

Relationships between nutrition-related knowledge, attitude, and self-efficacy among adolescents: A community-based survey

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ABSTRACT

Introduction: Millions of adolescents are facing the burden of malnutrition in India, and the sociocultural context of nutrition poses challenges while addressing this burden. This study aimed to assess: (a) the determinants of knowledge, attitude, and self-efficacy scores and (b) the relationships between nutrition-related knowledge, attitude, and self-efficacy scores among adolescents in India. **Methods:** The community-based study was conducted among adolescents across three rural and three urban districts in India. This observational study employed a self-administered structured questionnaire containing information on demography, nutrition-related knowledge, attitude, and dietary self-efficacy. Differences in knowledge, attitude, and self-efficacy scores between sociodemographic variables were assessed using the *t*-test. Regression analysis was used to determine relationships between knowledge, attitude, and self-efficacy scores. **Results:** A total of 985 adolescents (44.5%) from rural areas and 1225 (55.5%) from urban slums participated. There were significant differences in knowledge, and self-efficacy scores between rural, urban inhabitants ($P < 0.001$), and adolescents with different grades of education ($P < 0.001$ for knowledge and $P = 0.01$ for self-efficacy). There were significant differences in knowledge and attitude scores among adolescents from non-backward and backward classes ($P < 0.001$ for knowledge and $P = 0.02$ for attitude) and those who were vegetarians and non-vegetarians ($P = 0.002$ for knowledge and $P < 0.001$ for attitude). The study demonstrated significant relationships between knowledge, attitude, and self-efficacy scores ($P < 0.001$). **Conclusion:** Nutrition-related knowledge, attitude, and self-efficacy scores are determinants of dietary behavior and are inter-related. Community-based interventions targeting to improve the nutritional status of adolescents should focus on improving self-efficacy besides the other two determinants.

Keywords: Diet, food, health education, malnutrition

Introduction

Adolescence is a period of rapid growth, and development and adequate nutrition is crucial during this period. Suboptimal nutrition during adolescence may contribute to impaired development with transgenerational consequences.^[1] Poor nutrition is a leading risk factor for many of the predominant causes of deaths among adolescents.^[2] Millions of adolescents, both girls and boys in India, are facing the burden of undernutrition. Studies point to differences by social castes and

ethnicity in access to resources, services, and prevalent cultural norms in the Indian context.^[3] The prevalence of undernutrition is higher among girls, poorer and less educated adolescents compared with their counterparts.^[4]

Unhealthy dietary behaviors may lead to poor nutrition status among adolescents and to improve these behaviors, it is important to develop effective tailored interventions guided by relevant theory. There are theoretical models that suggest underlying mechanisms facilitating the transition from intervention to behavioral outcomes.^[5] For example, Bandura's social cognitive

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theory (SCT) postulates that behavior change is influenced by the interplay among personal factors, environmental factors, and attributes of one's behavior.^[6] The social cognitive determinants of dietary behaviors include knowledge, attitude, self-efficacy, social support, intention, etc.^[7]

Self-efficacy is one's belief in one's capability to organize and execute the action for obtaining results.^[8] It plays a vital role in predicting dietary decisions.^[9] It is gained through knowledge, understanding, and skill development. Few international studies have demonstrated interaction among factors such as knowledge, attitude, and self-efficacy in predicting healthy behaviors.^[10-12] However, there is limited evidence on association among these predictors from low-middle-income countries (LMIC).^[7] This study aimed to assess: (a) the determinants of knowledge, attitude, and self-efficacy scores and (b) the relationships between nutrition-related knowledge, attitude, and self-efficacy scores among adolescents in India.

Materials and Methods

Participants and procedures

This descriptive cross-sectional study was approved by the institutional ethical review board. Rural and urban slums were compared with respect to nutrition-related knowledge, attitude, and self-efficacy among adolescents (10–19 years). The rural areas included three districts of Uttar Pradesh, namely Allahabad, Kaushambi, and Banda. The urban areas included West Delhi, Nagpur, and Chandigarh. The areas selected were the intervention sites under project JAGRITI, a community-based implementation programme. The 3-year-long project engaged and educated adolescents on health, nutrition, and hygiene. We used multistage random sampling for sample collection. Within each district, one block was selected randomly. In each block, 10 villages were selected. In each village, 35 households were selected randomly. Similar sampling strategy was used for urban slums (clusters instead of villages).

