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ASSESSMENT OF KNOWLEGDE REGARDING COMPLIMENTARY FEEDING AMONG CHILDBEARING WOMEN IN SELECTED HOSPITALS OF PESHAWAR

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ABSTRACT

Background: Complementary feeding is the gradual introduction ofsolid or semi-solid foods alongside breastfeeding when breast milk alone can no longer satisfy the nutritional needs of a growing infant. The World Health Organization (WHO) defines complementary feeding as the process that begins at six months of age, during which suitable, energy-dense, and nutrient-rich foods are introduced while breastfeeding continues up to two years or beyond. Objectives: To assess the knowledge of childbearing women regarding complementary feeding practices in selected hospitals of Peshawar. Methodology: This descriptive cross-sectional study was conducted from August to December 2024 at three hospitals in Peshawar, Pakistan Lady Reading Hospital, Northwest General Hospital & Research Center, and Peshawar General Hospital. Ethical approval was obtained, and informed consent was secured before data collection. The study assessed the knowledge of caregivers with infants aged 6–24 months regarding complementary feeding. A total of 249 participants were selected using convenience sampling. Data were collected using a standardized questionnaire administered in person and through on-site completion, with responses evaluated on a 5- point Likert scale. Results: The study assessed 249 childbearing women's knowledge of complementary feeding. Most participants (46.2%) were aged 25–30 years, with 45% being illiterate and 71.1% residing in suburban areas. While 84% agreed that complementary feeding should start at 6 months, misconceptions were noted, such as 53.4% supporting cow's milk for infants under 12 months and 40.2% opposing honey use. Conclusion: The study revealed that while most caregivers had basic knowledge about the appropriate timing for initiating complementary feeding, significant misconceptions persisted regarding specific practices, such as the use of cow's milk and honey for infants under 12 months. These findings highlight the need for targeted educational interventions to enhance caregivers' understanding of safe and optimal complementary feeding practice.

INTRODUCTION

Complementary feeding is the gradual introduction of solid or semi-solid foods alongside breastfeeding when breast milk alone can no longer satisfy the nutritional needs of a growing infant (1). The World Health Organization (WHO) defines complementary feeding as the process that begins at six months of age, during which suitable, energy-dense, and nutrient-rich foods are introduced while breastfeeding continues up to two years or beyond. This stage is crucial as it lays the foundation for a child's growth, development, and long-term health (2). Complementary feeding bridges the nutritional gap between exclusive breastfeeding and the growing demands of the infant's body (3). The importance of complementary feeding cannot be overstated. At around six months of age, the energy and nutrient requirements of a baby begin to exceed what breast milk alone can provide. Proper complementary feeding practices ensure that these increased demands are met. Introducing the right types of foods at the right time helps prevent malnutrition, supports immune system development, and fosters healthy physical and cognitive growth (4). Conversely, inadequate or inappropriate complementary feeding practices such as delayed initiation, poor dietary diversity, or insufficient feeding frequency can lead to stunted growth, micronutrient deficiencies, increased susceptibility to infections, and even long-term health issues such as poor cognitive development and chronic diseases in adulthood (5). Despite global recommendations, complementary feeding practices vary widely and are often suboptimal, particularly in low- and middle-income countries. In Pakistan, malnutrition is a significant public health issue, with high rates of stunting, wasting, and underweight children under five years of age. The Pakistan Demographic and Health Survey (PDHS) reports that only a fraction of children aged 6–23 months receive the minimum acceptable diet, and a majority are fed diets that are inadequate in terms of diversity and frequency. Many mothers in Pakistan introduce complementary foods either too early or too late, and the foods provided are often low in nutritional value, consisting primarily of starchy staples such as porridge made from wheat or rice flour (6).

Timely and appropriate complementary feeding is essential to combat malnutrition and associated health risks. The WHO emphasizes four key criteria for complementary feeding:

Timely – Foods should be introduced when the infant reaches six months of age.

