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BEYOND HUNGER: EXPLORING THE COMPLEXITIES OF MALNUTRITION

Paras Shukla*[1], Dr. Shoheb Shaikh[2], Mohit Jadhav[3]

[1]Research Scholar Siddhi's Institute of Pharmacy, Nandgaon Thane.

[2]Associate Professor, Siddhi's Institute of Pharmacy, Nandgaon Thane.

[3]Assistant Professor, Siddhi's Institute of Pharmacy, Nandgaon Thane.

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Corresponding Author: Paras Shukla

Address: Research Scholar Siddhi's Institute of Pharmacy, Nandgaon Thane.

Email ID: shaikhshoheb91@gmail.com,

ABSTRACT

Cicely Williams (1893-1992), a pediatrician described malnutrition-related disorders in African children during the 1930s, a time when vitamin research dominated nutritional thinking. The terms "over nutrition" and "under nutrition" refer to the two basic forms of malnutrition, which occur when the body does not receive the necessary nutrients. Most impacted are children and newborns, as well as residents of underdeveloped nations. The majority of malnourished individuals pass away from concomitant conditions like tuberculosis, cancer, etc. The most typical symptoms of this sickness or pandemic include pale complexion, weakness, diarrhea, dizziness, and many more. The body needs extra nutrients to combat these symptoms. There are many medications and supplements on the market, but they can have negative side effects.

KEYWORDS: Malnutrition, Nutrition, Undernutrition, Overnutrition, PEM, Herbal formulations, Global crisis, Product, Essential nutrients, herbs, analytical study.

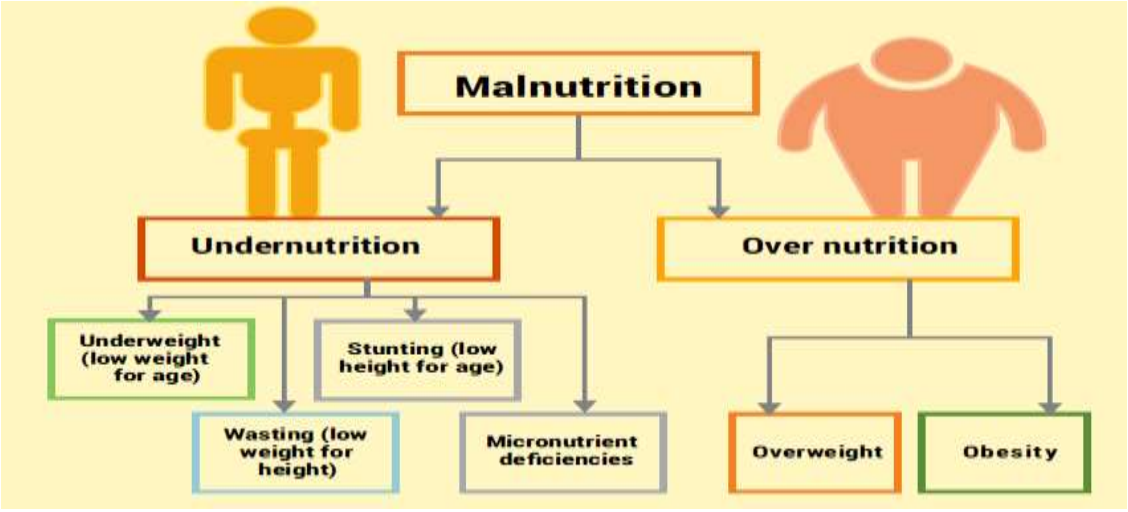
INTRODUCTION

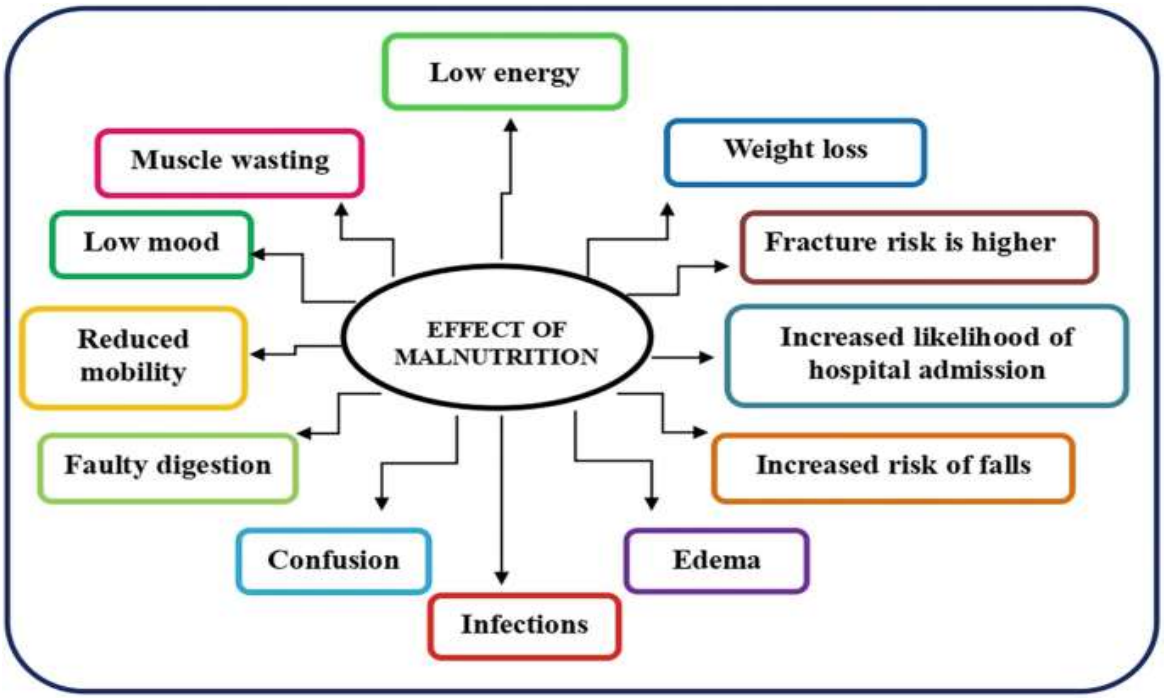
The initial phase's clinical update of protein-energy deficiency was originally released in Spanish in 1865; however it hadn't been commonly circulated. And after the rediscovery this description was successful translated in English language in the 1933. Both WHO (World

