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ORIGINAL ARTICLE

LOCAL WISDOM-BASED COMPLEMENTARY FEEDING FOR STUNTING PREVENTION: A QUALITATIVE STUDY USING THE HEALTH PROMOTION MODEL

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ABSTRACT

Stunting remains a major health concern in low- and middle-income countries, including Indonesia, where complementary feeding practices are strongly influenced by culture, maternal knowledge, and environmental support. Local wisdom offers a culturally relevant approach for improving child nutrition and preventing stunting. This study aims to explore mothers' experiences in preparing complementary foods using local wisdom and to analyze these practices through the Health Promotion Model. The researchers applied a qualitative phenomenological approach with ten mothers of undernourished children aged 6–24 months in coastal Banyuwangi. Data were collected through in-depth interviews and analyzed using the Colaizzi method, guided by Health Promotion Model constructs. The analysis revealed five themes: cultural beliefs in food choices, maternal knowledge of nutrition, use of local ingredients, external support from health workers, and sustained maternal engagement in complementary feeding. The findings highlight that complementary feeding grounded in local wisdom can potentially support stunting prevention. Thus, strengthening maternal self-efficacy, addressing barriers, and enhancing social support are critical to improving feeding practices.

Keywords: *Complementary feeding; health promotion model; local wisdom*

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BACKGROUND

The 2030 Agenda for Sustainable Development emphasizes collective action for a better future, including ensuring proper nutrition for children, particularly in relation to Goal 2 (zero hunger) and Goal 3 (good health and well-being) (Gatica-Domínguez et al., 2021). Although the number of malnutrition cases among toddlers has declined globally, stunting prevalence remains high (Renggli et al., 2021). A toddler is classified as stunted if their height-for-age Z-score (HAZ) is less than -2 SD (Priyantini et al., 2023).

Stunting and micronutrient deficiencies are commonly caused by inadequate nutrient intake and absorption (Ryckman et al., 2021). Growth failure typically starts during pregnancy and can persist through the first two years of a child's life (Nwankwo et al., 2024). Undernutrition in childhood remains a significant public health challenge, particularly in low- and middle-income countries (Masuke et al., 2021). Poor quantity and quality of complementary foods between 6–23 months are major causes of malnutrition, especially micronutrient deficiencies, with both short- and long-term impacts (White et al., 2021).

Meanwhile, the quality of complementary feeding practices is still relatively low in Indonesia (Susanto et al., 2024). Complementary feeding is a crucial stage in infant development. It marks the transition from exclusive breastfeeding or formula to introducing other foods. The process often begins at six months and continues until the infant reaches 23 months, though breastfeeding may continue beyond this point (World Health Organization, 2023). Complementary feeding encompasses various practices, including obtaining food by producing or

purchasing it, and preparing and feeding it to the infant (Dickin et al., 2021). However, the lack of high-quality complementary foods is the most direct and frequent cause of growth failure and exposure to diseases in children under five years of age (Laksono et al., 2022). Due to their role in their infants' feeding practices, mothers have an essential role in ensuring their infants have access to high-quality complementary foods to prevent stunting (Amalia et al., 2022).

Indonesia's cultural diversity, natural resources, and local wisdom can be leveraged to develop nutritious, affordable complementary foods (Violin et al., 2025). The country's diverse natural resources can be used to support public consumption of local ingredients and to improve access to a diverse, nutritionally balanced diet (Sharma et al., 2020). Local wisdom values inherent in community practices can also be leveraged to build collective awareness of stunting risks in children (Lamawuran et al., 2023). The health promotion model has been applied in various studies to investigate the roles of family members and health behaviors (Ho et al., 2022). Therefore, this model can be applied to analyze the mothers' insights and experiences with complementary feeding.

This study aims to explore the role of local wisdom in providing adequate complementary feeding to prevent stunting. The Health Promotion Model (HPM), developed by Nola J. Pender, is one of the theoretical frameworks that can be used to understand and modify health behaviors, including the practice of complementary feeding. Integrating local wisdom into the HPM framework is expected to facilitate stunting prevention efforts.