Adequate – The foods should provide sufficient energy, protein, vitamins, and minerals to meet the nutritional needs of a growing child.

Safe – Foods should be prepared and stored hygienically to minimize the risk of infections.

Properly fed – Feeding should be consistent with the child's appetite and developmental readiness, and caregivers should actively encourage eating.

Failure to meet these criteria can have severe consequences. Poor complementary feeding practices increase the risk of malnutrition, leading to stunted growth and a weakened immune system. Children who are malnourished are more susceptible to illnesses such as diarrhea and respiratory infections, and they experience delayed recovery from diseases, further exacerbating the cycle of poor health. Additionally, malnutrition during this critical period can result in irreversible cognitive impairment, reducing a child's learning capacity and productivity later in life (7).

The determinants of complementary feeding practices are complex and multifaceted. Maternal knowledge and education play a central role in shaping feeding behaviors. Mothers who are aware of the importance of diverse and nutrient-rich diets are more likely to provide adequate complementary foods to their children. However, in many low-income households, limited access to information, healthcare services, and affordable nutritious foods poses significant barriers. Cultural and traditional practices also influence feeding behaviors. For instance, in some communities, certain foods are believed to be inappropriate for young children, leading to the exclusion of essential nutrients from their diets (8).

Studies conducted in South Asia, including Pakistan, have highlighted several factors that influence complementary feeding practices. These include maternal age, education level, socioeconomic status, and urban or rural residence.

Mothers in rural areas often have less access to healthcare and nutrition education, which contributes to delayed initiation of complementary feeding and reliance on low-quality foods. Additionally, household income significantly impacts the ability to purchase a variety of nutrient-rich foods, resulting in diets that are predominantly carbohydrate- based with minimal protein, fats, and essential micronutrients (9).

Hygiene and food safety are also critical aspects of complementary feeding. Improper storage and preparation of complementary foods can expose children to harmful pathogens, leading to infections such as diarrhea, which further exacerbates malnutrition (10). Educating mothers on the importance of hygienic food preparation and safe feeding practices is essential to reducing these risks (11).

In Pakistan, the lack of awareness regarding complementary feeding practices is further compounded by limited healthcare interventions targeting maternal education (12). Public health programs have traditionally focused more on promoting exclusive breastfeeding, with less emphasis on the complementary feeding phase. As a result, many mothers are unaware of the appropriate timing, types of food, and feeding practices required for optimal child growth and development (13).

Maternal knowledge and practices are important for complementary feeding (14). Mothers of infants have gaps and challenges in knowledge and the implementation of practices. Stunted overweight, or obese children, especially malnutrition and death reduce the growth and development of infants (15). cultural practices, beliefs and knowledge of parents regarding appropriate practices influence complementary feeding (16).

Peshawar, a city with a population of nearly 2 million, serves as a microcosm of the challenges faced in Pakistan regarding complementary feeding. While urbanization and increased access to healthcare facilities have improved maternal and child health in some areas, significant disparities persist, particularly in low-income and peri-urban communities. Factors such as limited maternal education, cultural beliefs, and economic constraints continue to hinder the adoption of recommended feeding practices (17).

Recognizing the importance of complementary feeding, this study seeks to assess the knowledge and practices of childbearing women in Peshawar regarding complementary feeding. By identifying the gaps in awareness and understanding the factors influencing feeding practices, the findings of this research aim to contribute to the development of targeted interventions. These interventions can include community-based education programs, healthcare provider training, and policy recommendations to improve complementary feeding practices and ultimately enhance child health outcomes in the region.

This research also aims to shed light on the sociocultural, economic, and healthcare-related barriers that prevent mothers from implementing optimal feeding practices. The findings will be instrumental in informing public health strategies to promote timely, adequate, and safe complementary feeding, ensuring that children receive the nutrition they need to thrive during their critical early years of life.

