

## CONSTRAINTS IN THE PROVISION OF NUTRITION EDUCATION FOR RURAL SCHOOL CHILDREN

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### ABSTRACT

*The provision of effective nutrition education (NE) to rural school children is essential for preventing malnutrition and promoting good health throughout life. However, there are many challenges to its implementation. This study was conducted in the Arwal district of Bihar, India, to identify and rank the perceived constraints faced by teachers in delivering NE to students in rural schools. A purposive sampling technique was used to choose 120 responders from three blocks that were chosen at random. Data was gathered using a pretested list of barriers that were divided into three categories: organizational, technical, and socioeconomic. The Rank Based Quotient (RBQ) technique was applied to quantify and rank the severity of each constraint. The study found that the primary socioeconomic constraint for teachers was limited financial resources in schools (RBQ: 96.22). The main technical barrier for parents was their limited awareness about nutrient-retaining cooking methods (RBQ: 101.22). The most severe organizational barrier was identified as limited parental participation in school activities (RBQ: 108.02). In order to guarantee the successful implementation of nutrition education programs in rural areas, the study comes to the conclusion that a multi-stakeholder approach is crucial, with an emphasis on obtaining dedicated funding, enhancing parents' practical culinary skills, and strengthening school-community ties through strong Parent-Teacher Associations (PTAs). The results of multiple regression analysis showed that institutional and socio-personal factors had a significant impact on the barriers to nutrition education. The model was significant at the 0.01 level and accounted for 65.6% of the variation ( $R^2 = 0.656$ ). Although budget availability and knowledge of nutrition policies also had a significant impact, the most important factors lowering constraints were the frequency of training programs, institutional support, and the availability of teaching aids. These results emphasize how crucial it is to strengthen the delivery of nutrition education through capacity building, institutional support, and sufficient resource support.*

**Keywords:** nutrition, teachers, rural children, bihar; RBQ

### INTRODUCTION

In order to support growth and development during this critical stage of puberty, adolescence typically involves high nutritional needs (Vinaya et al., 2021). It is particularly important for girls who menstruate and are more susceptible to anaemia to meet these nutritional needs. Furthermore, teenage girls need to be in the best possible health and nutrition as they prepare to become mothers in order to maintain their wellbeing and ability to conceive. (Soliman et.al, 2014). In this stage of life, girls typically restrict their food intake in order to preserve their body shapes (Bibiloni, 2013). The most significant factor influencing performance is nutritional awareness (Bhimani et al., 2020), which is followed by educational attainment of anganwadi workers and advice from supervisors or health professionals (Gujral et al., 1992; Ikpe and Omede, 2025). Also, this group also

has a tendency to eat a lot of fast food, which is high in sugar, salt, and saturated fats, rather than fruits and vegetables. Poor eating habits have a detrimental impact on adolescents' nutritional status; this is also the case in India, where there is a notable discrepancy between adolescents' knowledge and practice of nutrition in rural areas (Parmar and Patel, 2021; Vinaya et al., 2020).

Lack of awareness and knowledge about nutrition and health during adolescence is one of the main causes of these nutritional problems. Thus, by encouraging behaviour change, nutrition education (NE) is a promising intervention that can successfully address this issue (McAleese and Rankin, 2007). In many low- and middle-income nations, nutrition education (NE) is often a crucial part of successful intervention packages meant to lower stunting (Hossain et al., 2017). Nutrition education (NE) is incorporated into

school curricula in developed countries that acknowledge it as a way to improve health. Additionally, these programs are maintained with the support of state government funding (Beckwith, 2010). Combining two or more extension teaching techniques is much more effective at drawing people in, generating interest, and convincing them to act in a way that will satisfy them (Gupta, 2012; Vaghela et al., 2019). A more comprehensive approach is required for nutritional education (NE) that results in behavioural changes, especially for teenage girls. This group would help mothers and improve the long-term health of children. According to research, incorporating NE into junior high school curricula improves the teaching-learning process, boosts parental support, and improves students' nutritional knowledge and eating habits (Sungkowo et al., 2008). Programs that increase teachers' capacity to help spread knowledge about food and nutrition are also essential. Soni and Kamaliya (2009). These initiatives were implemented in rural schools to assess how a teacher-led nutrition and health education program affected the nutritional status of teenage girls and boys. Therefore, the purpose of this study was to determine the perceived challenges that teachers and parents encounter when implementing nutrition education programs for schoolchildren in rural areas.

