

Original Research Article

Knowledge, attitude and practices among mothers of children regarding vitamin supplementation in selected rural areas of Chitradurga

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Received: 14 September 2026

Accepted: 15 October 2026

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ABSTRACT

Background: Vitamins are essential micronutrients required for growth, immunity, and overall development in children. Inadequate knowledge and improper practices regarding vitamin supplementation among mothers may lead to adverse health outcomes, particularly in rural populations. Therefore, this study aimed to assess the knowledge, attitude, and practices (KAP) regarding vitamin supplementation, evaluate the impact of an educational intervention, and determine the association with socioeconomic factors.

Methods: A community-based, cross-sectional study was conducted among 204 mothers aged 0-12 years across three selected rural areas of Chitradurga. Data were collected using self-designed, pre-validated questionnaire consisting of five 10-item sections covering socio-demographics, KAP before and 1-2 weeks following an educational intervention delivered via leaflets and verbal communication. Data were analysed using IBM SPSS version 27, employing descriptive statistics, paired t-tests, and chi-square tests.

Results: At baseline, only 33 (16.2%) of participants had good knowledge and 30 (14.7%) demonstrated good practices, while over 184 (90%) showed a positive attitude toward vitamin supplementation. Awareness regarding the correct age 16 (7.8%) and dosage 5 (2.5%) was notably low. Following the educational intervention, practice scores improved significantly from 3.08 to 5.55 ($p<0.001$). No significant association was found between socioeconomic status and practice levels.

Conclusions: Mothers demonstrated poor knowledge and practices despite having a positive attitude toward vitamin supplementation. Educational interventions significantly improved practices, indicating that lack of awareness rather than financial constraints is the primary barrier.

Keywords: Vitamin supplementation, Mothers, Child health, KAP study, Rural population, Educational intervention

INTRODUCTION

Vitamins are essential nutrients required for the body's basic processes, including metabolism, growth, and the maintenance of normal physiological functions.¹ Since the human body cannot synthesize most vitamins in adequate amounts, they must be obtained through diet or supplementation.² However, minimum nutritional requirements are often not met, necessitating supplementation.³

Vitamins perform various biochemical functions in the body. For instance, vitamin A plays an important role in growth, vision, and immunity; B-complex vitamins act as coenzymes in metabolic processes; vitamin C functions as an antioxidant; and vitamin D is essential for bone growth and calcium homeostasis.⁴⁻¹⁰ Vitamin E also acts as an antioxidant protecting cells from oxidative stress, while vitamin K plays a key role in blood clotting and bone metabolism.¹¹ Deficiencies of these vitamins can lead to impaired immunity, growth disturbances, and

increased susceptibility to infections, particularly among children.¹²

Mothers play a vital role in ensuring proper nutrition and healthcare for their children. Their KAP regarding vitamin supplementation directly influence child health outcomes.¹³ Studies have reported inadequate awareness regarding the appropriate age and dosage for supplementation, despite generally positive attitudes toward its use.¹⁴

In rural areas of Chitradurga, lack of specific knowledge may be a more significant factor influencing practices than socioeconomic constraints. This gap between knowledge and practice highlights the need for targeted educational interventions to improve awareness and promote appropriate health behaviours.

Therefore, the present community-based, cross-sectional observational study was conducted to assess the KAP regarding vitamin supplementation among mothers of children and to evaluate the effect of a structured educational intervention on their practices. The study also aimed to determine the association between socioeconomic status and practice levels.

METHODS

A community-based, cross-sectional observational study featuring a pre-test/post-test educational intervention component was conducted over a six-month period from April 2025 to September 2025.

The study was carried out in selected rural areas of the Chitradurga district, Karnataka, India, specifically targeting the rural areas of Kodanahatti, Medahalli, and Matadakurubarahatti. Active field data collection and the educational intervention took place between April and July 2025.

