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Evaluation of the Nutritional Status and Level of Health Awareness among Adolescent Girls Residing in Rural Areas of India

Dr. Archana Chaudhary

Professor (Home Science), Jwala Devi Vidya Mandir P.G.College, Kanpur, India

ABSTRACT:

The adolescent years are important because they bridge the gap between childhood and maturity. Optimal health and nutrition may be attained during this time, which is considered the second window of opportunity following infancy. Adolescent females also reach around half their adult weight and height at this time, making it an important developmental window. Adolescent girls who are malnourished not only put their own health at risk, but also perpetuate the cycle of hunger that has plagued their families for generations. One hundred rural teenage females in the Kannauj area of Uttar Pradesh, ranging in age from 10 to 19 years old, participated in this cross-sectional research. The current research aims to quantify the rates of short height for age, low body weight, obesity, and health education. The research found that among rural teenage females, underweight is more of a health concern than fat. Twenty percent of the sample population is underweight, whereas just six percent are overweight. Poverty, illiteracy, unemployment, food insecurity, and other aspects of rural living have been hypothesised to contribute to the prevalence of thinness there.

Keywords: Nutritional, Health Awareness, Adolescent, Rural, India

INTRODUCTION

Teenage women are an important demographic since they are the future of any country. Both their individual well-being and the growth and improvement of society as a whole depend on their physical and nutritional health. Adolescent girls' health and nutritional requirements are especially severe in rural India, where a sizable majority of the population dwells. Health and nutritional status, especially for teenage girls, may be affected by the varying socioeconomic situations, limited access to healthcare facilities, and traditional cultural practises that are common in India's rural regions. Early marriage, lack of educational opportunities, ignorance of health concerns, and insufficient access to nutritional food are just some of the many obstacles these girls encounter. Their health and happiness suffer, which might stunt their development and dampen their future chances.[1]

Adolescent girls' nutritional status in rural regions is affected by a number of variables, such as their eating habits, the food security of their households, their access to safe water and sanitation, and their knowledge of the necessity of a healthy diet. Both undernutrition and over nutrition have been linked to stunted growth, impaired cognitive function, and an

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increased risk of developing chronic illnesses later in life. Inadequate health education might also discourage these young women from seeking medical attention when they need it or from adopting healthy lifestyle choices.

1.1 Nutritional Status among Adolescent Girls in Rural India

Adolescent girls' nutritional condition in rural India is a pressing issue since it affects their health, growth, and opportunities. How well an individual's dietary intake meets his or her metabolic demands for growth, energy, and maintenance of physiological functions is a measure of nutritional status. Understanding the nutritional status of adolescent girls is crucial for developing effective interventions and policies that can improve their well-being in the context of rural India, where factors such as limited access to quality healthcare, traditional dietary practises, and socioeconomic challenges prevail.[2]

Factors Influencing Nutritional Status:

Adolescent females in rural India face several challenges that affect their nutrition. The availability of nutrient-dense foods and the frequency of meals directly affect the intake of critical nutrients, hence dietary habits play a crucial role. Many people in rural India still depend on basic foods, some of which may be deficient in essential nutrients. Furthermore, dietary diversity might be reduced due to economic restrictions and restricted access to markets. One additional important factor in determining nutritional health is the stability of the household food supply. Both under- and over-nutrition may emerge from economic instability, which in turn reduces people's capacity to buy food. Food insecurity may cause people to eat too few calories and not get enough essential nutrients, which can slow their physical and mental development. However, when inexpensive, high-calorie meals are readily available, both over nutrition and the risks associated with obesity rise.[3]

Nutritional status is also affected by other factors, such as access to safe drinking water and proper sanitation. Adolescent girls' health and nutritional condition may be negatively affected by a lack of access to clean water and sanitation, which in turn can increase the prevalence of infectious illnesses and hinder the body's ability to absorb and use nutrients.

