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Knowledge gap on balanced diet and its association with sociodemographic factors: A study on adolescents

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Abstract

Objectives: In adolescence, adequate nutritional knowledge might translate well into healthy food habits. State-wise literacy levels are available, but nutrition literacy status still needs to be added. This study assesses the knowledge gap regarding a balanced diet among adolescent girls.

Methods: This was a school-based descriptive cross-sectional study among 71 adolescent girls conducted in November 2021. Using a random sampling method, schools were selected in Prayagraj, India. A self-structured and validated Knowledge Assessment Questionnaire (KAQ) was used for data collection. KAQ included sociodemographic details and questions on a balanced diet. Chi-Square test and descriptive statistics were used for statistical analysis.

Results: Most students' knowledge level was far below the average score. ($t(70) = 3.5, p < .001$). The mean age of the respondents was 13.87. Girls aged 17-19 scored better than 10-13- and 14-16-year-olds. The KAQ showed moderate reliability (Cronbach's $\alpha = 0.7$). The age of the respondent ($p = 0.00$), education of the respondent's father ($p = 0.02$), and income of the family ($p = 0.00$) were the factors significantly associated with the knowledge level of the respondents.

Conclusion: Thus, easy-to-understand nutrition educational material for adolescents should be introduced. Curricula and nutrition education interventions should be implemented in schools for adequate adolescent knowledge levels.

Keywords: Adolescents, literacy, education, balanced diet, knowledge, nutrition education, vulnerable group, nutrition literacy

Introduction

The World Health Organization (WHO) defines adolescents as individuals aged 10 to 19 years old. In comparison, those aged 10-14 and 15-19 are considered younger and older adolescents, respectively [1].

Other than pregnancy, the nutritional requirement of adolescents is the highest [2]. Still, it is accompanied by inconsistent eating habits like skipping meals to lose weight [3] and missing breakfast [4]. Studies show that the intake of lesser calories than Recommended Dietary Allowances by adolescents puts them at risk of nutritional deficiency disorders [5-7].

Due to the onset of menstruation and other physical, psychological, and cognitive developments in the body, adolescence is a critical transition phase in an adolescent girl's life. Adolescents experience a second growth spurt of energy [8]. During this time, one-fifth of an adult's height and half of the adult's body weight are achieved [9].

Knowledge regarding Iron Deficiency Anemia [10, 11] and primary sources of energy and protein [12] is unsatisfactory along with an unclear understanding of a balanced diet in adolescence [13]. This can result in various micronutrient deficiencies [14], delayed sexual maturation and slowed linear growth [15].

The latest census report of India reveals that 20.9% of the population in India comprises of adolescents [16]. Only 29.5% of adolescents in India consumed five servings of fruits and vegetables each day, reports the Global School-Based Student Health Survey (GSHS) [17]. Distorted views like "If people eat less and exercise more, they will always lose weight," "Low-fat and diet foods are always healthier alternatives to full-fat products," "Avoid carbohydrates and fat," and "Eat in a calorie deficit and exercise frequently" were most generally held by adolescents [18]. In 2019, 29.9% of women of reproductive age were anemic [19]. Also, anemia is more prevalent in urban than rural areas [20]. Thinness was prevalent more in girls in early adolescence (69.8%) than in boys in late adolescence (40.7%) [21]. Healthy children perform better at school, making focusing on school-going students crucial [22]. A nutritious diet is incredibly costly in India, where females have an even harder time affording it [23].

By 2022, India had set a national goal of reducing anemia prevalence to 36% in adolescent girls (15-19 years) [24]. According to CNNS, 41% of preschool children, 28% of adolescents, and 24% of school-aged children are still anemic [25], which calls for more effort and innovation to improve consumer knowledge, which can be accomplished through media campaigns and school-based intervention, 23 positive food parenting practices, enforcement of proper school canteen policies, and modifications in the canteen services [26, 27].

Although before implementing such programs, the authors aim to assess the knowledge gap regarding a balanced diet via a self-designed and validated questionnaire.

Materials and Methods

This study was conducted in a school. It was a descriptive cross-sectional study. It was carried out among 10–19-year-old adolescent girls studying in a school in Prayagraj in Northern India. Girls were primarily focused on in this study because of their reproductive role. An incomplete questionnaire was excluded from the study. Respondents answered without referring to any source of information. The sample size was large enough to detect unforeseen problems with a 5% probability at a 95% confidence level, resulting in 59 respondents for the only arm. Allowing a 15% non-response rate required 70 respondents [28]. However, 71 respondents were taken.

