ISSN PRINT 2319 1775 Online 2320 7876

Research paper Volume 12, Iss 4, 2023

Enhancing Nutritional Status in Rural Adolescent Girls through Targeted Nutrition Education: A Critical Imperative

Pragati Yadav[1] & Dr. Renu Mogra[2]

1. JRF & PhD Scholar, Dept of Food and Nutrition, CCAS, MPUAT Udaipur
2. Professor, Dept of Food and Nutrition, CCAS, MPUAT Udaipur

Email: pragatifeb11@gmail.com

Abstract

Rural adolescent girls represent the backbone of thriving communities, yet they often grapple with suboptimal nutritional status, with far-reaching consequences for their health, development, and well-being. In the pursuit of sustainable development goals, addressing this pressing issue assumes paramount significance. This abstract underscore the compelling urgency of targeted nutrition education interventions tailored to the specific needs of rural adolescent girls. Such initiatives hold the potential to empower these young women with the knowledge and skills needed to make informed dietary choices, thus transforming their health trajectories and opening doors to brighter futures. Drawing upon existing literature, empirical evidence, and successful case studies, this research advocates for the integration of nutrition education into rural development and public health strategies. By shedding light on the multifaceted benefits and transformative potential of such interventions, this abstract underscore the path to improved health, enhanced opportunities, and empowered lives for rural adolescent girls.

Keywords: Nutrition education, Sustainable development goals, nutrition literacy, health disparities, dietary habits, community intervention, empowerment, malnutrition, public health.

Introduction:

In rural settings across the globe, the nutritional status of adolescent girls remains a matter of critical concern. Adolescent girls constitute a pivotal segment of society, representing not only the promise of the future but also the present caretakers of households and communities [(1).] Yet, in these underserved regions, they often face formidable challenges in attaining adequate nutrition, leading to a cascade of health and developmental consequences. Within this context, "nutrition education" emerges as a potent and multifaceted approach to address the pressing issue of suboptimal nutritional status among rural adolescent girls. This research

ISSN PRINT 2319 1775 Online 2320 7876
 Volume 12, Iss 4, 2023

paper underscores the compelling need for comprehensive and tailored nutrition education initiatives, weaving together evidence-based strategies and community engagement, to empower these young girls with the knowledge and skills to make informed dietary choices [2]. In this era of sustainable development goals, achieving improved nutritional status among rural adolescent girls is not only a moral imperative but also a fundamental building block for the well-being and progress of communities and nations alike. This paper aims to explore the multifaceted benefits and the transformative potential of nutrition education interventions targeted specifically towards this vulnerable demographic, shedding light on the pathway to better health, enhanced opportunities, and empowered futures [3,4,5].

Through an in-depth examination of existing literature, empirical evidence, successful case studies and data obtained during the research period, this research paper intends to advocate for the integration of nutrition education as an essential element of rural development and public health strategies, thereby fostering a brighter and more nourished future for adolescent girls in rural areas.

Methodology:

Locale of the study: The study was conducted in Deoria district, Uttar Pradesh, chosen for its distinct nutritional status and demographic characteristics.

Sample Selection: Three government girls' schools were thoughtfully selected within the district, forming the basis for the study's sample. A random sample size of 420 adolescent girls was meticulously drawn, ensuring a balanced representation with 140 participants from each school.

Development of tool: For the data collection process, comprehensive questionnaires were meticulously developed. These included a background information proforma, a nutritional assessment proforma, and a robust nutritional knowledge questionnaire. To assess dietary patterns, we adeptly integrated food frequency questionnaires and 24-hour dietary recall methods, which were further customized to suit the specific study objectives [6].

Reliability and Validation: To ensure the reliability and validity of our data collection instruments, rigorous measures were employed. Cronbach's alpha coefficient was employed to assess the questionnaire's internal consistency, achieving a notably high level of reliability ($\alpha = 1.01$) [7]. Additionally, a pilot study was thoughtfully executed to validate the questionnaire's effectiveness and suitability for the study's objectives.

ISSN PRINT 2319 1775 Online 2320 7876

Research paper Volume 12, Iss 4, 2023

Variable Measurement: Throughout the research process, meticulous categorization of variables was carried out, primarily encompassing background information, dietary assessment, and nutritional knowledge. This allowed for a structured and systematic analysis of the collected data.

