

## Impact of Intervention on Nutritional Knowledge and Awareness among Adolescents in Kamrup - Metropolitan District of Assam, India

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### ABSTRACT

Adolescence is a crucial phase characterized by significant physical and psychological changes and the provision of adequate nutrition assumes a central position in influencing the overall health and welfare of individuals in this age group. This study specifically focused on examining the impact in both rural and urban regions with 100 adolescents. A cross-sectional comparative study was undertaken in a sample of schools with the participation of 200 teenagers aged 13-18 years. The sample was divided equally between rural and urban locations. The intervention encompassed testing KAP by using information and communication tools, leaflets with recipes rich in protein and iron and an exhibition on balanced diet and nutrients. Pre-test and post-test questionnaires were employed to evaluate participants' nutritional knowledge and awareness. Subsequently, the collected data was evaluated to ascertain the efficacy of the intervention. The results showed that both rural and urban adolescents' nutritional knowledge and awareness were enhanced. It was observed that urban adolescents' cognitive achievement increase was 33.3 per cent, whereas rural adolescents' increase was 24.4 per cent. Urban adolescents' awareness increase 32.1 per cent, while rural adolescents' was 36.9 per cent. Both boys and girls improved their knowledge and awareness. Adolescents aged 16-18 years had slightly stronger pre-test knowledge than those aged 13-15 years, although they improved similarly. Thus, the study demonstrated the positive impact of intervention and hence recommends the need of nutrition education for adolescents to improve their dietary pattern and thereby health.

**Keywords :** Adolescence, Quality education, RDA, Nutritional knowledge and Awareness

ADOLESCENTS, defined by UNICEF (2018) and WHO (2022) as those between 10 and 19 years of age, go through a period of rapid growth and development. They reach 50 per cent of their adult body weight, the final 20 per cent of their adult height, and accumulate up to 40 per cent of their adult skeletal mass during this time (IAP, 2021). According to the 2011 Census, 20 per cent of India's population are adolescents. The total adolescent population of Assam is 65.6 lakhs, placing it 13<sup>th</sup> among the Indian states and Union territories (United Nations Population Fund India, 2014). Adolescence is the most appropriate time to develop positive health behaviours that can continue

throughout life. At the same time, it is the most vulnerable period in terms of the development of diseases that can be seen in adulthood (Akman *et al.*, 2012 and Carrara & Schulz, 2018). Adolescents encounter many factors that threaten their health during their growth and development stages. One of these factors, malnutrition, adversely affects both the physical and mental development of adolescents (Carrara and Schulz, 2018). The main nutritional problems of adolescents living in developing countries are malnutrition, obesity and other chronic diseases and inadequate/unhealthy eating habits and lifestyle (Aksoydan *et al.*, 2011 and Sarkar *et al.*, 2019).

Lifestyle is considered to be an important determinant of health and sickness. Some of the health problems are rooted in childhood habits and lifestyle.

Awareness regarding the health implications associated with their selection of snacks and food items was higher in adolescence. This will enhance their knowledge and empower them to select more nutritious snack options that can concurrently enhance their immune system while providing the requisite energy for productivity (Larson *et al.*, 2016). 73 per cent of the children skip breakfast and only 27 per cent of them had breakfast regularly. (Nataraj *et al.*, 2017). Lifestyle is considered to be an important determinant of health and sickness. Some of the health problems are rooted in childhood habits and lifestyle. Obesity is one of the major health issues of modern civilization. (Hukla *et al.*, 2016). Nutrition education programs are strategically developed to enhance individuals' understanding of nutrition, with the ultimate objective of promoting healthy dietary practices among the broader community or a particular demographic (Lee *et al.*, 2005, Powers *et al.*, 2005, Morgan *et al.*, 2010 and Heaney *et al.*, 2011). Considering the escalating prevalence of nutrition-related diseases on a global scale, it becomes imperative to prioritize substantial investments in rigorous research endeavors aimed at advancing and

enhancing the assessment of nutrition knowledge for future purposes. The goal of this study was to see if nutrition education using a multi-media strategy could enhance adolescents nutrition knowledge and awareness. The acquisition of knowledge is considered a crucial first stage in the promotion of belief formation and the modification of unwanted behaviors, as outlined by the knowledge, attitude and practice (KAP) model (Ul Haq *et al.*, 2018). Thus, the present study was undertaken to evaluate the morbidity status of the adolescents and the impact of a nutrition education intervention on the level of nutritional knowledge and awareness among adolescents residing in the Kamrup-Metropolitan district of Assam.