Types and Consequences of Malnutrition:

Malnutrition is a broad term that includes both under- and over-nutrition. Stunting (low height for age), wasting (low weight for height), and micronutrient deficiencies are all signs of undernutrition, which occurs when the body does not get enough of the calories and vital nutrients it needs. Adolescent females struggle to realise their full potential when faced with these situations since they not only limit physical growth but also affect cognitive development. However, teenage females in rural India are increasingly affected by overnutrition, which encompasses overweight and obesity. Excess weight is caused by inactivity and eating a diet high in calories but low in nutrients. Long-term health is

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compromised by the increased likelihood of developing chronic illnesses such type 2 diabetes, cardiovascular disease, and hypertension that are associated with overnutrition.[4]

Micronutrient Deficiencies:

Micronutrient deficiencies, sometimes known as "hidden hunger," are a serious issue when it comes to the diets of rural Indian teenage females. Anaemia, weakened immunity, poor eyesight, and neural tube anomalies are just some of the health concerns that may result from a lack of essential vitamins and minerals. Both physical and mental growth might be negatively impacted by these inadequacies.

1.2 Health Awareness Levels among Adolescent Girls in Rural India

Adolescent girls' health education is an important factor in their growth, especially in India's rural communities. When we say someone is "health aware," we mean they have a well-rounded understanding of the importance of personal hygiene and preventative medicine. It is crucial to understand adolescent girls' health awareness levels in rural India, where traditional beliefs, limited educational opportunities, and inadequate access to healthcare resources prevail, in order to design effective interventions that enable them to make informed choices about their health and improve their quality of life.[5]

Importance of Health Awareness

Individual and social flourishing depend on a foundation of health knowledge. Adolescent girls are more likely to engage in healthful practises and make well-informed choices when they have access to correct information regarding health and hygiene practises. With this information in hand, they will be better able to protect themselves from illness, take charge of their health, and recognise when it's time to visit a doctor. Adolescents who have the necessary information may also serve as health advocates, raising awareness and promoting healthy lifestyle choices among their peers and wider communities.

Factors Affecting Health Awareness

Several variables affect teenage girls' degree of health knowledge in rural India. Education is a key component. Women and girls who have access to formal education are more likely to learn about health and hygiene via books and other printed materials. However, access to school, particularly for females in rural regions, might be a barrier to gaining such expertise. Health awareness is significantly influenced by cultural ideas and gender norms. Adolescent girls' views of health may be influenced by traditional beliefs, leading them to choose home cures over medical attention. Access to healthcare information and services may be further hampered by gender stereotypes that limit women's mobility and decision-making capacity.[6]

Availability of Healthcare Information and Resources

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The health knowledge of teenage girls in rural India is strongly influenced by the ease with which they may get access to healthcare information and services. Particularly in outlying places, people may be less likely to have access to reliable health information due to a lack of convenient healthcare options. Missed chances for preventative care might result from people not knowing about services like vaccination programmes or maternity healthcare. Adolescent girls may have trouble getting the healthcare they need in many rural areas because of a lack of resources. In addition, the local community may not respond positively to healthcare information if it is not presented in ways that are culturally appropriate and easy to grasp.

Empowering Health Awareness

Adolescent females need a diversified approach to health education if they are to be empowered. Providing females with access to both formal and informal education settings is crucial. Nutrition, cleanliness, sexual and reproductive health, and illness prevention are all areas that might benefit greatly from a school-based health education programme. Supplementing formal education with community-based seminars and awareness initiatives may reach more people. It is also important to include families and local authorities. Girls are more likely to seek out information and follow healthy practises if their families and communities actively support and encourage them to do so. Access to healthcare information and services may also be improved via the use of technology, such as mobile apps or telemedicine.[7]

LITERATURE REVIEW

Benjamin, P. P. (2015) The nutritional condition of teenage females has just recently been investigated, especially in rural India. Adolescent females are less likely to attend school and have less access to resources, therefore the results of research involving younger children cannot be generalised to them. Girls who don't go to school are probably from a poor demographic, and their health is at risk since they participate so heavily in unpaid domestic and peri-domestic labour.[8]