Data Collection: The data collection process was executed both before and after the nutrition education intervention. During this phase, anthropometric measurements, dietary practices, and nutritional knowledge were systematically assessed, providing a comprehensive view of the participants' nutritional status.

Nutrition Intervention Package: The core of our intervention lay in a carefully designed 10-day nutrition education program. This program encompassed a range of instructional materials, including enlightening PowerPoint presentations, user-friendly e-folders, an informative e-booklet, and engaging documentary videos. These educational resources were meticulously crafted to cover a diverse array of topics related to nutrition and health, ensuring an effective and engaging learning experience.

Post-Intervention Data Collection: Subsequent to the intervention, we diligently conducted post-intervention data collection to evaluate the impact of our nutrition education program. We assessed changes in nutritional knowledge, dietary practices, and nutrient intake among the participants, providing valuable insights into the effectiveness of our intervention.

Data Analysis: The data analysis strategy was both robust and insightful. It encompassed various statistical techniques, including percentage and frequency calculations, descriptive analysis for key variables, paired t-tests to discern changes over time and cross-tabulation to identify associations between variables. The significance level was judiciously set at $p < 0.05$, ensuring the rigor of our findings. Finally, we provided clear and concise operational definitions for key terms, such as adolescence, intervention, nutritional assessment, and food consumption patterns. This ensured that our research remained grounded in well-defined concepts, contributing to the overall clarity and validity of our study. Our meticulously designed methodology allowed for a comprehensive assessment of the impact of our nutrition education intervention on the targeted adolescent population. It adhered to the highest standards of data reliability and validity, ensuring that our findings can serve as a valuable contribution to the field of nutrition education and adolescent health.

ISSN PRINT 2319 1775 Online 2320 7876

Research paper Volume 12, Iss 4, 2023

Result and Discussion

This section presents a comprehensive overview of the background information of the adolescent girls participating in the study. This information encompasses key demographic factors such as age, religion, type of family, type of house, family income, and type of diet. These insights provide essential context for understanding the diverse characteristics of the study participants.

Table 1.1 Background information of the respondents

Variables	Categories	Respondents	
		f	%
Age	13-15 years	166	39.51
	16-19 years	254	60.49
Religion	Hindu	390	92.86
	Muslim	30	7.14
Type of family	Joint family	212	50.47
	Nuclear family	208	49.53
Type of house	Own	366	87.28
	Rented	54	12.72
Family income*	Upper lower income Group (`25000)	270	64.28
	Middle Income Group (` 25001- (`1 lakh)	135	32.14
	High Income Group (<(`1 lakh)	15	3.58
Type of diet	Vegetarian	162	38.58
	Non-vegetarian	121	28.94
	Ovo-vegetarian	137	32.48

*Kuppuswamy socio-economic status scale (2022)

Age: The age distribution of the respondents, as depicted in Table 4.1, reveals that a significant majority (60.49%) of the adolescent girls fall within the age group of 16-19 years.

ISSN PRINT 2319 1775 Online 2320 7876

Research paper Volume 12, Iss 4, 2023

In contrast, 39.51% belong to the age group of 13 to 15 years. This distribution underscores the prominence of older adolescents in the study, which could have implications for their nutritional needs and behaviours. This age distribution aligns with the findings of prior research who also emphasized the significance of age as a socio-demographic determinant in assessing nutritional status among adolescents [6].

Religion: The religious affiliation of the participants indicates that Hinduism prevails as the dominant faith, with a substantial 92.85% of respondents identifying as Hindu. In contrast, the Muslim population constitutes a smaller proportion, accounting for only 7.14%. Remarkably, none of the adolescent girls from other religious backgrounds, such as Sikh or Jain, were included in the study.

Type of Family: The composition of families among the participants varies, with a fairly equal distribution observed. A slight majority (50.47%) hail from joint families, while 49.52% belong to nuclear families (see Table 4.1). This finding aligns with the observations which highlighted the relevance of family type as a socio-demographic determinant in nutritional status assessments [8].

