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Nutritional Status Assessment Of Rural Adolescent Girl Child In Contai, Purba Medinipur, West Bengal

Mrs. Anusree Giri
Assistant Teacher,
Majilapur Birendra Vidyapith,
Dakshin Dauki, Contai, Purba Medinipur,

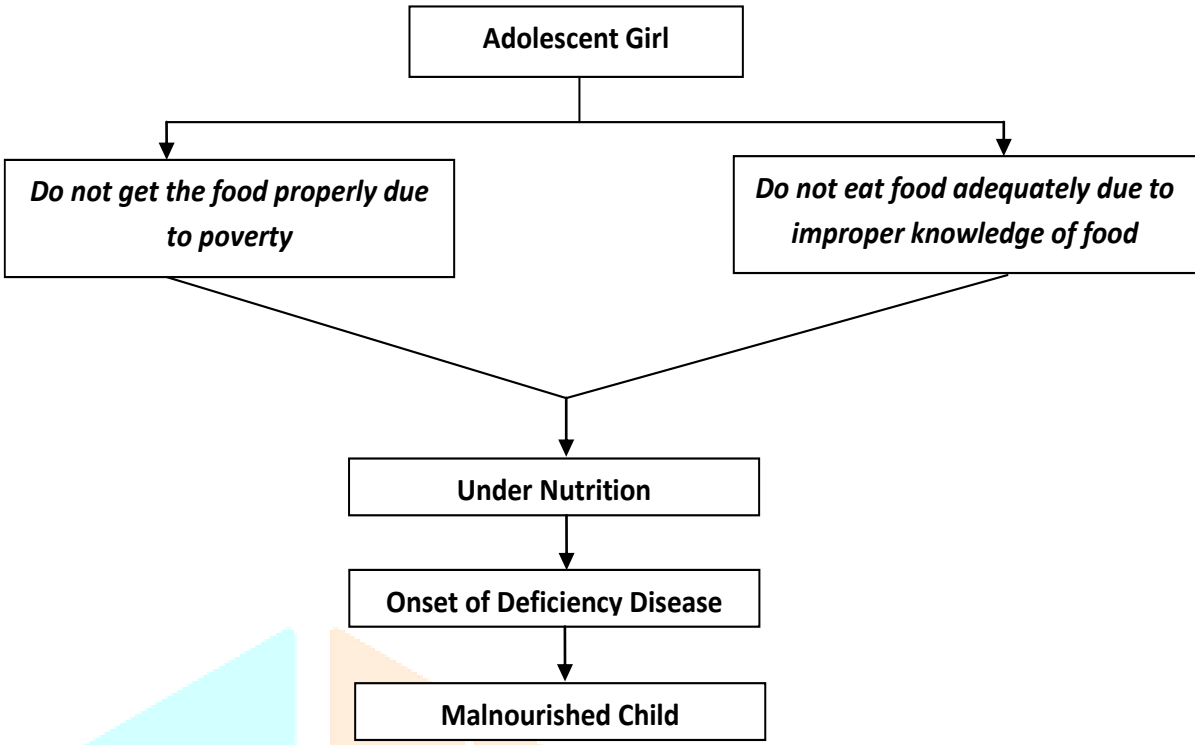
Miss. Manasree Giri
M. Sc., University Of Calcutta

Abstract: This is a cross sectional study is done with total 133 samples, who is within 15-18 years girl child and is studying in between class 9-12, in a rural area of Contai, Purba Medinipur district, West Bengal. The samples were undertaken from November 2021 to January 2022. Here we use variables like Height, Weight, BMI, Waist- Hip- Ratio, Average calorie intake, MUAC. The study result is showing that 11.2% students are suffering from underweight and having <18.5% BMI, but 66.1% students have normal BMI and 18% students are overweight and 4.5% students are obese. They are consuming more carbohydrate than RDA and less protein. They are taking iron tablet supplying by Govt. Health Stuff, but not consume any Zn or Ca or any other food supplement.

Keywords: Adolescent girl, Nutritional status, BMI, malnutrition, nutrient supplementation

1. Introduction:

According to WHO Individuals between 10 - 19 years are considered adolescents. This is the transitional period from childhood to adult hood. In this stage physical, Biochemical and emotional development is increased with many physical and mental changes due to hormonal influence .Due to pubertal changes and menarche they need balanced diet and malnutrition delays menarche. At this age energy needs increases to meet the growth and energy expenditure but most of the adolescence satisfy their hunger with empty calorie food ,that contain only calorie but no protein and vitamins and minerals. So for this malnutrition can seen in their nutritional status. As protein is very essential nutrient for growth and development on one hand it is also important for maintain the pubertal changes on the other hand in this stage with macronutrient .so micronutrient like Iron, zinc calcium, phosphorus are too much important to prevent the specific micronutrient deficiency. specially the health of the adolescence girls are directly related with the health of the new born, Infant mortality rate maternal mortality rate low birth weight baby. Further so the study focuses on the nutritional status assessment of adolescent girl.



Flow chart: 1

2. Review of Literature:

The literature review for this research work has been done based on in-depth study of printed as well as online published materials available from periods 2010 to 2022. And search for this literature study has been included the in-depth analysis of each & every micro facets of the subjects which are influencing the research work to understand and delaminate the problems to give shape of the research work. The brief observation of the research work may highlight as described in the **Vikaspedia** under growth and development as "Adolescence is a significant period for physical growth and sexual maturation. Nutrition being an important determinant of physical growth of adolescents is an important area that needs attention. Growth retardation is one of the most important health concerns for adolescents and their parents as well as health care workers.