METHOD

Study design

This study uses a qualitative framework with a phenomenological approach (Polit & Beck, 2018). Phenomenology was used to explore how a specific group of people within a particular setting or institutional context undergo certain lived experiences (Van Manen, 2017). This design was chosen to obtain deep insights into participants' experiences, enabling a more concrete depiction of mothers' experiences in preparing complementary foods for undernourished toddlers, with a focus on cultural, behavioral, and nutritional perspectives. In this study, the researchers collected participant data from toddler examinations conducted at the Singotrunan Banyuwangi Community Health Center. A total of 10 respondents underwent in-depth interviews.

Setting and participants

This study was conducted at the Singotrunan Community Health Center in Banyuwangi from January to February 2025. Sampling followed the principle of data saturation, meaning participants were included until no new insights emerged and the data began to repeat (Yu & Song, 2021). The population in this study was mothers of toddlers aged 6–24 months who were malnourished. The inclusion criteria were individuals willing to participate and those who have experience caring for malnourished toddlers. Malnutrition was determined by the results of a weight/height examination referring to the Z-Score table, including underweight. The sampling technique used in this study was purposive sampling, and data were collected from ten participants.

Data collection

The researcher collected data independently through inquiries, interviews, and observations. The study was conducted between January and February 2025. The tools used for data collection included a demographic survey, interview guides, field notes, and an audio recorder. The researcher used a semi-structured interview guide that incorporated components of the Health Promotion Model. The interview guide was structured to ensure the interviews remained focused and aligned with the research objectives. The interviews were conducted in each participant's home in a quiet atmosphere, where privacy and confidentiality were maintained for 40 to 60 minutes. The interviews continued until the participants provided the same answers or themes. In this study, data saturation was reached after 10 interviews, resulting in a total of 10 participants.

Data analysis

Colaizzi's descriptive method (1978) was used to analyze the collected data. This method comprises the following steps:
(1) collecting participant statements;
(2) understanding the participants' statements;
(3) extracting important sentences;
(4) conceptualizing important themes;
(5) categorizing concepts and topics;
(6) building a comprehensive description of the problem being examined; and
(7) validating the data following the four criteria established by Lincoln and Guba (1985).

Trustworthiness

Data validation was conducted based on four criteria established by Lincoln and Guba: credibility, dependability, confirmability, and transferability. Credibility was achieved by triangulating the sources, namely from cadres and nutrition coordinators of the community health center through in-depth interviews. Confirmability was ensured by relaying the interview results back to the participants and having them verify their statements. Transferability was ensured by using content analysis based on the Health Promotion Model, which includes components of Individual Characteristics and Experiences, Cognition and Behavior-Specific Effects, and Behavioral Outcomes. We created a matrix to help identify key research findings.

Ethical consideration

This study has undergone an ethics review at the Institute of Health Science Banyuwangi, with the reference number 053/01/KEPK-STIKESBWI/XII/2024-2025. The researcher provided informed consent forms before asking the participants for their willingness to participate. All participants signed the informed consent forms to confirm their consent to participate in this study.

RESULT

The participants in this study were mothers of malnourished toddlers aged 6–24 years. In this study, each participant was given a code, P (participant), followed by a number to maintain their confidentiality. Details of the participant demographics are shown in Table 1.

Table 1. Participants' demographic characteristics

Code	Mother's age	Education level	Employment Status	Toddler's Age (months)	Ethnicity	Nutritional status
P1	39	Junior high school	Unemployed	18	Javanese	Underweight
P2	28	Senior high school	Unemployed	19	Javanese	Underweight

Code	Mother's age	Education level	Employment Status	Toddler's Age (months)	Ethnicity	Nutritional status
P3	35	Junior high school	Unemployed	24	Non Javanese	Underweight
P4	30	Bachelor	Teacher	18	Non Javanese	Underweight
P5	36	Senior high school	Merchant	17	Javanese	Underweight
P6	39	Junior high school	Unemployed	18	Javanese	Underweight
P7	28	Junior high school	Unemployed	19	Javanese	Underweight
P8	35	Junior high school	Unemployed	24	Non Javanese	Underweight
P9	30	Bachelor's degree	Teacher	18	Javanese	Underweight
P10	36	Senior high school	Merchant	17	Javanese	Underweight

This study identified five themes and 15 subthemes, which are shown in Table 2 below.