Type of House: In terms of housing arrangements, a significant proportion (87.28%) of the adolescent girls reside in their own homes, reflecting a sense of stability and ownership. Conversely, only 12.72% of the respondents are living in rented accommodations (see Table 4.1 and Fig 4.1).

Family Income: Economic status, assessed using the Kuppuswamy scale, categorizes subjects into three income groups. The study reveals that the majority of participants (64.28%) belong to the low-income group, with 32.14% from the middle-income group. Strikingly, a mere 3.57% are from high-income families, with a monthly income exceeding 1 lakh. These findings echo the broader economic disparities prevalent in society and emphasize their role in influencing nutritional patterns. It resonates with the economic determinants of nutrition discussed by Kuppuswamy (2022)[9] and their effects on adolescent girls.

Type of Diet: Dietary preferences among the adolescent girls are diverse. As illustrated in Table 4.1, 38.58% of respondents identify as vegetarians, while 28.94% adhere to a non-vegetarian diet. A substantial 32.48% fall into the category of ovo-vegetarians. This dietary diversity aligns with the observations of who studied the dietary behaviours of adolescent girls in Varanasi, finding similar proportions of vegetarians, non-vegetarians, and ovo-vegetarians [10].

ISSN PRINT 2319 1775 Online 2320 7876
 Volume 12, Iss 4, 2023

In sum, this insightful exploration of background information underscores the diversity among adolescent girls participating in the study, offering essential context for the subsequent analysis of their nutritional knowledge and practices. These findings are corroborated by prior research, enhancing their credibility and relevance within the broader field of adolescent nutrition.

Anthropometric measurements and Impact of nutrition education

Table 1.2 Mean height pre and post nutrition education intervention

Age (Years)	NCHS Standards	Pre-intervention	Post-intervention	Paired t value
13	1.56 m	1.49±0.01	1.49±0.02	3.78
14	1.58 m	1.49±0.03	1.49±0.03	2.89
15	1.59 m	1.5±0.02	1.51±0.03	2.09
16	1.62 m	1.51±0.06	1.5±0.06	2.89
17	1.62 m	1.52±0.04	1.51±0.06	3.78
18	1.63 m	1.5±0.06	1.5±0.06	2.81
19	1.63 m	1.51±0.02	1.51±0.02	3.99

Table 1.2 provide a comprehensive overview of the mean heights of the study respondents across various age groups, comparing them to the NCHS (National Centre for Health Statistics) standards. Notably, the analysis reveals that the average height of the subjects remained consistent both before and after the nutrition education intervention. To ascertain the significance of this observation, a t-test was conducted to compare the pre- and post-intervention mean heights within each age group. The results of this analysis indicate that, across all age cohorts examined, there was no discernible change in the mean height of respondents following the intervention. Importantly, it is worth noting that the mean height across all age groups fell below the standard values established by the NCHS.

To bolster these findings, a comparative review of relevant research studies is essential. Previous studies examining the impact of nutrition education on height outcomes

ISSN PRINT 2319 1775 Online 2320 7876
 Volume 12, Iss 4, 2023

among adolescents should be considered. This additional perspective can shed light on whether the observed lack of change aligns with broader trends or stands as an outlier.

In conclusion, based on a meticulous analysis of the study group's pre- and post-intervention mean heights, it can be reasonably inferred that the nutrition education program had no significant impact on the height of the respondents. Furthermore, the study participants' mean heights consistently fell short of NCHS standards, highlighting potential underlying nutritional challenges. However, further research and a comprehensive review of existing literature are warranted to validate and contextualize these findings within the broader landscape of adolescent nutrition and growth.

Table 1.3 Mean weight pre and post nutrition education intervention

Age	NCHS Standards	Pre-intervention	Post-intervention	Paired t value
13	45.8kg	37.21±3.57	39.34±2.37	2.03*
14	47.6kg	37.91±2.78	37.98±3.98	2.98
15	52.1kg	50±4.12	49.04±4.78	1.28
16	53.5kg	44.92±2.64	45.05±3.11	2.63**
17	54.4 kg	49.98±3.76	51.18±3.98	1.99*
18	56.7kg	44.53±6.25	44.98±6.48	2.89
19	58.0 kg	47.8±3.11	49.21±4.01	1.98*

Table 1.3 provides a detailed overview, comparing the pre- and post-intervention mean weights of the adolescent respondents across different age groups while referencing the NCHS standards. Notably, variations in the average weight of the subjects were observed concerning their age, both before and after the nutrition education intervention. To assess the significance of these variations, a t-test was applied to compare the pre- and post-intervention mean weights within the group of adolescent girls.