Inadequate nutritional intake during adolescence can have serious consequences throughout the reproductive years and beyond. Poor nutrition during adolescence can impair the work capacity and productivity of adolescent boys and girls in their later years. Further, an undernourished girl is at the risk of developing complications during pregnancy and the chances of her giving birth to a low birth weight baby increases, thus perpetuating a vicious cycle of malnutrition and ill-health" (**Vikaspedia, Feb 2022).**

Joshi, Sheloj M & et all (2014) has described in article that **"**Adolescent girls are backbone of healthy and progressive family and thus future builders of positive health of community. Adolescence is a crucial part of life. Adolescence is a crucial part of life. During this period, adolescents gain up to 50% of their adult weight, 20% or more than that of their adult height and 50% of their adult skeletal mass.To attain healthy reproductive outcome and efficient physical activity nutritional status of adolescent girl is valuable."

Adolescents are the best human resources. But for many years, their health has been neglected because they were considered to be less vulnerable to disease than the young children or the very old. Their health attracted global attention in the last decade only **(Kalhan, M & et all, 2010).**

According to NFHS-3 malnutrition levels are higher in adolescent girls as almost half of the girls i.e. 46.8% in age 15-19 years are undernourished5. Among women who are thin, almost half (45 percent) are moderately or severely thin.

(National family health survey India (NFHS-3), 2005- 06,volume I. Mumbai: IIPS; 2007.p304.)

Further it is also mentioned by **Joshi, Sheloj M & et all (2014)** that now it is essential to study the dietary pattern of adolescent girls especially in rural area for designing strategy to tackle the problem of poor nutrition and variables as well as methodology they used as - age, socioeconomically status, weight, height and dietary intake pattern. 24 hours dietary recall method was used to calculate the calories. The result shows in this study that 33.5% subjects suffered from chronic energy deficiency (CED) grade III (BMI<16), 35.5% adolescent girls were under weight (BMII<18.5) and only 31% study subjects had normal nutritional status. Also Majority of the participants i.e. 85.5% consume<1400 kcal daily in their diet. About 70% of adolescent girls who consumes<1400 kcal were under nourished while 87.5% of adolescent girls who consumes calorie between 1600-1800kcal.and 75% who consumes calorie between 1800-2000k cal. Were under nourished.

Maity, B. (2015). Nutritional Status of School Children in Rural Scenario, Results show that boys are heavier than girls and girls are found taller than the boys in each age. The mean weight of the adolescent girls was much lower in comparison to ICMR standard specifications. Underweight is used as an indicator to determine acute undernutrition. Height and weight of all age groups are the most common measurements used to measure nutritional status among Adolescent Girls.

M, Rubavel, Richard, Jonas & Joyce, Winnie (2021) Observed in his study about **Situational Analysis on Nutritional Status of Adolescent Girls: A Study from Rural Karnataka, India** that Adolescence is a critical period of life. This is a time of rapid development of the body, brain, and behaviours. They undergo puberty changes and also face difficulties that may affect health throughout life which is a setback for the growth of adolescent girls. It is important to study the nutritional status of adolescent girls. Their study identified the Nutritional aspects of the Adolescent girls to focus on the Socio-Economic conditions of the families, Nutritional intake of the Adolescent Girls, and status of Body Mass Index (BMI) and Mid Upper Arm Circumference (MUAC) among the adolescents and to suggest recommendation to improve the Nutritional status of adolescent girls. The study found that there is variation between the Indian Standards of (ICMR) and in the present study. Few Students skip their breakfast due to various reasons such as poor economic background and there is no time to take breakfast in the morning. The results in two extremes Overweight and underweight. It is found that 18 % of Adolescent girls are at risk due to Mal- Nutrition. Around 44% of adolescent girls are not aware of the Iron tablets, 54% of them not aware of Vitamins & Minerals, and 72% of adolescents not aware of calcium. Only 4% percentages of adolescent girls are not taking a three-meal in a day which could be addressed and it is ensured to take three meals a day. However, in the qualitative discussion with adolescent girls, It is found more than 4% of respondents are skipping breakfast due to their economic condition of families and lack of time . This needs to be addressed with the various strategic interventions and development projects Programmes for exclusively adolescent girls. These disparities need to address by training them on Balance Diet, Suggesting them to take nutritional supplements and basic exercise would help them to have a better health condition. It is also observed that 4 % of the respondents skipping breakfast but it is found in the qualitative discussion, it is found that more than 4 % of the adolescents are skipping breakfast due to various reasons. This is one of the grey areas which need to be addressed among adolescent students. It is found that few students are hesitant to express that they are skipping breakfast. It is about 60 % of the Adolescent Girls not taking Fish, 52% of the respondents not taking Meat, 36 % of them not taking egg in Seven days. It is around 18 % of Adolescent girls fall under thinness and Sever Thinness. They are at risk due to the Mal- Nutrition. It is around 8% of adolescent Girls fall under Obesity and Overweight and this issue also to be addressed.

3. Aims and Objective of the Study:

The aims of the study has been outlined as below -

i. To study the difference between RDA of nutrient and intake of nutrients.
ii. To measure the BMI mid upper Arm circumference and waist hip ratio of adolescent girl.
iii. To know the prevalence of nutritional deficiency syndrome.

The main objectives are sa follows -

i. To upgrade the nutritional status by giving suggestion
ii. To deliver knowledge and awareness to adolescent girl of 15-18 years old about importance of nutrient
iii. To highlight the different types of nutritional deficiency disorder noted in adolescence girl aged 15-18 years
iv. To aware about the hygiene and sanitation and its relation with physical health.