Table 2. Analysis of the extracted themes

Participants statements	Meaning	Sub-themes	Themes
"I usually feed my child rice and moringa fruit. The other parents here say moringa fruit are nutritious (to eat)." – (P4) *"In between, I give them bananas, watermelon, dragon fruit, and fish because they are found in abundance in Banyuwangi" – (P2)*	Cultural beliefs influence mothers' perception of which foods are healthy	Sub-themes 1.1: Healthy food	Theme 1: Cultural beliefs shape food preferences
"I usually cook rice with simple side dishes like tofu and tempeh. My kids eat whatever's available at home. We rarely eat meat because it's expensive. We usually eat meat when we get it for Eid Al-Adha." (P6) *"Our daily meals include rice, tofu, tempeh, and sometimes water spinach. If I have some money, I will buy chicken. My kids eat with me, but I separate the spices so it's not too spicy for them." (P7)*	Daily eating habits affect complementary food choices	Sub-themes 1.2: Daily food	
"I started giving my child complementary foods when he was six months old. I made porridge from mashed cassava or sweet potato, because that's the traditional food my grandmother used to feed him. I believe local food is better than instant food." (P5). *"For complementary feeding, I prefer porridge and steamed bananas, as that's what we would traditionally feed infants. I never gave my child meat or eggs when they started on complementary feeding, because I was afraid it would be too hot for their bodies. Only when they grow a little older would I give them those kinds of foods." (P8)*	Cultural norms guide the selection of complementary foods	Sub-theme 1.3: Type of Complementary Food	
"I learned about complementary feeding from a midwife at a community health post (Posyandu). But after that, I often sought out information on YouTube and Instagram. Many pediatrician and nutritionist accounts also share complementary feeding meal ideas." (P1) *"I learned from my first child's experience. I also participated in complementary feeding training from the community health center."(P4)*	Mothers access food ingredients health workers, and digital media sources.	Sub-theme 2.1: How to obtain food ingredients	Theme 2: Mothers' knowledge in preparing nutritious complementary foods
"My child has difficulty eating. He doesn't have a big appetite." – (P7) *"If I make my own complementary food, it's a hassle because I don't know the nutritional value." – (P5)*	Barriers hinder mothers in preparing nutritious foods	Sub-themes 2.2: Perceived Barrier	
"I try to use ingredients that are locally available, like tempeh, tofu, moringa leaves, and pumpkin. Sometimes I also cook sea fish. Besides it being inexpensive, it's also readily available at the market. I adjust my meals to ensure it still has protein, carbohydrates, and vegetables. But sometimes we would keep cooking the same meals." (P4).	Local ingredients are utilized for variety in meals	Sub-theme 2.3: Variations of local ingredients in the daily menu	
"Yes, so that their growth and development are optimal." – (P2) *"So that they get enough nutrition." (P3)* *"To prevent any harm to the child." (P4)*	Mothers understand the benefits of complementary foods	Sub-theme 2.4: Benefit of complementary feeding	
"I mix lemuru fish and moringa leaves when I do complementary feeding, because there are lots of them in the garden."(P4)	Mothers use local ingredients for preparing	Sub-theme 3.1: Types of local ingredients for	Theme 3: Selecting the Right Local