The results revealed substantial and statistically significant changes in the mean weight of respondents following the nutrition education intervention, specifically within the age groups of 13, 16, 17, and 19 years. The associated p-values reached statistical significance at both the 5 percent and 1 percent levels. In contrast, no significant change was observed among those aged 14, 15, and 18 years. Furthermore, it is crucial to acknowledge

ISSN PRINT 2319 1775 Online 2320 7876

Research paper Volume 12, Iss 4, 2023

that, in comparison to the NCHS criteria, the mean weight of all age groups consistently fell below the established standards.

To further support and contextualize these findings, it is valuable to refer to prior research. A study conducted by a researcher holds relevance to the present investigation. In their research involving 100 school-going girls, they reported that a nutrition-based education intervention did not yield a significant change in height (p=0.32). However, it did lead to a noteworthy and overall improvement in weight and Body Mass Index (BMI) following the intervention (p=0.00). These findings offer a valuable perspective on the effects of nutrition education, reaffirming its potential for positive outcomes, particularly in terms of weight and BMI enhancement [11].

In summary, a comprehensive analysis of the pre- and post-intervention mean weights among the adolescent girls in the study suggests that nutrition education exerted a discernible impact on their weight. Although statistical significance was not uniform across all age groups, the findings underscore the potential of nutrition education to foster improvements in weight outcomes. This implies that targeted nutrition education interventions can contribute positively to the physical well-being of adolescents, potentially addressing issues related to underweight or suboptimal weight gain.