4. Nutritional Problems:

The problem of the areas has been outlined as below after the in-depth study on literature review.

i. They show many types of irritating manner, especially they try to maintain a distance with their parents and need separation also.
ii. Anorexia is a common problem during this period, so for this they skip meals, as through its important for them.
iii. They feel extremely emaciated and get emotional.
iv. They feel low self esteem.
v. Some of them show eating disorder anorexia Nervosa and bulimia Nervosa.
vi. They faced sometimes fatigue and weakness due to malnutrition.
vii. Sometimes they are facing with Iron deficiency anemia.

5. Methodology:

In this cross sectional study, I had select Government aided school .Then after taking permission from the head of the institution; I had selected the girl student of class 9 to class 12 students, ages15 -18 years old. Then I have measured height (by using measuring tape) weigh t(by using weighing machine) MUAC, waist circumference ,hip circumference (by using measuring tape). Then I have noted the amount of food consumption by using 24 hours recall method. After taking this information I made the list of BMI Average height, and average weight, waist Hip ratio and nutrient intake table. All the results are included in the study.

6. Analysis of Samples, Review & Result:

In this area, the in-depth analysis has been done based on samples collected physically from schools in Contai Division of Purba Medinipur district of West Bengal on girl's child who are reading in Class 9 to 12. The samples has been grouped and compared with two standards like – WHO & ICMR to understand the comparative analysis & review the of nutritional status assessment with actual scenario.

To conduct this analysis, here we have plotted data in different table format and after that converted the result in to bar diagrams. After that finding has been enumerated separately.

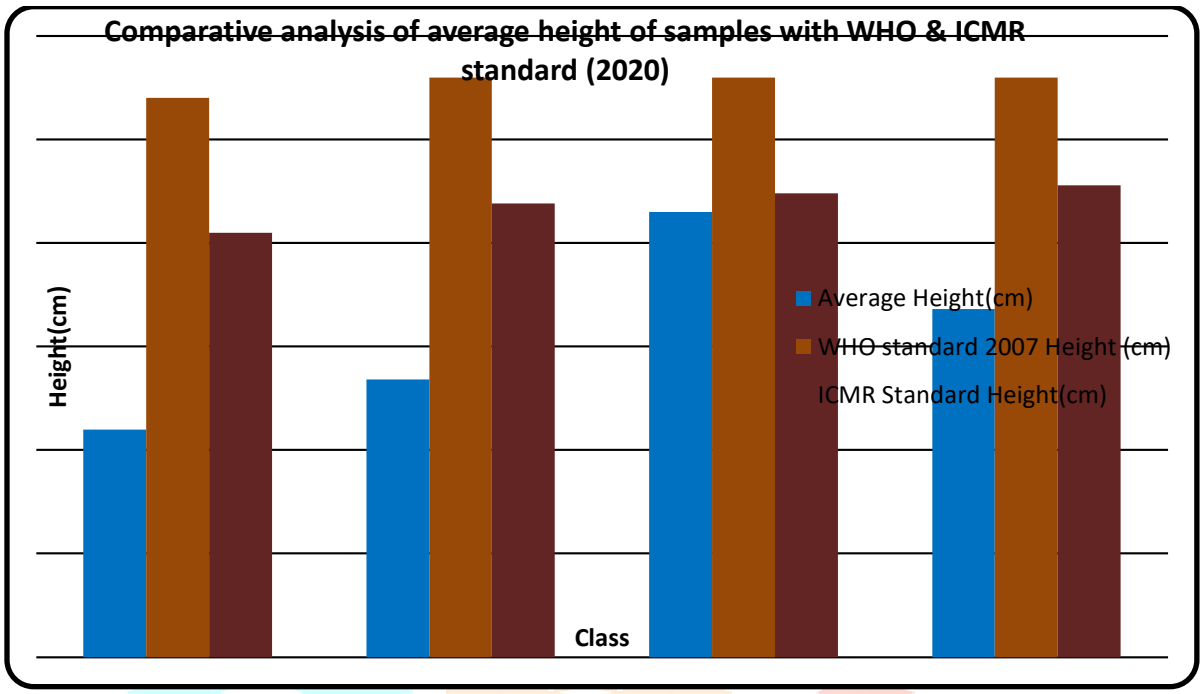
The details of analysis & review of the result as are follows:

Comparative Analysis Of Average Height and Weight Of Samples with WHO Standard and ICMR (2020) Standard:

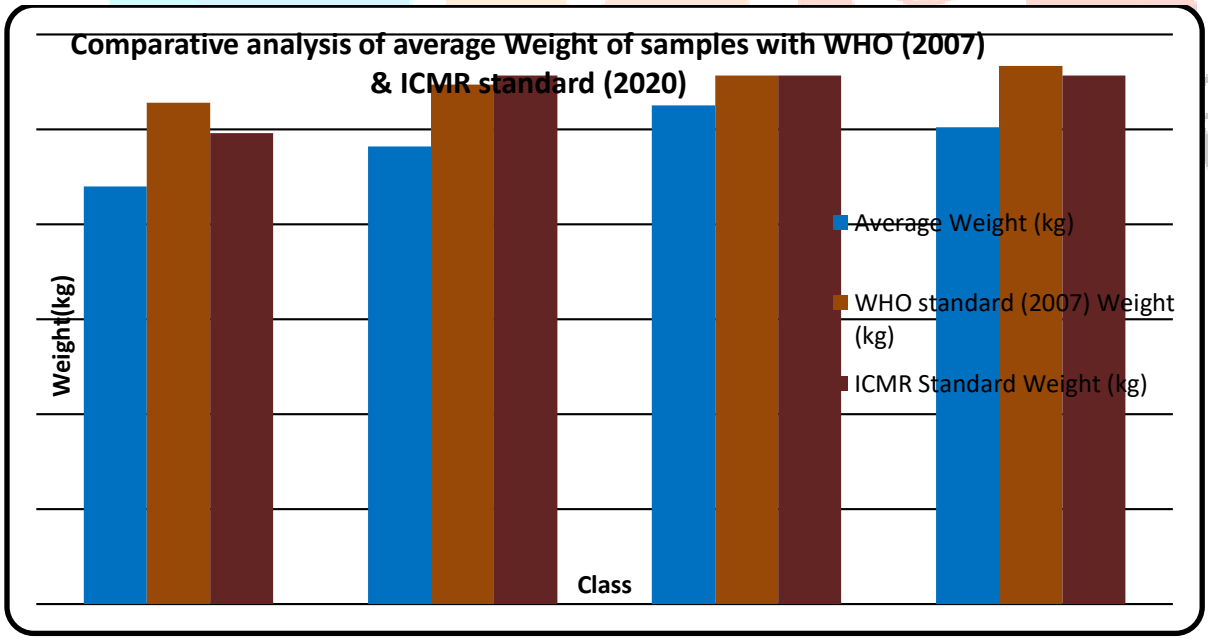
Sample Result			WHO Standard (2007)		ICMR Standard (2020)	
Class	Average Height (cm)	Average Weight (kg)	Height (cm)	Weight (kg)	Height(cm)	Weight (kg)
9	146.0	44.0	162	52.8	155.5	49.6
10	148.4	48.2	163	54.7	156.9	55.7
11	156.5	52.5	163	55.7	157.4	55.7
12	151.8	50.2	163	56.7	157.8	55.7

Table: 1

The above data can be plot in to bar diagrams also to understand the results easily. Below diagrams are representing in-depth comparative view of samples along with standard.



Graph: 1



Graph:2

In Table 2, the samples have been plotted to understand that how much percentage of height and weight is decreased from WHO and ICMR standard:

Sample Result			WHO standard		Deficit Percentage%		ICMR Standard (2020)		Deficit percentage	
Class	Average Height (cm)	Average Weight (kg)	Height (cm)	Weight (kg)	Height(cm) %	Weight (kg)%	Height (cm)	Weight (kg)	Height (cm) %	Weight (kg) %
9	146.0	44.0	162	52.8	10.9	20.0	155.5	49.6	6.5	12
10	148.4	48.2	163	54.7	10.1	13.4	156.9	55.7	5.7	15.5
11	156.5	52.5	163	55.7	4.1	6.0	157.4	55.7	0.5	6.0
12	151.8	50.2	163	56.7	7.3	12.9	157.8	55.7	3.9	10.9

Table: 2

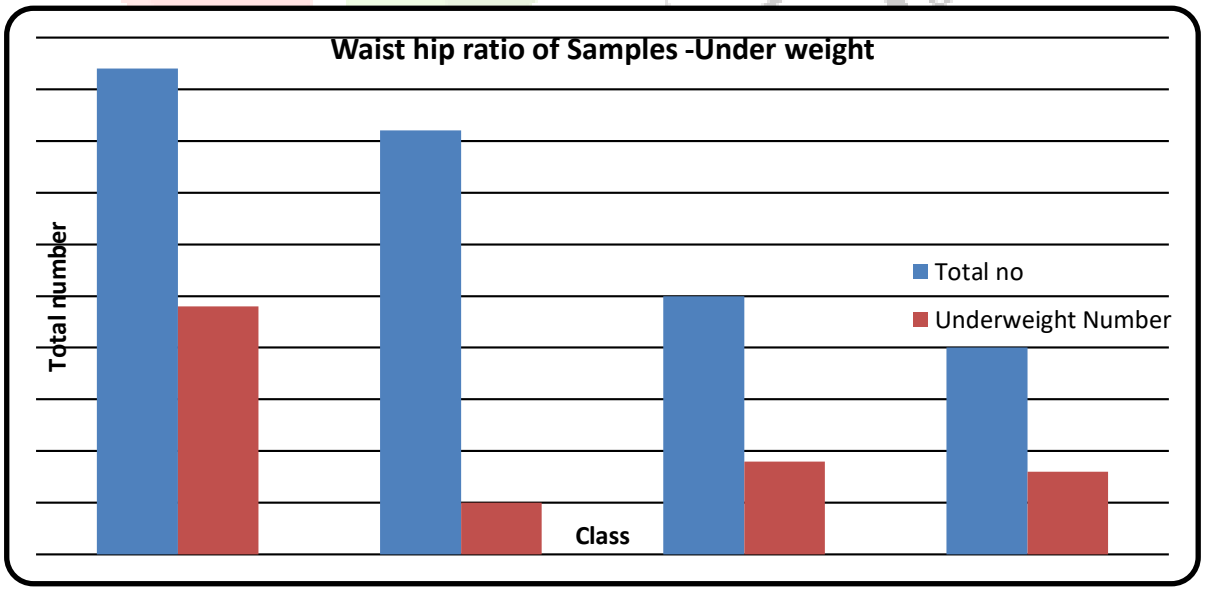
From the above tables it is clear that sample's height and weight is decreased from WHO standard and from ICMR standard. This deficit percentage is caused either for their food habit or their environment and genetics.