Study participants and eligibility

Mothers of children ranging from infancy up to 12 years of age who were permanent residents of the selected rural areas were eligible for inclusion. Conversely, mothers of children older than 12 years, residents of urban areas, and mothers with communication impairments or psychiatric disorders were excluded from participation. A final sample size of 204 mothers participated in and completed the study.

Variables and scoring matrix

The primary outcomes measured were maternal KAP (both baseline and post-intervention) regarding vitamin supplementation. Independent variables included socio-demographic and socioeconomic status details. A cut-off score of ≥ 6 in each section was used to categorize a mother as having “good knowledge,” a “positive attitude,” or “good practice.”

Data sources and instrumentation

Primary field data were obtained directly through structured, face-to-face maternal interviews. Following an exhaustive review of contextual literature, a self-designed research instrument was developed and subsequently validated by a panel of subject experts. To ensure optimal comprehension and linguistic fidelity, the questionnaire was prepared in parallel English and Kannada formats. The instrument architecture comprised six distinct, structured sections containing 10 closed-ended questions. Section 1 gathered comprehensive details, specifically capturing the mother's name, age, locality, occupation, level of education, family size, and number of children. Section 2 comprised the 10-item knowledge assessment domain, section 3 consisted of the 10-item attitude assessment domain, while section 4 formed the 10-item socioeconomic assessment domain. Finally, section 5 and section 6 established the 10-item baseline pre-intervention practice and post-intervention practice domains, respectively.

Intervention protocol and evaluation

After completing the baseline pre-test questionnaire, mothers received an educational intervention through verbal counselling and an informational leaflet. The education focused on the benefits of vitamin supplementation, consequences of vitamin deficiencies, safe administration practices, and natural food sources rich in vitamins. A post-test assessment using the final 10-item practice module was conducted 1-2 weeks later. The post-test items evaluated the same domains but used distinct, parallel questions to track changes in cumulative scores rather than repeating the exact same questions.

Sample size and bias minimization

The sample size of 204 participants was calculated using Cochran's formula based on a 95% confidence level, a 10% margin of error, and an anticipated 5% non-response rate. To minimize bias, the questionnaire was validated by experts and pre-tested on a pilot sample equal to 10% of the total sample size (excluded from the final data). Standardized explanations were used across all households, and the data were kept anonymous.

Statistical analysis

Data were compiled in Microsoft excel and analysed using IBM SPSS Statistic version 27. Descriptive statistics used frequencies, percentages, means, and standard deviations. A paired t test was used to compare the difference between average pre-test and post-test practice scores.

The association between socioeconomic status and baseline practice levels was calculated using the chi-square test of independence along with Cramer's V. Statistical significance was set at a $p < 0.05$.

Ethical considerations

The study protocol was approved by the institutional ethics committee (IEC) of SJM College of Pharmacy, Chitradurga (Ref. No. SJMCP/527/2025-26) on April 21, 2025. Written informed consent was obtained from all participants after explaining the study purpose in their local language. All participant information was kept strictly confidential.

RESULTS

Demographic characteristics of participants

A total of 204 mothers participated in the study. Among the 204 mothers, 110 (53.92%) were aged 20-29 years, 78 (38.24%) were aged 30-39 years, 9 (4.41%) were aged 13-19 years and 7 (3.43%) were aged 40-49 years. Most participants were housewife (140; 68.63%), and (64; 31.36%) were either employed or engaged in agriculture. Regarding education, 92 (45.10%) had college/university education, 81 (39.71%) had completed secondary, 26 (12.75%) had primary education and 5 (2.45%) had no formal education as shown in Table 1.

Baseline knowledge

Only 33 of 204 mothers (16.2%) achieved the predefined good-knowledge threshold. Although 103 (50.5%) mothers knew that vitamin supplementation was important for children, only 16 (7.8%) knew the recommended age for starting supplementation and 5 (2.5%) knew the appropriate dosage according to age. Only 24 (11.8%) had previously received information or training on vitamin supplementation. These findings indicate that general awareness of supplementation was considerably better than knowledge of specific recommendations. The details are mentioned in Table 2.