Health Organization) and FAO (Food and Agriculture Organization) take the responsibility to find the solution and explore the further research.[1] The Word "Malnutrition" is derived from the "Latin words","Malus" means "Bad" or "Poor" and "Nutritio" means "Nourishment" or “Feeding".[2] The Word Malnutrition has many synonyms such as BULIMIA, ANOREXIA NERVOSA, STRAVATION etc.[3] Malnutrition refers to a condition where there is a lack of proper Nutrition in the body. Either due to an inadequate intake of essential nutrients or an excessive intake of unhealthy foods. It can have sever Health consequences and affect individuals of all ages. We can also say that it is a type of Disease, occur by relative or obsolete deficiency or excessive of one or more Nutrients.[4] It can occur due to various factors, including insufficient Food intake, Poor absorption of the nutrients and utilize it properly. Mostly affected to infants, small children, pregnant women, and old people, as well as people living in developing countries Like India, Sri Lanka etc.[5]

There are two primary forms of Malnutrition

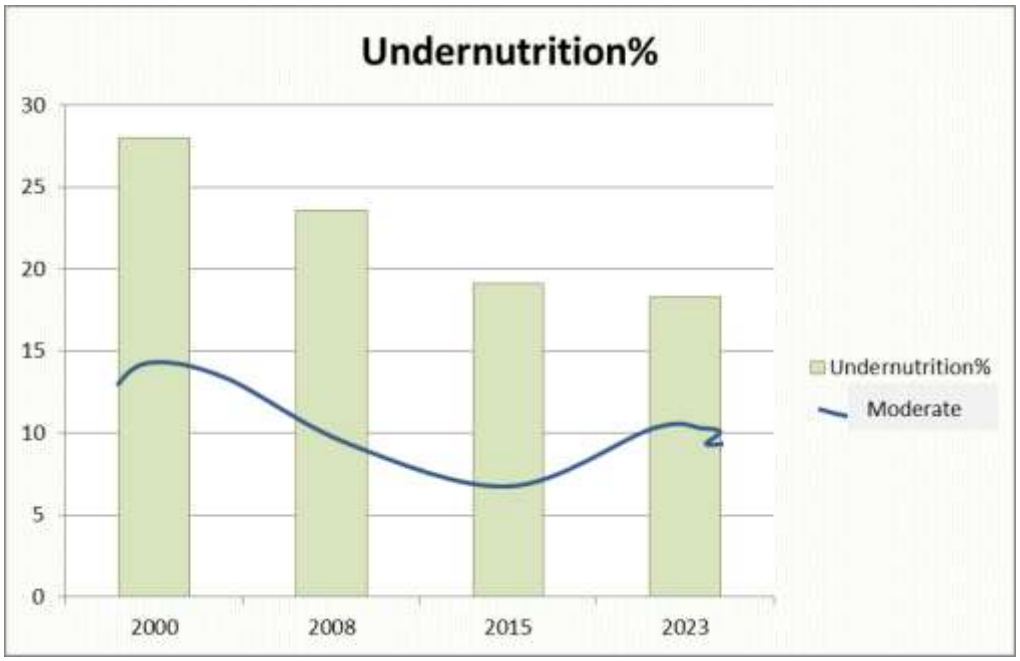
1. Undernutrition
2. Overnutrition.[6]





UNDERNUTRITION

Undernutrition refers to a condition in which a person's nutrients intake is insufficient to meet their body's needs. It occur when person does not consume enough calories, protein, Vitamin, and minerals that are necessary for healthy growth and functioning of the body. Undernutrition can affect Individuals of all ages, but it is particularly detrimental to children and can have lifelong consequences on their physical and cognitive development. It adversely affect physical and mental functioning, and causes changes in body composition and body cell mass. Undernutrition is a major Health problem causing the highest mortality rate in children particularly in those under 5 years, and is responsible for long-lasting physiologic effects. It is a barrier to the complete physical and mental development of children.[7] The rate of decreasing hunger has essentially stopped, and it is still too high worldwide. Considering a global GHI score of 18.3, and this is deemed moderate, the 2023 score is less than one point lower than the 19.1 global score in 2015. In fact, the number of undernourished individuals worldwide increased from 7.5 percent in 2017 to 9.2 percent in 2022, or around 735 million people.[8]



Underweight

This kind of malnutrition affects children or individuals with low body mass or weight. It can be described as a person who is underweight but of appropriate age. Since their weight is lower than their age, they fall into the underweight category of malnutrition. likewise referred to as low weight for age.[9]