Participants statements	Meaning	Sub-themes	Themes
	complementary foods	complementary foods	Ingredients for MP-ASI
"I make fish soup, sometimes I just fry it." - (P2) *"I don't make it like a porridge. I mix rice and fish together." (P3)*	Mothers apply local cooking methods for complementary foods	Sub-theme 3.2: How to cook complementary foods	
"I start providing complementary foods at 6 months old."- (P3) *"I asked the integrated health post first and then started complementary feeding at 6 months and 1 week old." (P10*	Mothers follow cultural practice to start complementary feeding at certain age	Sub-theme 3.3: Starting to give complementary foods	
"Often, Miss" - (P2) *"Often, Miss, because my husband likes fishing." - (P4)*	Frequency of providing fish-based complementary food varies	Sub-theme 3.4: Frequency of giving fish as a complementary food	
"The cadre suggested using moringa leaves and sea fish as a mixture for complementary feeding."(P6) *"The health cadre often tells me that I can use moringa leaves to mix into porridge, because they are highly nutritious and easy to find." (P3)*	Community health cadres provide guidance	Sub-theme 4.1: Cadre Suggestions	Theme 4: External support
"The community health center regularly holds counseling sessions on nutrition and how to cook complementary foods. We're also given recipes." (P9) *"If a child's weight drops, they will be immediately directed to take part in nutritional counseling at the community health center." (P5)*	The role of community health centers supports mothers	Sub-theme 4.2: The Role of Community Health Centers	
"Yes, it's up to him. I give him whatever vegetables he wants, as long as he eats them." - (P2) *"There's a commitment to giving him fish, but not often." - (P3)* *"I give him fish because his dad loves fishing." - (P4)*	Mothers show dedication in providing healthy food	Sub-theme 5.1: Mothers' Engagement to Preparing Nutritious MP-ASI	Theme 5: Sustained Maternal Engagement in complementary feeding
"Yes, I've given her fish and meat." (P1) *"I'll still give her the usual food." - (P2)* *"Well, I'll just give her complementary food, but what's the point? She's a bit thin and won't eat much." - (P3)*	Mothers continue providing complementary foods	Sub-theme 5.2: Continuity of providing complementary food	

DISCUSSION

HPM: Personal factor

Theme 1: Cultural beliefs shape food preferences

Culture significantly influences family food preferences. Thus, cultural beliefs about what constitutes healthy food, the types of food consumed daily, and complementary foods are shaped by social norms and traditions. Some mothers provided fish as a complementary food, as it is an abundant natural resource in Banyuwangi. Cooking local fish can also be a family food security strategy, as it is relatively affordable and readily available in local traditional markets. Therefore, the abundant fish resources in Banyuwangi can serve as a basis for community-based nutrition interventions to reduce stunting prevalence.

This finding aligns with the Health Promotion Model (Pender, 2006), which emphasizes that cultural beliefs can both reinforce and inhibit healthy behaviors. The behavior-specific cognitions and effect aspects of the Health Promotion Model also include maternal self-efficacy in preparing complementary food and interpersonal family support factors. These components align with this study's results, which found that the family influenced mothers to prepare nutritious complementary food using local ingredients. Families, especially mothers, have a critical role in helping their infants achieve good nutritional status and preventing stunting.

Meanwhile, local culture teaches certain lifestyle habits, such as eating patterns, as well as how to prepare and consume food and maintain cleanliness. Communities can follow local wisdom to support their nutritional needs by eating nutrient-rich local foods. However, certain cultural beliefs can also lead to food taboos that may reduce infants' nutritional intake, as a non-Javanese participant stated, "I never gave my children meat or eggs when they started eating complementary foods, because I was afraid it would be too hot for their bodies." (P8).

HPM: Perceived benefit of action

Theme 2: Mothers' knowledge in preparing nutritious complementary foods

In the second theme, the results showed that some mothers obtained information about complementary feeding from health workers, social media, or family experiences. However, economic constraints often limited the variety of meals. Participants (P1), (P4), and (P5) said they learned about complementary feeding from Posyandu midwives, but often looked for information on YouTube and Instagram because many pediatrician and nutritionist accounts also share complementary feeding recipes. In addition, mothers of toddlers asked their families about making complementary foods with local ingredients.

Interestingly, most mothers understood the importance of providing diverse meals for infants and young children, but only about half believed that vegetables should be offered

daily (Rakotomanana et al., 2020). There was also a significant relationship between maternal education and appropriate complementary feeding practices (Shagaro et al., 2021). Thus, the government and health care workers can continue to use social media to educate mothers of toddlers about complementary feeding.