World Health Organization (2003) underscores the significance of complementary feeding (CF) as an essential strategy for reducing malnutrition and improving health outcomes for infants and young children. CF involves the introduction of solid or semi-solid foods to meet the growing nutritional demands of children starting at six months of age. WHO guidelines recommend that CF should complement breastfeeding until two years of age or beyond to ensure optimal growth and development. The organization emphasizes the importance of ensuring that complementary foods are not only timely but also nutritionally adequate, safe, and prepared hygienically to avoid infections and malnutrition (13).

Arimond and Ruel (2004) demonstrated through a study in Bangladesh that timely and nutritionally adequate CF substantially reduces stunting and wasting among children under five years of age. They found that poor CF practices, including the delayed introduction of complementary foods or reliance on low-quality diets, are significant contributors to undernutrition in developing countries. The study emphasizes the importance of

promoting dietary diversity and improving household food security to ensure better health and developmental outcomes (2).

National Institute of Population Studies (NIPS) and ICF International (2018) reported alarming statistics on CF practices in Pakistan. The Pakistan Demographic and Health Survey revealed that only 42% of children aged 6–23 months receive the minimum acceptable diet. The survey highlighted disparities between urban and rural areas, with rural populations exhibiting significantly lower dietary diversity and poorer feeding practices. This underscores the urgent need for targeted public health interventions to improve CF practices, especially in underserved regions (9).

Ali et al. (2020) explored the socio-economic and cultural determinants influencing inadequate CF practices in Pakistan. Their study revealed that low maternal education, poverty, and limited access to healthcare services were critical barriers to optimal CF. Mothers in low-income households often lacked awareness about the nutritional requirements of complementary foods and resorted to feeding children inexpensive carbohydrate-rich meals, leading to nutritional deficiencies. The authors emphasized the need for community-based education programs to address these gaps (1).

Khan et al. (2019) conducted a cross-sectional study in India that highlighted the role of maternal education and household income in influencing CF practices. The study revealed that mothers with higher educational levels and incomes were more likely to introduce complementary foods at the appropriate time and provide a diverse diet. Shah et al. (2021) observed similar patterns in Pakistan, where households with limited financial resources often faced challenges in accessing nutrient-rich foods, further exacerbating the issue of malnutrition among children (7).

METHODOLOGY RESEARCH DESIGN

This study employed a descriptive cross-sectional design to assess the knowledge of childbearing women regarding complementary feeding practices in selected hospitals of Peshawar

STUDY SETTING

This study was conducted at Lady Reading Hospital Peshawar, Northwest General Hospital & Research Canter and Peshawar General Hospital. Lady Reading Hospital (LRH) Peshawar is one of the largest and most prominent healthcare institutions in Khyber Pakhtunkhwa, Pakistan. With 33 specialized medical and surgical departments, it provides comprehensive healthcare services to a diverse patient population. The hospital employs approximately 1,350 doctors, supported by a total staff of 4,500, including nurses, paramedics, and administrative personnel.

STUDY DURATION

The study was conducted from August to December 2024.

SAMPLE SIZE

Using a confidence level of 95% (Z= 1.96) and 5% margin of error the total sample size for pediatric department is 249.

SAMPLING TECHNIQUE

Convenience sampling technique

SAMPLE SELECTION

Inclusion Criteria:

Caregiver with infant's aged 6-24months

Exclusion Criteria:

Caregivers with infants having sever medical condition (e.g. Celiac disease, food allergies) that require specialized dietary recommendations

DATA COLLECTION PROCEDURE

Ethical approval was obtained from the relevant institutional review board, and informed consent was secured from all participants prior to data collection A standardized questionnaire was used to collect information about caregivers' knowledge of complementary feeding. The questionnaire was distributed according to the sample size and included questions about the timing, benefits, and practices of complementary feeding. A 5-point Likert scale was employed to measure the level of agreement or understanding, ranging from "strongly agree" to "strongly disagree."