### MATERIAL AND METHODS

*Study design and selection of locale:* A cross-sectional comparative study was carried out in schools selected in rural and urban areas of the Kamrup metropolitan district of Assam. The two Rural Schools selected for the study were: 1) Swahid Kushal Konwar High School, Panikhaiti and 2) Chandrapur High School, Chandrapur. The two Urban schools selected for the study were : 1) Pub Guwahati High School, Bamunimaidan and 2) St.Vivekananda English Academy, Maligaon. A total of 200 adolescents (100

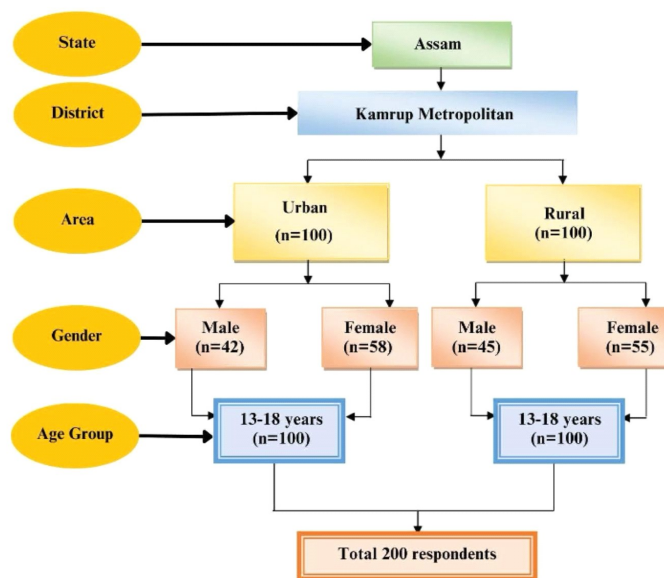
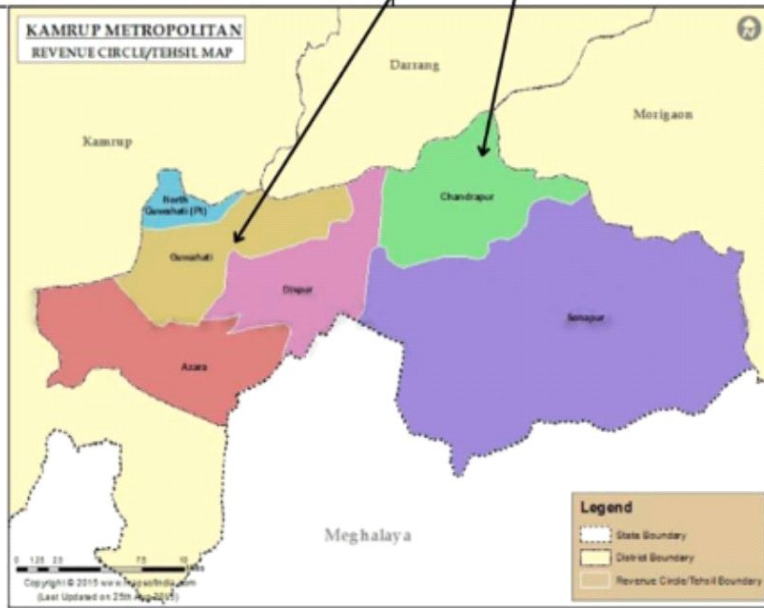
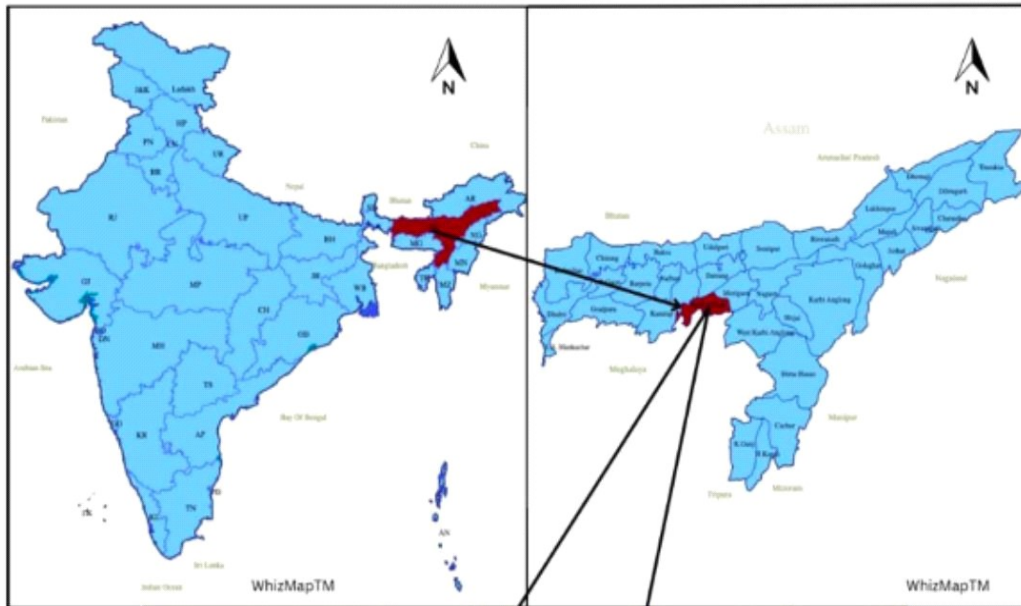
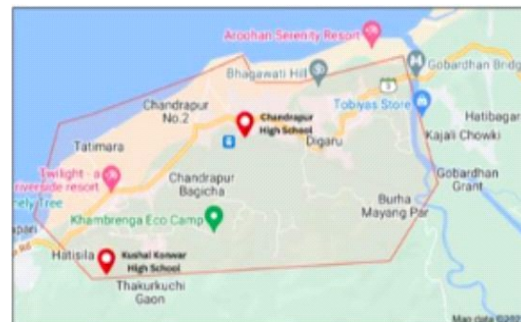


