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Original Research Article

Cross-sectional assessment of nutritional status, knowledge, attitudes and practices of lactating mothers in selected rural and urban areas of Vijayapura District, Karnataka

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ABSTRACT

Background: Maternal nutrition and appropriate infant feeding practices are critical determinants of maternal and child health. However, inadequate dietary intake and suboptimal breastfeeding practices remain major public health concerns in many parts of India, particularly in rural communities. The present study assessed the nutritional status, dietary intake, and knowledge, attitudes, and practices (KAP) related to breastfeeding among lactating mothers in rural and urban areas of Vijayapura district, Karnataka.

Methods: A community-based cross-sectional study was conducted among 200 lactating mothers aged 18-35 years selected through multistage random sampling from rural and urban areas of Vijayapura district. Data were collected using a pre-tested structured questionnaire to obtain socio-demographic information and breastfeeding-related KAP. Anthropometric measurements were used to determine body mass index (BMI), and dietary intake was assessed using a three-day 24-hour dietary recall method. Data were analyzed using descriptive statistics, chi-square tests, and independent t-tests.

Results: Among the respondents, 15% were underweight and 22.5% were obese. Energy intake was lower than recommended levels, with rural mothers meeting 43.66% and urban mothers 54.55% of daily requirements. Protein adequacy was higher among urban mothers (83.85%) than rural mothers (63.10%). Intake of iron, calcium, and vitamin C was inadequate in both groups. Although awareness of exclusive breastfeeding was high (94.5%), only 35.5% initiated breastfeeding within the first hour of birth, and 26% practiced pre-lacteal feeding.

Conclusions: The findings indicate gaps in maternal nutrition and breastfeeding practices. Strengthening nutrition education and breastfeeding counselling through community health programs is essential to improve maternal and infant health outcomes.

Keywords: Attitudes, Infant feeding, Knowledge, Lactating mothers, Longitudinal study, Maternal health, Nutritional status, Practices, Rural-urban disparities

INTRODUCTION

Maternal and child nutrition is a critical public health concern in developing countries, where malnutrition, inadequate dietary diversity, and improper infant feeding practices contribute significantly to adverse health outcomes.[2,6] The nutritional status of lactating mothers directly influences breast milk quality, infant growth, immunity, and overall development.[2,20] Therefore, understanding mothers' knowledge, attitudes, and practices (KAP) related to breastfeeding and complementary feeding is essential for designing effective

interventions that support both maternal and child health.[3,8] India continues to face a high burden of malnutrition, with pronounced rural–urban disparities. According to NFHS-5 (2021), 32.1% of children under five are underweight and 35.5% are stunted, reflecting persistent nutrition challenges.[7] Maternal undernutrition, anemia, and micronutrient deficiencies remain widespread and directly affect infant nutritional outcomes.[2,6,10] Vijayapura district in Karnataka, known for its socio-economic inequalities, limited dietary diversity in rural areas, and varying cultural beliefs related to infant feeding, provides a relevant context for studying these disparities.[5,24] Urban areas within the district may have better access to healthcare and nutrition education, while rural communities continue to rely on traditional feeding practices that may not align with recommended guidelines.[1,5,24]

Breastfeeding and complementary feeding practices are influenced by maternal education, household income, cultural norms, and access to health services.[17,24] Although the World Health Organization recommends exclusive breastfeeding for the first six months followed by continued breastfeeding with complementary foods, adherence remains inconsistent across India.[22,23] Studies indicate that gaps in knowledge, cultural misconceptions, and socio-economic barriers continue to hinder optimal infant feeding practices.[8,12,14,15]

Despite the growing evidence on maternal and infant nutrition, limited research has explored longitudinal changes in KAP and dietary intake among lactating mothers in districts like Vijayapura, where cultural and socio-economic disparities remain prominent.[5,6,24] This represents a significant research gap.