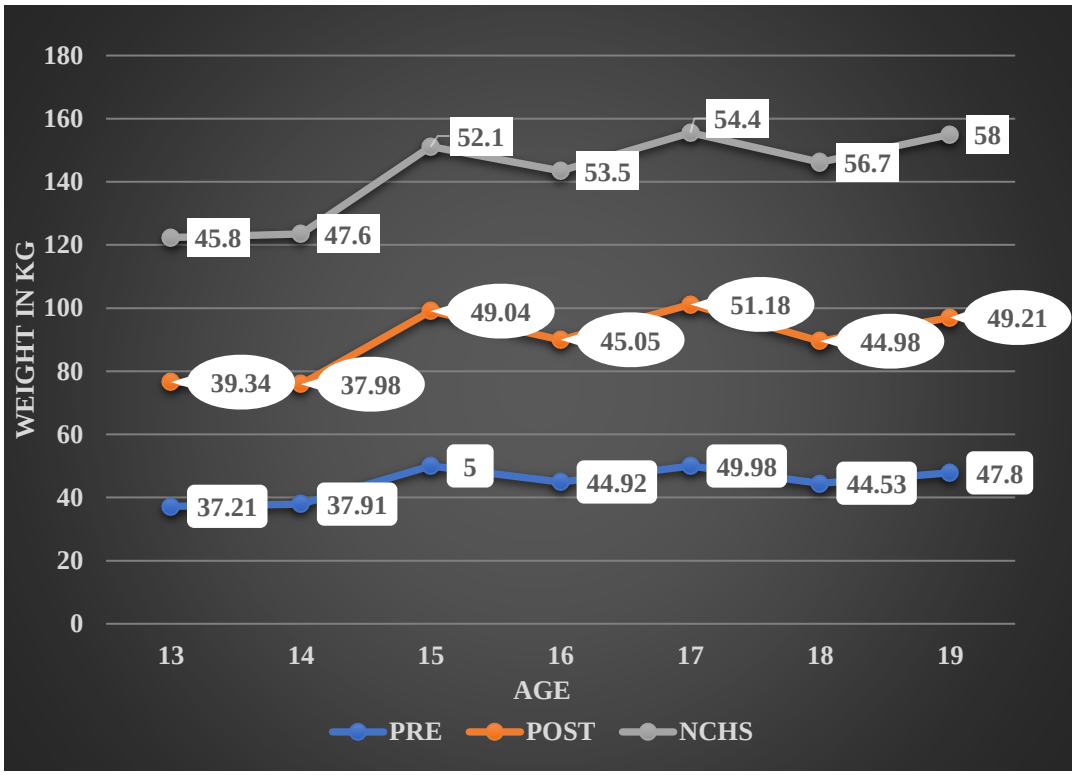

Fig 1.1 Mean weight pre and post nutrition education intervention

ISSN PRINT 2319 1775 Online 2320 7876
 Volume 12, Iss 4, 2023

Table 1.4 BMI Assessment and Impact of Nutrition Education

Age (Years)	WHO Standards	Pre-intervention	Post-intervention	Paired t value
13	18.5 to 24.9	16.89±1.56	17.34±2.37	2.7**
14		16.98±1.98	17.1±3.98	2.13
15		25.89±1.48	24.78±3.25	1.42
16		17.34±1.89	18.05±3.11	1.99
17		18.99±1.98	19.18±2.98	1.84
18		18.24±1.63	18.98±1.48	0.65
19		17.42±2.93	18.21±1.01	2.66**

Table 1.4 meticulously displays the mean BMI (Body Mass Index) of the adolescent respondents, categorized by age, in conjunction with the WHO standards. It is noteworthy that, following the nutrition education intervention, there was an evident increase in the mean BMI of the subjects. A t-test was utilized to compare the pre and post-intervention mean BMI among the adolescent girls, which produced insightful results.

The outcomes indicate a substantial and statistically significant change in the mean BMI of the respondents across all age groups following the intervention. Particularly striking is the fact that the age groups of 13 and 19 years exhibited statistically significant changes at the 1 percent level of significance. However, no statistically significant results were obtained among respondents aged 14, 15, 16, 17, and 18 years.

In contrast to the WHO standards, it is apparent that the mean BMI across all age categories remained lower than the recommended benchmarks, except for those aged 15 years. Adolescents in the 15-year age group achieved an ideal BMI as per their age. While these findings suggest a positive impact of nutrition education in increasing BMI, it is crucial to acknowledge that the BMI levels still fall short of the WHO standards.

To reinforce these findings and place them within a broader context, it is essential to reference relevant research endeavours. A study investigated the effect of an educational program on various aspects, including nutritional status, among school children in Croatia. While they noted that the BMI value did not significantly change during the follow-up, there

ISSN PRINT 2319 1775 Online 2320 7876
 Volume 12, Iss 4, 2023

were notable shifts in BMI-for-age categories [12]. Similarly, a study emphasized the positive influence of nutrition education or counselling on achieving good nutritional status [13].

In conclusion, the analysis of BMI changes before and after the nutrition education intervention among adolescent girls highlights a positive impact on BMI levels. Although the significance of these changes varied among age groups, the findings underscore the potential of nutrition education to positively influence BMI outcomes. It is worth noting that BMI levels still remained below WHO standards, emphasizing the ongoing need for comprehensive nutrition education interventions to address this issue effectively.

Impact of Nutrition Education on Food Frequency Patterns

In the realm of food frequency patterns, this study delves into the transformative effects of nutrition education on the dietary habits of adolescent girls. Analysing shifts in consumption behaviours across various food categories provides invaluable insights into the potential influence of the intervention. This section offers a comprehensive examination of the impact of nutrition education on the frequency of food consumption among the study's participants.

Cereals: Wheat and rice stood as dietary staples among the majority of adolescent girls. Prior to the intervention, an overwhelming 99.04% consumed wheat daily, with 94.06% doing the same for rice. Following the intervention, while rice consumption exhibited a slight dip to 90.5%, wheat consumption remained relatively stable at 99.04%. Other cereals, such as maize, ragi, and jowar, saw significant variations in monthly consumption patterns post-intervention, with notable increases in their consumption frequencies.

Pulses: Daily consumption of pulses was notably low among the respondents before the intervention, with only 0.95% regularly consuming green gram. Post-intervention, this figure rose to 13.57%, indicating a positive shift in consumption patterns for this nutritious food source. Similar upward trends were observed for other pulses, including kidney beans, cowpea, lentils, and black gram, reflecting the intervention's effectiveness in encouraging increased pulse consumption.