Fig. 1: Flow chart depicting methodology of study



Guwahati (Urban)



Chandrapur (Rural)

Locale of the study

from rural and 100 from urban) in the age group of 13- 18 years studying in 7<sup>th</sup> - 12<sup>th</sup> standard were randomly selected. Out of 200 adolescents, 87 were males and 113 were females.

*Morbidity status:* Episodes of illness and health-related problems from the past 3 months prior to the interview were recorded through a standardized questionnaire. Common ailments, digestion problems, physical anguish and other problems like eye problems, menstrual problems and sleep disturbances were taken into account.

*Development of Nutrition Education Materials:* The development of nutrition education materials plays a critical role in effectively communicating precise information, capturing the interest of the target audience, and encouraging the adoption of healthy eating behaviors. Various nutrition education materials like booklets, leaflets, charts, flashcards, presentation were developed for intervention programmes. The intervention was done for 3 consecutives in the four schools.

- A booklet entitled 'Adolescent Nutrition' was developed. Information about what is Food, Nutrition, Health, Nutrients, Nutritional status, Adolescence, Importance of nutrients during adolescence, balanced diet for adolescents, Important Macronutrients and Micronutrients, Dietary guidelines for eating out and RDA 2020 for adolescents.
- Two Leaflets, one recipe in each leaflet, were prepared on locally available and low-cost protein and iron-rich recipes, which included the ingredients, importance of the ingredients, method of preparation and nutritive value.
- A lecture on Adolescent Nutrition, Health and Hygiene was explained with the help of PPTs to the respondents in all four schools in both English and their native language, which is Assamese.
- An Exhibition was conducted, which included :
  - I. Three posters on Dietary Guidelines by B. Srilakshmi, Dietetics, 7<sup>th</sup> Edition, My Plate

for the Day by NIN and Go, Grow and Glow Foods category for adolescents by IAP, 2022.

- II. Display of My Plate for the Day by NIN, 2020, with locally available vegetables, fruits, oils, pulses and cereals.
- III. Display of locally available Zinc, Protein and Iron-rich foods like pumpkin seeds, sesame laddus and an Assamese special snack named *maah-khore*.
- IV. Eight Flashcards were prepared, which comprised of the major nutritional problems, their Symptoms and causes faced by Adolescents, namely : Anorexia nervosa, Bulimia nervosa, Binge eating, Obesity, Anaemia, Pre-menstrual Syndrome, Undernutrition and Osteoporosis.

*Impact of Nutritional Education on Knowledge and Awareness :* A questionnaire was prepared to elicit information on nutrition knowledge and awareness among the respondents. The questionnaire comprised of 25 questions on Nutritional knowledge and 15 questions on Nutritional awareness. Responses were collected before the intervention (pre-test) and 15 days after the intervention (post-test), and scores were assigned. 1 mark for correct and 0 for incorrect. Based on the total scores obtained, the respondents were classified into three categories for knowledge *viz.*, inadequate (0-50% - 0-12 score), moderate (51-75% - 13-19 score) and adequate (76-100% - 20-25 score). For awareness, the scores are classified into low (0-50% - 0-7 score), moderate (51-75% - 8-11 score) and high (76-100% - 12-15 score).