Data were collected through in-person interviews, where trained researchers asked caregivers the questions and recorded their responses. Alternatively, caregivers who were comfortable completed the questionnaire on-site at the hospital. Before using the questionnaire, it was tested with a small group to ensure clarity and accuracy.

Caregivers were given clear instructions, and efforts were made to address any language barriers, such as providing translations or using bilingual

interviewers. The collected data were kept confidential, and anonymity was ensured throughout the process. This approach ensured the collection of accurate and reliable information about caregivers' knowledge of complementary feeding.

DATA ANALYSIS PROCEDURE

Data analysis was carried out using statistical software SPSS version 22 to evaluate awareness regarding complementary feeding. Frequencies and percentages were calculated for categorical variables, and trends were visually presented through tables and figures. The mean and standard deviation were used to summarize continuous variables, providing a clear understanding of the data distribution.

RESULTS

The study on the "Assessment of Knowledge Regarding Complementary Feeding Among Child-Bearing Women" included a total of 249 participants, categorized into three age groups. The largest proportion of respondents, 46.2% (n = 115), were in the 25–30 years age group. This was followed by the 31–35 years age group, which comprised 38.6% (n = 96) of the participants. The smallest group, 15.3% (n = 38), was in the 18–24 years age category.(Figure 4,1)

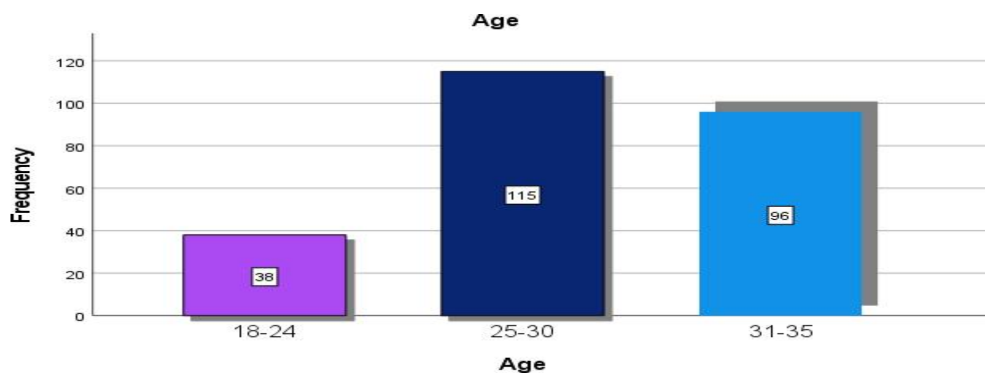

Figure 4.1: Age of the participants

The educational background of the participants varied significantly. The largest group, 45.0% (n = 112), was illiterate, followed by 31.3% (n = 78) who held a bachelor's degree, and 23.7% (n = 59) with a high school diploma. In terms of residential area, the majority of participants, 71.1% (n = 177), lived in suburban areas, while 28.9% (n = 72) resided in urban areas.(Figure 4.2)