The present study aimed to assess and compare the nutritional status, dietary intake, and infant feeding practices of lactating mothers in rural and urban areas of Vijayapura district. By using a longitudinal approach, the study captures changes in breastfeeding behaviors, complementary feeding patterns, and nutrient adequacy over time. The findings are expected to guide policymakers, public health professionals, and community workers in developing culturally appropriate nutrition education programs and targeted interventions to improve maternal and child health outcomes in the region.[22,23]

METHODS

This cross-sectional observational study was conducted among lactating mothers in selected rural and urban areas of Vijayapura District, Karnataka, from March 2024 to August 2024. A total of 200 mothers aged 18-35 years were selected using a multistage random sampling technique.

First, rural and urban areas were randomly identified, followed by the random selection of Anganwadi Centres, Primary Health Centres (PHCs), Urban Health Centres, and community health camps within these areas. Eligible lactating mothers were then chosen through simple random sampling to ensure equal representation from rural (n=100) and urban (n=100) settings. Mothers were included if they were permanent residents, aged 18-35 years, within 12 months postpartum, and willing to provide informed consent. Those with chronic illnesses, pregnancy complications, or on therapeutic diets were excluded.

Data were collected using a pre-tested structured questionnaire that captured socio-demographic characteristics and assessed the mothers' knowledge, attitudes, and practices (KAP) regarding breastfeeding and complementary feeding. Nutritional status was evaluated using anthropometric measurements, including height measured with a portable stadiometer and weight assessed using a calibrated digital weighing scale, from which body mass index (BMI) was calculated using WHO Asian classification standards. Dietary intake was assessed using a three-day 24-hour dietary recall method, excluding holidays and festivals, and household measures were converted to grams using standard food models and the Indian food composition tables (IFCT). All instruments were calibrated daily to maintain accuracy.

Written informed consent was obtained from all participants prior to data collection. Data were analyzed using SPSS software. Descriptive statistics such as mean, standard deviation, frequencies, and percentages were calculated, while inferential statistics including chi-square tests and independent t-tests were applied to examine associations and compare mean nutrient intake between rural and urban mothers. A p value of less than 0.05 was considered statistically significant.

RESULTS

The socio-economic profile of respondents is detailed in Table 1. The majority (64.5%) of mothers were aged 18-25 years, with a higher prevalence in rural areas (74%) than urban areas (55%). Urban areas had a greater proportion of mothers aged 26-30 years (41%) compared to rural areas (25%). Only 2.5% of participants were aged 31-35 years, and no respondents were above 35 years of age.

Hinduism was the predominant religion (83%), with higher representation in rural areas (98%) compared to urban areas (69%). Muslims accounted for 16 percent, predominantly in urban areas (29%), while Christians represented only one percent of the total respondents. Most respondents belonged to joint families (77%), with rural areas (82%) showing a slightly higher prevalence than urban areas (72%).

Table 1: Socio economic profile of the respondents (n=200).

Characteristics	Category	Number of subjects (rural) (n=100)	Number of subjects (urban) (n=100)	Total (n=200)	Percentage	Chi-square (p value)
Age of respondent (years)	18-25	74.0	55.0	129	64.5	0.2133^{NS}
	26-30	25.0	41.0	66.0	33.0	
	31-35	1.00	4.00	5.00	2.50	
	>35	0.00	00.0	0.00	0.00	
	Total	100	100	200	100	
Religion	Hindu	98.0	69.0	167	83.0	0.2381^{NS}
	Christian	0.00	2.00	2.00	1.00	
	Muslim	2.00	29.0	31.0	16.0	
	Others	0.00	0.00	0.00	0.00	
	Total	100	100	200	100	
Nature of family	Nuclear	18.0	28.0	46.0	23.0	0.1305^{NS}
	Joint	82.0	72.0	154	77.0	
	Total	100	100	200	100	
Education	Illiterate	0.00	0.00	0.00	0.00	0.1505^{NS}
	Primary	51.0	0.00	51.0	25.5	
	High school	32.0	16.0	48.0	24.0	
	PUC	10.0	15.0	25.0	12.5	
	Degree	7.00	58.0	65.0	32.5	
	Diploma	0.00	0.00	0.00	0.00	
	>Degree	0.00	11.00	11.0	5.50	
	Total	100	100	200	100	
Occupation	House wives	97.0	78.0	175	87.5	0.2381^{NS}
	Labor	0.00	2.00	2.00	1.00	
	Government-employee	3.00	5.00	8.00	4.00	
	Non-government employee	0.00	15.0	15.0	7.50	
	Total	100	100	200	100	
Monthly income	5000-10000	37.0	1.00	38.0	19.0	0.2133^{NS}
	10000-20000	44.0	16.0	60.0	30.0	
	20000-30000	8.00	36.0	44.0	22.0	
	30000 and above	11.0	47.0	58.0	29.0	
	Total	100	100	200	100	