Informal verbal assent and consent were obtained from the adolescents and their parents, respectively. They were assured about the confidentiality of the information provided. Prior to administering the survey, the research team read instructions to the participants.

Study instrument

The study instrument consisted of a self-administered, validated, and structured questionnaire. The questionnaire contained the following: demographic information, knowledge, attitude related to nutrition, and five dietary self-efficacy items. The internal reliability of the questionnaire was 0.7. The knowledge items (15 questions) measured basic knowledge about nutrients, cooking practices, and good eating habits. The score ranged from 0 (worst score) to 15 (best score). The attitude section was scored on a Likert scale of five items ranging from strongly agree to strongly disagree. It consisted of nine questions. The attitude items measured the attitude of the participants towards common eating habits crucial

for good nutrition and healthy living. For dietary self-efficacy, a pre-validated, five-item subscale^[13] was used. The self-efficacy subscale contained questions pertaining to participant's confidence for greater fruit and vegetable intake, less fat and soda intake, healthy eating at a fast-food restaurant, and better nutrition planning. The self-efficacy scores were measured on a Likert scale with the values ranging from 1 (not at all confident) to 7 (very confident).

Data analysis

The summary scores for all the knowledge, attitude, and self-efficacy items between rural or urban slums were compared using the *t*-test. The analysis was repeated after adjusting for age, and education status using the general linear model and results did not change significantly. Multiple regression analysis was used to determine the relationships between knowledge, self-efficacy, and attitude and how they predicted each other among the study participants. The data were analyzed using SPSS version 24 (Chicago, ILL, USA) with a two-sided *P* value of <0.05 considered statistically significant.

Results

Demographics

There were 985 participants (44.5%) from rural areas and 1225 (55.5%) from urban slums. Mean (\pm SD) age of the participants was 13 (\pm 2) years. A nearly equal number of girls (48%) and boys (52%) participated in the survey. There were 1682 (76%) participants in the early adolescence age group (10–14 years) and 528 (24%) in the late adolescence age group (15–19 years). Other demographic variables have been shown in Table 1.

Knowledge, attitude and self-efficacy

Scores on knowledge, attitude, and self-efficacy items among participants from different sociodemographic characteristics are shown in Table 2. The last two categories of the education status (9th–12th standard and graduation) were clubbed together in the model because of the small sample of the last category (graduation and above). For knowledge score, significant differences

Table 1: Demographic variables of the participants (n=2210)

Variable	Rural areas (n=985) n (%)	Urban slums (n=1225) n (%)
Castes		
General	259 (26.3)	738 (60.2)
OBC	513 (52.1)	92 (7.5)
SC/ST	213 (21.6)	395 (32.2)
Education status		
Illiterate and primary standard	19 (1.9)	66 (5.4)
6-8 th standard	631 (64.1)	784 (64.4)
9-12 th standard	321 (32.6)	328 (26.8)
Graduation and above	14 (1.4)	42 (3.4)
Adolescence age group		
10-14 years	688 (69.8)	994 (81.1)
15-19 years	297 (30.2)	231 (18.9)

OBC: Other backward classes, SC: Scheduled caste, ST: Schedule tribe

Table 2: Knowledge, attitude, and self-efficacy scores of participants with different demographic characteristics (n=2210)