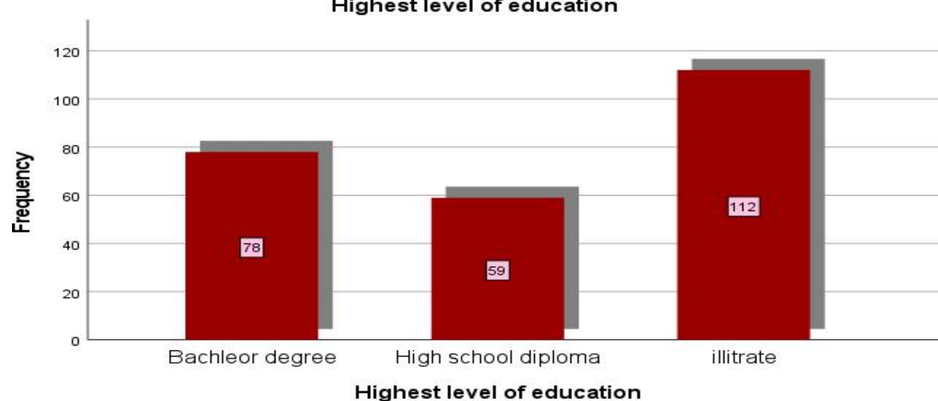

Figure 4.2: Highest Level of Education

The data collected on infants' ages and birth terms revealed some interesting trends. Among the infants, 69.9% (n = 174) were 14 months old, while 30.1% (n = 75) were 6 months old. In terms of birth term, the majority, 87.1% (n = 217), were full term, while 10.4% (n = 26) were pre-term, born at 33 weeks, and 2.4% (n = 6) were born even earlier. These findings suggest that most of the infants were older (14 months) and born full term, with a smaller proportion being younger (6 months) and pre-term. (Table 3.1)

Table 3.1: *Infants' Age and Birth Term Distribution*

Variable	Category	Frequency	Percent
Infants' Age	6 months	75	30.1%
	14 months	174	69.9%
	Total	249	100.0%
Infants' Birth Term	Full term	217	87.1%
	Pre-term (33w)	26	10.4%
	< 33 weeks	6	2.4%
	Total	249	100.0%

KNOWLEDGE AND PERCEPTIONS REGARDING COMPLEMENTARY FEEDING PRACTICES:

Participants' responses highlighted varying knowledge and perceptions about complementary feeding. Most (84.0%, n = 209) agreed or strongly agreed that infants should start complementary food at 6 months, while a small group (16.0%, n = 40) disagreed. Regarding the sufficiency of breast milk until 8 months, 73.9% (n = 184) agreed, but 26.1% (n = 65) strongly disagreed. Additionally, 60.2% (n = 150) supported introducing complementary food one at a time, while 16.4% (n = 41) disagreed, and 23.3% (n = 58) were neutral. (Table 3.2)

Table 3.2: *Participants' Knowledge and Perceptions Regarding Complementary Feeding Practices*

Statement	Response	Frequency	Percent
Infants should start complementary food at 6 months?	Strongly Agree	112	45.0%
	Agree	97	39.0%
	Disagree	20	8.0%
	Strongly Disagree	20	8.0%
	Total	249	100.0%
Breast milk alone is sufficient for infants until 8 months?	Strongly Agree	158	63.5%
	Agree	26	10.4%
	Strongly Disagree	65	26.1%
	Total	249	100.0%
Complementary food should be introduced one at a time?	Strongly Agree	79	31.7%
	Agree	71	28.5%
	Neutral	58	23.3%
	Disagree	14	5.6%
	Strongly Disagree	27	10.8%

Table 3.3: *Participants' Knowledge and Perceptions on Infant Feeding Practices*

Statement	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)	Total (%)
Cow's milk is a suitable alternative to breast milk for infants under 12 months	53.4	20.1	4.0	10.8	11.6	100.0
Honey is safe for infants under 12 months	6.4	20.1	22.1	40.2	11.2	100.0
Infants should be fed complementary foods 2-3 times a day at 6 months	22.1	36.9	16.9	16.1	8.0	100.0
Iron-rich foods should be introduced first to infants	19.7	36.9	26.5	14.5	2.4	100.0

More than half of the participants (53.4%, n = 133) strongly agreed that cow's milk is a suitable alternative to breast milk for infants under 12 months, while 20.1% (n = 50) agreed. A minority (4.0%, n = 10) were neutral, and 22.4% (n = 56) disagreed or strongly disagreed, showing mixed opinions.

On the safety of honey for infants under 12 months, 40.2% (n = 100) disagreed, and 11.2% (n = 28) strongly disagreed, reflecting concerns about its use. Meanwhile, 26.5% agreed or strongly agreed, and 22.1% (n = 55) were neutral.

Regarding feeding complementary foods 2–3 times a day at 6 months, 36.9% (n = 92) agreed, and 22.1% (n = 55) strongly agreed, indicating general support for this practice. However, 16.9% (n = 42) were neutral, and 24.1% (n = 60) disagreed or strongly disagreed.