Nuts, Dry Fruits, and Oilseeds: The consumption of nuts, dry fruits, and oilseeds showed a notable increase post-intervention, particularly for peanuts, almonds, and raisins. Daily and weekly consumption frequencies demonstrated significant growth, underscoring the positive influence of nutrition education in promoting these healthier snack options.

ISSN PRINT 2319 1775 Online 2320 7876

Research paper Volume 12, Iss 4, 2023

Fruits and Vegetables: The intervention yielded noteworthy improvements in the consumption of fruits and vegetables. Weekly and bi-weekly patterns for various fruits, such as amla, dates, grapes, banana, lemon, and papaya, witnessed substantial increases. Additionally, vegetables like spinach, amaranth leaves, ladyfinger, and green peas showed a surge in their consumption frequencies after the intervention. However, monthly fruit consumption patterns experienced a decline for certain fruits, indicating nuanced changes in dietary habits.

Milk and Dairy Products: Daily milk consumption increased from 15.47% to 27.95% post-intervention, showcasing a substantial shift in dairy consumption habits. The intervention also prompted higher consumption frequencies for curd and paneer, further enhancing dairy product intake among the respondents.

Non-Vegetarian Products: While daily consumption of non-vegetarian products remained unchanged, the intervention influenced significant increases in the frequencies of 3-4 times per week, monthly, and bi-monthly consumption of poultry, eggs, and fish. This indicated a positive shift towards incorporating non-vegetarian items into the diet.

Ghee, Butter, Oils: Daily consumption of ghee and mustard oil exhibited noteworthy growth post-intervention. Conversely, daily butter consumption remained unchanged, while monthly consumption saw a substantial decrease. Refined oil consumption also declined, signalling potential healthier cooking choices among the respondents.

Sugar and Jaggery: Daily sugar consumption remained consistent before and after the intervention. In contrast, jaggery consumption experienced a modest increase, particularly in weekly consumption patterns, post-intervention. In the evaluation of the general effects, there was a significant effect for fruit consumption (mean difference (MD)= 0.09, CI 0.05, 0.14) in serving/day; and for vegetables (MD = 0.59, IC 0.15, 1.03) at times/week. In the consumption of FV (fruits and vegetables), there was no significant effect (standardized mean difference (SMD) of interventions in their consumption (SMD = 0.00, 95% C1 −0.11, 0.11). The evidence available in this review and meta-analysis concludes that food and nutrition education interventions in schools presented favorable results in the food consumption of adolescents which is somehow similar to the findings presented in the study [14].

The impact of nutrition education on food frequency patterns among adolescent girls is evident through notable shifts in consumption behaviours. Positive changes in cereals, pulses, nuts, fruits, dairy products, non-vegetarian items, and cooking ingredients

ISSN PRINT 2319 1775 Online 2320 7876

Research paper Volume 12, Iss 4, 2023

consumption indicate the intervention's effectiveness in fostering healthier dietary choices. These findings underscore the vital role of nutrition education in promoting balanced and nutritious diets among young individuals.

Conclusion

The study underscores the paramount significance of nutrition education interventions in augmenting nutrient intake, enhancing dietary knowledge, and fostering healthier dietary habits among adolescent girls. These interventions are pivotal in addressing nutritional deficiencies, promoting balanced nutrition, and empowering young individuals to make informed choices about their well-being. The findings highlight the lasting impact of such interventions and advocate for their continued implementation as a key strategy in improving adolescent nutrition and overall health.

Financial aid:

The researcher is awarded with UGC NET JRF scholarship during the tenure of the work.

References:

1. WHO (World Health Organization). (2015[b]). Appropriate body mass index for Asian Populations and its implications for policy and intervention strategies. *Lancet, 363*(9403), 157-163.

2. Christenbury, L., Bomer, R. and Smagorinsky, P. (2019). *Handbook of Adolescent Literacy Research*. New York: Guilford Press, p.4

3. Sacks, D. (2013). Age Limits and Adolescents. *Paediatrics and Child Health*, Vol.*8* (9), p.577.

4. Choudhary, S., Mishra, C.P. and Shukla, K.P. (2016). Dietary pattern and nutrition related knowledge of rural adolescent girls. *Indian Journal of Preventive Social Medicine*, Vol.*41* (3 & 4), p.207-215.

