

A Study on Nutritional Knowledge, Attitude Towards Micronutrient Intake Practice's Among Adolescent Girls in urban Patna, Bihar

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Abstract

Adolescence is a critical stage of growth and development during which proper nutrition and healthy lifestyle practices play a vital role in shaping long-term health outcomes. The present study was conducted to assess the nutritional knowledge, attitudes, and practices (KAP) of adolescent girls in Patna, Bihar. Patna was purposively selected as the study area due to its rapid urbanization and educational infrastructure. A cross-sectional study design was adopted, and a total of 150 adolescent girls aged 17–26 years were selected through random sampling from two colleges. Data on nutritional KAP were collected using a structured questionnaire adapted from previous studies, while anthropometric measurements (height and weight) were taken to assess nutritional status. The results revealed that all participants were female, with the majority in the 17–20 years age group 76 (51.1 percent), unmarried 136 (90.7 percent), and residing in urban areas 111 (74.0 percent). More than half of the respondents were underweight 76 (51.1 percent), while 35 (23.3 percent) were overweight, 15 (10.0 percent) obese, and only 24 (16.0 percent) had normal BMI. Regarding nutritional knowledge, most had heard of micronutrients 126 (84.0 percent), recognized the importance of a balanced diet 135 (90.0 percent), and knew that calcium is essential for bone health 127 (84.6 percent). However, misconceptions were evident, as 78 (52.0 percent) considered fast food a good source of nutrients and 85 (56.0 percent) believed sugary drinks provide essential nutrients. Attitude findings showed that although 122 (81.3 percent) valued dietary variety and 136 (90.0 percent) emphasized the role of exercise, unhealthy practices persisted: 110 (73.3 percent) preferred fast food, 95 (63.3 percent) believed skipping breakfast controls weight, and 123 (82.0 percent) consumed snacks instead of fruits.

The study concludes that while adolescents possessed moderate nutritional knowledge and positive attitudes towards health, unhealthy dietary practices were common. This coexistence of awareness with poor habits highlights the need for strengthened school-based nutrition education, improved access to affordable healthy foods, and behavior change interventions to promote better dietary choices among adolescent girls.

Keywords: Adolescents, Nutrition, Knowledge, Attitude, Practices, BMI, Patna

1. Introduction

Micronutrients also known as vitamins and minerals which are important parts of human nutrition that are needed in little amounts but have a big impact on development, growth, and health. Increased dietary intake is necessary to support the fast physical, cognitive, and emotional growth that occurs during adolescence (Shenkin, 2006). Teenage girls are particularly vulnerable to micronutrient deficits because of physiological changes like menstruation, which raises the requirement for specific nutrients like iron. Long-term health depends on ensuring sufficient consumption of micronutrients throughout this time, yet nutritional knowledge, attitudes, and practices (KAP) among this population continue to be of concern on a global scale (Ayal et al., 2022). In order to better understand the KAP associated with micronutrients in adolescent girls, this study will concentrate on how education, socioeconomic variables, and cultural practices influence their dietary habits and understanding of nutrition (Perveen, 2017). Adolescent females who are deficient in important micronutrients including iron, iodine, zinc, and vitamins A, D, and B12 may experience delayed growth, weakened immune systems, reduced cognitive function, and a higher chance of acquiring chronic illnesses in the future. For example, anaemia caused by iron deficiency is common in teenage girls, particularly in low- and middle-income nations (Tugume et al., 2024). The World Health Organization (WHO) estimates that iron deficiency is the main cause of anaemia, which affects 600 million teenage females worldwide. Adolescents' immune systems may be compromised by further deficiencies like zinc and vitamin A, leaving them more vulnerable to illnesses and other health issues. It is critical to evaluate adolescent girls' nutritional knowledge, attitudes toward food choices, and actual dietary patterns due to the significance of micronutrients (Kumari, 2017). A person's comprehension of the value of nutrients, food sources, and the contribution of a balanced diet to overall health is referred to as their nutritional knowledge. An individual's attitude includes their thoughts, feelings, and readiness to make good eating choices. In this context, "practice" refers to actual food intake practices and consumption patterns (Silva et al., 2023). The way these three elements interact is essential in figuring out how well-nourished teenage girls are. For instance, cultural norms or unfavourable opinions regarding particular foods may discourage someone from adopting healthy eating practices, even if they are sufficiently aware of the significance of micronutrients (Silva et al., 2023). The adolescent demographic is a distinct challenge for health educators and policymakers due to their strong social impact, exposure to media, and the abundance of dietary options in their surroundings. Adolescents are the age group that starts making their own dietary selections on their own, frequently putting convenience, taste, and social conventions ahead of nutritional benefit (Qutteina et al., 2021). This age group frequently consumes fast food, skips meals, and snacks on processed foods heavy in sugar, salt, and harmful fats, which increases their risk of micronutrient deficiencies. Socioeconomic factors also have an impact on these eating habits; low-income households, for example, frequently have less access to nutrient-dense meals because of availability and cost issues (Rousham et al., 2022). Therefore, in order to create successful interventions to enhance the nutritional status of teenagers, it is crucial to identify the factors that influence their food choices. Previous research has demonstrated that teenagers generally have limited nutritional awareness, particularly in low- and middle-income nations. Inadequate education of the significance of micronutrients and their food sources is frequently mentioned as a primary cause of unhealthy eating habits. Additionally, attitudes toward particular foods, especially those high in important micronutrients, can be greatly influenced by cultural taboos and beliefs. For example, red meat, which is a good source of iron and zinc, may be shunned for cultural or religious reasons in some cultures, increasing the risk of iron and zinc