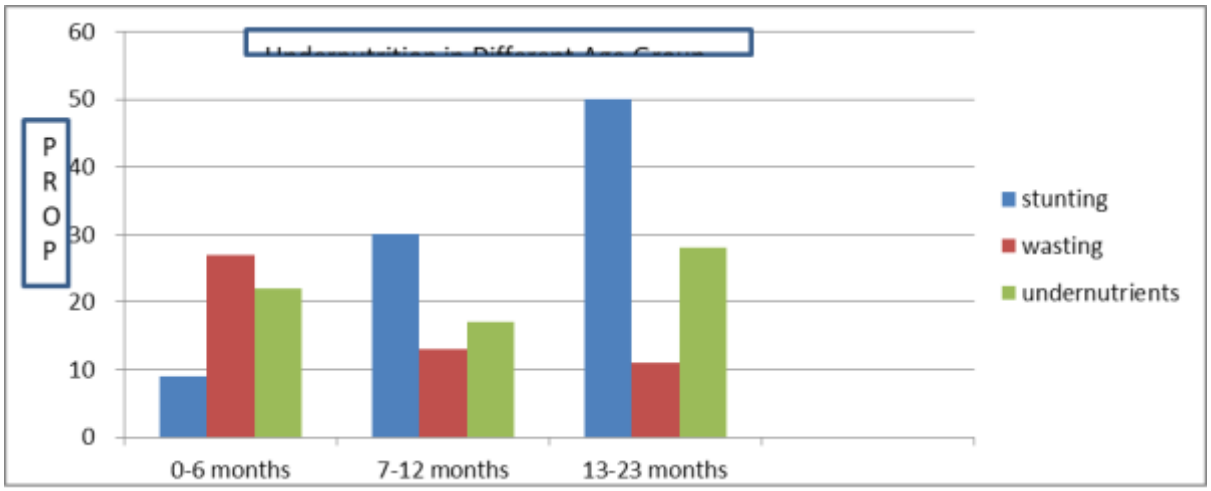
Stunting

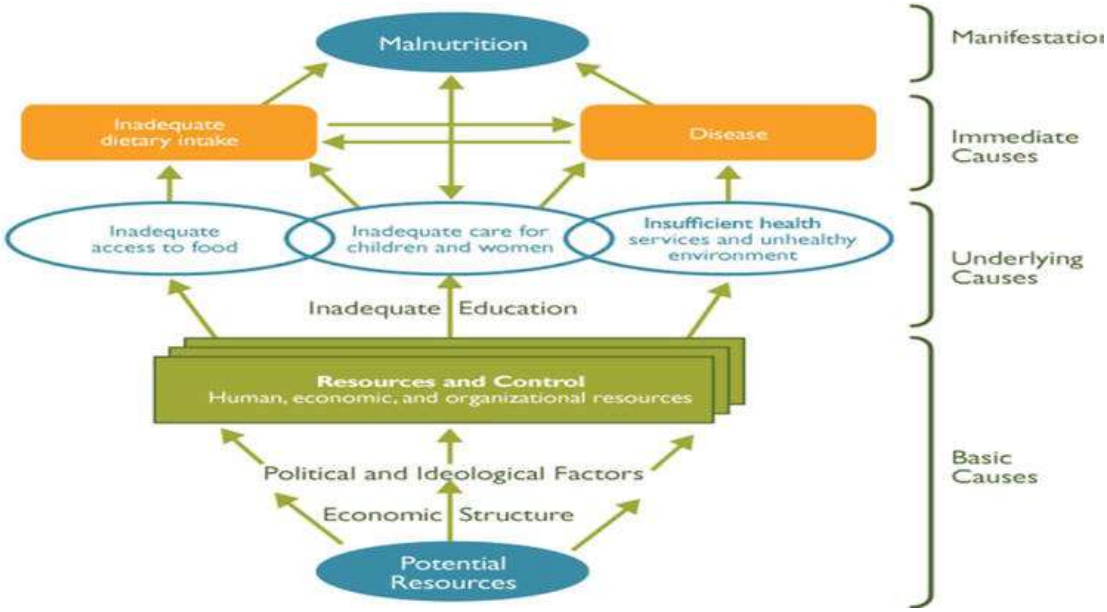
This is another kind of malnutrition where the victim is a child or a person with a lowered height. One way to characterize it would be that the person is underweight yet of appropriate age. Because they are not consuming enough nutrient-rich food, their height restricts or ceases to increase overall at a certain age, depending on their age. People that fit this description fall under the malnutrition category of stunting. As well as referred as low height for age.[10]

Wasting

This kind involves a person or child having a low body mass or weight. It can be described as a person who weighs less or has less body mass, but due to other biological factors, their height is ideal. indicates that although the person is of a suitable height, their body does not carry the necessary quantity of weight. People like these fall into the Wasting category of malnutrition. Additionally, low weight for height was provided.[11]

Press Information Bureau, Government of India, Ministry of Women and Child Development published state wise details on Malnutrition on 09-December-2013.





Micronutrients Deficiency

This is the most prevalent kind, which is defined as a persistent lack of vitamins and minerals that are necessary for optimal development and growth. as well as maintenance. Given that a few of these compounds are deemed necessary, we must get them from our meals. On the other hand, it may also be linked to increased needs, certain chronic illnesses, and inadequate intestinal absorption.[12]

Macronutrients Deficiency

A macronutrient shortage is characterized by a persistently low supply of biomolecules such as protein, fat, and carbohydrates, which are necessary for the body's optimum growth and

development, maintenance of health, and prevention of diseases like Kwashiorkor. Furthermore, it is easily obtained through diet.

Protein-Energy Malnutrition

Undernutrition in protein-energy is another name for (PEM) protein-energy malnutrition and followed by (PCM) Protein Calories Malnutrition.[14] This is a highly frequent type that is mostly targeted at children under the age of five. It is primarily found in underdeveloped nations like Tanzania, India, and others where children are not receiving the necessary nutrients from a conventional diet that includes calories, protein, and other essential items. In contrast, older generations in industrialized nations tend to experience it more frequently. To put it simply, this is the situation when our body lacks energy, which leads to a shortfall in both macro and micronutrients. PEM, or protein energy malnutrition, is defined by the World Health Organization as an imbalance between the body's requirement for protein and energy to ensure healthy development and growth and the amount of these nutrients that are available.[15] Protein Energy Malnutrition is defined as an inadvertent loss of at least 10 percent of one's weight in a span of fewer than six months.[16]

These PEM is further divided into two types

- Primary Protein Energy Malnutrition.
- Secondary Protein Energy Malnutrition.

