the policy makers while designing the program framework based on the evidences and interconnectedness of the issues.