Table 3 describe below the Waist hip ratio of the Samples

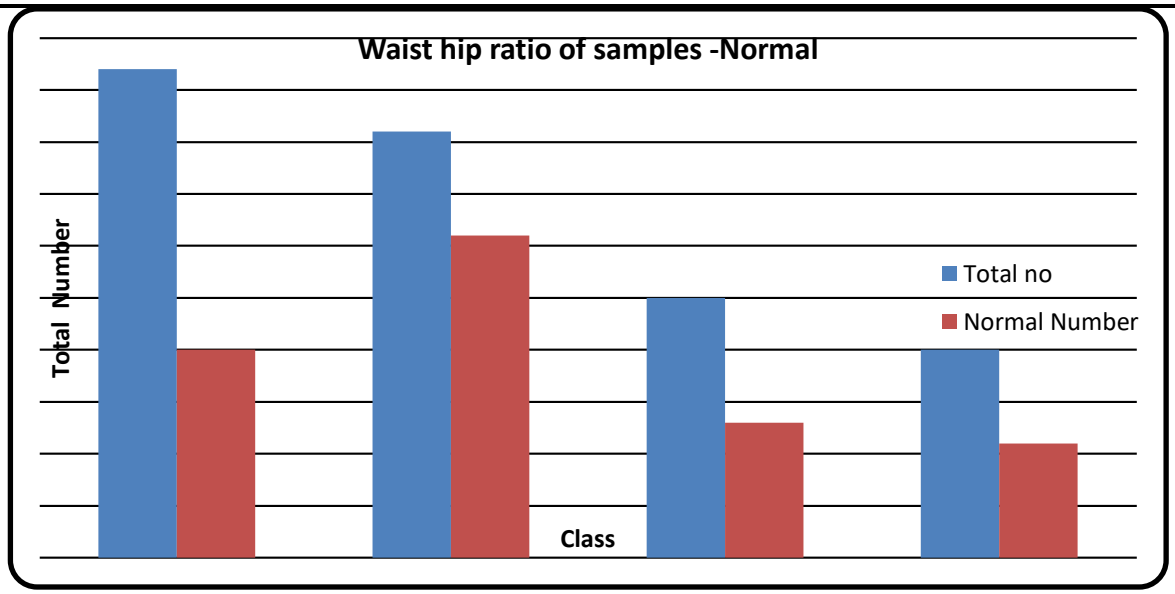
Samples		Underweight(<0.8)		Normal (0.8)		Overweight (>0.8)	
Class	Total no	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
9	47	24	51	20	42.5	3	6.3
10	41	5	12.1	31	75.6	5	12.1
11	25	9	36	13	52	3	12
12	20	8	40	11	55	1	5

Table: 3

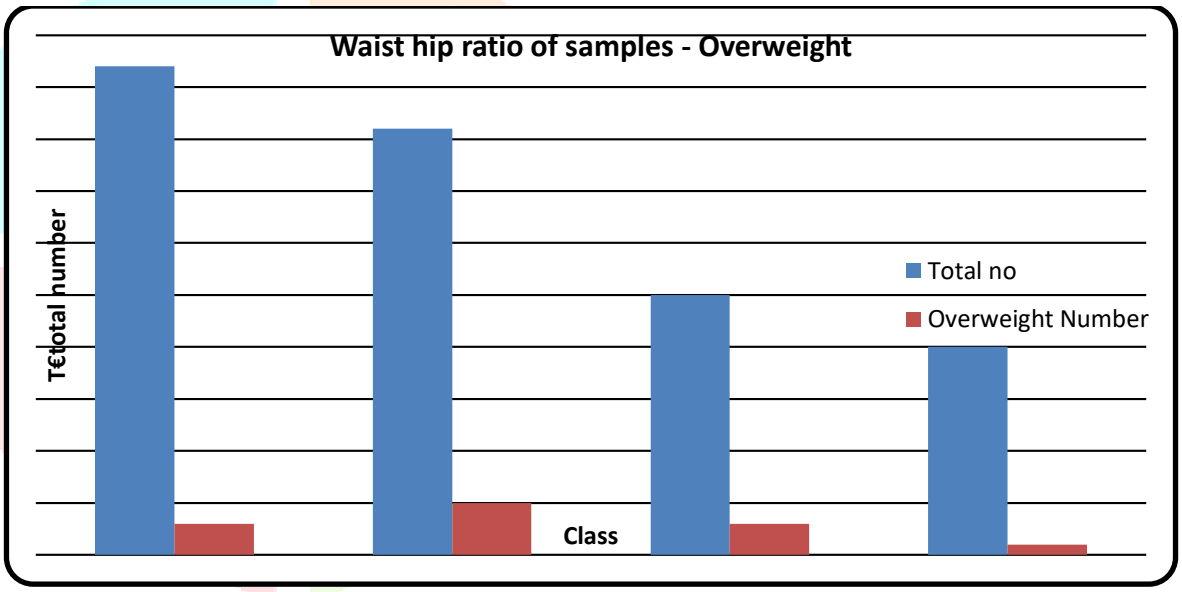
The graphic representation of waist hip ratio comparing underweight or overweight are as follows -