## OBJECTIVE

To analyse the constraints in the provision of nutrition education for rural school children in Arwal district of Bihar

## METHODOLOGY

In 2022, the study was conducted in the state of Bihar. Bihar is the state with the highest rates of underweight and stunting, according to the National Family Health Survey. These circumstances led to the deliberate selection of the suggested study area. Ex-post facto research design was used to examine the challenges parents and teachers encounter when attempting to educate rural schoolchildren about nutrition. Respondents were chosen using a multistage sampling strategy that combined purposive and random sampling techniques. The current study was purposefully carried out in Bihar's Arwal district. The nutrition profile of the Poshan district indicates that the highest proportion of underweight residents is found in the Arwal district. Three blocks were chosen at random from the district. 40 responders were chosen from each block, for a total sample size of 120. Through careful literature review and expert

consultation, a list of constraints was created to determine the challenges that teachers and parents face. Several types of constraints were identified, including organizational, socioeconomic, technical, and other constraints. Teachers and parents who had participated in the study were asked to rank the constraints based on how relevant they thought they were to their situation. The Rank Based Quotient technique (RBQ) (Sabarathnam, 1988) was used to quantify the listed constraints, which is as follows:

$i$  = Frequency of teachers for the  $i$ th rank of the problem  
 $n$  = Total number of ranks  
 $i$  = Rank given by the respondents  
 $N$  = Total number of respondents contacted.

Additionally, the study looks at how socioeconomic and socio-personal independent variables influenced the dependent variable by using multiple regression analysis.

## Multiple Linear Regression

Multiple regression is a statistical tool used to derive the value of a dependent variable from several other independent, or predictor, variables. It is the simultaneous combination of multiple factors to assess how and to what extent they affect a certain outcome. The formula used for this purpose is as follows:

$$Y = a + b_1X_1 + b_2X_2 + \dots + b_nX_n + e$$

Where,

$Y$  = Dependent variable

$a$  = Constant

$X_1, \dots, X_n$  = values of independent variables

$n$  = Total number of independent variables

$b_1, \dots, b_n$  = partial regression coefficients which represent the variation in  $Y$  can be associated with given variation in any of the  $X$  with remaining independent variables held constant.

$e$  = error term assumed to be normally distributed with mean 0 and variance.

## RESULTS AND DISCUSSION

Constraints analysis was carried out as per the above-mentioned procedure and constraints perceived by the teachers in different categories i.e. technological, socioeconomical and organizational are discussed below.

**Table 1 : Severity analysis of perceived socio- economic constraints**

(n=120)

Sr. No.	Particulars	RBQ score	Rank
1	Limited financial resources in schools to support NE activities.	96.22	1
2	Dependence on personal funds for materials/demonstrations.	53.13	3
3	High teacher workload due to understaffing in rural schools.	54.88	2
4	Social pressure to prioritize exam-oriented subjects over NE.	24.10	6
5	Poor socio-economic background of students, limiting adoption of NE	35.10	5
6	Limited access to affordable nutrition-related teaching aids	49.33	4

The analysis of socio-economic constraints faced by teachers and parents in the provision of nutrition education revealed significant variations in their perceived severity (Table 1). With a Rank I RBQ score of 96.22, the most severe constraint among the six identified was the lack of funding in schools to support NE activities. This was followed by reliance on personal funds for materials and demonstrations (53.13, Rank III) and a heavy workload for teachers as a result of understaffing in rural schools (54.88, Rank II). Based on the

results, the primary obstacle to providing nutrition education in rural schools is still institutional financial constraints. This supports past research that highlighted how institutional funding shortages jeopardize the long-term viability of school-based nutrition initiatives. Teachers are overworked with their primary academic responsibilities, leaving little time for extracurricular activities like nutrition education, according to the second-ranked constraint, workload due to understaffing.