## RESULTS AND DISCUSSION

### Morbidity Status of the Respondents (past 3 Months)

It is evident from the findings that the common ailments found slightly higher among urban respondents as compared to rural respondents, *i.e.*, cough (67% and 59%), fever (55% and 35%) and on the contrary, cold was found to be slightly higher in rural as compared to urban (76% and 74%). Digestion

problems were slightly higher in urban respondents as compared to rural respondents, *i.e.*, vomiting (19% and 8%), diarrhea (5% and 4%), whereas other stomach-related issues were found to be slightly higher in rural areas as compared to urban areas like gastritis (37% and 30%) and irregular bowels (8% and 4%).

TABLE 1

Morbidity status of the respondents (past 3 months)

Characteristics	Yes Response (%)			$\chi^2$ Test
	Urban (n=100)	Rural (n=100)	Total (n=200)	
<i>Common Ailments</i>				
Cold	74.0	76.0	75.0	0.11 <sup>NS</sup>
Cough	67.0	59.0	63.0	1.37 <sup>NS</sup>
Fever	55.0	35.0	45.0	8.08 <sup>*</sup>
<i>Digestion Problems</i>				
Vomiting	19.0	8.0	13.5	5.18 <sup>*</sup>
Diarrhea	5.0	4.0	4.5	0.12 <sup>NS</sup>
Gastritis	30.0	37.0	33.5	1.10 <sup>NS</sup>
Irregular bowels	4.0	8.0	6.0	1.41 <sup>NS</sup>
<i>Physical Anguish</i>				
Back ache	28.0	34.0	31.0	0.84 <sup>NS</sup>
Fatigue	37.0	60.0	48.5	10.59 <sup>*</sup>
Body ache	40.0	33.0	36.5	1.05 <sup>NS</sup>
Toothache	10.0	13.0	11.5	0.44 <sup>NS</sup>
Joint pain	16.0	18.0	17.0	0.14 <sup>NS</sup>
<i>Other Problems</i>				
Eye problem	17.0	17.0	17.0	0.00 <sup>NS</sup>
Menstrual problem	12.0	27.0	19.5	7.16 <sup>*</sup>
Sleep disturbances	12.0	15.0	13.5	0.38 <sup>NS</sup>

\*Significant at 5% level, NS-Non-Significant

Physical anguish was found to be slightly higher in rural respondents as compared to urban respondents, like backaches (34% and 28%), fatigue (37% and 60%), toothaches (13% and 10%) and Joint pain (18% and 16%), whereas bodyaches were found to be slightly higher in urban respondents as compared to rural respondents, *i.e.*, (40% and 33%). Other problems were found to be slightly higher in rural respondents as compared to urban respondents, like menstrual problems (27% and 12%), sleep

disturbances (15% and 12%) and eye problems found to be equal in both urban and rural respondents, *i.e.*, 17 per cent.

It was interesting to note that there exists significant difference in the incidence of ailments statistically between urban and rural respondents on fever, vomiting, fatigue and menstrual problems ( $P < 0.05$ ). However, the incidence of different ailments between the group under study was found to be statistically non-significant for all other ailments ( $P > 0.05$ ).

Fever (55%) and vomiting (19%) was found to be higher in urban respondents compared to rural respondents as Urban areas are often characterized by elevated levels of environmental pollution, which can have detrimental effects on respiratory health and give rise to symptoms such as fever and coughing. Poor dietary habits, such as excessive consumption of processed or fast food, can weaken the immune system and lead to gastrointestinal issues. Whereas, fatigue and menstrual problems were higher among rural respondents as in rural locations, there may be constraints on the availability of sanitary facilities that are both clean and private.

In a similar study conducted by Bhattacharya *et al.* (2015) reported various disorders among the adolescents were shown. About 88.2 per cent of adolescents were suffering from one or more illnesses at the time of examination. As high as 55.18 per cent of the school-going adolescents had pallor with girls suffering more than boys. About 40.33 per cent adolescents had dental caries, 33.49 per cent adolescents were found to be suffering from refractive errors, 23.11 per cent adolescents had history of worm infestation, 38.9 per cent adolescents had skin problems and 68.61 per cent adolescents had one or the other ENT problem. The results of both research showed that adolescents suffer from an abundance of health problems. Numerous health problems were reported by a sizeable portion of the urban and rural participants and similarly, a vast majority of adolescents (88.2%) were dealing with multiple health issues, according to Bhattacharya *et al.* 2015.