Primary Protein Energy Malnutrition

Protein Energy Malnutrition (PEM) is a deficiency disease caused in the infants due to 'Food Gap' between the intake and requirements. This type of malnutrition is mostly found only in children, especially the children below the 5 ages, And rarely found in elders. This Primary PEM contains 3 types of disease which are followed as.[15]

1. Kwashiorkor

One other name for it is "Edematous Malnutrition" Kwashiorkor is a severe form of PEM that mainly affects newborns and young children. It is evident in an area where access to sufficient nutrition is restricted. Lack of protein in a child's diet can lead to kwashiorkor, frequently in conjunction with other dietary abnormalities. The primary cause of kwashiorkor is a prolonged, inadequate protein consumption, which is necessary for the body's cells to grow and maintain.[15] It is typically occurs due to the abandonment of breastfeeding before the Actual age due to the birth of a younger siblings. It results in cell membrane leakage,

which releases intravascular fluid and protein. Edema, or an accumulation of fluid in the body that causes the afflicted tissue to swell, is the result of this. It weakens an individual's immunity, leaving him more vulnerable to illness.[17,18]

2. Marasmus

Another severe form of malnutrition that mainly affects newborns and young children is called marasmus. It is usually brought on by a diet lacking in calories as well as other nutrients. As opposed to severe protein deficit, which is the hallmark of kwashiorkor, marasmus is caused by an overall insufficiency of calorie intake. The primary reason of the illness is that it was prevalent in an underdeveloped area with poor access to clean water and food. common among kids who aren't yet impacted by kwashiorkor. The children's weakened cell-mediated immunity makes them more prone to infection.[19]

3. Marasmic kwashiorkor

The third type of protein-energy malnutrition, known as marasmic kwashiorkor, is a combination of the signs and symptoms of kwashiorkor and marasmus.In addition to having edema, they are significantly underweight (below 60% of the 50th centile). Children who have marasmus may become marasmic kwashiorkor very quickly, particularly if they become infected and exhibit edema.[20]

Ministry of child and Women development has published a list with the help of NFHS (National Family Health Survey) as shown as below[21]

SR. NO..	STATE/UT	STUNTING%		WASTING%		UNDERWEIGHT%		Women whose Body Mass Index (BMI) is below normal (BMI <18.5kg/m2) %	
		NHFS 4 (2015-16)	**NHFS 5 (2019-21)**	**NHFS 4 (2015-16)**	**NHFS 5 (2019-21)**	**NHFS 4 (2015-16)**	**NHFS 5 (2019-21)**	**NHFS 4 (2015-16)**	**NHFS 5 (2019-21)**
1	**Andaman & Nicobar Islands**	**23.3**	**22.5**	**18.9**	**16**	**21.6**	**23.7**	**13.1**	**9.4**
2	**Andhra Pradesh**	**31.4**	**31.2**	**17.2**	**16.1**	**31.9**	**29.6**	**17.6**	**14.8**
3	**Arunachal Pradesh**	**29.4**	**28**	**17.3**	**13.1**	**19.4**	**15.4**	**8.5**	**5.7**
4	**Assam**	**36.4**	**35.3**	**17**	**21.7**	**29.8**	**32.8**	**25.7**	**17.6**
5	**Bihar**	**48.3**	**42.9**	**20.8**	**22.9**	**43.9**	**41**	**30.4**	**25.6**
6	**Chandigarh**	**28.7**	**25.3**	**10.9**	**8.4**	**24.5**	**20.6**	**13.3**	**13**

7	Chhattisgarh	37.6	34.6	23.1	18.9	37.7	31.3	36.7	21.1
8	Dadra & Nagar Haveli and Daman & Diu	37.2	39.4	26.7	21.6	35.8	38.7	23.4	25.1
9	Delhi	31.9	30.9	15.9	11.2	27	21.8	14.9	10
10	Goa	20.1	25.8	21.9	19.1	23.8	24	14.7	13.8
11	Gujarat	38.5	39	26.4	25.1	39.3	39.7	27.2	25.2
12	Haryana	34	27.5	21.2	11.5	29.4	21.5	15.8	15.1
13	Himachal Pradesh	26.3	30.8	13.7	17.4	21.2	25.5	16.2	13.9
14	Jammu & Kashmir	27.4	26.9	12.1	19	16.6	21	12.2	5.2
15	Jharkhand	45.3	39.6	29	22.4	47.8	39.4	31.5	26.2
16	Karnataka	36.2	35.4	26.1	19.5	35.2	32.9	20.7	17.2
17	Kerala	19.7	23.4	15.7	15.8	16.1	19.7	9.7	10.1
18	Lakshadweep	26.8	32	13.7	`17.4	23.6	25.8	13.5	8
19	Ladakh	30.9	30.5	9.3	17.5	18.7	20.4	10.5	4.4
20	Madhya Pradesh	42	35.7	25.8	19	42.8	33	28.4	23
21	Maharashtra	34.4	35.2	25.6	25.6	36	36.1	33.5	20.8
22	Manipur	28.9	23.4	6.8	9.9	13.8	13.3	8.8	7.2
23	Meghalaya	43.8	46.5	15.3	12.1	28.9	26.6	12.1	10.8
24	Mizoram	28.1	28.9	6.1	9.8	12	12.7	8.4	5.3
25	Nagaland	28.6	32.7	11.3	19.1	16.7	26.9	12.3	11.1
26	Orissa	34.1	31	20.4	18.1	34.4	29.7	26.5	20.8
27	Puducherry	23.7	20	23.6	12.4	22	15.3	11.3	9
28	Punjab	25.7	24.5	15.6	10.6	21.6	16.9	11.7	12.7
29	Rajasthan	39.1	31.8	23	16.8	36.7	27.6	27	19.6
30	Sikkim	29.6	22.3	14.2	13.7	14.2	13.1	6.4	5.8
31	Tamil Nadu	27.1	25	19.7	14.6	23.8	22	14.6	12.6
32	Telangana	28	33.1	18.1	21.7	28.4	31.8	22.9	18.8
33	Tripura	24.3	32.3	16.8	18.2	24.1	25.6	18.9	16.2
34	Uttar Pradesh	46.3	39.7	17.9	17.3	39.5	32.1	25.3	19
35	Uttarakhand	33.5	27	19.5	13.2	26.6	21	18.4	13.9
36	West Bengal	32.5	33.8	20.3	20.3	31.6	32.2	21.3	14.8