D. Ghosh and K. De (2016) The height, weight, and body mass index (BMI) of 21,485 children between the ages of 5 and 18 in a Study of growth characteristics and prevalence of overweight and obesity in school children in Delhi was determined. School girls from lower socioeconomic backgrounds were more likely to be overweight (2.14%) or obese (0.28%) than their wealthier counterparts (19.01% and 5.73%, respectively). It has been shown that children from higher socioeconomic backgrounds had considerably higher average height and weight than those from lower socioeconomic backgrounds.[9]

C. P. Mishra and K. P. Shukla (2016) analysed the nutritional condition of Tamilnadu's teenage females using anthropometric data. When comparing the chosen girls to the reference population of the National Centre for Health Statistics, they discovered that the girls' anthropometric measures were lower. Except for females aged 15–16 who have completed

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matriculation, a statistically significant difference in weight was noticed between the chosen girls and Indian teenage girls. When compared to the Indian Dietary Reference consumption, the average nutrient consumption of the chosen females attending public schools was substantially lower. Adolescents are particularly vulnerable to the health consequences of malnutrition due to a lack of adequate nutrition.[10]

R. Biswas (2015) researched the nutritional condition of teenage females living in rural Garhwal. Girls made up 34.61 percent of the teenage population that were judged to be underweight. The highest prevalence of stunting was seen in the 16–19 year old age group (33.33%). Overall, 43.47 percent of the population was underweight. Those between the ages of 12 and 15 had the highest prevalence of thinness (56.25 percent). More than half of rural teenage females were underweight for their age according to National Centre for Health Statistics (NCHS) criteria. Adolescent females in high-altitude regions were disproportionately likely to be stunted, underweight, or skinny. The females on the hills and their unique tactics deserve further consideration in this respect. should be designed to provide the nutrients they need.[11]

L. Kincaid (2016) Twenty-one thousand four hundred and eighty-five Delhi schoolchildren, ages five to eighteen, had their height, weight, and body mass index (BMI) measured for a study on the prevalence of overweight and obesity among India's youth. School girls from lower socioeconomic backgrounds were more likely to be overweight (2.14%) or obese (0.28%) than their wealthier counterparts (19.01% and 5.73%, respectively). It has been shown that children from higher socioeconomic backgrounds had considerably higher average height and weight than those from lower socioeconomic backgrounds.[12]

METHODOLOGY

One hundred teenage females, ages 10 to 19, were surveyed cross-sectionally in two villages in the Kannauj area of Uttar Pradesh. The settlements are sampled using a straightforward random sampling method. The main survey used a pre made, semi-structured questionnaire to collect data on anthropometrics, socioeconomic status, and nutritional literacy and health literacy. A measuring tape was used to get the height in centimeters. Using the same method, the participants' weights were recorded in kilograms using a bathroom scale. Care was taken with the scale, and it was calibrated on a regular basis. Weight (in kilograms) was divided by height (in metres) to get body mass index. The study was supplemented by calculating the mean, standard deviation, and other statistical measures with the help of SPSS20. Comparisons were made between the study's sample data and the reference value established by the ICMR and the NCHS-CDC. The NCHS-CDC's recommended cut-off values of the 5th and 85th percentiles, respectively, have been used to define emaciation and obesity. We have compiled secondary information from sources like the 2011 WHO/ICMR/census of India reports.

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Socio-Demographic Profile

One hundred females, aged 10 to 19, participated in the research. Girls made up 41% of the population between the ages of 10 and 14, while 59% of those 15 and 19. The average age of the responders was 14.8. All the women had entered menopause, and just 2% were married. All of those who answered the survey were students. Ninety-one percent of Hindus and ten percent of Muslims filled out the survey. Scheduled Castes made up 38% of the population, Other Backward Classes 43%, Scheduled Tribes 3%, and General Castes the remaining 6%. Of those who participated, 61% said their monthly household income was less than Rs. 15000. Additionally, the two most common sources of income for respondents' families are from agricultural work (32%) and farming (46%).