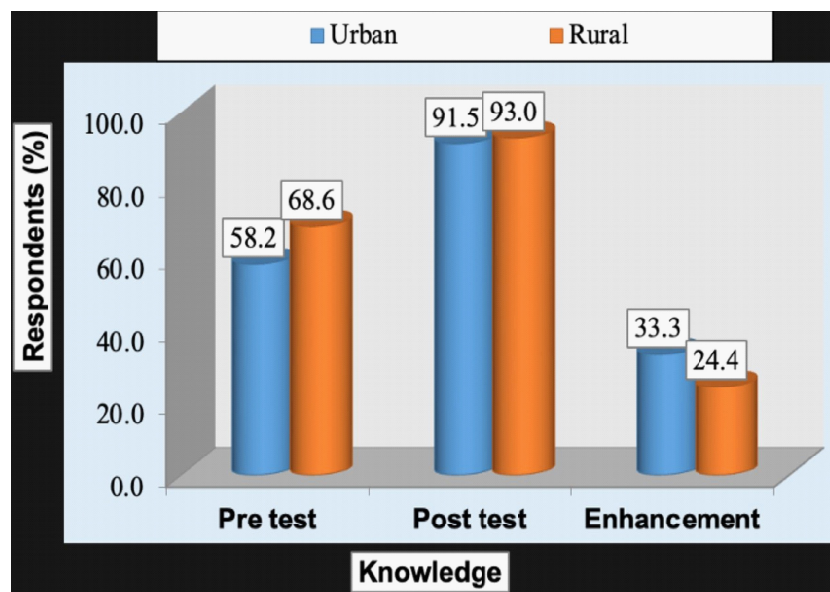


Fig. 2: Effectiveness of knowledge scores by residence

### Mean Nutritional Knowledge of the Respondents (Residence Wise)

The impact of the intervention on mean nutritional knowledge by residence revealed from the Fig. 2 that urban respondents mean knowledge increased by 33.3 per cent from 58.2 per cent to 91.5 per cent. Rural respondents had a 24.4 per cent enhancement of knowledge from 68.6 per cent to 93.0 per cent. The enhancement in knowledge was found to be statistically significant. The pre-test results indicated that respondents residing in rural areas exhibited a marginally higher average knowledge percentage in comparison to their urban counterparts prior to the implementation of the intervention. This may be because, there exists a notable emphasis on the transmission of traditional knowledge pertaining to food and nutrition, a practice that is perpetuated across successive generations. The acquisition of cultural knowledge has the potential to enhance one's foundational comprehension of nutrition. Rural respondents may have more direct exposure to farming and food cultivation, which can contribute to a better understanding of the nutritional value of different foods. The urban areas were observed to have slightly less per cent in pre-test mean nutritional knowledge as majority of the adolescents in urban areas are more likely to be exposed to a wide range of information,

including dietary trends promoted by celebrities, influencers and actors. These trends can include fad diets and unconventional dietary practices., where concept of zero figure was more rather than healthy and a balanced diet. Urban areas may provide more access to information but not necessarily accurate nutritional education. Adolescents may lack comprehensive knowledge about balanced nutrition and the potential risks associated with fad diets. Regardless of the location, may be less critical thinkers when it comes to evaluating the credibility and safety of dietary advice they find online. They may not always distinguish between evidence-based nutrition guidance and trendy but unproven dietary practices. However, the intervention had a positive effect on enhancing knowledge levels among both urban and rural populations, with rural inhabitants exhibiting marginally greater levels of knowledge before to and following the intervention. The observed increase in knowledge attainment within urban areas can be attributed to a multitude of reasons, encompassing disparities in baseline knowledge levels and the efficacy of intervention strategies. A study by Powell *et al.* (2017) on cultural knowledge impacting nutritional understanding was conducted in the East Usambara Mountains, Tanzania. This research highlighted the importance of dietary diversity in local diets and how cultural practices and local knowledge

TABLE 2  
Mean nutritional and health awareness of respondents (Residence wise)

Aspect	Awareness (%) of Residence					
	Urban (n=100)		Rural (n=100)		Total (n=200)	
	Mean	SD	Mean	SD	Mean	SD
Pre-Test	66.7	11.8	62.3	11.3	64.5	11.7
Post-Test	98.8	2.7	99.2	2.4	99.0	2.6
Enhancement	32.1	12.3	36.9	11.7	34.5	12.2
Paired t-test	26.10 *		31.54 *		28.28 *	

\*Significant at 5% level

systems influence nutritional choices. The study emphasized that locals had a strong understanding of the need for varied diets to maintain appetite and health. This understanding was deeply rooted in their day-to-day agricultural practices and food cultivation, similar to the rural respondents in this study. The study also noted that this knowledge was less common among more educated participants, indicating a divergence similar to the urban-rural differences in the present research study.