Graph: 3



Graph: 4



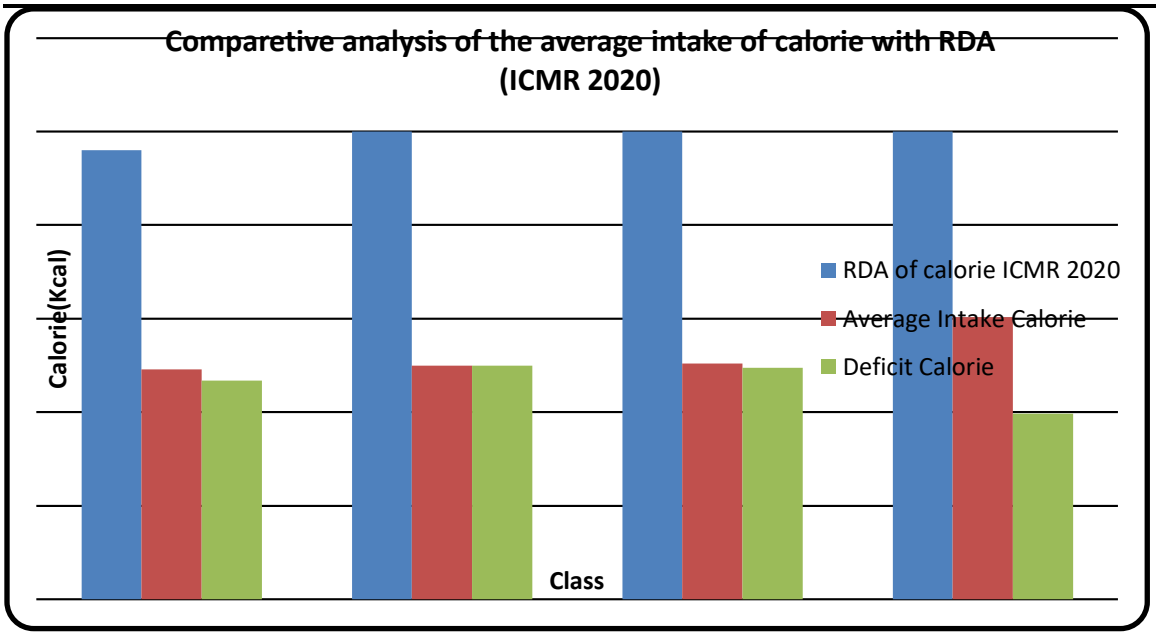
Graph: 5

From the above analysis it is clear that 42.5% samples in class 9 have normal Waist Hip Ratio, about 75.6% samples in class 10, and 52% samples in class 11 ,and 55% samples in class 12 have normal waist Hip ratio.

The data related to Comparative Analysis of the Average intake of calorie with RDA (ICMR 2020) has been plotted in the Table 4 blow

Class	Average age	RDA of Calorie (kcal) ICMR 2020	Average Intake Calorie(kcal)	Deficit Calorie (kcal)
9	15	2400	1229	1170
10	16	2500	1250	1249
11	17	2500	1261	1238
12	18	2500	1507	992

Table: 4



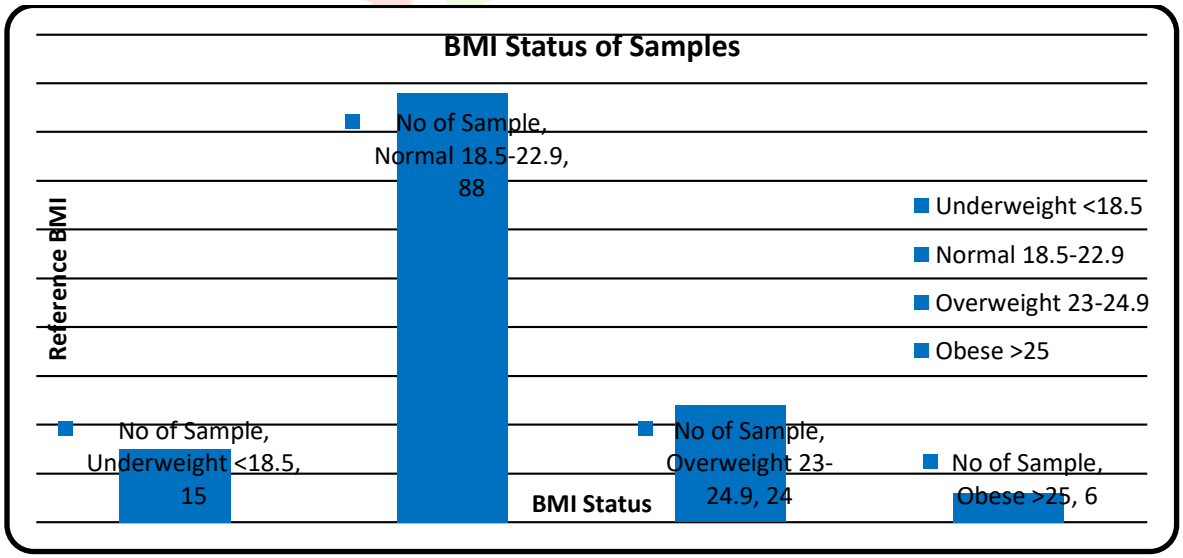
Graph: 6

Based on the above comparative analysis it is clear that they are consuming less calorie than RDA so for that they feel tired during their class time and cant give attention to their studies. Not only that but also they are looking thin and undernourished.

