Analyzing Malnutrition Scores Among Pre – Adolescent Population in Rural Tirupur

[1]Sugaina Parveen M,   [2]Kavya Jyothi H,   [3]Anjali M,   [4]Dhakshana R M

[1]Bachelor of Science,   [2]Assisstant Professor,   [3]Assisstant Professor,   [4]Master of Science,
[1,2,3,4]Department of Food Science and Nutrition, Dr. N. G. P Arts and Science College,
Coimbatore, India
Email -[1]sugainaparveen@gmail.com,   [2]kavyajyothi@drngpasc.ac.in,   [3]anjali.m@drngpasc.ac.in,
[4]dhakshana rm2000@gmail.com

Abstract: *The purpose of the study is to screen for malnutrition in children between the ages of 12 and 15 and to raise awareness about it. Malnourished children may have poor immunological systems, be small for their age, underweight or bloated, and listless. Around the world, a variety of nutrition screening techniques are in use. The "MUST" - Malnutrition Universal Screening Tool - is the screening tool that is most frequently utilised in all healthcare settings in the UK. In 2003, BAPEN developed and introduced MUST Screening tool- a five-step screening process used to find who are obese, underweight, or malnourished. Additionally, it contains management principles that can be used to create a care strategy. In terms of overall student malnutrition, 34% of pupils were at low risk, 18% were at medium risk, and 48% were at high risk. Boys who were malnourished tend to lack certain vitamins and minerals. Teenage girls are crucial because undernutrition has a harmful impact on their offspring. The girl child is more affected negatively. Adolescent girls who are undernourished when they begin their reproductive cycle will grow up to be undernourished adults who will then give birth to undernourished children, which will contribute to an underproductive community and the cycle of intergenerational starvation.*

Key Words: *Adolescent, Malnutrition, Over nutrition, Sustainable Development Goals (SDG), Under nutrition.*

1. INTRODUCTION:

An ecological issue that does not only affect malnutrition. Family structures, ignorance, and despair were shaken by the city's concerts or poverty. Even while dietary supplements are necessary, malnutrition is a bigger issue than just diet. Without significant social and economic change, malnutrition cannot be totally eradicated because it is so frequently associated with the conditions of a poor environment.

Undernutrition is a major public health issue in developing nations because it is known to negatively affect many biochemical and physiological processes of the body, including the structure and function of the brain. This includes stunted stature, low weight, arm circumference, and other physical dimensions of the body. Marasmus and Kwashiorkor are the two most severe clinical types of protein energy malnutrition in preschool- aged children that call for inpatient rehabilitation. One of the many global public health problems affecting people everywhere, malnutrition also makes it difficult to eradicate poverty. Therefore, it is predicted that 32% of the global disease burden may be eliminated with the eradication of malnutrition. One of the Sustainable Development Goals (SDG) is to "end hunger, achieve food security and improved nutrition, and promote sustainable agriculture" and is one of the 17 SDGs that make up the 2023 Agenda for Sustainable Development. There are three types of malnutrition: undernutrition (wasting, stunting, and underweight), over nutrition (obesity), and malnutrition related to micronutrients. There are 50 million wasted children and 149 million stunted children worldwide, according to estimates. According to reports, malnutrition was the direct or underlying cause of 45% of all child fatalities. Additionally, 678 million adults are classified as obese, and 40 million children under the age of five are expected to be overweight. Malnutrition has been addressed as a problem during the first 1000 days of life because this is when its manifestations and symptoms typically start to show. As a result, the collection of papers published on this issue sought to concentrate on nutrition education social determinants of health, factors and consequences of Malnutrition and suggestions to prevent Malnutrition population.

Malnourished people may be deficient in vitamins, minerals, and other nutrients that the body requires to function. However, those who eat a lot but do not vary their diet enough may also become undernourished.

Malnutrition can cause both short-term and long-term health issues, as well as sluggish healing from injuries and illnesses and an increased risk of infection. Specific health issues can be brought on by some deficits. For instance;

Lack of Vitamin A
Many kids all over the world have suffered eyesight issues as a result of vitamin deficiency. Malnutrition increases the risk of illness, and infection increases the risk of malnutrition, creating a vicious cycle. Weight loss, reduced immunity, mucosal injury, pathogen invasion, and impeded growth and development in children are all consequences of insufficient food intake. Students who eat well arrive at school more alert and ready to learn. Because better nutrition results in healthier students and sugar has a bad effect on children's behavior. A vital component of health and development is nutrition. Stronger immune systems, better pregnancy and childbirth, a lower risk of non-communicable diseases (including Diabetes and Cardiovascular disease), and longer life spans are all associated with enhanced newborn, child, and maternal health. Kids that are healthy learn better. Regular mealtimes will assist in controlling blood sugar. Some of the hormones that regulate our mood and focus may be affected by this. Children who have gone too long without meals (for instance, those who skipped breakfast) frequently exhibit poor moods and behavior.