### Mean Nutritional and Health Awareness of Respondents (Residence Wise)

The impact of the intervention on mean nutritional awareness by residents revealed from the Fig. 4 that urban respondents mean awareness increased by 32.1 per cent from 66.7 per cent to 98.8 per cent. Rural respondents had a 36.9 per cent enhancement of knowledge from 62.3 per cent to 99.2 per cent. Further, paired t-test revealed the enhancement of knowledge found to be significant in urban (= 26.10\*) and rural (= 31.54\*) at 5 per cent level. The pre-test scores indicated that rural residents had a slightly lower average awareness percentage compared to urban residents before the intervention. One possible explanation for this trend is that urban respondents placed a significant emphasis on health and hygiene, both within the school environment and within their own households. Urban areas generally have better access to clean water and sanitation facilities both in

schools and households. This access reinforces the importance of hygiene practices such as handwashing and sanitation, leading to better compliance with these practices among urban respondents. Also, urban households often have higher socioeconomic status, which can translate to greater access to hygiene products, nutritious food and healthcare services. This enables urban families to maintain better health and hygiene standards within their homes. However, the educational intervention demonstrated a good influence on enhancing awareness levels among individuals residing in both urban and rural areas. Notably, rural people exhibited a slightly greater improvement in awareness, whereas urban residents displayed marginally higher levels of awareness both prior to and following the intervention. In a similar study conducted by Jeinie *et al.* (2021) compared KAP across school students in Sabah based on locality and gender. No difference in nutritional knowledge was found, although urban students prioritized having a healthy/balanced diet (59.55% versus 48.50%,  $p = 0.03$ ) and ate daily breakfast (57.4% versus 10.2%,  $p < 0.001$ ) compared to rural.

### Mean Nutritional Knowledge of the Respondents (Gender and Age Wise)

The impact of the intervention on the mean knowledge scores of male respondents increased by 28.8 per cent from 63.6 per cent to 92.4 per cent. The mean knowledge scores of female respondents were 63.2

TABLE 3  
Mean nutritional knowledge of the respondents (Gender wise)

Aspect	Knowledge (%) of Gender									
	Male (n=87)		Female (n=113)		13-15 (n=139)		16-18 (n= 61)		Total (n=200)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Pre-Test	63.6	14.1	63.2	12.9	62.8	14.2	64.9	11.3	63.4	13.4
Post-Test	92.4	3.8	92.2	5.4	93.0	3.3	90.6	6.8	92.3	4.8
Enhancement	28.8	13.9	29.0	14.0	30.3	14.6	25.7	11.7	28.9	13.9
Paired t-test	19.33 *		22.02 *		24.47 *		17.19 *		20.79 *	

\*Significant at 5% level

per cent pre-test and 92.2 per cent post-test, with a 29.0 per cent enhancement in awareness. The paired t-test revealed that the enhancement found to be significant in both females and males at 5 per cent level. The pre-test scores indicated that there was a similar level of baseline knowledge between males and females. The mean knowledge percentages for both genders were very close, with males at 63.6 per cent and females at 63.2 per cent. However, the educational intervention yielded a favourable outcome in enhancing knowledge levels among individuals of both male and female genders, demonstrating comparable levels of knowledge enhancement across the two groups. The intervention's efficacy in facilitating knowledge enhancement across genders is evidenced by the initial congruity in baseline knowledge and subsequent improvement in knowledge levels. Similar study was conducted by Ambre *et al.* (2015) where the authors assessed the effect of nutrition education intervention program on dietary eating patterns of 300 adolescent girls (16-19 Years). Nutrition education was imparted through audio-visual aids for three months in college settings. Before and after imparting nutrition education, the changes in eating patterns were evaluated by questionnaire method. A significant improvement in their nutritional knowledge was observed after giving Nutritional Education Programme. Similarly Amahmid *et al.* (2020), assessed the impact on adolescents attitudes and dietary behaviours through nutrition education in school curriculum : the

inclusion of nutrition education in the Sciences curriculum led to a notable enhancement in students' understanding of nutrition-related disorders, their ability to prioritize the nutritional content of meals, and their preference for fresh vegetables. Additionally, there was a decrease in the use of soda drinks ( $p < 0.05$ ). Several other similar studies by Lee *et al.* (2021) and Wiafe *et al.* (2023) stated that nutrition education yielded favorable outcomes in promoting healthy dietary patterns among adolescents both male and female. Furthermore, it demonstrated a detrimental correlation with the misperception of body image, thus affirming the significance of incorporating nutrition instruction inside schools.