NS – Not significant

Educational attainment varied significantly, with 32.5 percent of mothers holding degrees. Urban mothers were more educated (58%) compared to rural mothers (7%). Primary education was more common among rural respondents (51%), whereas urban respondents had a higher percentage of those with a degree or above (69%). None of the respondents were illiterate.

A majority of respondents (87.5%) were housewives, with a higher percentage in rural areas (97%) than urban areas (78%). Only a small fraction of respondents was employed, with four percent working as government employees and 7.5 percent in non-government jobs. Monthly income levels highlighted no significant urban-rural disparities. A larger proportion of rural respondents (81%) reported an income between ₹5,000-20,000, whereas urban respondents were more likely to have higher income levels, with 36 percent earning ₹20,000-30,000 and 47% earning above ₹30,000. No significant difference was found between rural and urban socio-economic status of respondents in Vijayapura

The data presented in Table 2. Knowledge of the respondents regarding breast feeding shows that, a high proportion (94.5%) had heard about exclusive breastfeeding, with universal awareness among urban mothers. Postnatal counseling on breastfeeding was received by 95.5% of respondents, primarily through mothers (59.5%) or hospital staff (40.5%), with rural mothers relying more on familial knowledge.

Most respondents (62%) recognized the correct six-month duration for exclusive breastfeeding, though 22.5% believed it should be only three months. Awareness about colostrum was moderate, with 36% considering it beneficial, while 14% were unaware of its importance. A significant proportion (68.5%) acknowledged the nutritional value of breast milk, while fewer recognized its protective (26.5%) or maternal health benefits (5%).

Table 2: Knowledge of the respondents regarding breast feeding (n=200).

Characteristics	Categories	Rural (n=100)	Urban (n=100)	Total (%)	Chi-square (p value)
Awareness of exclusive breastfeeding	Yes	89.0	100	189 (94.5)	0.002*
	No	11.0	0.00	11 (5.5)	
Receipt of breastfeeding counselling during postnatal period	Yes	91.0	100	191 (95.5)	0.006*
	No	09.0	0.00	9.0 (4.5)	
If yes sources of breastfeeding information	Mother	52.0	67.0	119 (59.5)	0.01*
	Media	00.0	0.00	0.00 (0.00)	
	Hospital/Asha worker	48.0	33.0	81 (40.5)	
	Relative	00.0	0.00	0.00 (0.00)	
Duration of exclusive breastfeeding	3 months	45.0	0.00	45 (22.5)	0.26^{NS}
	6 months	27.0	0.00	27 (13.5)	
	9 months	03.0	0.00	03 (1.5)	
	12 months	24.0	100	124 (62)	
Opinion regarding colostrum feeding	Good for health	72.0	0.00	72 (36)	0.22^{NS}
	No should be discarded	00.0	0.00	0.00 (0.00)	
	Don't know	28.0	0.00	28 (14)	
Perceived advantages of breast milk	Nutritious	37	100	137 (68.5)	0.17^{NS}
	Protective	53	0.00	53 (26.5)	
	Economic	00	0.00	0.00	
	Good for mother	10	0.00	10 (5)	
	All above	00	0.00	0.00	

*- Significant; NS – Not significant

Table 3: Attitude of the respondents towards breast feeding.