Adolescent schoolgirls present on the day of the study were included in the study. The study was approved by the Research Advisory Committee of the Institute, which comprises of Student Advisory Committee, Departmental Research Committee, and Ethical Committee. Permission from the head/principal of the school was obtained before the study. Consent/Assent was obtained from adolescents and their teachers (guardians). The aims and objectives of the research were explained to both the respondents and their guardians. Their participation was voluntary. The collected questionnaires were kept anonymous to keep their data confidential by assigning them unique IDs [29].

The Knowledge Assessment Questionnaire (KAQ) was structured and standardized. There were 21 questions, 5 for sociodemographic profile and 16 for balanced diet-related knowledge questions. The first section included the respondent's family income, among other questions. They were categorized according to their income status where they were considered below the poverty line, above the urban poverty line, middle class, upper middle class, and high class when the income ranged between Rs. 1000/- to 33,000/Annum, Rs. 33,001/- to 55,000/-Annum, Rs. 55,001/- to 88,800/-Annum, Rs. 88,801/- to 1,50,000/-Annum, Above Rs. 1,50,000/-Annum, respectively [30]. One score was given for the correct answer, while zero for incorrect/do not know. A perfect score of 16 was considered "best." The scores were divided as Poor - "0-4", Average- "5-8", Good- "9-12", Excellent "13-16".

SPSS version 22 was used for statistical analysis. Data were summarized using Descriptive statistics. Cronbach's α was employed to assess the reliability of the KAQ. The chi-square test evaluated the relationship between sociodemographic data and knowledge levels. One sample T-test was used to check the deviation from the expected mean score. Cross-tabulation

was used to differentiate Knowledge levels according to various variables. The level of significance was set as ($P \leq 0.05$) [31].

Results

Descriptive statistics of sociodemographic characteristics (Table 1) indicate that the age of the respondents in this study ranged from 10 to 17 years ($M=13.87$, $SD=2.82$). Most respondents' fathers had studied up to high school (43.7%), and respondents' mothers (47.9%) had up to primary school, indicating low educational status. The majority (40.8%) of the respondents belonged to the Middle-Class group. Most of them (47.9%) lived in joint families. Initially, Cronbach's α for KAQ was 0.5 for 16 item scale; on standardizing the items, Cronbach's α showed moderate reliability of 0.7 ($n=5$).³¹ Hence, the KAQ can be further used to assess Knowledge Levels (KL).

Table 1: Distribution of respondents according to their Sociodemographic profile (n=71)

Age group (in years)	No. of respondents	Percentage (%)
10-13	21	29.6
14-16	25	35.2
17-19	25	35.2
Type of family		
Nuclear Family	37	52.1
Joint Family	34	47.9
Education of Father		
Illiterate	5	7
Primary school	14	19.7
High school	31	43.7
Intermediate	11	15.5
Graduate	2	2.8
Postgraduate	8	11.3
Education of Mother		
Illiterate	5	7
Primary school	34	47.9
High school	23	32.4
Intermediate	6	8.5
Graduate	2	2.8
Postgraduate	1	1.4
Annual family income in Rs.		
Below Poverty Line	8	11.3
Above Urban Poverty Line	23	32.4
Middle Class	29	40.8
Upper Middle Class	8	11.3
High Class	3	4.2

In one sample t-test, it was found that knowledge scores were statistically significantly lower by 1.06 (95% CI, 0.46 to 1.67) than an average knowledge score of 6.5 ($t(70) = 3.5$, $p < .001$). These results imply below-average KL among respondents. Analysis of knowledge levels regarding a balanced diet among respondents revealed that the Knowledge Level (KL) of the majority (52.1%) of the respondents was "Average," followed by 38% "Poor" and 9.9% "Good." No one had an "Excellent" Score. (Table 2).

Table 2: Association of Knowledge Levels with Age, Respondent's Father's Education, and Annual Family Income. (n=71)

Sociodemographic characteristics	Knowledge Levels			χ^2
	Poor (%)	Average (%)	Good (%)	
Age				
10-13	18 (66.7)	3 (8.1)	0 (0)	$\chi^2(4)=36.76$ p=0.000 S*
14-16	8 (29.6)	16 (43.2)	1 (14.3)	
17-19	1 (3.7)	18 (48.6)	6 (85.7)	
Education of Father				
Illiterate	5 (18.5)	0 (0)	0 (0)	$\chi^2(10) = 20.541, p=0.01,$ S*
Primary school	6 (22.2)	8 (21.6)	0 (0)	
High school	14 (51.9)	14 (37.8)	3 (0)	
Intermediate	1 (3.7)	7 (18.9)	0 (0)	
Graduate	0 (0)	2 (5.4)	0 (0)	
Postgraduate	1 (3.7)	6 (16.2)	1 (14.3)	
Annual family income in Rs.				
Below Poverty Line	7 (25.9)	1 (2.7)	0 (0)	$\chi^2(8) = 23.966, p=0.002,$ S*
Above Urban Poverty Line	12 (44.4)	11 (29.7)	0 (0)	
Middle Class	8 (29.6)	15 (40.5)	6 (85.7)	
Upper Middle Class	0 (0)	7 (18.9)	1 (14.3)	
Below Poverty Line	0 (0)	3 (8.1)	0 (0)	
Above Urban Poverty Line	7 (25.9)	1 (2.7)	0 (0)	
Total	27 (38)	37 (52.1)	7 (9.9)	71 (100)