Attitude toward vitamin supplementation

Attitudes were markedly more favorable than knowledge and practice. Almost all mothers 202 (99.0%) believed vitamin supplementation was necessary for their child's health, while 199 (97.5%) trusted information provided by healthcare professionals. A total of 185 (90.7%) believed supplementation should be a routine part of childcare and 197 (96.6%) supported government initiatives providing free vitamin supplements. Overall, 193 (94.6%) participants met the predefined positive-attitude threshold.

Baseline practice

Only 30 (14.7%) mothers achieved a baseline practice score of ≥ 6 . Regular administration of vitamin supplements was reported by 34 (16.7%), consultation with a doctor regarding the child's vitamin needs by 33 (16.2%), label checking before purchasing supplements

by 41 (20.1%), and ensuring the correct dosage by 32 (15.7%). In contrast, 120 (55.8%) reported including vitamin-rich foods in child's daily diet and 136 (66.7%) reported encouraging other mothers to provide vitamin supplements, as shown in Table 3. The distribution of mothers according to baseline KAP regarding vitamin supplementation is shown in the Figure 1.

Change in overall practice score following educational intervention

All 204 participants completed the post-test. The mean overall practice score increased from 3.08 ± 1.967 at baseline to 5.55 ± 1.694 after the educational intervention, representing a mean increase of 2.466 points. The paired t-test showed a statistically significant difference between the two overall scores ($t=13.533$, $df=203$, $p<0.001$). After the intervention, 131 (64.2%) participants achieved a practice score ≥ 6 compared with 30 (14.7%) at baseline, as shown in Table 4.

Importantly, the pre-test and post-test practice questionnaires used different but conceptually related questions. Therefore, the significant paired comparison should be interpreted as evidence of improvement in the overall practice score across comparable practice domains among the same participants, rather than as evidence of change in each identical practice item.

Association between socioeconomic status and practice

Baseline practice was categorized as poor (<6) or good (≥ 6), while socioeconomic status was classified as low, medium or high according to the study scoring system. Good practice was observed in 10 (12.2%) participants in the low socioeconomic group, 13 (21.0%) in the medium group and 7 (11.7%) in the high group. There was no statistically significant association between socioeconomic status and baseline practice, $\chi^2(2)=2.792$, $p=0.248$; Cramer's $V=0.117$, indicating a weak association, as shown in Table 5.

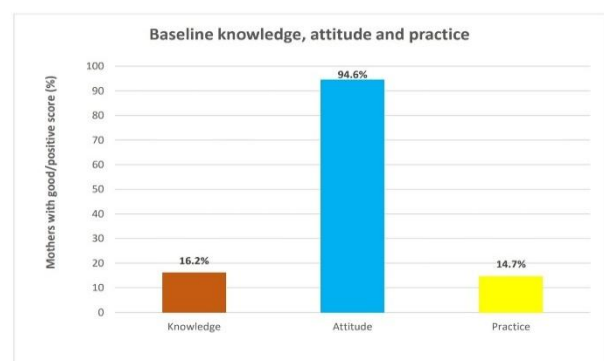


Figure 1: Distribution of mothers according to baseline KAP regarding vitamin supplementation.

Table 1: Demographic characteristics of participants, (n=204).

Variables	Category	N	Percentage (%)
Age (in years)	13-19	9	4.41
	20-29	110	53.92
	30-39	78	38.24
	40-49	7	3.43
Occupation	Housewife	140	68.63
	Employed	64	31.36
Education	No formal education	5	2.45
	Primary	26	12.75
	Secondary	81	39.71
	College/University	92	45.10

Table 2: Selected baseline knowledge indicators regarding vitamin supplementation.