### Mean Nutritional Knowledge of the Respondents (Age-Wise)

The impact of the intervention on mean knowledge by age group of 13-15 years improved by 30.3 per cent from 62.8 per cent to 93.0 per cent. In 16-18 years, with knowledge score was 64.9 per cent in the pre-test and 90.6 per cent in the post-test, with 25.7 per cent improvement. Further the enhancement of knowledge scores found to be significant at 5 per cent level in 13-15 years ( $t= 24.47^*$ ) and 16-18 years ( $t= 17.16^*$ ). The pre-test scores indicated that there was a slight difference in baseline knowledge between the two age groups. The 16-18 years age group had a slightly higher mean knowledge percentage (64.9%) compared to the 13-15 years age group (62.8%). This



may be because adolescents within the age range of 16-18 years may possess a greater duration of formal educational experience in comparison to their counterparts falling within the age range of 13-15 years. Consequently, it is plausible that their curriculum encompassed a more extensive array of courses, incorporating topics pertaining to nutrition. The prolonged exposure to educational experiences may perhaps lead to a modest increase in foundational knowledge. The cognitive development of adolescents exhibits variation throughout distinct phases. Adolescents in the older age range of 16 to 18 years may exhibit more advanced information processing capabilities, enhanced critical thinking ability and an increased capacity to effectively retain and apply knowledge. Consequently, this developmental stage may be associated with a higher degree of foundational knowledge. However, The effectiveness of the intervention program is evident in the substantial knowledge enhancement observed in both groups, underscoring the positive impact of targeted health education interventions on adolescents of different age groups. The implementation of a Multimedia strategy placed a strong emphasis on snacking behaviour and guidelines for eating outside among individuals in this particular age range. Following the intervention, a notable outcome was found during the post-test assessment. A similar study was conducted by Zaki *et al.* (2019), where the author examined the impact of a multimedia-based nutrition education intervention on enhancing nutrition knowledge and reducing

unhealthy snacking behaviour among adolescents. The results indicated that 46.2 per cent of the respondents from the treatment group showed an improvement in their nutrition knowledge post-test score and it was concluded that nutrition education via a multi-media strategy yields more favourable outcomes in terms of enhancing nutrition knowledge and reducing unhealthy eating habits among adolescents. Pallavi Barooah, 2012 conducted a similar study on Adolescents' Nutrition, Attitudes and Practices and it was found that 69.75 per cent of the subjects aged between 17-19 years have comparatively better knowledge on nutrition and nutritional needs followed by 59.3 per cent by 15-16.11 years old and 49.5 per cent by the 13-14.11 years old adolescent girls.

#### Mean Nutritional Awareness of the Respondents (Gender Wise)

The impact of the intervention on the mean awareness scores of male respondents increased by 34.5 per cent from 64.7 per cent to 99.2 per cent. The mean knowledge scores of female respondents were 64.3 per cent pre-test and 98.9 per cent post-test, with 34.6 per cent enhancement in awareness. The paired t-test revealed the enhancement found to be significant in both females and males at 5 per cent level. The pre-test scores indicated that there was a similar level of baseline awareness between males and females. The mean awareness percentages for both genders were very close, with males at 64.7 per cent and females at 64.3 per cent. However, the educational intervention

TABLE 4  
Mean nutritional and health awareness of the respondents (Gender wise)

Aspect	Awareness (%) of Gender					
	Male (n=87)		Female (n=113)		Total (n=200)	
	Mean	SD	Mean	SD	Mean	SD
Pre-Test	64.7	10.5	64.3	12.6	64.5	11.7
Post-Test	99.2	2.2	98.9	2.8	99.0	2.6
Enhancement	34.5	11.0	34.6	13.1	34.5	12.2
Paired t-test	29.25 *		28.08 *		28.28 *	