Questions	Rural (n=100)					Urban (n=100)					χ^2
	Strong disagree	Disagree	Neutral	Agree	Strong agree	Strong disagree	Disagree	Neutral	Agree	Strong agree	P value
Formula feeding is more convenient than the breast feeding	81	20	00	00	00	100	00	00	00	00	NA^{NS}
Breast feeding increases infant and mother bonding	00	02	07	60	32	00	00	00	00	100	NA^{NS}
Breast fed babies are healthier and stronger than the formula fed babies	00	00	27	58	18	00	01	56	27	16	NA^{NS}
Formula feeding is the better choice if the mother plans to go back to her work	49	45	05	00	01	00	15	44	41	00	0.00*
Mother who formula feeds miss one of the great joys of motherhood	13	08	00	64	15	00	00	00	00	100	NA^{NS}
Breast fed babies are more likely to be over fed than formula fed babies	00	00	01	58	31	00	11	50	36	03	NA^{NS}
Breast milk is the ideal food for babies	00	03	13	46	41	00	00	00	00	100	NA^{NS}
Breast milk is more easily digested than formulas milk	00	00	17	54	30	00	00	00	39	61	NA^{NS}
Breast milk is cheaper than formula milk	04	01	10	40	50	00	12	35	37	16	0.00*
Benefit of breast feeding last only as long as the babies feed	00	00	01	31	69	03	70	24	03	00	0.00*

*If the p value is less than 0.05, you can conclude that there is a significant difference in responses between Rural and Urban areas for that question.
NS – Not significant

Table 4: Practice of the respondents regarding breast feeding (n=200).

Characteristics	Categories	Rural	Urban	Total (%)	Chi square (P value)
Time of initiation of breast feeding	Within 1 hour	43	28	71 (35.5)	0.21^{NS}
	1-4 hours	21	66	87 (43.5)	
	After 2days	20	06	26 (13)	
	After 5 days	16	00	16 (8)	
Duration of feeding the baby	Every 2hrs	70	61	131 (65.5)	0.29^{NS}
	3-4 hrs	15	00	15 (7.5)	
	Whenever baby cries	15	39	54 (27)	
	On demand	0.0	00	00.00	
Colostrum feeding practice after delivery	Yes	81	99	180 (90)	0.00*
	No	19	01	20 (10)	
Pre-lacteal feeding practice	Yes	39	13	52 (26)	0.00*
	No	61	87	148 (74)	
Type of pre-lacteal feed given	Sugar water	02	03	5 (2.5)	0.24^{NS}
	Honey	29	02	31 (15.5)	
	Plain water	06	07	13 (6.5)	
	Cow's milk	02	00	2 (1)	
Introduction of complementary foods before 6 months	Yes	56	23	79 (39.5)	0.00*
	No	47	77	124 (62)	
Type of complementary food introduced	Fruit juices	00	00	0.00	0.26^{NS}
	Cereals/Porridge	34	00	34 (17)	
	Cow's milk	15	00	15 (7.5)	
	Formula milk	07	23	30 (15)	

Note: *- Significant; NS – Not significant.

Table 5: Knowledge, attitude, and practices of rural and urban respondents regarding infant feeding practices.

Parameters	Rural (n=100)	Urban (n=100)	Total (N=200) (%)	P value
Good knowledge (9 to 12)	74	100	174(87.0)	0.00*
Poor knowledge (6 to 9)	26	00	026(13.0)	
Negative attitude (10-24 point)	00	00	000(00.0)	0.19^{NS}
Neutral attitude (25-37 point)	97	76	173(86.5)	
Positive attitude (38-50 point)	03	24	027(13.5)	
Poor practices (7-10 points)	00	00	000 (00.0)	NA^{NS}
Good practices (11-14 points)	100	100	200 (100)	

*- Significant; NS – Not significant

Table 6: Complication during delivery (n=200).