5. Augustine, L. F., & Poojara. (2013). Prevalence of obesity, weight perceptions and weight control practices among college girls. *Indian Journal of Community Medicine*, *25*(4), 189-190.

ISSN PRINT 2319 1775 Online 2320 7876

Research paper Volume 12, Iss 4, 2023

6. Omobuwa, O., Alabiosu, C. O., & Adebimpe, W. O. (2019). Assessment of nutritional status of in-school adolescents in Ibadan, Nigeria. *South African Family Practice, 56*(4), 1-5.

7. Directorate of Census Operations, GOI. (2011). *District Census 2011*. Retrieved from https://www.google.com/search?q=directorate+of+census+operations+deoria&sxsrf=APwXEdeC76BbYELT7d2pZngyCihD0leQ%3A1680818659381&ei=40EvZPWCF_eMseMP-rOFyAc

8. Yerpude, P. N., & Jogdand, K. S. (2013). A cross-sectional study of socio-demographic determinants of anaemia in adolescent boys of urban slum area in South India. *International Journal of Medical Research & Health Science, 2*(3), 463-468.

9. Kumar, G., Dash, P., Patnaik, J., & Pany, G. (2022, June 29). SOCIOECONOMIC STATUS SCALE-MODIFIED KUPPUSWAMY SCALE FOR THE YEAR 2022. International Journal of Community Dentistry, 10, 1-6. doi:10.56501/intjcommunitydent. v10i1.26

10. Choudhary, S., Mishra, C.P. and Shukla, K.P. (2016). Dietary pattern and nutrition related knowledge of rural adolescent girls. *Indian Journal of Preventive Social Medicine*, Vol.*41* (3 & 4), p.207-215.

11. Khattar, M., & Battalwar, R. (2020). To Study the Effect of Imparting Nutrition Education on Nutrient Intake of 10–11-Year-Old Girls of Government Schools in Mumbai. International Journal of Food, Nutrition and Dietetics, 8(2), May–August.

12. Kendel Jovanović, G., Janković, S., & Pavičić ŽeŽelj, S. (2023). The effect of nutritional and lifestyle education intervention program on nutrition knowledge, diet quality, lifestyle, and nutritional status of Croatian school children. Frontiers in Sustainable Food Systems, 7, Article 1019849. https://doi.org/10.3389/fsufs.2023.1019849

13. Park, P. S., Chun, B. Y., Jeong, G. B., Huh, C. H., Joo, S. J., & Park, M. Y. (2017). The effect of follow-up nutrition intervention programs applied to aged group of high-risk undernutrition in rural area (I). Korean Journal of Food Culture, 22, 127–139.

14. Medeiros, G. C. B. S., Azevedo, K. P. M., Garcia, D., Oliveira Segundo, V. H., Mata, Á. N. S., Fernandes, A. K. P., Santos, R. P. D., Trindade, D. D. B. B., Moreno, I. M., Guillén Martínez, D., & Piuvezam, G. (2022). Effect of School-Based Food and

ISSN PRINT 2319 1775 Online 2320 7876

Research paper Volume 12, Iss 4, 2023

Nutrition Education Interventions on the Food Consumption of Adolescents: A Systematic Review and Meta-Analysis. International journal of environmental research and public health, 19(17), 10522. https://doi.org/10.3390/ijerph191710522

Reviewers Details

1. Dr Renu Mogra, Professor, Dept of FoOd Science and Nutrition , CCAS, MPUAT Udaipur

Ph no: 7737264919; mail id: mograrenu@yahoo.co.in

2. Dr Ritu Pandey, Assistant Professor, Dept of Textiles and Apparaels, College of Home Science, CSA Kanpur Ph no: 7905440675; mail id: ritupandey70@gmail.com

3. Dr Santosh Yadav, Assistant Professor, Dept of Agronomy, College of Agriculture, GBPUAT Pantnagar. Ph no 90227802828; mail id: santosh.yadav87@gmail.com