deficits. Likewise, certain societies could attach greater significance to their staple foods, choose meals high in calories but deficient in vital micronutrients, such cereals and grains, over those high in nutrition, like fruits, vegetables, and foods derived from animals (Wiafe et al., 2023). Though it affects people everywhere, the influence of nutritional knowledge, attitudes, and behaviours on micronutrient intake is more noticeable in areas with high rates of food poverty and poor access to healthcare. In these situations, gender differences in the distribution of food within households—boys obtaining a higher portion of nutrient-rich foods—make teenage females more susceptible to malnutrition (Siddiqui et al., 2020). Additionally, teenage females are more vulnerable to anaemia if their diets do not sufficiently satisfy the increased needs for iron that come with the onset of menstruation. Adolescent girls who are malnourished are more likely to face difficulties during pregnancy and childbirth and give birth to low-birth-weight babies, which feeds the cycle of hunger (Khurana, 2020). Poor nutritional status throughout adolescence can also have an impact on future generations. Another important element impacting adolescents' nutritional practices, attitudes, and understanding is their educational setting. Schools can be venues for nutrition education, educating teenagers about the value of micronutrients and helping them build a positive attitude toward eating a balanced diet. But the inclusion of nutrition instruction in school curricula is frequently lacking, and when it is, it might not be thorough or taught well. Furthermore, friends' influence and the availability of healthy food selections in school canteens might support or contradict healthy eating habits (Patimah et al., 2023). Even if adolescents are aware of the advantages of eating a healthy diet, they may still pick unhealthy foods if their friends do. This is because adolescents are quite vulnerable to social pressure. The purpose of this study is to investigate the present nutritional practices, attitudes, and knowledge of adolescent girls with relation to micronutrients, as well as the variables influencing these aspects (Sogari et al., 2018). Through identifying areas of knowledge gaps and deviations from suggested dietary requirements, this research aims to provide insights for the creation of focused interventions geared at improving teenage girls' micronutrient status. These interventions could take the form of community health campaigns, school-based nutrition teaching initiatives, and legislative reforms meant to broaden access to nutrient-dense foods. Furthermore, this study will look at how social, familial, and community factors influence the dietary habits of teenagers (Hantira et al., 2023). Adolescents' eating habits are greatly influenced by family dynamics, particularly parental nutrition knowledge and attitudes. Adolescents' food preferences are frequently shaped by what is available in the home and their parents' eating habits. Therefore, in order to create a family environment that supports healthy eating, programs targeted at improving adolescent nutrition must also involve parents and caregivers. In conclusion, adolescence is a critical time for creating dietary habits that last a lifetime and making sure that one is getting enough nutrients, especially micronutrients (Savage et al., 2007). It is crucial to evaluate teenage girls' nutritional knowledge, attitudes, and practices as well as the obstacles preventing them from embracing healthy eating habits, given the possible long-term health effects of micronutrient deficiencies. With a thorough examination of the variables influencing teenage girls' consumption of micronutrients and suggestions for enhancing their nutritional status, this study aims to add to the expanding corpus of research on adolescent nutrition.