Due to higher medical expenses caused by malnutrition, poverty is further exacerbated. The study also found that students in grade 7 who were hungry or undernourished could not focus or learn as well and were unable to take part in physical activities or sports properly. Malnutrition results in weight loss, a loss of muscle and fat mass, hollow cheeks and sunken eyes, a swollen stomach, dry hair and skin, sluggish wound healing, exhaustion, trouble concentrating, irritability, melancholy, and worry.

Eating a healthy, balanced diet is the greatest method to stop malnutrition. If your appetite is weak, attempt to eat three modest meals throughout the day and two to three snacks. Try not to skip meals. Drinks should only be consumed after a meal because doing so can make you feel full.

Malnutrition can be significantly reduced in a community by having a good health care system that offers immunization, oral rehydration, routine deworming, early diagnosis, and effective treatment of common illnesses. Malnutrition refers to a lack of essential nutrients as well as a lack of nourishment. Malnourished mothers cannot have healthy pregnancies or breastfeed babies who cannot grow healthily. Lack of variety in a child's nutrition results in disease, stunted growth, weakness, and even death. A nutritious diet supports normal growth, development, and ageing, helps people maintain a healthy body weight, and lowers their chance of developing chronic diseases, all of which contribute to overall health and wellbeing.

According to a 2019 report by the United Nations Children's Fund (UNICEF), India had the highest number of under-five-year-old deaths in 2018, with 882000. According to the 2019 State of the World's Children report, malnutrition was to blame for 69% of under-five mortality in India. The most worrisome statistic, however, showed that over 3 lakh children die each year due to starvation, accounting for about 4500 deaths per day in the country among children under the age of five. In order to determine the prevalence of malnutrition and raise awareness of it, the study seeks to conduct a nutrition screening of children between the ages of 13 and 15 years.

2. LITERATURE REVIEW:
Chronic hunger and malnutrition are substantially more common in developing nations, despite the fact that famines and other periods of extreme hunger receive a lot of journalistic attention. According to estimates, every year at least 12 million low-birth-weight babies are born, 162 million preschoolers, and approximately a billion individuals of all ages suffer from malnutrition. **[Jere Behrman et al., 2004]**

In underdeveloped nations, malnutrition—which has two components of protein: energy malnutrition and micronutrient deficiency—remains a significant health problem? It is the most significant risk factor for disease and mortality on a global scale, particularly affecting hundreds of millions of pregnant women and young children. The main signs of malnutrition in underdeveloped nations, aside from Marasmus and Kwashiorkor (the two kinds of Protein-Energy Malnutrition), are deficits in iron, iodine, vitamin A, and zinc. These populations frequently experience a vicious cycle where a high frequency of poor diet and infectious diseases coexist. **[Olaf Muller et al., 2005]**

The best global indicator of a child's wellbeing is their nutritional health. Despite the fact that numerous child surveys have been carried out since the 1970s, there is a lack of comparability across them, making it challenging to track trends in child malnutrition. Low height for age (stunting) was found when cross-sectional data from 241 nationally representative surveys were analyzed in a consistent manner. To assess regional and worldwide trends from 1980 to 2005, multilevel modeling was used. Although success has been unequal among regions, the prevalence

of stunting has decreased in developing countries from 47% in 1980 to 33% in 2000 (i.e., by 40 million). **[Mercedes de Onis et al., 2000]**

The four most significant types of malnutrition—protein-energy malnutrition, iron deficiency and anaemia (IDA), vitamin A deficiency (VAD), and iodine deficiency (IDD)—are discussed below in terms of their global and regional prevalence, the age and gender groups most affected, their clinical and public health repercussions, and especially the recent progress in country and regional quantitation and control zinc deficiency, with its accompanying diminishing health risks. According to WHO estimates, in 1995, more than half of all child fatalities in poor countries were related to malnutrition (underweight). **[LS Stephenson et al., 2000]**

RNIs, or recommended nutrient intakes, are established for healthy people who live in clean environments. For people who live in disadvantaged situations and have mild malnutrition, wasting, and stunting, there are no commonly approved RNIs. For children with moderate malnutrition who need to grow more quickly in order to get back to normal, two sets of dietary recommendations for 30 essential nutrients are given: one for those who will receive specially formulated foods and diets, and the other for those who will take combinations of locally available foods over a longer period of time in order to treat or prevent moderate stunting and wasting. Much of the older material is prescriptive and to the child who is moderately wasted or stunted because of the change in the criteria of severe malnutrition. Using a factorial approach been used in deriving the recommendations for both functional, protective nutrients (Type1) and growth nutrients (Type 2). **[Michael H Golden, 2009]**