When asked about introducing iron-rich foods first, 36.9% (n = 92) agreed, and 19.7% (n = 49) strongly agreed, while 26.5% (n = 66) were neutral. A smaller proportion (16.9%, n = 42) disagreed or strongly disagreed. (Figure 3.3)

A majority of participants (53.4%) agreed that cow's milk can be an alternative to breast milk for infants under 12 months. However, there was significant disagreement on honey's safety for infants under 12 months, with 40.2% disagreeing. On the introduction of complementary foods, most participants (36.9%) supported feeding infants 2-3 times a day at 6 months, and 36.9% also agreed that infants require a high-protein diet for growth. About 43.4% believed sweet potatoes provide essential vitamins and minerals, while 36.9% supported feeding infants every 2-3 hours. Regarding sources of information, 27.3% found family members reliable, but a significant portion (28.1%) disagreed. The majority (53.4%) believed whole grains are essential for infant nutrition, while only 6% strongly agreed that infants can eat the same food as adults. Lastly, a notable proportion (40.6%) agreed that vitamin D supplements are necessary for breastfed infants. (Table 3.4).

Table 3.4: ***Participants' Knowledge and Perceptions on Infant Nutrition and Feeding Practices***

Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
Family members are reliable sources of information on complementary feeding?	68 (27.3%)	49 (19.7%)	38 (15.3%)	24 (9.6%)	70 (28.1%)	249
Complementary feeding should be started with cereals?	64 (25.7%)	22 (8.8%)	76 (30.5%)	40 (16.1%)	47 (18.9%)	249
Vitamin D supplements are necessary for breastfed infants?	53 (21.3%)	101 (40.6%)	74 (29.7%)	21 (8.4%)	-	249
Whole grains are essentials for infant nutrition?	15 (6.0%)	133 (53.4%)	60 (24.1%)	27 (10.8%)	14 (5.6%)	249
Infants can eat the same food as adults?	10 (4.0%)	72 (28.9%)	123 (49.4%)	11 (4.4%)	33 (13.3%)	249
Infants require a high-protein diet for growth?	49 (19.7%)	119 (47.8%)	21 (8.4%)	60 (24.1%)	-	249
Sweet potatoes provide essential vitamins and minerals?	108 (43.4%)	86 (34.5%)	25 (10.0%)	15 (6.0%)	15 (6.0%)	249
Infants should eat every 2-3 hours?	92 (36.9%)	104 (41.8%)	42 (16.9%)	11 (4.4%)	-	249

DISCUSSION SECTION

This study highlights important gaps in knowledge and behaviors regarding complementary feeding and provides insight into the attitudes and understanding of childbearing women. By placing these results in the context of previous studies, it is possible to get important insights into the variables affecting mothers' feeding habits and knowledge.

In our study, a significant majority of participants (84.0%) correctly selected six months as the optimal age to begin supplemental feeding, which is consistent with World Health Organization (WHO) guidelines. This finding is similar with Joshi et al. (2014), who performed research in Nepal and found that more than 75% of moms followed this advice. Early or delayed introduction of supplemental meals can have serious health consequences, like as malnutrition and gastrointestinal issues. While the majority of participants in this study recognized the optimal timing, the 16.0% who disagreed or were unsure suggest ongoing knowledge gaps that need targeted educational interventions (2).

In our investigation, 53.4% of participants believed that cow's milk is an acceptable substitute to breast milk for infants under 12 months, indicating a serious misperception. Due to cultural and financial concerns, cow's milk is widely used in South Asia, according to research by Owais et al. (2017) that found similar results. However, because to its link to iron-deficiency anemia and gastrointestinal discomfort, the American Academy of Pediatrics strongly cautions against consuming cow's milk before the age of one year. This myth emphasizes how important it is for healthcare professionals and community initiatives to deliver proper information on the dangers of introducing cow's milk too soon (5).