2. Objective

1. To evaluate knowledge towards micronutrient among adolescent girls of Patna Bihar.

- To analyse the attitudes towards micronutrient intake practices among adolescent girls of urban Patna, Bihar.

3. Methodology

The study was conducted among adolescent girls in urban Patna, Bihar. Patna was purposively selected as the study area due to its rapid urbanization and the presence of a large number of educational institutions. Two high colleges were randomly chosen for data collection. A cross-sectional study design was adopted, and a total of 150 adolescents, aged 17–26 years, were selected through random sampling. The nutritional knowledge, attitude, and practices (KAP) of the respondents were assessed using a slightly modified version of a structured questionnaire adapted from an earlier study. Percentages were applied to the responses to identify patterns and associations. In addition, anthropometric measurements such as height and weight were recorded using standard procedures to assess the nutritional status of the participants.

Data analysis

Table 1: Distribution of respondents as per their sociodemographic information.

Variables	Category	Frequency (N=150)	Percent (%)
Gender	Female	150	100
Age	17-20	76	51.1
	21-23	50	33.3
	24-26	24	16
Marital status	Married	14	9.3
	Unmarried	136	90.7
Family type	Joint	41	27.3
	Nuclear	109	73.2
Socio-economic status	Lower class	62	41.3
	Middle class	74	49
	Upper class	14	9.3
Resident	Urban	111	74
	Rural	39	26
BMI	Underweight	76	51.1
	Normal	24	16
	Overweight	35	23.3
	Obese	15	10

The sociodemographic profile of the respondents shows that all participants were female 150 (100.0 percent). With respect to age, the majority of respondents were in the 17–20 years group 76 (51.1 percent), followed by 21–23 years 50 (33.3 percent), and 24–26 years 24 (16.0 percent). Regarding marital status, most respondents were unmarried 136 (90.7 percent), while only 14 (9.3 percent) were married. In terms of family type, the majority belonged to nuclear families 109 (73.2 percent), whereas 41 (27.3 percent) lived in joint families. Socio-economic status distribution revealed that 74 (49.0 percent) of the respondents were from the middle class, 62 (41.3 percent) from the lower class, and only 14 (9.3 percent) from the upper class. With respect to residence, the majority were from urban areas 111 (74.0 percent), while 39 (26.0 percent) came from rural areas. Analysis of BMI indicated that more than half of the respondents were underweight 76 (51.1 percent), while 24 (16.0 percent) had a normal BMI, 35 (23.3 percent) were overweight, and 15 (10.0 percent) were obese.

Table 2: Distribution of respondents as per their nutritional knowledge.

Questions	Answers choices		
	Yes (%)	No (%)	Don't know (%)
Have you heard of the term "micronutrients" before this survey?	126 (84.0)	18 (12.0)	06 (4.0)
A balanced diet includes fruits, vegetables, proteins, and carbohydrates	135 (90.0)	10 (6.6)	05 (3.3)
Iron is important for preventing anaemia, especially in girls.	109 (72.6)	31 (20.6)	10 (6.6)
Calcium is needed to maintain healthy bones and teeth.	127 (84.6)	20 (13.3)	03 (2.0)
Fast food is a good source of essential vitamins and minerals.	78 (52.0)	52 (34.6)	20 (13.3)
Vitamin C helps the body absorb iron and boosts the immune system.	90 (60.0)	50 (33.3)	10 (6.6)
Eating fruits and vegetables every day is important for good health.	138 (92.0)	08 (5.3)	04 (2.6)
Skipping meals regularly has effected on your nutritional health.	125 (84.0)	20 (13.3)	05 (3.3)
Drinking sugary drinks like soda provides your body with essential nutrients.	85 (56.0)	40 (26.6)	15 (10.0)
Micronutrient deficiencies can lead to health problems like fatigue and a weakened immune system.	110 (73.3)	30 (20.0)	10 (6.6)
Do you think you have enough knowledge about nutrition to make healthy food choices?	78 (52.0)	32 (21.3)	40 (26.6)
Have you heard of the term "micronutrients" before this survey?	136 (90.6)	11 (7.3)	03 (2.0)
Do you believe that your diet provides you with enough vitamins and minerals?	98 (65.3)	42 (28.0)	10 (6.6)