Knowledge indicators	Frequency		Percentage (%)	
	Yes	No	Yes	No
Importance of vitamin supplementation	103	101	50.5	49.5
Aware of essential vitamin types	62	142	30.4	69.6
Understood benefits of supplementation	80	124	39.2	60.8
Previously received information/training	24	180	11.8	88.2
Knew recommended age to start supplementation	16	188	7.8	92.2
Aware of consequences of vitamin deficiencies	90	114	44.1	55.9
Knew where to obtain reliable information	66	138	32.4	67.6
Aware of government/free supplementation programmes	88	116	43.1	56.9
Understood role of diet in vitamin provision	36	168	17.6	82.4
Knew appropriate dosage according to age	5	199	2.5	97.5

Table 3: Selected baseline practice indicators regarding vitamin supplementation.

Practice indicators	Frequency		Percentage (%)	
	Yes	No	Yes	No
Regularly give supplements as recommended	34	170	16.7	83.3
Consulted a doctor about vitamin needs	33	171	16.2	83.8
Check supplement labels before purchase	41	163	20.1	79.9
Experienced difficulty accessing supplements	92	112	45.1	54.9
Include vitamin-rich foods in daily diet	120	84	55.8	41.2
Noticed health improvement after supplementation	99	105	48.5	51.5
Ensure correct dosage	32	172	15.7	84.3
Attended nutrition/vitamin awareness session	18	186	8.8	91.2
Encourage other mothers to provide supplements	136	68	66.7	33.3
Stopped supplements because of side effects/concerns	24	180	11.8	88.2

Table 4: Comparison of overall practice scores before and after the educational intervention.

Outcomes	Pre-test	Post-test	Mean difference	Test statistic	P value
Mean practice score $\pm$ SD	3.08 $\pm$ 1.967	5.55 $\pm$ 1.694	-	-	-
Participants with score ≥ 6 (n, %)	30 (14.7%)	131 (64.2%)	-	-	-
Paired t test	-	-	2.466	13.533	<0.001

Table 5: Association between socioeconomic status and baseline practice.

Socioeconomic status	Poor practice, n (%)	Good practice, n (%)	Total
Low	72 (87.8)	10 (12.2)	82
Medium	49 (79.0)	13 (21.0)	62
High	53 (88.3)	7 (11.7)	60
Total	174	30	204

DISCUSSION

This community-based observational study assessed the KAP regarding vitamin supplementation among mothers in selected rural areas of Chitradurga, followed by an educational intervention. The study enrolled 204 participants for a study period of six months from three different rural areas of Chitradurga (Kodanahatti, Matadakurubarahatti, Medahalli) after obtaining IEC approval. A self-designed and validated questionnaire was used for data collection. Findings revealed important gaps in knowledge and practice, despite a generally positive attitude towards vitamin supplementation.

The study showed that only 16.2% of mothers had good baseline knowledge (score ≥ 6). While nearly half of the respondents were aware of the importance of vitamin supplementation, very few knew the recommended age to initiate supplementation (7.8%) or the correct dosage (2.5%). This indicates that although mothers recognized the concept of supplementation, their understanding of specifics was poor. These findings align closely with previous research conducted in Ahmedabad, Euphrates and Tamil Nadu, where mothers likewise exhibited deficient baseline knowledge.^{4,15,16}

Despite limited knowledge, mothers demonstrated overwhelmingly positive attitudes. Over 90% believed supplementation should be part of routine childcare, trusted healthcare professionals, and supported government initiatives to provide free supplements. This encouraging trend suggests that positive attitudes can foster behavioural adjustments when paired with proper knowledge and resources, consistent with prior studies from China, Libya and Jordan.^{10,17-19}

At baseline, only 14.7% of mothers had good practices (score ≥ 6). The most common behaviours included adding vitamin-rich foods to diets (55.8%) and encouraging others (66.7%), but few mothers regularly gave supplements (16.7%) or ensured correct dosage (15.7%). This discrepancy between attitude and practice highlights key barriers such as accessibility, cost, and a lack of professional guidance. These observations mirror those documented in a prior studies from Saudi Arabia and Bangladesh.^{9,20}