Characteristics	Categories	Rural (n=100)	Urban (n=100)	Total (%) (n=200)	P value
Type of delivery	Normal	45	60	105 (52.5)	0.05*
	C-section	55	40	95 (47.5)	
Health problems in the baby after birth	No complication	100	85	185 (92.5)	0.08^{NS}
	Jaundice	-	-		
	Fever	-	-		
	Low birth weight	-	15	15 (7.5)	
Start of breast feeding after delivery	Immediately	23	33	56 (28)	0.24^{NS}
	Within 6 hours	37	49	86 (43)	
	6-12 hours	03	13	16(8)	
	12-24 hours	14	00	14(7)	
	After 24 hours	23	05	28 (14)	

* - Significant; NS – Not significant.

Table 3 shows that a significantly majority of respondents (81% rural, 100% urban) strongly disagreed that formula feeding is more convenient than breastfeeding. Almost all urban mothers (100%) strongly agreed that breastfeeding enhances mother-infant bonding, whereas rural mothers were slightly divided, with 60% agreeing and 32% strongly agreeing.

Regarding health benefits, most rural respondents (58%) agreed that breastfed babies are healthier, while urban responses were more divided, with 56% neutral and only 16% strongly agreeing. On the question of formula feeding being a better choice for working mothers, urban respondents were more inclined to agree (41%), whereas most rural mothers (49%) strongly disagreed.

The idea that mothers who formula-feed miss the joy of motherhood was strongly supported by urban mothers (100% strongly agreed), whereas rural responses were more distributed, with 64% agreeing. Most rural (58%) and urban (50%) respondents agreed that breastfed babies are more likely to be overfed.

Regarding digestion, urban respondents showed a strong consensus (100% strongly agreed) that breast milk is easier to digest, whereas rural mothers were more divided. A significant proportion (50% rural, 16% urban) strongly agreed that breastfeeding is more economical, with urban mothers showing higher disagreement. The belief that breastfeeding benefits last only during infancy was rejected by 69% of rural respondents, whereas 70% of urban respondents strongly disagreed.

Table 4 shows practice of the respondents regarding breast feeding. A majority of respondents initiated breastfeeding within 4 hours of birth (79%), though only 35.5% did so within the recommended 1 hour. Most mothers (65.5%) fed their babies every 2 hours, with rural mothers being more consistent in this practice. Colostrum feeding was high (90%), but 10% of respondents did not provide it. Pre-lacteal feeding was reported by 26% of mothers, with honey (15.5%) being the most common substance given.

Introduction of complementary foods before 6 months was higher in rural areas (56%) compared to urban (23%). The most commonly introduced food was cereals/porridge (17%), followed by formula milk (15%) and cow's milk (7.5%).

A majority of respondents (87%) had good knowledge of infant feeding, with all urban mothers scoring in this category. While 86.5% had a neutral attitude, only 13.5% displayed a positive attitude. All respondents (100%) demonstrated good breastfeeding practices, with no cases of poor practices reported (Table 5).

Table 6 indicates the complication during delivery more than half (52.5%) of the respondents had a normal delivery, while 47.5% underwent a c-section, with a higher prevalence in rural areas. Most newborns (92.5%) did not suffer from complications, though 7.5% of urban babies had low birth weight. Regarding breastfeeding initiation, 43% of mothers started within six hours, while 28% initiated immediately. However, 14% delayed beyond 24 hours.

Table 7: Nutritional information of the respondents.

Characteristics	Categories	Rural	Urban	Total (%)	P value
Type of food habit	Vegetarian	26	32	58 (29)	0.19^{NS}
	Non-vegetarian	36	54	90 (45)	
	Eggetarian	40	14	54 (27)	
Number of meals per day	1	00	00	00 (00)	0.13^{NS}
	2	00	00	00 (00)	
	3	94	100	194 (97)	
	4	06	00	06 (3.0)	
Receipt of supplements from Anganwadi	Yes	100	100	200 (100)	NA^{NS}
	No	00	00	00 (00)	

NS – Not significant

Table 8: Classification of lactating mothers based on BMI (n=30).