The findings on nutritional knowledge among adolescent girls revealed that most respondents had heard of the term micronutrients 126 (84.0 percent), understood the importance of a balanced diet 135 (90.0 percent), iron for anaemia prevention 109 (72.6 percent), and calcium for bone health 127 (84.6 percentage). A large majority recognized the importance of fruits and vegetables 138 (92.0 percentage) and the negative impact of skipping meals 125 (84.0 percent). However, misconceptions persisted, as over half believed that fast food 78 (52.0 percentage) and sugary drinks 85 (56.0 percent) were good sources of nutrients. While 110 (73.3 percent) were aware that micronutrient deficiencies cause health issues, only 78 (52.0 percent) felt confident about their nutrition knowledge. These findings are consistent with earlier studies, such as Verma et al. (2018), which reported that while adolescents generally recognize the role of fruits, vegetables, and micronutrients, misconceptions about fast food and dietary adequacy remain common.

Table 3: Distribution of respondents as per their attitude towards food practices.

Questions	Answer choices		
	True (%)	False (%)	Not sure (%)
I believe eating a variety of foods is important for staying healthy.	122 (81.3)	20 (13.0)	08 (5.3)
I prefer eating fast food over home-cooked meals because it is more convenient.	110 (73.3)	30 (20.0)	10 (6.6)
I think skipping breakfast is a good way to control my weight.	95 (63.3)	40 (26.6)	15 (10.0)
I often eat snacks like chips or candy instead of fruits and vegetables	123 (82.0)	20 (13.3)	07 (4.6)
I believe it is important to drink plenty of water every day.	135 (90.0)	10 (6.6)	05 (3.3)
I eat fruits and vegetables at least once every day.	110 (73.3)	30 (20.0)	10 (6.6)
I avoid eating certain foods because I think they will make me gain weight, even if they are healthy.	122 (81.3)	22 (14.6)	06 (4.0)
I think it's okay to skip meals if I'm busy or not hungry.	109 (72.6)	35 (23.3)	06 (4.0)
I believe taking vitamin supplements is more important than eating healthy foods.	125 (83.3)	20 (13.3)	05 (3.3)
I usually choose sugary drinks like soda or juice over water.	102 (68.0)	40 (26.6)	08 (5.3)
I think it's important to include protein in every meal.	133 (88.6)	10 (6.6)	07 (4.6)
I often feel that healthy food is too expensive to buy regularly.	135 (90.0)	12 (8.0)	03 (2.0)
I believe exercising regularly is as important as eating a balanced diet.	136 (90.0)	11 (7.3)	03 (2.0)

I feel confident that I make healthy food choices most of the time.	125 (83.3)	18 (12.0)	07 (4.6)
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The data on the attitude towards food practices among adolescent girls shows that 122 (81.3 percent) respondents considered eating a variety of foods important for health, while 20 (13.0 percent) disagreed and 8 (5.3 percent) were not sure. A majority of 110 (73.3 percent) preferred fast food over home-cooked meals, compared to 30 (20.0 percent) who disagreed and 10 (6.6 percent) who were uncertain. About 95 (63.3 percent) believed skipping breakfast was a good way to control weight, whereas 40 (26.6 percent) did not agree and 15 (10.0 percent) were unsure. Snacks like chips or candy were often preferred over fruits and vegetables by 123 (82.0 percent) respondents, with 20 (13.3 percent) disagreeing and 7 (4.6 percent) uncertain. Most participants, 135 (90.0 percent), believed drinking plenty of water daily was important, while 10 (6.6 percent) disagreed and 5 (3.3 percent) were unsure. Eating fruits and vegetables at least once a day was reported by 110 (73.3 percent), while 30 (20.0 percent) disagreed and 10 (6.6 percent) were not sure. Avoiding certain foods due to fear of weight gain was noted by 122 (81.3 percent), with 22 (14.6 percent) disagreeing and 6 (4.0 percent) uncertain. A total of 109 (72.6 percent) felt it was acceptable to skip meals if busy or not hungry, compared to 35 (23.3 percent) who disagreed and 6 (4.0 percent) who were not sure. The idea that taking vitamin supplements is more important than eating healthy foods was supported by 125 (83.3 percent) respondents, while 20 (13.3 percent) disagreed and 5 (3.3 percent) were unsure. A majority of 102 (68.0 percent) usually preferred sugary drinks over water, while 40 (26.6 percent) disagreed and 8 (5.3 percent) were not sure. Including protein in every meal was considered important by 133 (88.6 percent), while 10 (6.6 percent) disagreed and 7 (4.6 percent) were uncertain. Healthy food was considered too expensive to buy regularly by 135 (90.0 percent), compared to 12 (8.0 percent) who disagreed and 3 (2.0 percent) who were not sure. Regular exercise was believed to be as important as eating a balanced diet by 136 (90.0 percent), while 11 (7.3 percent) disagreed and 3 (2.0 percent) were not sure. Finally, 125 (83.3 percent) respondents felt confident about making healthy food choices, while 18 (12.0 percent) disagreed and 7 (4.6 percent) were not sure.