The intervention significantly improved mothers' practices. The mean practice score increased from 3.08 to 5.55 ($p < 0.001$), with the proportion of mothers achieving good practice scores rising markedly. Notably, behaviours such as label checking, consulting providers, and giving correct dosages improved substantially. This suggests that targeted health education can successfully translate positive attitudes into improved practices. The findings are consistent with prior interventional studies, which demonstrated that structured health education significantly enhances maternal practices regarding child nutrition. Interestingly, the paired sample correlation between pre- and post-test scores was negligible,

indicating that improvement was independent of initial practice levels. This highlights that even mothers with very poor baseline practices benefitted from the intervention.

No significant association was found between socioeconomic status and practice levels ($p = 0.248$). This suggests that poor practices were widespread across all socioeconomic groups, reinforcing the need for universal educational strategies rather than targeting specific economic groups. However, other study conducted in Tamil Nadu demonstrated that maternal educational status shows significant association with vitamin knowledge, which directly impacts practice levels.²¹ Our study reveals that although mothers demonstrated poor baseline knowledge and practices, their positive attitudes toward vitamin supplementation provided a foundation for change. The educational intervention significantly improved practices, underscoring the effectiveness of community-based health education. Scaling such interventions through government and primary healthcare platforms could substantially reduce micronutrient deficiencies among children in rural areas.

Limitations

The study was limited to one district (Chitradurga), which may restrict generalizability. Additionally, data were based on self-reported practices, which may be subjected to recall or social desirability bias. Finally, the follow-up period was short, so long-term sustainability of improved practices was not assessed.