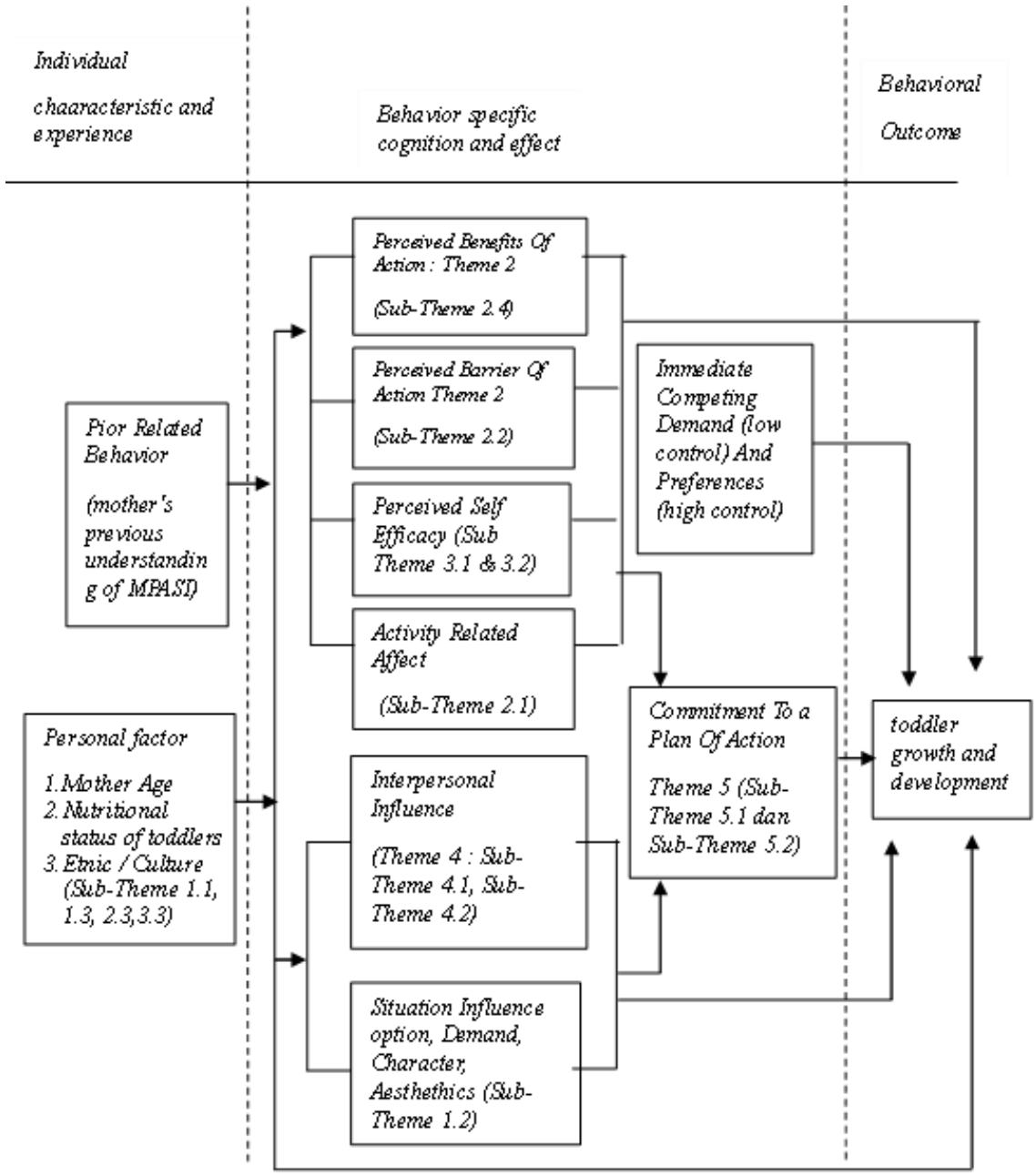

Figure 1: Local wisdom-based complementary feeding for stunting prevention based on the Health Promotion Model

HPM: Perceived self-efficacy

Theme 3: Selecting the right local ingredients for complementary feeding (MP-ASI)

This study found that the participants utilize local ingredients such as sea fish, tempeh, moringa, and dragon fruit, which are rich in vitamins and minerals, to help meet their infants' nutritional needs. All these ingredients are readily available in Banyuwangi. They prepare complementary feeding dishes using simple recipes passed down through generations. Most mothers begin complementary feeding when their infants are 6 months old. Introducing food before the recommended age can lead to complications, as the child's immune system is still immature, leaving them more susceptible to allergic reactions (Nuryanto et al., 2022).

Several studies have shown that Moringa leaves are rich in bioactive substances that improve health and various nutrients, including protein and micronutrients. Global and local research has also found that moringa has been widely accepted by consumers as a complementary food (Sokhela et al., 2023). Meanwhile, fish is typically introduced less frequently than other foods during the complementary feeding stage (Cartmill et al., 2022).