*Significant

The chi-square test of independence revealed a significant association between increasing KL and advancement of age ($p=0.000$) and the respondent's father's education ($p=0.02$) and annual family income ($p=0.00$). The higher the family's educational status and income status, the better the score of the respondents. The Association of the type of family and education of the mother with KL was found to be non-significant.

Discussion

This study assessed the Knowledge level of adolescents in the Prayagraj district of Uttar Pradesh, India. Overall, the KL of most of the respondents in this study was below average. Low food and nutrition literacy levels are linked with a decrease in the diversity of the foods taken in school-aged children. It is also speculated that it would hamper the ability to follow nutritional recommendations. Hence assessment of the knowledge levels of the young population is crucial and should be improved via education and interactive activities [32]. On the other hand, high levels are linked with increased consumption of fruits and vegetables [33].

The areas that could have been improved were knowledge about food sources of macronutrients, the meaning of a balanced diet, energy-dense foods, causes of anemia, and iron-rich foods. The large percentages of adolescents with low levels of food and nutrition knowledge suggest that the country's primary school curricula must improve on developing these skills. In India, food and nutrition are included in the school curriculum as a part of Home Science and Biology subjects, Home Science being optional. This results in theoretical and limited nutrition chapters. Also, the school's canteen and other food services contradict the nutrition lessons [34-35]. Indian Planning Commission states that the Indian educational system should be held accountable for compelling students to rote learning and associated non-comprehension rather than promoting critical thinking [36]. This might be a possible reason behind low nutrition knowledge. Consequently, the current secondary school curriculum could benefit from nutrition as a separate subject emphasizing the latest findings in nutrition science.

This study also strongly associated the respondents' socioeconomic status (SES) and KL. The results indicated that adolescent girls from families with higher income status scored better than the rest of the adolescents. Together with income, SES takes into account education, financial security, and self-perceived economic status. SES is thus pertinent to research, application, instruction, and advocacy in all behavioral and social science domains. According to earlier research, academic skill development is slower for children from low-SES parents and communities than for children from higher-SES groups [37]. Low socioeconomic status (SES) children are more vulnerable to impaired cognitive, linguistic, memory, and socioemotional processing, which affects adult health and income [38]. Contrary to this, higher-income families might provide their children with a better quality of life, improving their academic and health vitals. Hence, SES is closely related to the academic performance of a student. This study also showed higher KL among adolescents with highly educated fathers. According to a long-term study, a child's educational goals and achievements at age 19 and later in life were influenced by his parents' academic levels when the boy was eight years old, and this had a positive impact on his success in school and at work by the time he was 48 [39]. Hence, children belonging to more educated families tend to do well academically.

Association of age and KL shows better KL with advancing age. This might be due to the growth in cognitive abilities of the individual with age. With typical aging come measurable changes in intellect. However, factors other than normal cognitive aging, such as dietary concerns, adolescent educational experiences, exposure to environmental toxins or social stressors, familiarity with new technology, and other unmeasured variables, may impact test performance [40]. Hence more variables should be studied collectively to conclude.

No matter how crucial nutrition knowledge is, it has been established that a good understanding of nutrition does not guarantee good food habits [41]. Hence, along with nutrition lessons, a curriculum focusing on developing food selection and preparation skills should also be focused on [42].

Conclusion

The adolescence phase of life is one of the most vulnerable times in one's life. They are subjected to peer pressure, hormonal changes, physical growth, and development which results in a difference in their preferences for eating. An adolescent girl is the future mother of generations to come; hence, a balanced diet will result in optimum mineral and nutrient stores in her body, resulting in a healthy child. Based on a self-designed and validated questionnaire, this study found below-average knowledge levels among school-going adolescent girls in an urban setting. The factors associated with low Knowledge Levels were the father's education status, the family's income status, and the adolescent's age. High nutrition literacy status in the community results in a healthy and fit nation; hence, future studies should focus on developing knowledge, skill, and behavior modification modules. A separate subject on Food and Nutrition can be introduced in school which should be compulsory for all male and female students, unlike the Home Science subject which is currently optional and mainly for girls. Adult education programs can also be carried out to improve adults' functional literacy, which might result in an information-rich environment at home.

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Conflicting Interest

None

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