CONCLUSION

The present study indicated that although mothers in the rural areas of Chitradurga demonstrated very limited baseline knowledge and poor practices regarding vitamin supplementation for children, their overall attitudes were highly positive and supportive toward the idea of supplementation. This positive outlook served as a strong foundation for change once mothers were provided with targeted educational interventions. The Intervention significantly improved their practices, as evidenced by a substantial rise in mean practice scores and a higher proportion of mothers meeting the threshold for good practice. Importantly, the improvement was consistent across all socioeconomic groups, suggesting that lack of awareness and guidance, rather than financial or social barriers alone, was the key factor influencing poor practices. These findings emphasize that community-based health education programs, when delivered effectively, can bridge the gap between favourable attitudes and actual behavioural practices. Therefore, integrating structured health education into routine maternal and child health services, strengthening government led supplementation programs, and ensuring easy access to supplements could play a pivotal role in reducing micronutrient deficiencies among children in rural populations.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Yamunambigai M, Manohari K, Nithiya K. A descriptive study to assess the knowledge regarding vitamin A deficiency among mothers of under five children in selected rural areas at Puducherry. *Int J Adv Res*. 2023;11(2):685-91.
2. Vora A, Patel P, Gohel P, Mistry P, Rathod Z, Saraf M. A review on vitamins: it's biological role and deficiencies in humans. *Vidya-A J Gujarat University*. 2022;1(2):70-5.
3. Corsello A, Spolidoro GC, Milani GP, Agostoni C. Vitamin D in pediatric age: Current evidence, recommendations, and misunderstandings. *Front Med*. 2023;10:1107855.
4. Arpit Prajapati AP, Asha Solanki AS, Sonaliya KN. Knowledge, attitude and practices among mothers of pre-school children regarding vitamin A supplementation at field practice area of GCS Medical College, Ahmedabad. *Healthline*. 2015;6:23-28.
5. Youness RA, Dawoud A, ElTahtawy O, Farag MA. Fat-soluble vitamins: updated review of their role and orchestration in human nutrition throughout life cycle with sex differences. *Nutrit Metabolism*. 2022;19(1):60.
6. Mangshetty S, Patil A, Mangshetty R. A study of clinical spectrum of vitamin B12 deficiency in pediatric age group in a tertiary care hospital. *Int J Contemp Pediatr*. 2025;12:602-8.
7. Hanna M, Jaqua E, Nguyen V, Clay JB. Vitamins: functions and uses in medicine. *Perm J*. 2022;26(2):89-97.
8. Maggini S, Wenzlaff S, Hornig D. Essential Role of Vitamin C and Zinc in Child Immunity and Health. *J Int Med Res*. 2010;38:386-414.
9. Bassam SE, Abd-Elmageed FN. Mothers' knowledge, practice, and attitudes toward vitamin D deficiency among children in the Qassim region, Kingdom of Saudi Arabia. *J Med Life*. 2022;15(9):1100.
10. Yu C, Cai J, Wang C, Luo Y, Fang J. Knowledge, attitude, and practice toward pediatric vitamin D deficiency among parents. *Front Pediat*. 2024;12:1393488.
11. Jain G, Adhikari KM, Vasnik GK, Singh D, Somasundaram V, Gupta R, et al. Prevalence of subclinical vitamin K deficiency in early infancy in exclusively breast-fed term infants. *J Marine Med Society*. 2023;25(1):S55-7.
12. Adhulia A, Maurya M, Tiwari AD. Developmental delay in children with severe acute malnutrition and its association with vitamin b12 deficiency. *Indian J Child Health*. 2019;6:548-51.
13. Soliman NS, Wahdan MM, Abouelezz NF, Sabbour SM. Knowledge, attitude and practice towards vitamin D importance and supplementation among mothers of under five children in a primary health care center in Cairo. *Egypt J Community Med*. 2020;38(4):62-75.
14. Sheth AM, Rangoonwala MM, Lodhiya KK, Zalavadiya DD, Joshi NB. A study on awareness and practice regarding Vitamin A intake and its deficiency disorders among mothers of pre-school children in Khirasara village, Rajkot, Gujarat. *National J Community Med*. 2016;7(06):505-9.
15. Abbas HF, Kassim NM, Hameed IH, Danook AS. Assessment of knowledge, attitudes, and traditional preventive practices of the mothers toward vitamin (d) deficiency among children in the middle Euphrates pediatric teaching hospitals. *Turk J Physiot Rehabil*. 2021;32(3):1.
16. Kavitha D, Anjalakshi C, Venkataraman P, Murali. Knowledge, attitude and practice regarding vitamin d deficiency among antenatal mothers in Tamilnadu. *Int J Pharm Bio Sci*. 2015;6(4):486-97.
17. Xu J, Zhang L, Yu D, Zhai X, Zhang R. Parents' knowledge, attitudes, and practices regarding vitamin A and D intake in children: a study from Yangzhou, China. *BMC Public Health*. 2025;25(1):700.
18. Abdulmalek L, Benkhaial F. Knowledge, attitude, and practice of parents regarding Vitamin A supplementation to children in Benghazi, Libya. *Ibnosina J Med Biomed Sci*. 2018;10(05):174-7.
19. Elshahoryi NA, AlShwareb AA, Al-Maseimi OD, Khomsan A, Sweidan DH. Nutrition-related knowledge, attitudes, and practices (KAP) of preschool children's mothers and associated factors. *Int J Res Stud Med Health Sci*. 2022;7:1-9.
20. Sultana P, Hasan KM. Mother's nutritional knowledge and practice: a study on slum area of Khulna City. *Europ J Med Health Sci*. 2020;2(6):1-6.
21. Sakthivel M, Selvaraj K. A Cross-Sectional Study on the Knowledge, Attitude and Practice of vitamin A Supplementation Among Mothers Having Child Under 5 years of age residing in Parandur Village, Kanchipuram, Tamil Nadu, India. *Ann Romanian Soc Cell Biol*. 2020;24:1062-8.

Cite this article as: Lalbiakngheta C, Channeswara DD, Lalremruati HS, Sannathimanna NK, Rajashekar Y. Knowledge, attitude and practices among mothers of children regarding vitamin supplementation in selected rural areas of Chitradurga. *Int J Contemp Pediatr* 2026;13:2280-5.