BMI Classification	Presumptive diagnosis	Rural (n=100)	Urban (n=100)	Total (N=200) (%)	P value
<18.5	Underweight	15	15	30 (15)	0.2771^{NS}
18.5-22.9	Ideal BMI	52	30	82 (41)	
≥23	Overweight	18	15	33(16.5)	
≥25	Obese Grade I	15	30	45 (22.5)	
≥30	Obese Grade II	00	10	10 (5)	
Total		100	100	200	
Mean±SD		21.66	23.8		

NS – Not significant

Table 9: Mean nutrient intake and nutrient adequacy of the respondents.

Nutrients	RDA	Rural		Urban		T-test P value
		Mean intake	(%) nutrient adequacy	Mean intake	(%) nutrient adequacy	
Energy (Kcal)	2600	1135.16	43.66	1418.22	54.55	0.0702*
Protein (gm)	68	42.91	63.10	57.02	83.85	0.089^{NS}
Fat (gm)	30	28.43	94.77	37.1	123.67	0.084^{NS}
Iron (mg)	21	09.21	43.86	10.32	49.14	0.036*
Calcium (mg)	1200	284.72	23.73	347.85	28.99	0.063^{NS}
Vitamin C (mg)	105	30.7	29.24	26.85	25.57	0.0425*

*- Significant; NS – Not significant

Table 10: Breast feeding and complimentary practices of infants (n=60).

Characteristics	Categories	Rural (n=30) (%)	Urban (n=30) (%)	Total (n=60) (%)
Ordinal position	First	20 (66.66)	19 (63.33)	39 (65.00)
	Middle	10 (63.33)	07 (23.33)	17 (28.30)
	Last	-	04 (13.33)	04 (06.60)
If milk supplements are given, type of milk is given	Cow	-	04 (13.33)	04 (06.60)
	Buffalo	-	01 (03.33)	01 (01.60)
	Goat	-	-	-
	Breast Milk	30 (100.0)	25 (83.33)	55 (91.60)
If yes ratio of dilution with water	1:01	-	00 (00.00)	00 (00.00)
	1:1/2	-	01 (03.33)	01 (1.60)
	1:1/4	-	01 (03.33)	01 (1.60)
Any canned milk is given	Yes	-	05 (16.66)	05 (8.30)
	No	30 (100.0)	25 (83.33)	55 (91.60)
If canned milk is given, the brand name	Similac	-	01 (03.33)	01 (1.60)
	Royale	-	01 (03.33)	01 (1.60)
	Carnation	-	01 (03.33)	01 (1.60)
	Optifeed	-	01 (03.33)	01 (1.60)
	Lactodex	-	01 (03.33)	01 (1.60)
Form of feeding	Powder	-	-	00 (00.00)
	Liquid	-	05 (16.66)	05 (8.30)
Follow the instruction for quantity	Yes	-	05 (16.66)	05 (8.30)
	No	-	-	-
Quantity of milk given (in ml)/per feed	10-20	-	-	-
	30-40	-	24 (80.00)	24 (40.0)
	50-60	-	06 (20.00)	06 (20.0)
Breast milk is sufficient for child, after 6 months	Yes		-	30 (100.0)
	No	30 (100.0)	30 (100.0)	30 (100.0)
If no, age of weaving food introduced (in months)	After 3	-	-	-
	After 6	30 (100.0)	22 (73.33)	52 (86.60)
	After 9	-	08 (26.67)	08 (13.30)
Usage of commercially available weaning food	Yes	30 (100.0)	16 (53.33)	46 (76.60)
	No	-	14 (46.67)	14 (23.30)
Instructions followed for quantity	Yes	30 (100.0)	21 (70.00)	51 (85.0)
	No	-	09 (30.00)	09 (15.0)
Bottle feeding practice	Yes	18 (40.00)	12 (40.00)	12 (20.0)
	No	12 (60.00)	18 (60.00)	48 (80.0)
No. of bottles in house	1	05 (16.67)	03 (10.00)	03 (5.0)
	2	04 (13.33)	05 (16.00)	05 (8.3)
	3	03 (10.00)	04 (13.00)	04 (6.60)
Sterilization of feeding bottles	Yes	20 (66.67)	12 (40.00)	12 (20.0)
	No	10 (33.33)	18 (60.00)	-
No. of Time of sterilization	1-2 time	08 (26.66)	07 (23.00)	07 (11.60)
	2-3 time	07 (23.33)	02 (06.67)	02 (3.30.0)
	3-4 time	03 (10.00)	03 (03.00)	03 (5.00)