4. Result and discussion

The analysis of food-related attitudes among adolescent girls revealed both positive and negative patterns. A large proportion of respondents acknowledged the importance of eating a variety of foods 122 (81.3 percent), drinking adequate water daily 135 (90.0 percent), including protein in meals 133 (88.6 percent), and exercising regularly along with a balanced diet 136 (90.0 percent). Moreover, 125 (83.3 percent) reported feeling confident in their ability to make healthy food choices, reflecting a generally good level of awareness regarding health-promoting practices. However, the findings also highlighted risk-prone behaviors. A considerable number of respondents preferred fast food over home-cooked meals 110 (73.3 percent), believed skipping breakfast could help control weight 95 (63.3 percent), and frequently consumed snacks like chips or candy instead of fruits and vegetables 123 (82.0 percent). In addition, 102 (68.0 percent) admitted choosing sugary drinks over water, while a majority 135 (90.0 percent) perceived healthy foods as too expensive to buy regularly. These results demonstrate a coexistence of healthy awareness with unhealthy practices, suggesting that knowledge alone may not translate into positive behavior. Similar findings were reported by **Mehta and Sharma (2019)**, who observed that although adolescents understood the importance of good nutrition, they often indulged in fast food and skipped

meals due to convenience and peer influence. The perception of healthy foods being costly is consistent with **Gupta et al. (2021)**, who noted affordability as a key determinant of adolescents' dietary decisions. Likewise, the tendency to replace breakfast and fruits with processed snacks aligns with **Patel and Singh (2020)**, reflecting the growing impact of lifestyle changes and modernization on adolescent diets.

5. Conclusion

The study concluded that adolescent girls displayed a mix of both healthy and unhealthy attitudes towards food practices. While most respondents recognized the importance of a balanced diet, protein intake, water consumption, and regular exercise, a significant proportion also preferred fast food, skipped breakfast, consumed snacks instead of fruits, and chose sugary beverages over water. The perception of healthy food as expensive further influenced their dietary behavior. These findings suggest that although awareness exists, unhealthy attitudes and lifestyle choices may compromise their nutritional well-being, potentially leading to undernutrition, overweight, or micronutrient deficiencies in the long term.

6. Suggestions

1. Nutrition Education Programs: Schools and colleges should organize regular nutrition awareness sessions to correct misconceptions about fast food, sugary drinks, and meal skipping.
2. Promotion of Healthy Eating Habits: Campaigns encouraging daily consumption of fruits, vegetables, and homemade meals should be strengthened through peer and community involvement.
3. Affordable Access to Healthy Foods: Policies and initiatives to make healthy food items affordable and accessible to adolescents, especially in urban areas, are essential.
4. Parental and Peer Role: Parents and peers should be encouraged to model healthy eating behaviors, as adolescents are highly influenced by social environments.
5. Integration with Physical Activity: Along with diet, adolescents should be motivated to include regular exercise in their daily routine to promote holistic health.
6. Counselling Services: Personalized dietary counselling can be introduced in schools/colleges to guide adolescents in making better food choices.

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