Indian children experience higher levels of malnutrition than children in many other low- and middle-income countries relative to economic growth and poverty levels. With an emphasis on the kinds of semisolid supplemental foods ingested, research provided in this article investigated the relationships between newborn and young child feeding practices among Indian children and their rates of stunting, underweight, wasting, and anaemia. It achieved this by thoroughly analyzing information on more than 57,000 children aged 6 to 23 months that was acquired from the fourth iteration of the nationally representative National Family Health Survey (2015–2016). One of the main conclusions was that there was a correlation between lower rates of malnutrition and giving children food derived from animals and high in vitamin A. The study went on to explore whether having livestock and taking part in the Integrated Child Development Services programme could support better complementary child feeding. It came to the conclusion that having chickens and receiving daily food from the programme were indeed associated with significantly higher rates of children adhering to the suggested feeding practices as well as somewhat lower rates of childhood malnutrition. **[Ivica Petrikova, 2022]**

The main contributor to disease and early mortality among children in underdeveloped nations remains to be undernutrition. The traditional indices of stunting, wasting, and underweight may potentially be underestimating the severity of the issue, according to this study, which evaluates how the incidence of undernutrition in children is quantified. Policymakers, planners, and organizations working to achieve international development goals should consider the consequences of this carefully. We created an alternative composite index of anthropometric failure (CIAF) and compared it to traditional indices using anthropometric data on 24 396 children in India. The CIAF explores the connection between several anthropometric failure subgroups, poverty, and morbidity, demonstrating that children who have many anthropometric failures are more likely to have poorer homes and are at an increased risk of morbidity. The CIAF is the sole indicator that provides a single, aggregated statistic of the proportion of undernourished children in a population, despite the fact that it is well known that stunting, wasting, and underweight reflect discrete biological processes of clear importance. **[Shailen Nandy et al., 2005]**

In the world, 171 million children suffer from chronic undernutrition. This terrible situation has lifetime harmful effects on a child's ability to grow into a productive adult, such as stunted growth and decreased cognitive development. Lack of a credible and continuous government commitment to address the issue is one of the fundamental causes of undernutrition. With increased efforts to address undernourishment, such as investing in life-saving nutrition treatments for the most vulnerable, providing enough funding, and constructing capacity to deliver those interventions, with an emphasis at the country level, this is expected to change. However, the regulation of the nutrition industry is still a topic that needs more research in order to advance the nutrition agenda. This is a crucial time to comprehend how governance improves nutrition outcomes in the developing world in the context of global efforts, such as the Scaling up Nutrition movement, and how nutritionists, development actors, civil society, the private sector, and donors can support government officials in maintaining political commitments over the long term. **[Andres Mejia Acosta et al., 2012]**

3. METHODOLOGY:
3.1. Selection of sample:
About 100 samples of age group (13 – 15 years) both male and female were selected.

3.2. Selection of area:

Municipal Middle School, Mettupalayam, Tirupur was selected for the study.

3.3. Selection of tool:

There are many nutrition screening tools in use across the world. However, the most commonly used screening tool in all health care settings in the UK is the "MUST" – Malnutrition Universal Screening Tool. This was developed and launched by BAPEN in 2003. MUST is a five – step screening tool to identify adults, who are malnourished, at risk of malnutrition (undernutrition) or obese. It also includes management guidelines which can be used to develop a care plan. It is used in hospitals, community and other care settings and can be used by all health care workers.

3.3.1. Step – 1: Measure height and weight to get a BMI score using chart provided. If unable to obtain height and weight, use the alternative procedures shown in this tool. Weight is measured using weighing balance.

3.3.2. Step – 2:

BMI score

Formula:

$$Body\ Mass\ Index = \frac{Weight\ in\ kg}{Height\ in\ m^2} \quad (kg/m^2)$$

BMI (kg/m²)	Score
Overweight > 20 (>30 obese)	0
Moderate 18.5 – 20	1
Underweight <18.5	2

3.3.3. Step – 3:

Note percentage unplanned weight Loss and scores using tables . Unplanned weights Loss in pass 3 – 6 months.

Percentage (%)	Score
< 5	0
5 – 10	1
>10	2

3.3.4. Step – 4:

Establish acute disease effect and score
If patient is acutely ill and there has been or is likely to be no nutritional intake for > 5 days

Score	2

3.3.5. Step– 5:

Add scores from step 1, 2, 3 and 4 together to obtain overall risk of malnutrition.

Score	Risk of Malnutrition
0	Low Risk

1	Medium Risk
2	High Risk

3.3.6. Step – 6:
Use management guidelines and/ or local policy to develop health care plan.

• **Low Risk (Score – 0)**
- Repeat screening
- Hospital – weekly
- Care Homes – Monthly
- Community – annually for special groups [e.g., those > 75 years]

• **Medium Risk (Score – 1)**

° Document dietary intake for 3 days
° If adequate – little concern and repeat screening.
- Hospital – weekly
- Care Homes – at least monthly
- Community – at least every 2 – 3 months

°If inadequate – clinical concern, follow local policy, set goals, improve and increase overall nutritional intake, monitor and review care plan regularly.