Secondary Protein Energy Malnutrition

It is brought on by a disease of the gastrointestinal tract (GI tract). Certain infections, hyperthyroidism, burns, trauma, and other serious illnesses can cause it. It inhibits the body's ability to metabolize foods and reduces hunger. When food is not absorbed, the cell cannot receive more energy for development and maintenance, which can result in serious disorders like malnutrition.[22] This is the condition which is the first stage of this big Pandemic.

MINERALS	MAJOR DEFICIENCY DISORDER
IODINE	Goiter, Hypothyroidism, Iodine Deficiency disorder, Increased risk of stillbirth, birth defects, infants mortality, cognitive impairment.
CALCIUM	Decreased bone mineralization, Rickets, Osteoporosis.

IRON	Iron Deficiency anemia, reduced learning and work capacity, maternal and infant mortality, low birth weight.
ZINC	Poor Pregnancy outcome, impaired growth(stunting), genetic disorders, decreased resistance to infectious disease.
FLUORIDE	Increased dental decay, affect bone health.
SELENIUM	Cardiomyopathy, increased cancer and cardiovascular risk.

There are also Various types of Malnutrition depends upon the deficiency of the particular nutrients and as well as other important electrolytes in the body. Like--Lack of protein can cause kwashiorkor, lack of carbohydrates can cause weight loss and frailty, and lack of calcium can cause osteoporosis. Rickets-Tetany, Iodine deficiency can cause goiter, Selenium deficiency can cause Kashan, Iron deficiency can cause anemia, Zinc deficiency can cause growth retardation, Vitamin C deficiency can cause scurvy, and Vitamin D deficiency can cause osteoporosis A shortage of vital components such as electrolytes and biomolecules can lead to several disorders, including rickets, among others.[23]

VITAMINS	MAJOR DEFICIENCY DISORDER
VITAMIN A	Night blindness, xerophthalmia, increased risk of mortality in children and pregnant women
FOLATE (VITAMIN B6)	Megaloblastic anemia, neural tube and other birth defects, heart disease, stroke, impaired cognitive function, depression.
COBOLAMINE (VITAMIN B12)	Megaloblastic anemia (associated with HELICOBACTER PYLORI induced gastric atrophy)
THIAMINE (VITAMIN B1)	Beriberi (cardic and neurologic), wernicke and korsakov syndromes (alcoholic confusion and paralysis)
RIBOFL AVIN (VITAMIN B2)	Non specific faitgue, eye change, dermatitis , brain dysfunction, impaired iron absorption.
NIACIN (VITAMIN B3)	Pellagra (dermatitis, diarrhea, dementia, death)
VITAMIN B6	Dermatitis, neurological disorder, convulsions, anemia, elevated plasma homocysteine.
VITAMIN C	Scurvy (fatigue, hemorrhages, low resistance to infection, anemia)
VITAMIN D	Rickets, osteomalacia, osteoporosis, colorectal cancer.

Overnutrition

In order to acknowledge the potentially harmful health implications of consuming too many nutrients, the World Health Organization has lately included overnutrition in its definition of malnutrition. This includes the consequences of obesity and overweight, which include a number of non-communicable diseases (NCDs) that are closely linked to them. It also covers the potential toxicity brought on by taking too much of a certain vitamin. Your body stores extra calories as fat cells in your adipose tissue when it doesn't need them as protein, carbohydrates, or fat. However, the fat cells themselves must proliferate when the body runs

out of tissue in which to store fat. Numerous metabolic problems and chronic inflammation are linked to enlarged fat cells.[25]

There are mainly two types of Overnutrition cases that are to be known one is overweight and another one is obesity.