RESULTS

4.1 Nutritional Status

Adolescence is a time of rapid physical and mental development that bridges the ages of childhood and maturity. Tracking a child's growth might reveal issues with diet or health that would otherwise go undetected. It is common practise to assess nutritional status (such as stunting, wasting, thinness, obesity, etc.) by comparing a person's weight and height. Many factors, including genes, family history, metabolism, etc., play a role in why some people are unusually tall or short. Here, teenage girls' anthropometric data are collected and compared to NCHS and ICMR guidelines to determine their average dietary intake.

Height for age: Height distribution of teenage females in comparison to ICMR and NCHS guidelines. At age 10 the mean height is 135.33 4.08 cm, while at age 18 it is 154.33 4.97 cm. Between the ages of 11 and 13, a significant increase in height is seen, with the average height increasing from 135.334.08 cm at age 10 to 146.55.08 cm at age 13. After that point, growth in stature slows down considerably. Maximum development in females occurs between the ages of 10 and 14, with the onset of adolescence. Additionally, a t-test was used to compare the mean height of the sample to the NCHS and ICMR norms.

Table 4.1: Height for Age compared with NCHS and ICMR standards

Height					
Age(Years)	**Present study**	**NCHS Standards**	***P* value**	**ICMR Standards**	***P* value**
10	135.33±4.08	138.6	0.107	126±7.01	0.003
11	138.88±3.64	145	0.002	131.2±7.25	0.001
12	143.86±4.6	151.2	0.006	136.7±8.16	0.006
13	146.5±5.08	156.4	0.000	141.5±7.26	0.013
14	148.36±4.41	159.8	0.000	145.3±7.22	0.044
15	149.13±4.03	161.7	0.000	147.7±6.87	0.178
16	151.92±4.87	162.5	0.000	149.6±5.99	0.128
17	152.07±6.11	162.9	0.000	150.1±5.96	0.249

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18	154.33±4.97	163.1	0.001	150.0±5.92	0.031
19	153.29±6.21	163.2	0.006	150.5±5.97	0.280

Based on the t-test results, the NCHS reference standard for height deviates significantly from the examined mean. however the observed mean 135.33 4.08 cm for the 10 year age group is not significant (p= 0.107,) when compared to the NCHS norm. For early adolescents, however, table 1 shows that the observed values are higher than the ICMR norm (p 0.05). There is no significant difference between observed and the ICMR requirements for females up to the age of 19 (p= 0.280), but there is for those older than 19 (p= 0.178, p= 0.128, p= 0.249). Thus, it can be concluded that the average heights of the subjects in the studies are more than the ICMR norm but less than the NCHS standard for their ages. Except for children aged 10, 11, and 12, when values lean towards NCHS norm, the analysed value seems to meet the ICMR requirement.

Weight for Age: Maintaining a healthy weight that is appropriate for one's age and gender is essential for good health. It's useful for avoiding or managing a wide range of medical issues. Mortality and morbidity are affected by a person's weight in both the short and long terms. The average weight for each age group in the study was compared to those of the NCHS and the ICMR. Subjects' mean body mass indexes ranged from 26.83 3.71 at 10 years to 49.29 5.27 at 19 years. Girls of all ages are heavier beyond what the ICMR considers healthy. When compared to NCHS guidelines, average weights across the board are much lower. The average age of the individuals increases throughout time, with the exception of those aged 17 when it decreases to 45.895.63. Weight also grows rapidly between the ages of 10 and 14, ranging from 26.833.71 for those who are 10 years old to 43.695.1 for those who are 15 years old.