• **High Risk (Score – 2)**
° Refer to Dietitian, Nutritional support, team or implement local policy.
° Set goals, improve and increase overall nutritional intake
° Monitor and review care plan
- Hospital – weekly
- Care Homes – Monthly
- Community – Monthly

° Unless detrimental or no benefit is excepted from nutritional support. (e.g., imminent death)

3.4. COMPILATION OF DATA:
Proper compilation of data was done for Anthropometric Assessment.
(Height, Weight, BMI – Body Mass Index, Malnutrition Scores)

4. RESEARCH DESIGN:
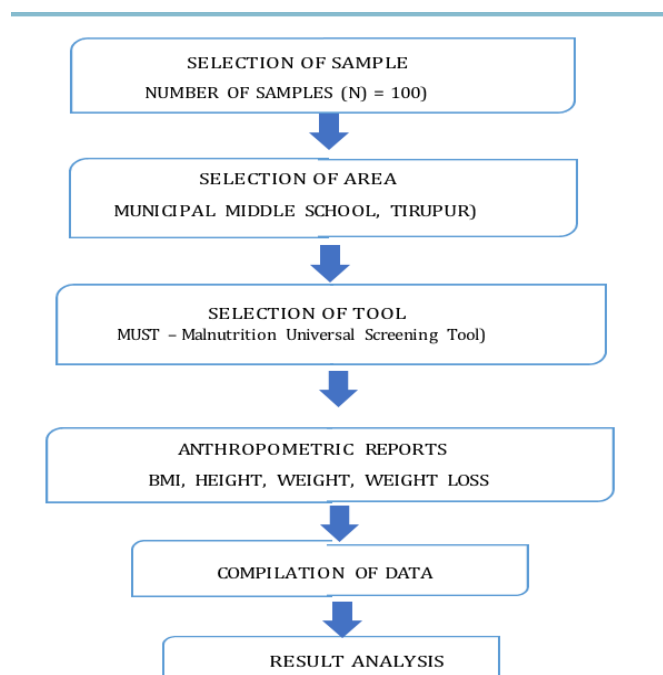
4. RESULT:

The result and discussion pertaining to the study "ANALYSING MALNUTRITION SCORES AMONG PRE – ADOLESCENT IN RURAL TIRUPUR" is discussed in this chapter.

4.1. OVERALL DATA
4.2. OVERALL MALNOURISHMENT PERCENTAGE
4.3. PERCENTAGE OF BOYS AND GIRLS MALNOURISHED
4.4. OVERALL UNDERNOURISHED PERCENTAGE
4.5. OVERALL OVERNOURISHED PERCENTAGE
4.6. OVERALL DATA OF HIGH RISK
4.7. OVERALL DATA OF MEDIUM RISK
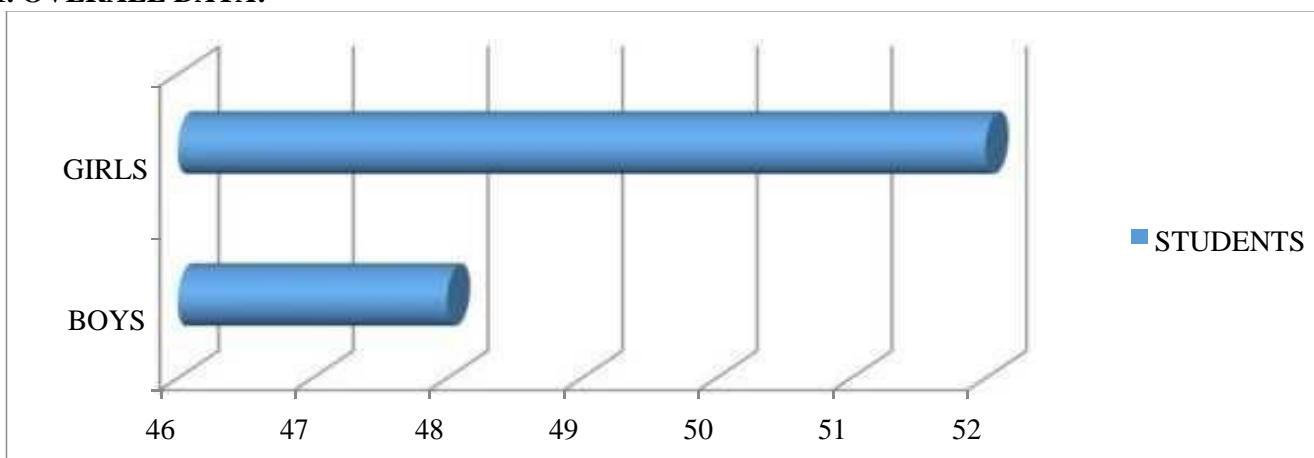4.8. OVERALL DATA OF LOW RISK