Overall, the use of local ingredients in preparing complementary foods is a positive step toward improving infant nutrition and preventing stunting. Local ingredients also provide natural nutritional content at a lower cost and help support the government's program to improve food security.

HPM: Interpersonal influence

Theme 4: External support

The research findings in theme 4 highlight the crucial role of health cadres, particularly in the socio-cultural methods they can apply to help communities combat stunting. Their role is emphasized in the participants' statements. For example, participants 3 and 6 mentioned that cadres suggested they use moringa leaves and sea fish as complementary foods. Health cadres can also educate the community about the importance of balanced nutrition and childcare. Mothers tend to avoid pressuring their infants, either by forcing them to eat or by limiting their food intake (Bergamini et al., 2022). Health cadres can be pioneers in the development of a healthy community by increasing the awareness of child nutrition and health, thereby contributing to stunting prevention efforts (Kartika et al., 2024).

In addition to facilitating health services, cadres can also act as agents of behavior change by integrating local wisdom into infant feeding practices. External support from health cadres can accelerate the implementation of recommended complementary feeding practices. Therefore, strengthening cadre skills and capacity building are critical for sustaining nutrition education programs at community health centers.

According to UNICEF's 1998 conceptual framework, inadequate maternal and child feeding practices are a key underlying factor of child malnutrition. These practices may stem from limited knowledge and awareness, as well as cultural and religious influences, all of which can substantially contribute to the problem of childhood malnutrition. (Muluye et al., 2020). Therefore, structured interventions at Puskesmas that integrate nutrition counseling with culturally sensitive approaches are critical in overcoming these challenges. Previous studies have also shown that nutrition education delivered through health workers and local cadres significantly improves the quality and diversity of complementary feeding.

HPM: Commitment to a plan of action

Theme 5: Sustained maternal engagement in complementary feeding

The interview results showed that most mothers were highly motivated to maintain their children's health through complementary feeding. However, environmental factors, such as the availability of local food ingredients, influenced their decision-making. This commitment aligns with the Health Promotion Model (HPM) and the Health Belief Model, which emphasizes that a person's health behavior is influenced by beliefs about benefits and perceived barriers (Alagili & Bamashmous, 2021). Mothers who believe that nutritious complementary foods are important for their child's health will be more committed to preparing appropriate food. Continuing complementary feeding practices is crucial for ensuring consistent nutrition for children.

However, some mothers understand the importance of complementary feeding, but barriers such as limited time, lack of recipe variety, and children's eating difficulties remain. This finding aligns with previous literature, which reported that the success of complementary feeding depends on maternal knowledge, internal (motivation, self-confidence), and external (family support, food availability) factors (World Health Organization, 2023).

Additionally, the findings show that mothers with high adaptability could adjust complementary food recipes to suit their child's developmental stage. For example, as a toddler grows older, food textures must be adjusted to help the child become accustomed to family foods. These statements illustrate the mothers' commitment to providing healthy complementary foods (MP-ASI). Overall, the participants' statements reflect their awareness and effort to ensure that their children's nutritional needs are met. Nevertheless, a diverse diet is required to meet children's nutritional needs.

CONCLUSION AND RECOMMENDATION

Conclusion

This study shows that adequate complementary feeding practices can help prevent stunting in infants. However, such feeding practices are influenced by local wisdom, maternal knowledge, family support, and health workers. This finding aligns with the Health Promotion Model, which emphasizes perceived benefits and barriers, maternal self-efficacy, and interpersonal influences.

Recommendation for Mothers

Mothers of infants are advised to prepare balanced, nutritious complementary feeding (MP-ASI) dishes using local foods (e.g., seafood, eggs, tempeh, and moringa leaves), tailored to the child's age and eating ability. Mothers need to increase their self-efficacy by practicing simple complementary feeding preparation at home.

Recommendation for Integrated Health Post (Posyandu) Cadres

Posyandu cadres can provide regular, structured education sessions on complementary feeding (MP-ASI) using simple language and real-life examples grounded in local wisdom.

Recommendations for Community Health Center Nurses

Nurses can develop local, ingredient-based toddler nutrition education programs to help the local community meet their nutritional needs using readily accessible food sources.

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