Table 7 shows the nutritional information of the respondents. The majorities (45%) of respondents were non-vegetarians, followed by eggetarians (27%) and vegetarians (29%). Almost all respondents (97%) consumed three meals per day, with a small percentage (3%) consuming four meals per day. All respondents (100%) received nutritional supplements from Anganwadis. No significant differences were observed between rural and urban groups.

The majority (41%) of lactating mothers had an ideal BMI (18.5-22.9), followed by 22.5% who were classified as obese grade I (≥25 BMI). 16.5% were overweight (≥23 BMI), while 15% were underweight (<18.5 BMI) (Table 8). Smaller proportions (5%) were classified as obese grade II (≥30 BMI). The mean BMI was higher among urban mothers (23.8) compared to rural mothers (21.66). No significant difference was observed between the groups.

The mean nutrient intake of rural and urban respondents was assessed and compared with the recommended dietary allowance (RDA). Energy intake was significantly lower than the RDA in both groups, with rural respondents meeting only 43.66% and urban respondents 54.55% of their requirement (p=0.0702). Protein and fat intake were higher in urban respondents (83.85% and 123.67%, respectively) than in rural respondents (63.10% and 94.77%). Iron intake showed a significant difference (p=0.036), with urban respondents having slightly better adequacy (49.14%) than rural respondents (43.86%). Calcium and vitamin C intake were also below recommended levels, with urban respondents having slightly higher intakes (Table 9).

Table 10 shows that breast feeding and complimentary practices of Infants: The majority of infants in both rural (100%) and urban (83.33%) areas were exclusively breastfed. Weaning was introduced after six months in most cases (86.6%), though 26.67% of urban mothers introduced weaning after nine months. The use of commercially prepared weaning food was significantly higher in rural mothers (100%) compared to urban mothers (53.33%). Bottle feeding was practiced by 40% of rural and urban mothers, but only 66.67% of rural and 40% of urban mothers sterilized bottles properly.

DISCUSSION

The Table 1 findings reveal significant socio-economic differences between rural and urban respondents. The predominance of joint families in rural areas aligns with studies highlighting traditional living arrangements in rural India. Higher education levels among urban women could be attributed to better educational access.[17,24] Similarly, urban employment rates were higher, likely due to greater job opportunities.[17,24] Income disparities reflect regional economic development, consistent with findings from the National Family Health Survey (NFHS-5, 2021).[5,7,24]

Despite high awareness of exclusive breastfeeding, misconceptions regarding its duration persist, particularly in rural areas.[3,8,14] The reliance on family sources for breastfeeding information in rural areas contrasts with urban mothers, who mostly received hospital counselling.[22] Limited knowledge about colostrum reflects traditional beliefs and taboos.[1,16] Educational interventions are crucial for reinforcing breastfeeding benefits, as recommended by the World Health Organization (Table 2).[22,23]

The Table 3 findings suggest strong positive attitudes towards breastfeeding, especially among rural mothers. The urban preference for formula feeding when returning to work aligns with evidence highlighting workplace challenges in sustaining breastfeeding.[19] Economic considerations also influence infant feeding choices, while increasing socio-economic status may encourage formula feeding because of convenience and work-related factors.[5,19] The misconception that breastfeeding benefits are short-lived among urban mothers further emphasizes the need for targeted educational interventions.[3,8,20]