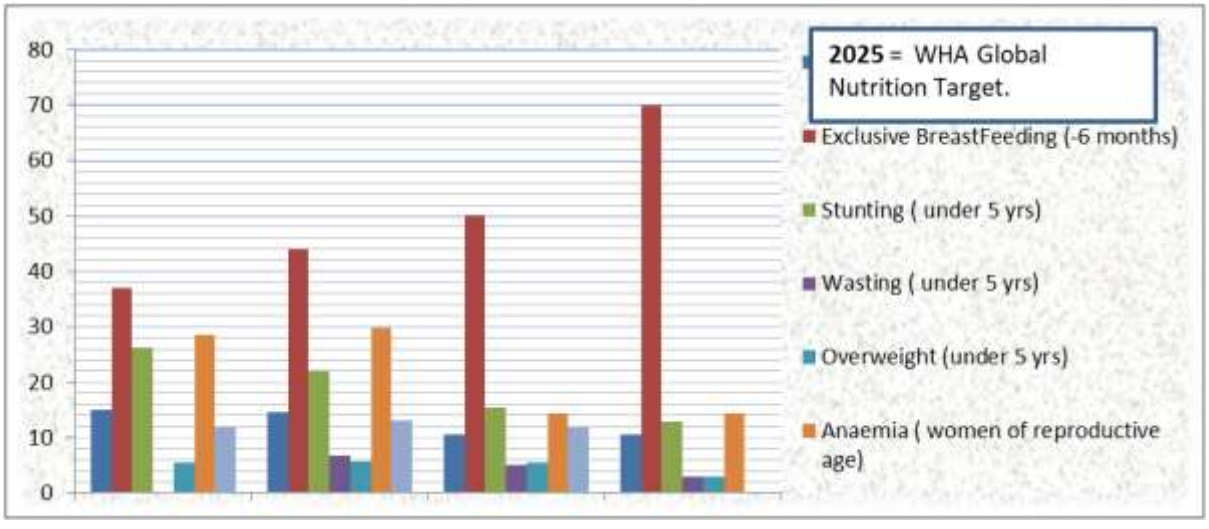
Overweight

A person suffering from malnutrition is not limited to those with low body weight or small stature. One may argue that the bodies are only carrying unnecessary body mass, but they also lack key nutrients, minerals, and other components necessary for healthy bodily functions, as well as the right ratio and quality of those nutrients.

Obesity

A paradoxical state of malnutrition, obesity is associated with an individual's lack of nutrients, biomolecules, and other critical electrolytes despite their enormous calorie consumption. Inadequate or unstable levels of vital micronutrients can have a substantial impact on day-to-day functioning, mental and emotional health, as well as physical health.[26]

The graphic displays the actual states of the various forms of malnutrition, together with a comparison ratio throughout time and a general notion of the situations that may arise in the future.[27]



The more than 40 different types of nutrients found in food can be broadly categorized into the following 7 key groups, which help prevent diseases like Marasmus, Kwashiorkor, malnutrition, and other conditions brought on by a lack of certain nutrients. They are seen as in the form of.[28,29]

1. Carbohydrates

2. Proteins

3. Fats

4. Minerals

5. Vitamins

6. Dietary Fiber

7. Water.

1. CARBOHYDRATES

The body uses carbohydrates as its main energy source. These consist of the sugars, glucose, and fiber that are present in grains, legumes, fruits, and vegetables. While simple sugars provide immediate energy, complex carbs provide longer-lasting energy. For a diet to be well-rounded, the amount of carbohydrates consumed must be balanced with that of proteins and fats .Refined and unrefined grains: potatoes, sweet potatoes, and yam; wheat, maize, corn, millet, oats, rice, flour, pasta and noodles. Fruit with sugar.

2. PROTEINS

Proteins are necessary nutrients that are vital to the building and operation of the organism. They are important in activities including immune system function, muscle development, and enzyme functioning and are composed of amino acids. Foods high in protein include dairy products, eggs, fish, poultry, and beans. Meat, fish, nuts, eggs, soya, beans and pulses.

3. FATS

Fats are essential nutrients that provide energy, support cell structure, and aid in nutrient absorption. Examples include saturated fats found in butter, unsaturated fats in olive oil, and omega-3 fatty acids in fish. Nuts, seeds, plant oils, dairy products (milk, cheese).

4. MINERALS

Minerals are essential nutrients that the body needs for various physiological functions. Examples include calcium for bone health, iron for oxygen transport in the blood, and potassium for maintaining fluid balance and nerve function. Peas, beans, vegetables, fruit, oats, whole grains, brown rice, nuts, seeds.

5. VITAMINS

Vitamins are essential organic compounds that play crucial roles in various physiological functions. For example, vitamin C supports immune function and collagen synthesis, found in fruits like oranges. Vitamin D aids in calcium absorption, often obtained through sunlight exposure and dietary sources like fatty fish.

6. Dietary Fiber

Dietary fiber is a type of carbohydrate that the body cannot digest. It's found in plant-based foods and provides various health benefits, including improved digestion and heart health. Examples of fiber-rich foods include whole grains (such as brown rice and oats), fruits, vegetables, legumes (like beans and lentils), and nuts.

7. Water

While water itself is not considered a nutrient, it plays a crucial role in nutrient transport, absorption, and overall bodily functions. Water helps dissolve minerals, vitamins, and other nutrients, making them accessible to the body. An example is how water facilitates the absorption of water-soluble vitamins like vitamin C and some B vitamins in the digestive system. Staying hydrated is essential for optimal nutrient utilization and overall health. Drinking water, other beverages. About 20% of water intake comes from food.[28,29]

NUTRIENTS	EXAMPLE 1	EXAMPLE 2	EXAMPLE 3	EXAMPLE 4
CARBOHYDRATES	POTATOES	SWEET POTATOES	RICE	CORN
PROTEINS	CHICKPEA	EDAMAME	SPIRULINA	TOFU
FATS	SOYABEANS	AVOCADO	SOYA BEAN	NUTS AND SEEDS
MINERALS	SPINACH	BEANS	BANANA	BROCCOLI
VITAMINS	ORANGE	MILK	SPINACH	AVOCADO
DIETARY FIBRE	BROCCOLI	OATS	LENTILS	CHICKPEAS

Malnutrition is a complicated disorder that can develop over a number of Steps or Stages & affects both the body's biochemical & physiological processes.

Steps are As Follow As

1. Inadequate nutrition intake
2. Negative nutrient balance
3. Nutrients reserves depletion
4. Weight loss
5. Functional impairments
6. Growth stunting (in children)

7. Organ damage
8. Impaired immune function
9. Long term consequences
10. Death due to other disease like TB, Anemia, Cardiovascular problem etc.