	Knowledge score		Attitude score		Self-efficacy score	
	Mean±SD	P	Mean±SD	P	Mean±SD	P
Areas						
Rural	7.8±2.1	<0.001	32.9±5.7	0.17	19.1±5	<0.001
Urban slums	7.2±1.9		32.6±4.9		18.3±4.9	
Castes						
General	7.4±1.8	<0.001	33.1±5	0.02	18.7±4.7	0.2
OBC	7.7±2.1		32.5±5.9		18.9±5.2	
SC/ST	7.3±2.2		32.4±5		18.5±5.23	
Education status						
Illiterate and primary standard	7±2.5	<0.001	32.9±4.5	0.9	17.7±5	0.01
6-8 th standard	7.4±2		32.8±5.3		18.6±4.6	
9-12 th standard and above	7.8±1.9		32.7±5.3		19.1±5.6	
Adolescence age group						
10-14 years	7.4±2	0.04	32.8±5	0.055	18.7±4.8	0.4
15-19 years	7.7±2		32.3±5.7		18.8±5.5	
Dietary pattern						
Vegetarian	7.5±1.9	0.002	32.5±5.2	<0.001	18.5±5	0.17
Non-vegetarian	7.5±2.17		33.4±5.2		18.9±4.9	
Ovo-vegetarian	7.13±2.13		32±5.2		18.8±4.9	
Major meals in a day						
Three major meals	7.6±1.8	<0.001	32.5±5.2	0.001	19±5	<0.001
Two major meals	7.9±2		33.5±5.3		18.8±4.8	
One or less than one meals	6.8±2.3		32.5±5.2		17.7±4.8	

OBC: Other backward classes, SC: Scheduled caste, ST: Schedule tribe; P value <0.05 was considered statistically significant

Table 3: Associations between knowledge, self-efficacy, and attitude scores (n=2210)

Predictors	Self-efficacy scores adjusted r^2	β coefficients	P
Attitude score	0.006	0.08	<0.001
Knowledge score	0.038	0.19	<0.001
Knowledge score + attitude score	0.04	0.18, 0.03	<0.001

were observed between rural and urban slums ($P < 0.001$). Significant differences in the scores among the three different caste groups ($P < 0.001$), and early and late adolescent age groups ($P = 0.04$) were observed. With respect to attitude scores, there were significant differences in scores among different caste groups ($P = 0.02$). The rural areas had significantly higher self-efficacy scores ($P < 0.001$) compared to urban slums. The self-efficacy scores increase as the education status of the adolescents' increase ($P = 0.01$). Overall, the adolescents from rural areas, belonging to other backward classes and general caste and with higher education status, scored better than their counterparts.

Table 3 shows the relationships between the constructs of knowledge, attitude, and self-efficacy. For all participants, self-efficacy was positively associated with knowledge ($P < 0.001$), attitude ($P < 0.001$), and the combined score of knowledge and attitude ($P < 0.001$).

Discussion

In our study, there were significant differences in knowledge and self-efficacy scores among rural, urban slum inhabitants,

and adolescents with different grades of education. There were significant differences in knowledge and attitude scores among adolescents from non-backward and backward classes and those who were vegetarians or non-vegetarians.

Rural inhabitants found to have better knowledge and self-efficacy scores compared to slum counterparts. This is consistent with the findings from a study by Dixit *et al.* (2013), whereby adolescents from slums had the least knowledge scores compared with ones from rural or urban areas.^[14] Similar to our study, caste and education differentials in dietary behaviors have been reported in other studies.^[15,16] Adolescents from the poor social background such as scheduled caste or tribe have poor nutrition-related knowledge, attitude, and practices. Their self-efficacy scores may be lower than non-backward classes because of lack of confidence and access to healthy food.^[17]

Early adolescents are at higher risk of undernutrition than late adolescents.^[18] Congruent with this study findings, a study from rural Bangladesh among adolescent girls also stated that dietary knowledge increases with age and education status.^[19] Self-efficacy also increases with increasing education. This supports the model linking education with better health outcomes through the facets of knowledge, problem-solving, emotional awareness, and self-regulation, values, and interactional skills.^[20]

Vegetarians demonstrated lower knowledge and attitude scores compared with those who were non-vegetarians or ovo-vegetarians in this study. In a study, it was stated that "high meat diet" or prudent diet (egg, fish, and vegetables) is common among people with higher education status.^[21] However, no

evidence in the literature could be found by the author comparing associations between nutrition-related knowledge, self-efficacy, and dietary patterns. Study results demonstrated significant, positive relationships between nutrition-related knowledge, attitude, and self-efficacy. This finding is in agreement with the observation from a study by Hall *et al.*^[10,22] Although both significant, relative to knowledge, attitude is strongly associated with dietary practices. Similarly, a study conducted by Deka *et al.* found that adolescents with good eating behavior, consuming two or more major meals in a day had significantly higher knowledge, attitude, and self-efficacy scores compared with those who had one or less than one major meal in a day.^[23] This was further supported by findings reported by Dixit *et al.* and Hall *et al.* that knowledge and self-efficacy appeared to be a stronger predictor of healthy behavior.^[14,22]