Regarding feeding frequency, 59.0% of participants in our survey agreed with WHO recommendations and supported feeding infants two to three times per day for six months. These results are consistent with those of Black et al. (2008), who showed that proper feeding frequency greatly enhances newborn development and nutrition, especially in environments with limited resources. Nonetheless, the current study found that 16.9% of participants were indifferent and 24.1% disagreed or strongly disagreed, suggesting that participants' understanding of the suggested feeding frequency varied. These disparities show that stronger health education initiatives are required (6).

According to 26.5% of participants, honey is a safe diet for babies less than 12 months, which is a worrying practice. In accordance with Shelton et al. (2014), honey is still used in baby food even though it poses a risk of botulism. This underlines how difficult it is to change deeply rooted eating habits. It's important to inform moms about the risks of giving honey to babies, especially in areas where beliefs affect feeding decisions (21).

In our study, the data indicated mixed feelings on offering iron-rich foods as the first supplemental food, with 56.6% agreeing or strongly agreeing. This is consistent with Krebs et al.'s (2006) findings, which stress the importance of iron-rich meals in avoiding anemia and encouraging healthy development. However, 26.5% were indifferent, while 16.9% disagreed or strongly disagreed, indicating a lack of understanding of iron's significance in baby feeding (22). Addressing this knowledge gap through prenatal and postnatal education may enhance mother habits.

The educational background of participants had a substantial impact on their understanding about supplemental feeding. Women with higher education were more likely to respond correctly, which is comparable with the findings of Das et al. (2020) in Bangladesh, who found maternal education to be a substantial predictor of optimal supplemental feeding practices. Illiteracy, which affected 45.0% of participants in this study, is a substantial obstacle to collecting and using correct health information, necessitating novel techniques such as community workshops and visual aids to reach this population (24).

Another interesting conclusion was that family members were perceived to be dependable providers of knowledge. While 27.3% agreed, a bigger minority (28.1%) strongly disagreed, indicating a mix of opinions. This is consistent with Ahmed et al.'s (2018) findings, which found that family traditions had both positive and negative effects on eating patterns. Incorporating family education into health promotion initiatives might help address harmful traditional behaviors while capitalizing on the beneficial function of family support (7).

The study also found a substantial conviction (43.4%) in the nutritional value of sweet potatoes, which are high in vital vitamins and minerals. This is corroborated by the findings of Afeiche et al. (2016), who highlighted the usefulness of nutrient-dense supplementary meals such as sweet potatoes

in boosting newborn nutrition. Encouraging the use of locally accessible foods can improve dietary variety and avoid malnutrition (8).

Lastly, 61.9% of participants believed that vitamin D supplements are required for breastfed newborns, which is consistent with the American Academy of Pediatrics' recommendations that vitamin D supplementation is important to prevent rickets and maintain proper bone growth. The necessity for counseling during pediatric visits is highlighted by the 38.1% of respondents who were ambivalent or disagreed, which reflects a lack of knowledge of supplementing standards (29).

CONCLUSION

The study found that while most women were aware of the appropriate age to start supplemental feeding, some were unaware of important practices such as avoiding honey for newborns and selecting appropriate foods. Many people agreed that newborns should be breastfed multiple times a day and start with iron-rich meals, although there was controversy over utilizing cow's milk and vitamin D supplements. Education levels and living in suburban regions tended to impact their understanding, indicating the need for more awareness campaigns to enhance feeding practices.

RECOMMENDATIONS

It is suggested that health education initiatives should be put in place to increase pregnant women's awareness of supplemental feeding, particularly in rural and suburban regions. Key subjects including the right age to introduce complementary meals, the dangers of giving babies cow's milk and honey, and the significance of vitamin D supplements and foods high in iron should be the emphasis of these seminars. Furthermore, giving moms easy access to materials and medical experts' assistance can enable them to make knowledgeable decisions about the nutrition of their children.

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