METHODOLOGY

Did you know that the Herbal Treatments have been utilize for promoting health and healing for thousands of years? We are going to get into cutting edge world of the Advanced Herbal System with Reviving Nutrition. We shall firstly understand about the Herbal System.

Herbal System

Herbal System are complete approaches to health and wellness that are frequently based on the old Tradition. They rely on the medicinal use of the plants, herbs, and botanical. To encourage harmony and balance within the body, this system makes uses of the natural healing properties of herbs. The choice and preparation of herbs in a Herbal System are determine by the herbs specification by their therapeutic, characteristics, and the condition of the Patients. These system frequently request consideration of the energy, emotional and physical components of health, placing a primary focus on prevention and resolving the basic causes of Imbalance. Teas, Tinctures, Capsule, and Powders are just a few of the different ways that herbal treatments are available. They might address certain health issues or promote overall well-being standardized, extract, rigorous scientific research and integration with conventional health care practices.[30,31,32]

DOSAGE FORM ARE THE MEANS BY WHICH DRUG MOLECULES ARE DELIVERED TO THE SITE OR ACTION WITH IN THE BODY DOSAGE FORM IS ALSO CALLED AS A DRUG DELIVERY SYSTEM

POWDER

A pharmaceutical powder is a mixture of finely divided drug or chemical in dry form. These are the solid dosage form of the medicaments which are meant for internal and external use. They are available in crystalline or amorphous form. The practical size of powder play an important role in physical, chemical and biological properties of the dosage form. There is a relationship between particle size of powder and dissolution, absorption and therapeutic efficiency of drug.

Powder are classified into various types such as:

1. Bulk powder for internal use
2. Bulk powder for external use
3. Simple and compound powder for internal use
4. Powder enclosed in catches and capsule.
5. Compressed powder (tablets)
6. Special powder.[33]

In order to manufacture our medication, we have chosen the bulk powder for internal use category. This powder combines many types of powder to provide a combination of nutrition powder in the form of herbal medicine.

The Essential Nutrient's Required for a healthy diet (children under 5yrs)

Sr.No.	NUTRIENTS	QUANTITY	REF
1	CALORIES	70 to 80 kcal/kg/day	[34]
2	TOTAL FATS	25% to 35% of fat per day of calories	[35]
3	CHOLESTEROL	Less than 300mg	[36]
4	SODIUM	1000mg/day	[37]
5	POTASSIUM	2300mg	[38]
6	CARBOHYDRATE	150g included with dietary fiber and sugar	[39]
7	PROTEIN	15 to 20 g	[40]
8	VITAMIN C	20mg	[41]
9	IRON	7mg to 10mg	[42]
10	VITAMIN B6	0.5mg to 0.6mg	[43]
11	MAGNESIUM	80mg to 100mg	[44]
12	CALCIUM	700mg to 1000mg	[45]
13	VITAMIN D	280IU/day to 340IU/day	[46]

In this formulation, we have included variety of herbs that supports the human body demand for necessary nutrients. and are as follows as

1. SPINACH (100g)[47]

2. AVOCADO (100g)[48]

1	SCIENTIFIC NAME	Persea american
2	FAMILY	lauraceae
3	KINGDOM	Plantae
4	COMMAN NAME	Butter fruit
5	WATER	73.2g
6	CALORIES	160kcal
7	TOTAL FATS	14.7g
8	SODIUM	7mg
9	POTASSIUM	485mg
10	TOTAL CARBOHYDRATE	8.53g
11	PROTEIN	2g
12	VITAMIN C	10mg
13	IRON	0.55mg
14	CALCIUM	12mg
15	VITAMIN B6	0.257mg
16	MAGNESIUM	29mg
17	PHOSPHOROUS	52mg
18	COPPER	0.19mg

3. STEVIA (100g)[49,50]

1	SCIENTIFIC NAME	candyleaf
2	FAMILY	asteraceae
3	KINGDOM	Plantae
4	COMMAN NAME	
5	WATER	0
6	CALORIES	0
7	TOTAL FATS	0
8	SODIUM	0
9	POTASSIUM	0

10	TOTAL CARBOHYDRATE	100g
11	PROTEIN	0
12	VITAMIN C	0
13	IRON	0
14	CALCIUM	0
15	VITAMIN B6	0
16	MAGNESIUM	0
17	PHOSPHOROUS	0
18	COPPER	0

4. SOYABEANS (100g)[51,52]

1	SCIENTIFIC NAME	Glycine max
2	FAMILY	Fabaceae
3	KINGDOM	Plantae
4	COMMAN NAME	soybean

5	WATER	8.54g
6	CALORIES	446kcal
7	TOTAL FATS	19.9g
8	SODIUM	2mg
9	POTASSIUM	1800mg
10	TOTAL CARBOHYDRATE	30.2g
11	PROTEIN	36.5g
12	VITAMIN C	6mg
13	IRON	15.7mg
14	CALCIUM	277mg
15	VITAMIN B6	0.377mg
16	MAGNESIUM	280mg
17	PHOSPHOROUS	704mg
18	COPPER	1.66mg

5. ORANGE (100g)[53,54]

1	SCIENTIFIC NAME	Citrus x sinensis
2	FAMILY	Rutaceae
3	KINGDOM	Plantae
4	COMMAN NAME	Sweet orange
5	WATER	87.1g
6	CALORIES	46kcal
7	TOTAL FATS	0.21g
8	SODIUM	0mg
9	POTASSIUM	169mg
10	TOTAL CARBOHYDRATE	11.5g
11	PROTEIN	0.7g
12	VITAMIN C	45mg
13	IRON	0.09mg
14	CALCIUM	43mg
15	VITAMIN B6	0.051mg
16	MAGNESIUM	10mg
17	PHOSPHOROUS	12mg
18	COPPER	0.039mg