**Table 2: Severity analysis of perceived technical constraint**

(n=120)

Sr. No.	Particulars	RBQ score	Rank
1	Lack of knowledge of basic nutrition principles	44.20	5
2	Limited awareness of cooking practices that retain nutrients.	101.22	1
3	Difficulty in interpreting nutrition information (e.g., food labels).	70.10	2
4	Lack of training in preparing low-cost balanced diets.	62.31	3
5	Dependence on traditional practices without validation.	52.66	4

From table 2 it can be inferred that, the most significant technical barrier to nutrition education for parents was found to be a lack of knowledge about nutrient-retaining cooking techniques (RBQ score 101.22, Rank 1). This suggests that even though parents might try to prepare meals at home, nutrient loss results from a lack of understanding of nutrient-preserving strategies like appropriate washing, chopping, and cooking techniques. McAleese and Rankin (2007) have reported similar results, emphasizing the importance of practical demonstrations in enhancing food preparation skills at the household level.

especially food labels, was the second biggest barrier found (RBQ score 70.10, Rank 2). Prior research also pointed out that labeling laws might not result in better consumer Behaviour in rural areas if awareness campaigns aren't focused.

Lack of training in creating affordable, balanced meals (RBQ score 62.31, Rank 3) is the third-ranked constraint, highlighting the disconnect between knowledge and ability. According to research by Vaghela et al. (2019), parents' capacity to adopt cost-effective eating habits is improved when theoretical knowledge and participatory training are combined.

The inability to understand nutrition information,

**Table 3: Severity analysis of perceived organizational constraint**

(n=120)

Sr. No.	Particulars	RBQ score	Rank
1	Limited participation of parents in school activities.	<b>108.02</b>	<b>1</b>
2	Weak parent-teacher associations (PTAs) for nutrition issues.	<b>102.77</b>	<b>2</b>
3	Poor coordination between schools and anganwadi centres.	42.12	5
4	Weak implementation of mid-day meal quality standards.	48.24	4
5	Absence of monitoring of children's nutrition at household level.	<b>95.36</b>	<b>3</b>

The analysis of organizational constraints faced by teachers in the provision of nutrition education revealed several critical barriers listed above in table 3. In terms of RBQ scores, the most significant limitation was the parents' limited involvement in school activities (RBQ = 108.02, Rank 1). Sherman and Muehlhoff (2007) reported similar results, emphasizing the importance of parent involvement in maintaining school-based interventions and reinforcing nutrition messages at home.

The inability of parent-teacher associations (PTAs) to adequately address nutrition-related issues was the second

most significant limitation (RBQ = 102.77, Rank 2). But prior research has generally recognized that PTAs in rural areas don't function well (Perikkou et al., 2015; Jorgensen et al., 2014).

Another significant constraint was the lack of routine household-level monitoring of children's nutrition (RBQ = 95.36, Rank 3). This is consistent with the findings of Krukowski et al. (2024), who pointed out that the impact of nutrition programs is diminished when follow-up monitoring is not conducted because there is no feedback loop to gauge progress or modify tactics.

**Table 4: Multiple regression analysis showing the effect of Socio-personal and Socio-economic variables on constraints in the provision of nutrition education (n=120)**

Sr. No	Independent variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
X <sub>1</sub>	Age	-0.035	0.052	-0.265	-1.341	0.144
X <sub>2</sub>	Gender	0.025	0.135	0.025	0.023	0.236
X <sub>3</sub>	Education	0.041	0.036	0.001	0.005	0.685
X <sub>4</sub>	Household size	0.152	0.078	0.125	1.653	0.054
X <sub>5</sub>	Annual Income	-1.053	0.005	-0.035	-0.354	0.763
X <sub>6</sub>	Occupation type	0.055	0.021	0.054	0.653	0.685
X <sub>7</sub>	Years of experience	0.045	0.245	0.063	0.047	0.365
X <sub>8</sub>	Availability of teaching aids	0.685	0.042	0.426	3.145***	0.002
X <sub>9</sub>	Size of land holding	-0.047	0.074	-0.021	-0.396	0.147
X <sub>10</sub>	Institutional support	0.523	0.036	0.453	3.865***	0.000
X <sub>11</sub>	Frequency of training programs	0.098	0.561	0.652	5.367***	0.000
X <sub>12</sub>	Awareness of nutrition policies	0.756	0.026	0.241	2.022**	0.061
X <sub>13</sub>	Budget/funds availability	0.384	0.084	0.413	4.534**	0.003
X <sub>14</sub>	Attitude toward nutrition education	0.058	0.025	0.156	0.005	0.425