Table 2: Weight for Age compared with NCHS and ICMR standards

weight					
Age (Years)	**Present Study**	**NCHS Standards**	***p* value**	**ICMR Standards**	***p* value**
10	26.83±3.71	33.6	0.003	22.5±4.28	0.076
11	32.63±3.69	37.39	0.008	24.5±4.62	0.000
12	35.79±4.74	41.82	0.015	27.3±5.70	0.003
13	37.45±5.15	45.98	0.001	30.6±6.58	0.002
14	40.68±4.94	49.49	0.000	33.5±5.69	0.001
15	43.69±5.1	52.13	0.000	35.4±6.78	0.000
16	46.71±6.02	53.94	0.002	37.9±5.81	0.000
17	45.89±5.63	55.18	0.000	39.3±5.65	0.001
18	48.28±5.45	56.22	0.002	39.6±7.57	0.001
19	49.29±5.27	57.35	0.007	39.9±6.38	0.003

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The average weights are greater than what is recommended by the ICMR but lower than what is recommended by the NCHS. When compared to NCHS guidelines on a per-age basis, the average weight of the individuals in the current study is substantially lower than average (p 0.05). Except for 10 years (p= 0.076), the mean weights are found to be considerably greater when compared to the ICMR norm. These findings are consistent with those found in investigations by authors like Sachan et al. (2012). As a result, it seems that teenage girls' weight increases with age, which is indicative of their improved nutritional status. Education, improved economic opportunities, and other factors may explain the improved nutritional status. In addition, government programmes like Midday Meal served in schools have greatly increased access to nutritious meals.

BMI and Prevalence of Thinness and Obesity: A person's nutritional state may be assessed quickly and accurately with the use of the Body Mass Index (BMI). The most common measurement is the body mass index, which is calculated by dividing a person's body mass by the square of their height and written as kg/m2. Screening for the prevalence of thinness and obesity is simplified by merely considering height and weight, rather than skinfold measurements, ethnic disparities, etc. Low body mass index (BMI) relative to age is associated with stunted development and an increased risk of death and illness. Girls who are too thin may suffer from lowered resistance to illness, anaemia, menstrual irregularities, stunted development, and other health problems. When a person's body fat percentage is higher than it should be, it might negatively impact their health.

Except for those under the age of 19, the computed BMI for the current research showed a steady rise with age. The average body mass index (BMI) increases from 14.692.25 at age 10 to 21.103.09 at age 19. A low body mass index, as calculated by Bisai (25.2%), Venkaiah & al. (39.5%), Ahmad et al. (47%) and others. Sachan et al. (2012), in their research of teenage females in the Lucknow area, found that 11.4% of rural girls were underweight. Obesity was far less common among the participants tested than thinness was. Children aged 10, 11, 12, and 14 show no signs of obesity. At age 19, people are at their heaviest (BMI of 14.29). More teenagers between the ages of 15 and 19 are overweight than those between the ages of 10 and 14. Overall, the research found a prevalence of obesity of 6%, which is quite similar to the 3.9% prevalence found by Sachan et al. in 2012. However, the current study's prevalence of overweight is lower than that seen in other studies conducted in India as a whole. Researchers in Tamil Nadu reported that 9.24% of teenage females were overweight in their 2019 research by Danasekaran and Ranganathan. Other studies have shown very similar results: Goyal (2018) found 4.7%, Maiti et al. (2013) found 10.62%, and Ahmad et al. (2018) found 5.9%. Adolescent females in rural areas have lower rates of obesity than their urban counterparts because they have more opportunities to be physically active.

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Table 4.3: Measuring BMI and Prevalence of Thinness and Obesity

BMI Values			Thinness			Obesity		
			5th Percentile			85th Percentile		
Age	N	Studied BMI (Mean ± SD)	NCHS standard	N	%	NCHS Standard	N	%
10	6	14.69±2.25	14.23	2	33.33	20.19	0	0.00
11	8	16.97±2.27	14.6	2	25.00	21.18	0	0.00
12	7	17.26±1.74	14.98	1	14.29	22.17	0	0.00
13	10	17.51±2.77	15.36	1	10.00	23.08	1	10.00
14	11	18.52±2.42	15.67	2	18.18	23.88	0	0.00
15	16	19.72±2.78	16.01	3	18.75	24.29	1	6.25
16	12	20.31±3.00	16.37	3	25.00	24.74	1	8.33
17	14	19.92±2.83	16.59	3	21.43	25.23	1	7.14
18	9	20.35±2.92	16.71	2	22.22	25.56	1	11.11
19	7	21.10±3.09	16.87	1	14.29	25.85	1	14.29