4.1. OVERALL DATA:

Figure 1: Overall Data

From the above bar chart, out of 100 students, 48% were boys and 52% were girls.
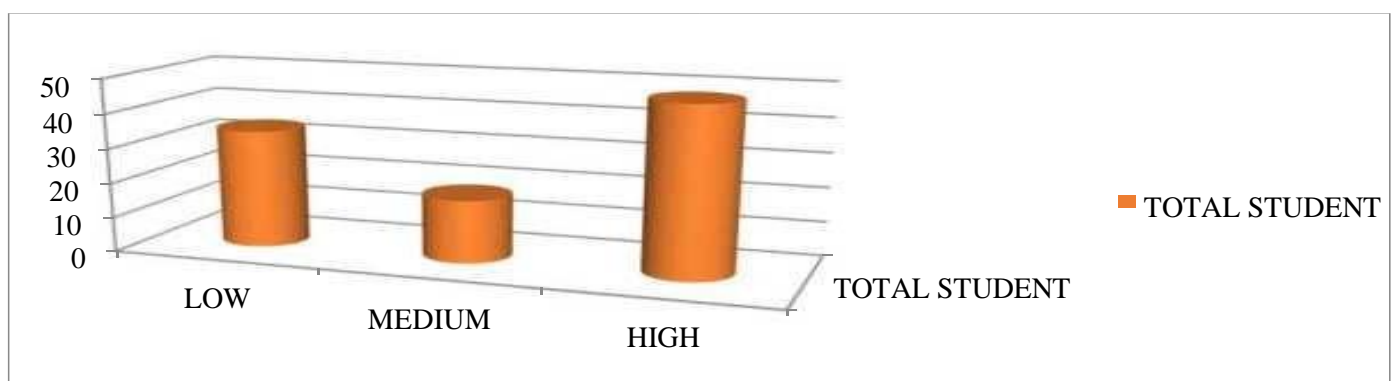
4.2. OVERALL MALNOURISHMENT PERCENTAGE:

Figure 2: Overall Malnourishment Percentage

From the above bar chart, it is observed that

34% of students were at low risk,

18% of students were at medium risk,

48% of students were at high risk

Malnutrition may occur when there is a lack of nutrients in the diet or when the body cannot absorb nutrients from food.

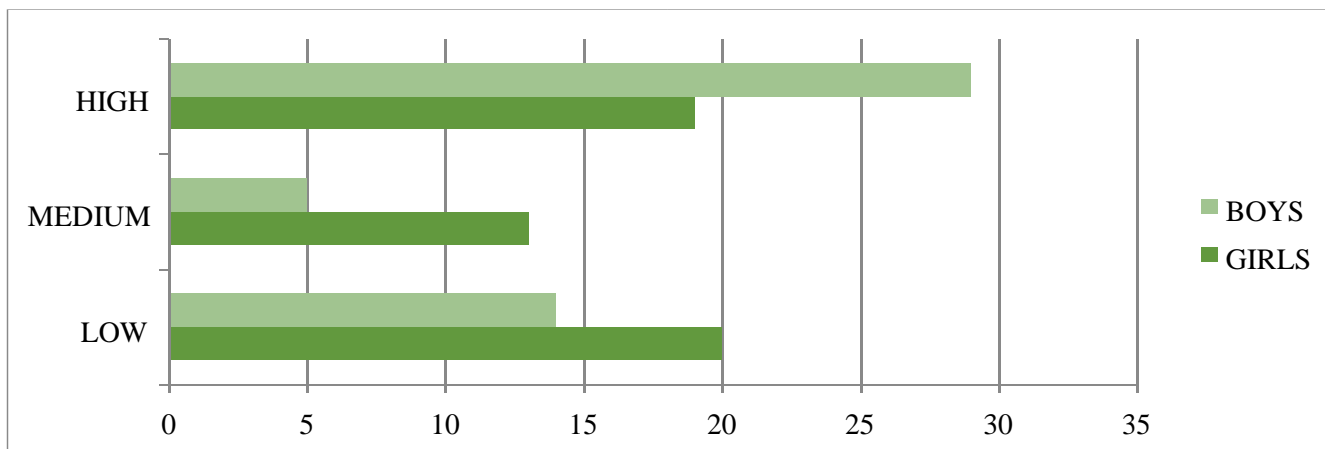## 4.3. PERCENTAGE OF BOYS AND GIRLS MALNOURISHED:

Figure 3: Percentage of Boys and Girls Malnourished

From the above bar chart, it is evident that

   Boys: 14% of boys were at low risk,

             5% of boys were at medium risk,

             29% of boys were at high risk,

     Malnourishment of boys can cause deficiencies in vitamins and minerals. Alcohol use disorder, consuming a lot of alcohol can lead to gastritis or long – term damage to the pancreas. The issues can make it hard to digest food, adsorb vitamins, and produce hormones that regulate metabolism. Alcohol also contains calories, so a person may not feel hungry.