R<sup>2</sup>=0.656      F=14.635\*\*\*      Durbin-Watson=1.624      \*\*\*significance at 0.01 level      \*\* significance at 0.05 level

Multiple regression analysis presented in Table 4 shows that with an R<sup>2</sup> value of 0.656, the variables in the regression equation are significant at the 0.01 level of probability and account for a significant amount of variation in the limitations in nutrition education delivery. According to the Durbin-Watson value of 1.624, the residuals do not appear to be autocorrelated.

At the 0.01 level of probability, it was determined that the frequency of training programs, institutional support, and the availability of teaching aids were the most significant independent variables. The availability of instructional

aids was noteworthy, emphasizing how sessions run more smoothly when there are easy-to-use resources. Teachers face fewer logistical and workload-related obstacles when schools offer coordination, time, and supervision, as evidenced by the highly significant institutional support. Frequency of training programs had the strongest, highly significant effect, showing that regular trainings make day-to-day delivery much easier for teachers. At the 0.05 level of probability, other variables such as budget/funds availability and awareness of nutrition policies were also found to be significant, suggesting that allocating funds for materials and activities directly alleviates constraints.

## CONCLUSION

This study systematically identified and prioritized the major constraints hindering the effective delivery of nutrition education in rural schools of Arwal district, Bihar. The results demonstrate the complexity of the issues, which cut across organizational, technical, and socioeconomic domains. Lack of institutional funding is the main socioeconomic barrier, making teachers rely on their own resources and making the difficulties caused by heavy workloads worse. On the technical front, parents, who are key influencers of dietary habits, lack practical knowledge not just of basic principles but, more importantly, of nutrient-retaining cooking methods and how to prepare affordable, balanced meals. In terms of organization, the poor community-school synergy—which is demonstrated by low parental involvement and ineffectual PTAs—threatens to seriously impair the dissemination of nutrition education outside of the classroom. Therefore, an integrated approach is needed to overcome these obstacles. Beyond merely disseminating information, interventions should involve: (1) setting aside specific government funds for NE programs in schools; (2) providing parents with practical, demonstration-based instruction on inexpensive, nutrient-conscious cooking; and (3) reviving PTAs to promote closer teacher-parent cooperation.

## IMPLICATIONS

- (1) The findings imply that NE should be formally integrated into larger national health and education missions. (e.g., Poshan Abhiyaan, Samagra Shiksha Abhiyan)
- (2) The study implies a need for better convergence between schools and other local systems, particularly Anganwadi centres under the ICDS.

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## CONFLICT OF INTEREST

All authors declare that they have no conflict of interest.

## REFERENCES

Beckwith, S., Cooper, M., Goesch, H., & MacKinnon, G. (2010). Where do we currently stand?

National Farm to School Network. <http://www.farmtoschool.org/learn>

Bhimani, G. J., Bariya, M. K., & Rathod, J. H. (2020). Knowledge regarding food and nutrition among farm women. *Gujarat Journal of Extension Education*, 31(1), 18–21.

Bibiloni, M. d. M., Pich, J., Pons, A., & Tur, J. A. (2013). Body image and eating patterns among adolescents. *BMC Public Health*, 13(1).

Gujral, S., Abbi, R., Mujoo, R., & Gopaldas, T. (1992). Determinants of community health workers' performance in India. United Nations University. <http://www.unu.edu/Unupress/food/8F134e/8F134E03.htm>

Gupta, D. D. (2012). Extension education: Core contents and emerging areas. *Agribios (India)*.