In Table 5, the BMI status of Samples has been measured as below

BMI status	Reference BMI	Number of samples	Percentage (%)
Underweight	<18.5	15	11.2
Normal	18.5-22.9	88	66.1
Overweight	23-24.9	24	18.0
Obese	>25	6	4.5

Table: 5



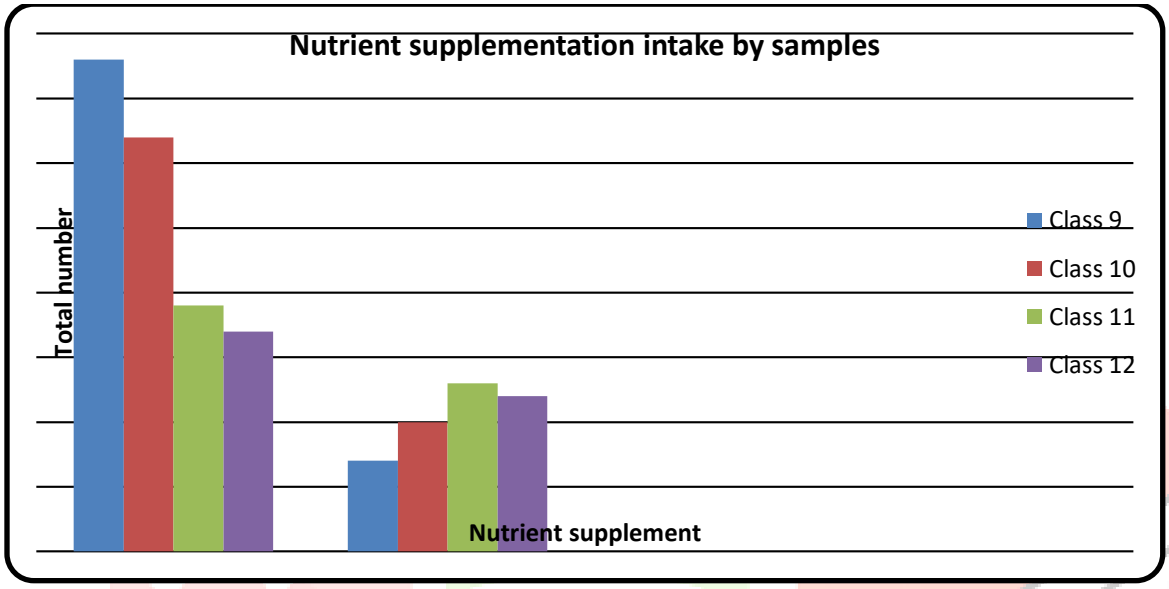
Graph: 7

The study result shows that 11.2% students are suffering with underweight, where 66.1% students are within normal BMI. 18% students are falling within overweight category and 4.5% students are there whose BMI is >25, that is they are going to obese category. Out of the total samples 11.2% are in high risk, who need to maintain dietary guidelines.

Nutrient supplementation intake by samples:

Class	Total number	Intake of IFA tablet	Intake of Zn tablet	Intake of vit D	Intake of Ca tablet
9	47	38	7	Nil	Nil
10	41	32	10	Nil	Nil
11	25	19	13	Nil	Nil
12	20	17	12	Nil	Nil

Table: 6



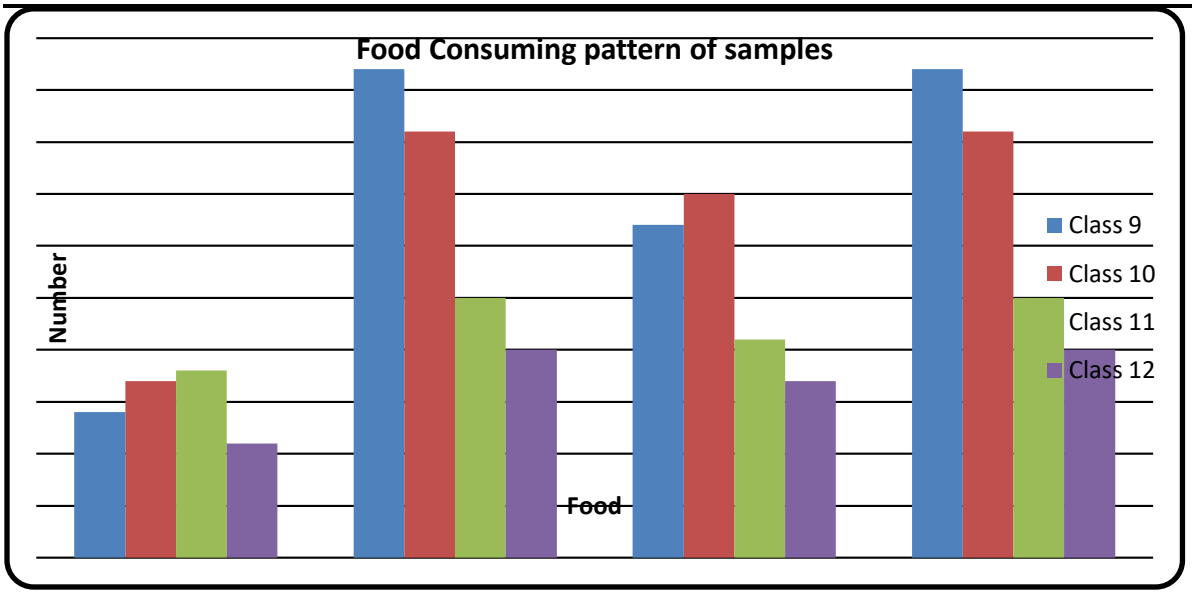
Graph: 8

From the above analysis it is clear that, maximum number student consume IFA tablet, supplied by government health stuff. The students who don't take IFA tablet having some doubt about the tablet either it is good or bad. Very few amount of student are taking Zn tablet for the prevention of corona pandemic situation, but no one samples are taking ny type of Ca or vit-D supplementation, which is very necessary for their motherhood stage.