   Girls: 20% of girls were at low risk,

             13% of girls were at medium risk,

             19% of girls were at high risk,

      Adolescent girls are important; malnutrition has a negative effect on their future generation. The adverse effect is more on the girl child. If adolescent girls enter into the reproductive cycle in a malnourished state, she will grow up into a malnourished adult and give birth to a malnourished child contributing to an unproductive community and the cycle of   intergenerational transfer of malnutrition.

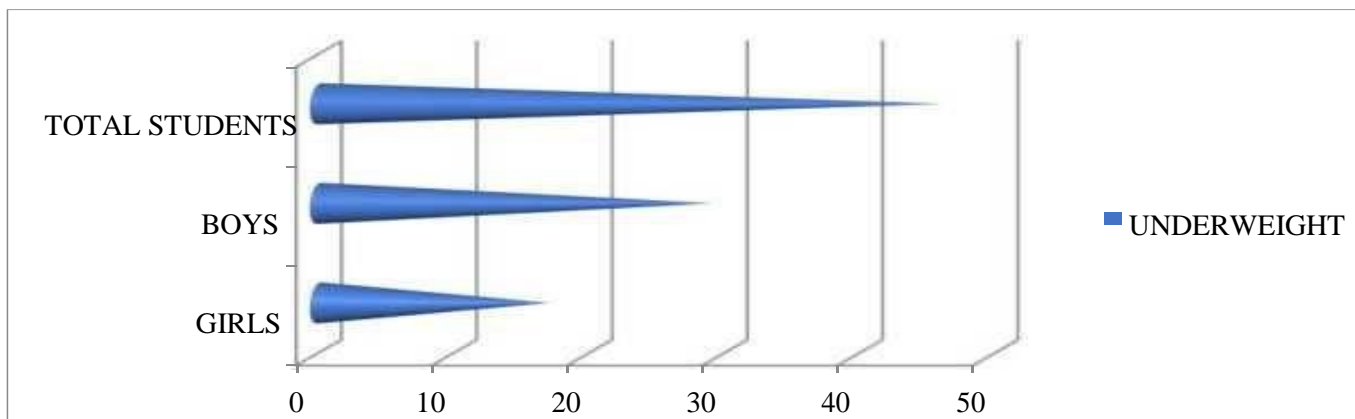## 4.4. OVERALL UNDERNOURISHMENT PERCENTAGE:

Figure 4: Overall Undernourished Percentage

From the above bar chart,

Overall 46% of students were undernourished,

29% of boys were undernourished,

17% of girls were undernourished,

Undernutrition is caused by a lack of nutrients, either as a result of a poor diet or problems absorbing nutrients from food. Undernutrition makes children in particular much more vulnerable to disease and death.
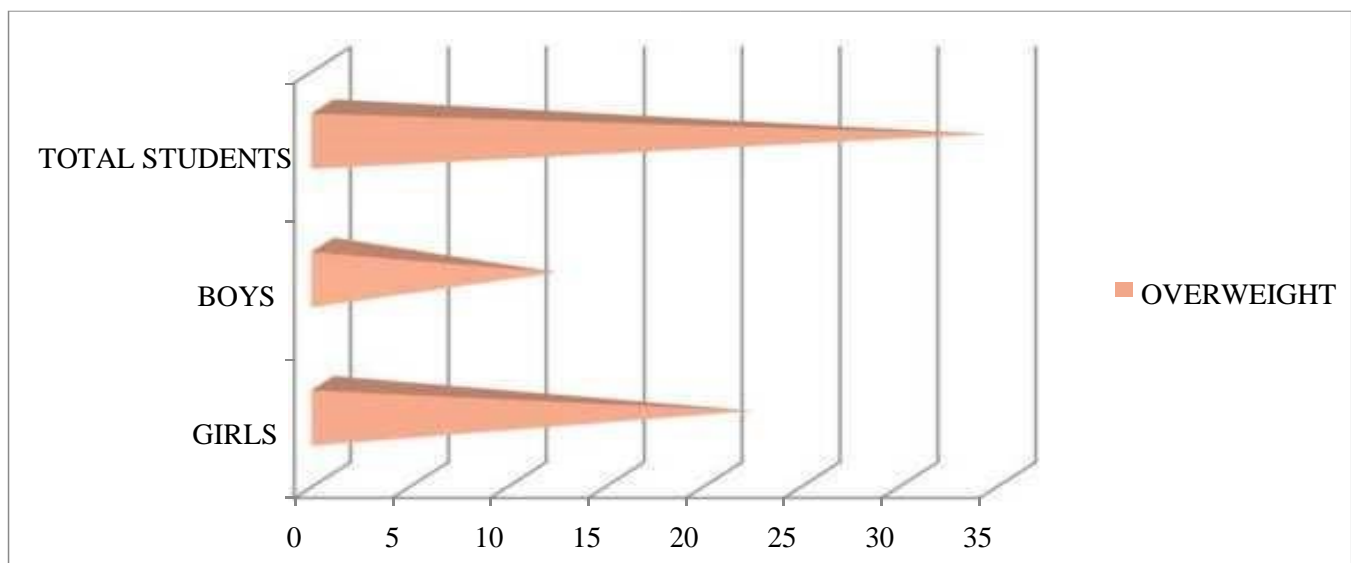
4.5. OVERALL OVERNOURISHMENT PERCENTAGE:

Figure 5: Overall Overnourished Percentage

From the above bar chart,

Overall 34% of students were overnourished,

12% of boys were overnourished,

22% of girls were overnourished,

Over nutrition is a form of malnutrition, imbalanced nutrition arising from excessive intake of nutrients, leading to accumulation of body fat that impairs health, resulting in overweight or obesity.

Over nutrition has several health implications, people who have are at greater risk.

✓ Heart Disease

✓ High Blood Pressure

✓ Diabetes

✓ Cancer

✓ High Cholesterol
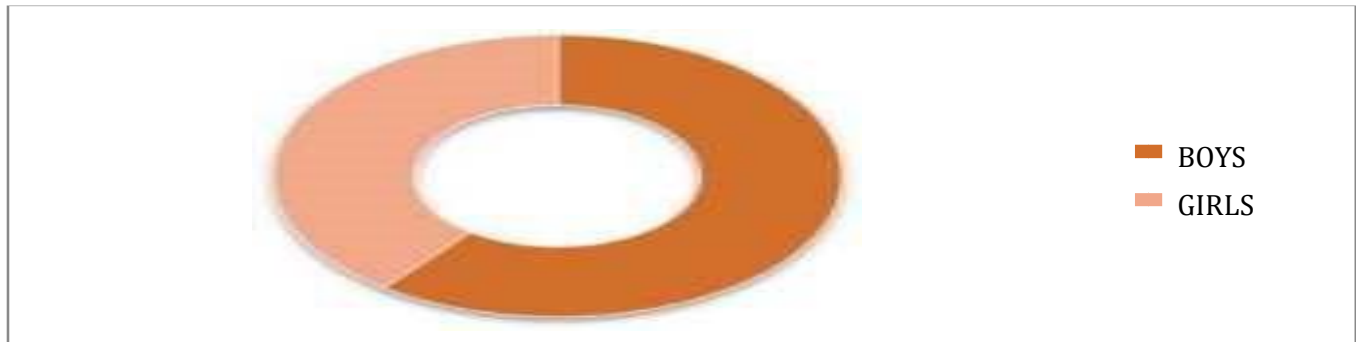
4.6. OVERALL DATA OF HIGH RISK:

Figure 6: Overall Data of High Risk

From the above chart,

  29% of boys were at high risk,

  19% of girls were at high risk,

PREVENTIVE MEASURES OF MALNUTRITION:

• Refer to Dietitian, nutritional support team or implement local policy

• Set goals, improve and increase overall nutritional intake

• Monitor and review care plan

☐   Hospital – Weekly

☐   Care home – Monthly

☐   Community – Monthly

• Unless detrimental or no benefit is expected from nutritional support

Example; Imminent Death

4.7. OVERALL DATA OF MEDIUM RISK:

Figure 7: Overall Data of Medium Risk

From the above pie chart,

  5% of boys were at medium risk,

  13% of boys were at medium risk,

PREVENTIVE MEASURES FOR MALNUTRITION:

- Document Dietary intake for 3days

- If adequate – little concern and repeat screening

☐   Hospital – Weekly

☐   Care Home – at least monthly

☐   Community – at least every 2-3 months
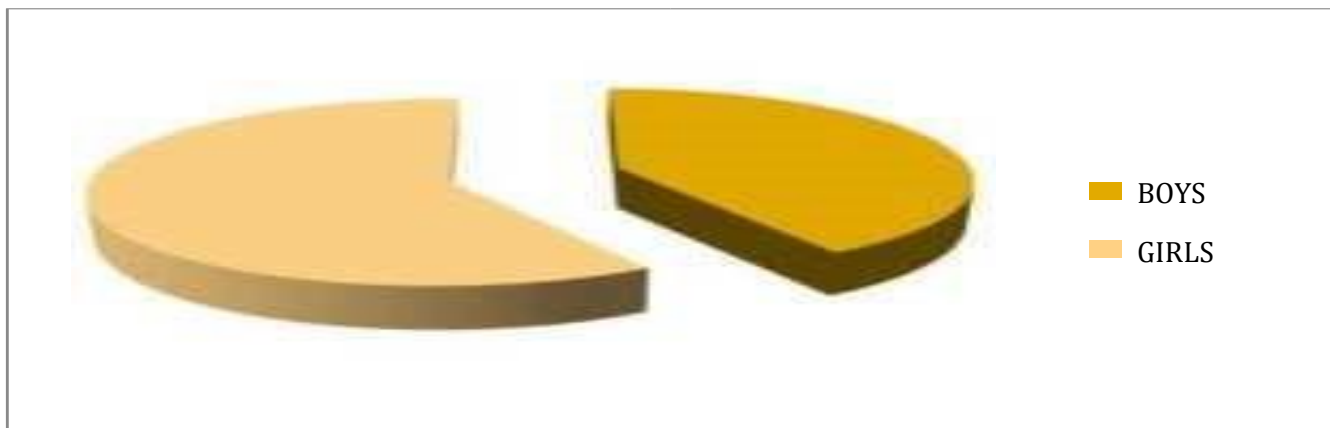
4.8. OVERALL DATA OF LOW RISK:

Figure 8: Overall Data of Low Risk

From the above pie chart,

14% of boys were at low risk,

20% of girls were at low risk,

Preventive Measures For Malnutrition:

- Repeat screening

☐   Hospital – weekly

☐   Care Home – monthly

☐   Community – annually for special groups

Example; those > 75 years

5. CONCLUSION:
The present study entitled "Analyzing Malnutrition Scores Among Pre – Adolescent Population in Rural Tirupur" is summarized below.

- ➢ Out of 100 samples 48 were boys and 52 students were girls
- ➢ Overall malnourishment of Students was - 34% of students were at low risk,18% of students were at medium risk & 48% of students were at high risk
- ➢ Malnourishment of boys - 14% of boys were at low risk, 5% of boys were at medium risk & 29% of boys were at high risk.
- ➢ Malnourishment of girls- 20% of girls were at low risk, 13% of girls were at medium risk & 19% of girls were at high risk.

INTERNATIONAL JOURNAL FOR INNOVATIVE RESEARCH IN MULTIDISCIPLINARY FIELD
ISSN(O): 2455-0620   **[Impact Factor: 7.581]**
Monthly, Peer-Reviewed, Refereed, Indexed Journal with IC Value : 86.87
Volume - 9, Issue - 8, August - 2023   **Publication Date: 31/08/2023**

- Malnutrition may occur when there is a lack of nutrients in the diet or when the body cannot observe nutrients from food.
- Malnourishment of boys can cause deficiency in vitamins and minerals. Alcohol use disorder, consuming a lot of alcohol can lead to gastritis or long term damage to the pancreas. The issues can make it hard to digest food, absorb vitamins, and produce hormones that regulate metabolism. Alcohol can also content calories, so the person may not feel hungry.
- Adolescent girls are important; malnutrition has a negative effect on their future generation. The adverse effect is more on the girl child. If adolescent girls enter into the reproductive cycle in a malnourished state, she will grow up into a malnourished adult and give birth to malnourished child contributing to an unproductive community and the cycle of intergenerational transfer of malnutrition.
- Undernutrition is caused by a lack of nutrients, either as a result of a poor diet or problems absorbing nutrients from food. Undernutrition makes children in particular much more vulnerable to disease and death.
- Over nutrition is a form of malnutrition imbalanced nutrition arising from excessive intake of nutrients, leading to accumulation of body fat that impairs health, resulting in overweight or obese.
- Over nutrition has several implications, people who have are at greater risk. Hard disease high blood pressure, diabetes, cancer, high cholesterol

5.2. NUTRITION EDUCATION:

Nutrition Education was given to the 100 samples on the risk of malnutrition, causes of Undernutrition and Over nutrition along with the consequences of Undernutrition and Over nutrition and how to prevent it.

REFERENCES:

1. Jere Behrman, Harold Alderman, John Hoddinot, (2004) Hunger and Malnutrition; Global crises, global solutions, 420.
2. Olaf Muller , Michael Krawinkel,(2005) Malnutrition and health in developing countries; cmaj,173(3), 279 – 286;
   DOI: https://doi.org/10.1503/cmaj.0503422
3. Mercedes de Onis , Edward A Frongillo , Monika Blossner, (2000) Is Malnutrition declining? An analysis of changes in level of child Malnutrition since 1980; Bulletin of the world health organization 78(10), 1222 – 1233.
4. LS Stephenson, MC Latham, EA Ottesen, (2000) Global Malnutrition; parasitology 121(S1),S5 – S22,
   DOI: https://doi.org/10.1017/s0031182000006478
5. Michael H Golden, (2009) Proposed recommended nutrient densities for moderately malnourished children; Food and Nutrition Bulletin (30), S267 - S342; DOI: https://doi.org/10.1177/15648265090303s302
6. Ivica Petrikova, (2022) The role of complementary feeding in India's high child malnutrition rates: findings from a comprehensive analysis of NFHS IV (2015 – 2016) data; Food security 14(1), 39-66.
7. Shailen Nandy, Michelle Irving, David Gordon, SV Subramanian, George Davey Smith,(2005) Poverty, child under-nutrition and morbidity, new evidence from India; Bulletin of the world health organization 83, 210 – 216.