\*Significant at 5% level

program had a positive impact on improving awareness levels among both males and females, with similar levels of awareness improvement in both genders. The initial similarity in baseline awareness and the subsequent improvement in awareness levels demonstrate the intervention's effectiveness in promoting awareness enhancement across genders. The present findings are in line with the study conducted on 112 adolescent girls from government schools of five villages in two blocks of the Kangra district of Himachal Pradesh. Das *et al.* (2016) revealed that the knowledge of girls regarding health aspects improved significantly after intervention. There was a considerable increase in the awareness levels of girls with regard to knowledge of health problems, environmental health, nutritional awareness on reproductive and child health. Likewise, Mittal *et al.* (2016) studied the efficacy of nutrition education intervention through nutritional games on improvement in nutrition knowledge, attitude and practices of 400 school-going girls aged 13-18 years in Bijnor, Uttar Pradesh. The pre and post-nutritional knowledge scores were rated on five-point rating scale. Nutrition knowledge of the girls was found poor, and ignorance about micronutrients and protective foods prevailed in respondents however, after imparting nutritional education through games, the results were very good and responsive. The post test scores increased positively and fell in excellent, very good and good category. Similar study was done by Sharma *et al.*, 2017, where there was a prevailing lack of knowledge on micronutrients among adolescent girls. Divya *et al.*,

2022 also had similar findings where the majority of the adolescent girls had a medium level of knowledge (knowledge index between 66.33 to 78.30), neutral attitude and poor nutrition practice (practice index below 61.29). It was found that nutritional knowledge, attitude and practice did not differ significantly between rural and urban. However, it was observed that there was significant increase in nutritional knowledge ( $\chi^2=41.03^{**}$ , 60.33<sup>\*\*</sup>) and practice ( $\chi^2=80.30^{**}$ , 40.21<sup>\*\*</sup>) as age progress.

### Mean Nutritional and Health Awareness of the Respondents (Age Wise)

The impact of the intervention on mean awareness by age group of 13-15 years improved by 34.4 per cent from 64.6 per cent to 99 per cent. In 16-18 years, with awareness score was 64.3 per cent in the pre-test and 99.0 per cent in the post-test, with 34.8 per cent improvement. Further the enhancement of awareness scores was found to be significant at 5 per cent level in 13-15 years ( $t=32.97^*$ ) and 16-18 years ( $t=22.46^*$ ). The pre-test scores indicated that there was a similar level of baseline awareness between the two age groups (13-15 years and 16-18 years). Both groups had very close mean awareness percentages. The specific aspect being assessed may represent foundational or basic awareness that is deemed important for all adolescents to know, regardless of their age. These fundamental concepts may be introduced early in the educational system and reinforced as students progress through different grade levels. Health and hygiene awareness has become widespread across all age groups, particularly in the

TABLE 5  
Mean nutritional awareness of the respondents (Age wise)

Aspect	Awareness (%) of Age					
	13-15 (n=139)		16-18 (n=61)		Total (n=200)	
	Mean	SD	Mean	SD	Mean	SD
Pre-Test	64.6	11.8	64.3	11.7	64.5	11.7
Post-Test	99.0	2.6	99.0	2.7	99.0	2.6
Enhancement	34.4	12.3	34.8	12.1	34.5	12.2
Paired t-test	32.97 *		22.46 *		28.28 *	

\*Significant at 5% level

wake of the COVID-19 pandemic. However, the educational intervention program had a positive impact on improving awareness levels among both age groups, with similar levels of awareness improvement. The initial similarity in baseline awareness and the subsequent improvement in awareness levels demonstrated the program's effectiveness in promoting awareness enhancement across different age groups of adolescents. The adolescents were partially aware about the importance of green leafy vegetables, nuts and oilseeds. A similar study conducted by Andonova., 2020 on diet awareness about healthy eating where the author observed that 46 per cent of students know the principles of healthy nutrition and 26 per cent - partially.

Health and nutrition education during adolescence is of paramount importance due to its alignment with a phase that involves accelerated physical maturation, cognitive advancement and emotional transformations. Adequate nutrition is crucial for the development of robust skeletal structure, muscular tissue and internal organs, while also exerting a significant influence on cognitive abilities such as focus and analytical thinking. The present study elucidates the beneficial effects of a nutrition education intervention on the enhancement of nutritional knowledge and awareness among teenagers, regardless of their gender, age, or place of residence. Interventions of this nature are of paramount importance in facilitating the adoption of healthy dietary patterns and enhancing the overall well-being of teenagers across many contexts. The aforementioned findings highlight the need of implementing health education programs that are specifically tailored to address the needs of teenagers. Such programs aim to equip young individuals with the requisite knowledge and awareness, enabling them to make educated decisions regarding their food habits and ultimately adopt better lifestyles.

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