6. PEANUTS (100g)[55,56]

1	SCIENTIFIC NAME	Arachis hypogaea
2	FAMILY	Fabaceae
3	KINGDOM	Plantae
4	COMMAN NAME	Ground nut
5	WATER	6.5g
6	CALORIES	567kcal
7	TOTAL FATS	49.2g
8	SODIUM	18mg
9	POTASSIUM	705mg
10	TOTAL CARBOHYDRATE	16.1g
11	PROTEIN	25.8g
12	VITAMIN C	0mg
13	IRON	4.58mg
14	CALCIUM	92mg
15	VITAMIN B6	0.348mg
16	MAGNESIUM	168mg
17	PHOSPHOROUS	376mg
18	COPPER	1.14mg

7. BROWN RICE (100g)[57,58]

1	SCIENTIFIC NAME	oryza sativa
2	FAMILY	poaceae
3	KINGDOM	plantae
4	COMMAN NAME	Long gain rice
5	WATER	7.3g
6	CALORIES	123kcal
7	TOTAL FATS	0.97g
8	SODIUM	4mg
9	POTASSIUM	86mg
10	TOTAL CARBOHYDRATE	25.6g
11	PROTEIN	2.74g
12	VITAMIN C	0mg
13	IRON	0.56mg
14	CALCIUM	3mg
15	VITAMIN B6	0.123mg
16	MAGNESIUM	39mg
17	PHOSPHOROUS	103mg
18	COPPER	0.106mg

8. SPIRULINA (100g)[59,60]

1	SCIENTIFIC NAME	Spirulina
2	FAMILY	spirulinaseae
3	KINGDOM	Monera
4	COMMAN NAME	Arthrospira
5	WATER	4.68g
6	CALORIES	290lcal
7	TOTAL FATS	7.72g
8	SODIUM	1050mg
9	POTASSIUM	1360mg
10	TOTAL CARBOHYDRATE	23.9g
11	PROTEIN	57.5g
12	VITAMIN C	10.1mg

13	IRON	28.5mg
14	CALCIUM	120mg
15	VITAMIN B6	0.364mg
16	MAGNESIUM	195mg
17	PHOSPHOROUS	118mg
18	COPPER	6.1mg

9. MILK POWDER (100g)[61]

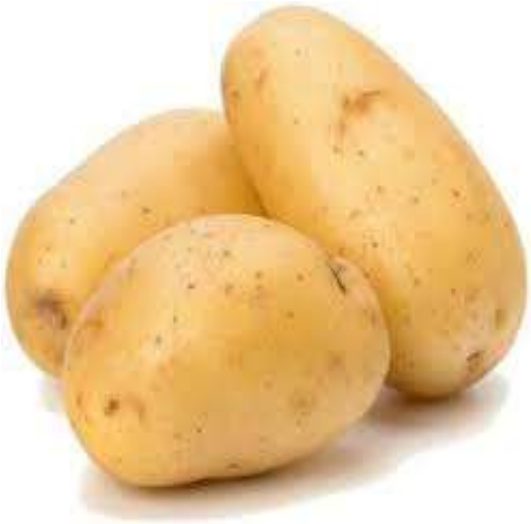
1	SCIENTIFIC NAME	-
2	FAMILY	-
3	KINGDOM	-
4	COMMAN NAME	-
5	WATER	-
6	CALORIES	446kcal
7	TOTAL FATS	15g
8	SODIUM	569mg

9	POTASSIUM	1355mg
10	TOTAL CARBOHYDRATE	57.8g
11	PROTEIN	20g
12	CHOLESTROL	97mg
13	IRON	0mg
14	CALCIUM	806mg
15	VITAMIN B6	-
16	MAGNESIUM	-
17	PHOSPHOROUS	-
18	COPPER	-

10. POTATO (100g)[62,63]

1	SCIENTIFIC NAME	Solanum tuberosum
2	FAMILY	Solanaceae
3	KINGDOM	Plantae
4	COMMAN NAME	White potato
5	WATER	79.2g
6	CALORIES	77kcal

7	TOTAL FATS	0.09g
8	SODIUM	6mg
9	POTASSIUM	425mg
10	TOTAL CARBOHYDRATE	17.5 to 19 g
11	PROTEIN	2.05g
12	VITAMIN C	19.7mg
13	IRON	0.81mg
14	CALCIUM	12mg
15	VITAMIN B6	0.298mg
16	MAGNESIUM	23mg
17	PHOSPHOROUS	57mg
18	COPPER	0.11mg



FORMULATION

1. DRYING: Dry all the herbs that are Essential for the formulation, it can be air dry or through sunlight or in an oven as well. Drying is the process of

removing water from liquid and Solid materials, usually with the help of heat, to produce solid-dried items.

2. GRINDING: Pulverize all the dried ingredients and make well fine powder as much as can obtain.

3. PARTICAL SIZE: It is very important to determine the particle size, it help the proper absorption of the drug and have an immediate action as well. Pass all the ingredient individually from the required sieve.

4. WEIGHING: Weigh all the ingredient as required quantity and make the proper packaging of the raw powdered of herbs.

5. MIXING: Mix all the ingredients with the required quantity which supposed to be added in it.

6. BALANCE: Make the proper composition of the main API and as well as the Excipients that will be used according to need like flavor, sweetness, colour etc.

7. PERFORMING THE ANALYTICAL STUDY OF PRODUCT: various tests like solubility, absorption, biodegradability, compositional changes, vacume etc.

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