Hossain, M., Choudhury, N., Abdullah, K. A.-B., Mondal, P., Jackson, A. A., Walson, J., et al. (2017). Evidence-based approaches to childhood stunting in low- and middle-income countries: A systematic review. *Archives of Disease in Childhood*, 102(10), 903–909.

Ikpe, E. and Omede, U. D. (2025) Effect of rainfall variability on the yield of rice and farmers' resilience towards food security in selected local government area of Benue State of Nigeria. *Gujarat Journal of Extension Education*, 39(1): 19–27. <https://doi.org/10.56572/gjoe.2025.39.1.0004>

Jorgensen, T. S., Krølner, R., Aarestrup, A. K., Tjørnhøj-Thomsen, T., Due, P., & Rasmussen, M. (2014). Barriers and facilitators for teachers' implementation of the curricular component of the boost intervention targeting adolescents' fruit and vegetable intake. *Journal of nutrition education and behaviour*, 46(5), e1-e8.

Krukowski, R. A., Denton, A. H., & König, L. M. (2024). Impact of feedback generation and presentation on self-monitoring behaviors, dietary intake, physical activity, and weight: A systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity*, 21(1), Article 3. <https://doi.org/10.1186/s12966-023-01550-7>

McAleese, J. D., & Rankin, L. L. (2007). Garden-based nutrition education affects fruit and vegetable

- consumption in sixth-grade adolescents. *Journal of the American Dietetic Association*, 107(4), 662–665.
- Parmar, H. R., & Patel, M. M. (2021). A study on nutritional knowledge and practices of rural adolescents in Gujarat. *Gujarat Journal of Extension Education*, 32(2), 112–116.
- Perikkou, A., Kokkinou, E., Panagiotakos, D. B., & Yannakoulia, M. (2015). Teachers' readiness to implement nutrition education programs: beliefs, attitudes, and barriers. *Journal of Research in Childhood Education*, 29(2), 202-211.
- Sabarathnam, V.E. (1988). Manuals of field experience training for ARS Scientists. *NAARM, Hyderabad*, 21.
- Sherman, J., & Muehlhoff, E. (2007). Developing a nutrition and health education program for primary schools in Zambia. *Journal of nutrition education and behavior*, 39(6), 335-342.
- Soliman, A., De Sanctis, V., & Elalaily, R. (2014). Nutrition and pubertal development. *Indian Journal of Endocrinology and Metabolism*, 18(Supply), S39–S47. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4266867/>
- Soni D.N. and Kamaliya K.B. (2009) Awareness of farm women about human nutrition. *Gujarat Journal of Extension Education* 20- 21: 79-81
- Sungkowo, S., Budi, S., & Siti, M. (2008). Intervensi pengayaan pengetahuan pangan dan gizi pada muatan lokal untuk Sekolah Menengah Pertama di Kabupaten Lampung Barat. *Jurnal Gizi dan Pangan*, 3(3), 156–166.
- Vaghela, A. G., Patel, G. J., & Dedun, V. (2019). Identification of effective extension methods as perceived by progressive farmers. *Gujarat Journal of Extension Education*, 30(1), 90–92.
- Vinaya Kumar, H. M, Gattupalli, N, Babu, SC and Bhatia, A. (2020). Climate-Smart Small Millets (CSSM): A Way to Ensure Sustainable Nutritional Security. In: Venkatramanan V., Shah S., Prasad R. (eds) *Global Climate Change: Resilient and Smart Agriculture*. Springer, Singapore. DOI: [https://doi.org/10.1007/978-981-32-9856-9\\_7](https://doi.org/10.1007/978-981-32-9856-9_7)
- Vinaya Kumar, H. M., Aishwarya P. and Patel, J. B. (2022). Gender, Climate Change, Food and Nutritional Security: A Nexus Approach. Conference: SEEG National Seminar on “Synergetic Extension Approaches for Livelihood Improvement and Agricultural Development” At: Junagadh Agricultural University, Junagadh (Gujarat), India. 57-66.

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