The study holds importance for primary care physicians, who are the initial point of contact of a patient with the health system. The sociodemographic factors influencing knowledge or attitude of the adolescents as revealed in the study should be considered by the physicians while providing nutritional counseling. An attempt should be made to improve not only nutrition-related knowledge but also the attitudes and self-efficacy of adolescents and their parents. Evidence from studies supports the need for incorporating interventions such as screening and customized counseling by primary care physicians for a sustainable solution to the growing malnutrition among adolescents in India.^[24,25]

Limitations

This study is one of the few studies which assessed the SCT constructs, primarily knowledge, attitude, self-efficacy, and their relations among adolescents in LMIC. However, there are certain limitations. First, the selection of the districts may not reflect truly random, as they were chosen from the project districts. Second, although we used a validated survey instrument, more elaborate questions on practices or behavior would have helped in assessing its relations with knowledge, attitude, and self-efficacy. Third, a higher representation of other backward classes compared with other social classes (SC/ST/General) may not reflect true sample selection. This may limit the external validity (generalization) of the results. Lastly, we did not obtain the socioeconomic status of the family in the survey, which is observed to be strongly associated with personal factors. Socioeconomic status was not obtained in this study to avoid misreporting of the same by adolescents, who may not know the exact figures.

Conclusion

The current results indicate that knowledge, attitude, and self-efficacy scores were higher among adolescents from rural areas, non-backward classes, with higher education status, non-vegetarians, and those having good eating behavior. There are relationships between knowledge, attitude, and self-efficacy scores. Emphasis should be laid more on improving self-efficacy and attitude among adolescents during public health nutrition interventions. Increasing the mean years of schooling will

help to improve the health and nutrition status of adolescents especially girls.

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Conflicts of interest

There are no conflicts of interest.

References

1. Salam RA, Hooda M, Das JK, Arshad A, Lassi S, Middleton P, *et al.* Interventions to improve adolescent nutrition: A systematic review and meta-analysis. *J Adolesc Health* 2016;59(Suppl 4):29-39.
2. Christian P, Smith ER. Adolescent undernutrition: Global burden, physiology, and nutritional risks. *Ann Nutr Metab* 2018;72:316-28.
3. Mitra A, Rao N. Gender differences in adolescent nutrition: Evidence from two Indian districts. LANSAs working paper series. 2017 May [cited 2019 Mar 02];13. Available from: <http://59.160.153.188/library/sites/default/files/LANSAs%20Working%20Paper%20Series%2013%20-%20Gender%20Differences%20in%20Adolescent%20Nutrition.pdf>.
4. Deshmukh PR, Gupta SS, Bharambe MS, Dongre AR, Maliye C, Kaur S, *et al.* Nutritional status of adolescents in rural Wardha. *Indian J Pediatr* 2006;73:139-41.
5. Dewar DL, Lubans DR, Plonikoff RC, Morgan PJ. Development and evaluation of social cognitive measures related to adolescent dietary behaviors. *Int J Behav Nutr Phys Act* 2012;9:36.
6. Bagherniya M, Taghipour A, Sharma M, Sahebkar A, Contento IR, Keshavarz SA, *et al.* Obesity intervention programs among adolescents using social cognitive theory: a systematic literature review. *Health Educ Res* 2018;33:26-39.
7. Sleddens EF, Kroeze W, Kohl LF, Bolten LM, Velema E, Kaspers PJ, *et al.* Determinants of dietary behavior among youth: An umbrella review. *Int J Behav Nutr Phys Act* 2015;12:7.
8. Tsang SKM, Hui EKP, Law BCM. Self-efficacy as a positive youth development construct: A conceptual review. *Sci World J* 2012;2012:452327. doi: 10.1100/2012/452327.
9. Muturi NW, Kidd T, Khan T, Kattelman K, Zies S, Lindshield E, *et al.* An examination of factors associated with self-efficacy for food choice and healthy eating among low-income adolescents in three U.S. states. *Front Commun* 2016. [cited 2019 Jan 1]; 1:[about 6p]. Available from: <https://doi.org/10.3389/fcomm.2016.00006>.
10. Sheeran P, Maki A, Montanaro E, Avishai-Yitshak A, Bryan A, Klein WM, *et al.* The impact of changing attitudes, norms, and self-efficacy on health-related intentions and behavior: A meta-analysis. *Health Psychol* 2016;35:1178-88.
11. Luszczynska A, Hagger MS, Banik A, Horodyska K, Knoll N, Scholz U. Self-efficacy, planning, or a combination of both? A longitudinal experimental study comparing effects of three interventions on adolescents' body fat. *PLoS One*. 2016 Jul [cited 2019 Jan 20]; 11: [about 7 p]. Available from:

- [https://doi: 10.1371/journal.pone.0159125](https://doi.org/10.1371/journal.pone.0159125). eCollection 2016.
12. Pearson N, Ball K, Crawford D. Predictors of changes in adolescents' consumption of fruits, vegetables and energy-dense snacks. *Br J Nutr* 2011;105:795-803.
 13. Rosenkoetter E, Loman DG. Self-Efficacy and Self-reported dietary behaviors in adolescents at an urban school with no competitive foods. *J Sch Nurs* 2015;31:345-52.
 14. Dixit S, Singh JV, Kant S, Agarwal GG, Dubey A, Kumari N. A cross-sectional study on predictors and significance of eating behavior of adolescent girls. *Vulnerable Child Youth Stud* 2014;9:10-6.
 15. Coelho KR, Belden C. A systematic review of the literature on the relationship between caste membership and health-related risk factors in India. *Int J Med Public Health* 2016;6:61-8.
 16. Pal A, Pari AK, Sinha A, Dhara PC. Prevalence of undernutrition and associated factors: A cross-sectional study among rural adolescents in West Bengal, India. *Int J Pediatr Adolesc Med* 2017;4:9-18.
 17. Dasgupta U, Mani S, Sharma S, Singhal S. Caste differences in behaviour and personality: Evidence from India. WIDER Working Paper series 060. World Institute for Development Economic Research (UNU-WIDER). 2016 May [cited 2019 Dec 15]; 060:[about 25 p]. Available from: <https://ideas.repec.org/p/unu/wpaper/wp2016-060.html>.
 18. Kigaru DMD, Loechl C, Moleah T, Macharia-Mutie CW, Ndungu ZW. Nutrition knowledge, attitude and practices among urban primary school children in Nairobi City, Kenya: A KAP study. *BMC Nutrition* 2015 [cited 2019 Mar 3]; 1 (44):[about 8 pages]. Available from: <https://doi.org/10.1186/s40795-015-0040-8>.
 19. Alam N, Roy SK, Ahmed T, Ahmed AM. Nutritional status, dietary intake, and relevant knowledge of adolescent girls in rural Bangladesh. *J Health Popul Nutr* 2010;28:86-94.
 20. Hahn RA, Truman BI. Education improves public health and promotes health equity. *Int J Health Serv* 2015;45:657-78.
 21. Yakub M, Iqbal MP, Iqbal R. Dietary patterns are associated with hyperhomocysteinemia in an urban Pakistani population. *J Nutr* 2010;140:1261-6.
 22. Hall E, Chai W, Albrecht JA. Relationships between nutrition-related knowledge, self-efficacy, and behavior for fifth grade students attending Title I and non-Title I schools. *Appetite* 2016;96:245-53.
 23. Deka MK, Malhotra AK, Yadav R, Gupta S. Dietary pattern and nutritional deficiencies among urban adolescents. *J Family Med Prim Care* 2015;4:364-8.
 24. Bhuyan SS, Chandak A, Smith P, Carlton EL, Duncan K, Gentry D. Integration of public health and primary care: A systematic review of the current literature in primary care physician mediated childhood obesity interventions. *Obes Res Clin Prac* 2015;9:539-52.
 25. Taylor JL, Aalsma MC, Gilbert AL, Hensel DJ, Rickert VI. Perspectives of family medicine physicians on the importance of adolescent preventive care: A multivariate analysis. *BMC Fam Pract* 2016;17:4.