The delayed initiation of breastfeeding contradicts WHO recommendations emphasizing initiation within the first hour after birth for optimal neonatal health.[23] Studies have shown that cultural practices, traditional beliefs, and lack of awareness contribute to delayed breastfeeding initiation (Table 4).[16,18] The high prevalence of pre-lacteal feeding, particularly honey, is also consistent with previous Indian studies reporting such practices as culturally rooted traditions.[13,16] Early complementary feeding, observed more frequently among rural mothers, highlights the need for improved education regarding exclusive breastfeeding.[4,12,14]

The high knowledge levels, particularly among urban mothers, suggest better access to healthcare services, antenatal counselling, and educational resources.[7,22] However, despite good knowledge, only a small proportion (13.5%) demonstrated a positive attitude, indicating that cultural and psychological barriers continue to influence infant-feeding decisions.[8,15] The uniformly good breastfeeding practices observed may reflect the positive impact of breastfeeding promotion programmes implemented through national maternal and child health initiatives.[15,22]

The findings from Table 6 reveal important trends in delivery mode and newborn health outcomes. Although normal delivery remained slightly more common (52.5%), the relatively high prevalence of caesarean sections (47.5%) may reflect increasing institutional deliveries and improved access to obstetric care.[7,24] Despite this, newborn complications were minimal (92.5% had no complications), while low birth weight observed among urban newborns may be associated with maternal nutritional status and lifestyle-related factors.[2,6]

Breastfeeding initiation patterns varied, with 28% of mothers initiating immediately, 43% within six hours, and 14% delaying beyond 24 hours. Delayed initiation contradicts WHO recommendations advocating breastfeeding within one hour after birth.[23] Similar findings have been reported in systematic reviews demonstrating that delayed breastfeeding initiation increases neonatal morbidity and mortality.[18] The delay may result from cultural beliefs, post-caesarean recovery, or inadequate breastfeeding support immediately after delivery.[13,16] These findings emphasize the need to strengthen breastfeeding education and postnatal counselling to improve early initiation and reduce unnecessary formula feeding.[15,22]

The findings indicate that non-vegetarian diets were more prevalent among respondents, reflecting regional and cultural dietary habits. A three-meal dietary pattern generally aligns with recommended meal frequency for lactating women.[10,21] The universal receipt of Anganwadi supplementation demonstrates the effectiveness of Government nutrition programmes in reaching beneficiaries.[9] A balanced diet together with dietary diversity remains essential for improving maternal and child nutritional outcomes.[10,21]

Both rural and urban respondents demonstrated inadequate intake of energy, protein, iron, calcium and vitamin C, although urban mothers exhibited comparatively better nutrient adequacy. Similar findings have been reported among Indian lactating women, where inadequate maternal nutrient intake contributes to anaemia and poor infant growth.[2,6,10] Urban mothers generally have greater dietary diversity and improved access to nutrient-rich foods than rural mothers.[5,10,21]

Breastfeeding practices were generally satisfactory; however, bottle-feeding hygiene and appropriate weaning practices require improvement. Rural mothers were more likely to use commercially available complementary foods, possibly because of limited awareness regarding homemade complementary feeding options.[12] Inadequate sterilization of feeding bottles has also been associated with increased gastrointestinal infections and other adverse infant health outcomes.[3,20]

The study was conducted using a cross-sectional design in selected rural and urban areas of Vijayapura district; therefore, long-term changes in maternal nutrition, knowledge, attitudes, and infant feeding practices could not be assessed. The study relied on self-reported information and a short-term dietary recall method, which may have introduced recall bias. Additionally, biochemical assessment of micronutrient status was not performed, limiting the objective evaluation of maternal nutritional deficiencies

CONCLUSION

The study highlighted significant socio-economic disparities, breastfeeding misconceptions, inadequate maternal nutrition, and suboptimal infant feeding practices among lactating mothers. Although breastfeeding rates were high, concerns such as early weaning and poor bottle-feeding hygiene were observed. Urban mothers demonstrated better nutrient intake and greater access to information, whereas rural mothers were more dependent on traditional practices. These findings emphasize the need for targeted educational interventions and improved access to diverse, nutrient-rich foods to enhance maternal and infant health outcomes.

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