Food consuming pattern of samples:

class	Total samples	Breakfast	Lunch	Snacks/Tiffin	Dinner
9	47	14	47	32	47
10	41	17	41	35	41
11	25	18	25	21	25
12	20	11	20	17	20

Table: 7



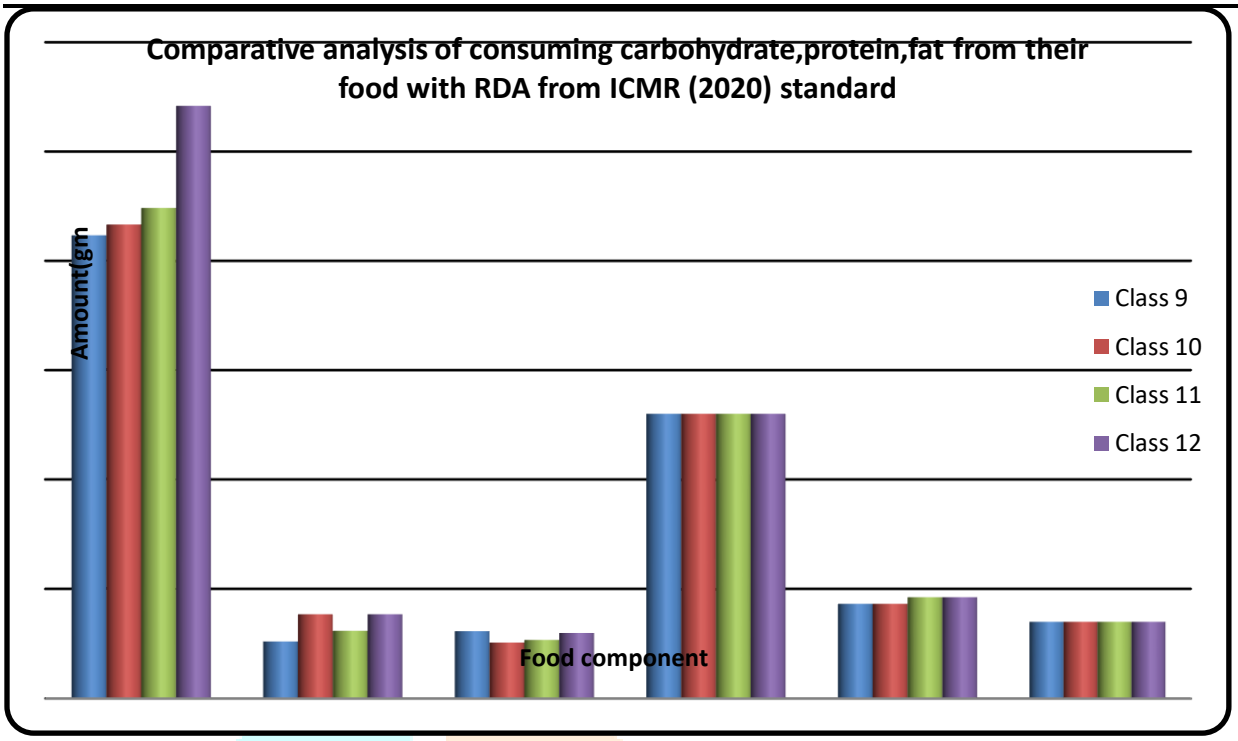
Graph: 9

This table shows that almost all students takes their lunch and Dinner, but skips their breakfast. Which is necessary for their improving memory and concentration, not only that our body can absorb essential nutrients in maximum amount, but also enhance immune system.

Comparative analysis of consuming carbohydrate, protein fat from their food with RDA from ICMR (2020) standard:

Sample Result (Average)					ICMR standard (2020)		
Class	Average age	Carbohydrate (gm)	Protein (gm)	Fat (gm)	Carbohydrate (gm)	Protein (gm)	Fat (gm)
9	15	211.7	26	30.7	130	43.2	35
10	16	216.6	38.4	25.5	130	43.2	35
11	17	224.2	30.9	26.7	130	46.2	35
12	18	270.9	38.4	29.9	130	46.2	35
Average Difference from RDA		+100.85	-9.77	-6.8	NIL	NIL	NIL

Table: 8



Graph:10

Based on the above comparative analysis it is clear that they are consuming more carbohydrate than RDA. It is also been seen that they are having less protein which is necessary for their growth and development and for future motherhood life.

7. Findings:

The overall study shows that the samples are studying in rural area of a school and Their average height and weight is decreased from their RDA (WHO and ICMR 2020), it is may be due to their food habits or for their genetics or environment. They are taking less amount of protein and more amount amount of carbohydrate which is create more burden to their growth and development. It has also been notified that though 66.1%samples have normal BMI but 11.2% samples are underweight and thin, which need to be correction. Otherwise it could hamper their physical fitness and reproductive stage.

8. Discussion:

Though several nutritional status assessment of adolescent group was done before, but in Contai Purba medinipur for first time this investigation was done to record the data about the nutritional status of girl children between class 9 to 12 ages between 15 to 18. This study did not included adolescent boy. Because the adolescent girls are the age of upcoming motherhood stage. Here the study result shows that total calorie as well as macronutrient deficiency is prominent among them, which can affect their physical and mental development. So they need proper dietary guidelines.

9. Conclusion: This school based study was done with adolescent girl child who are not taking mid day meal supplement along with any supplementary food. Some of them are severe malnourished,so they need proper nurtitional care. Their food habit have to be change through guidelines, so that they could take low cost nutritious food. Their parents need to be councelled first to give them proper nutrition from locally available food,so that the malnourished girl could catch up their proper growth and development and able to eradicate nutritional problem.

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