Thus, the research concludes that underweight adolescents in rural areas pose a greater health risk than their overweight counterparts. Poverty, illiteracy, unemployment, food scarcity, and other aspects of rural living have been hypothesised to contribute to the prevalence of thinness there. Adolescent girls' health might be severely compromised if underweight (thinness) is not handled during this time. This includes increased susceptibility to illness, anaemia, menstruation issues, etc. Therefore, it is crucial to ensure that underweight girls have access to enough nourishment. The rising health burden of noncommunicable illnesses is being heralded by the rising prevalence of overweight in the older teenage age (15-19 years). Health problems including hypertension, diabetes, cancer, and others are on the rise as people in rural parts of emerging nations adapt to city life.

4.2 Level of Health Awareness

The term "health awareness" describes a person's level of education on the topic of health. It's crucial in making medical treatment available to more people. Teenage girls in rural areas confront challenges such as a lack of opportunities to further their education, a lack of social and health-related information, and a lack of agency in making decisions about their own health. A number of reproductive health issues, such as malnutrition and preterm birth, have been exacerbated by these variables. Malnutrition, stunting, wasting, and other health issues might arise because neither girls nor their parents are aware of the increased nutritional demands at this crucial moment in life. The teenagers in this research clearly have an unsatisfactory level of health knowledge, as seen in table 4. While the vast majority are conversant with the symptoms of common illnesses as the common cold and cough (73%), fever (68%), etc., they are woefully uninformed as to the root causes of these conditions.

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They also have a poor grasp of the fundamentals of water-borne disorders such as diarrhoea (33%), dysentery (28%), and others. In addition, whereas a majority of teenagers have an incomplete understanding of where their vitamins and minerals come from, this is not the case for carbs (53%) or fats (62%). They also have a limited understanding of illnesses caused by inadequate nutrition, such as anaemia (37%), Rickets (28%), scurvy (22%), etc. Hygienic practises around menstruation are essential for preventing and treating a range of reproductive health issues. Only 36% of women correctly identified menstruation as a result of hormonal changes. Similarly, they have an unsatisfactory grasp of common menstruation issues (48%), UTIs (25%), and RTIs (25%). The vast majority of girls, however, know how to properly use tampons and pads (71%).

Table 4.4: Health Awareness of the adolescent girls

Health Awareness			
General Health Problems	**%**	**Diseases due to Nutrition Deficiency**	**%**
Reason of Cold and Cough	73	Anaemia	37
Reason of Fever	68	Rickets	28
Water-Borne Diseases	%	Scurvy	22
Diarrhoea	48	Night Blindness	31
Typhoid	33	**Menstrual Health and Hygiene**	**%**
Loss of Appetite	75	Cause of menstruation	36
Cholera	46	Use of sanitary napkin	71
Dysentery	28	Common menstrual problems	48
Nutrients Knowledge	**%**	Urinary Tract Infection and Reproductive Tract Infection	25
Sources of Carbohydrate	53	Sexually Transmitted Diseases	42
Sources of Protein	62	**Other Health Problems**	**%**
Sources of Vitamins	39	Hypertension	40
Sources Fat	50	Diabetes	59

5. CONCLUSION

Adolescent female nutrition is critical for ending the cycle of undernourishment that plagues whole families. This research shows that India has achieved significant progress towards its goal of guaranteeing the food security of its people, but that much more work need to be done in a more focused and comprehensive manner across a variety of fronts. The research shows that underweight teenage females in rural areas face serious health risks. Poverty, illiteracy, unemployment, food scarcity, and other aspects of rural living have been hypothesised to contribute to the prevalence of thinness there. The spread of urban lifestyles into rural regions may be contributing to the rising prevalence of obesity in late adolescence (15–19 years old). They also have a less-than-ideal grasp of health and wellness. Most of them are aware of the health issues, but they don't know why good diet is so important. It's clear that raising

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people's health consciousness via a variety of channels is essential, alongside meeting people's dietary requirements.

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