

Enhancing Parental Nutrition Literacy through NOVA Classification Education in Children's Food Selection for Stunting Prevention

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ABSTRAK

Stunting masih menjadi salah satu permasalahan kesehatan masyarakat yang berdampak pada pertumbuhan fisik, perkembangan kognitif, dan kualitas sumber daya manusia di masa depan. Salah satu faktor yang berkontribusi terhadap kejadian stunting adalah rendahnya literasi gizi orang tua dalam memilih makanan yang sehat dan bergizi bagi anak. Kegiatan pengabdian kepada masyarakat ini bertujuan untuk meningkatkan literasi gizi orang tua melalui edukasi klasifikasi NOVA dalam pemilihan makanan anak sebagai upaya pencegahan stunting di Desa Batee Linteung, Kecamatan Simpang Tiga, Kabupaten Aceh Besar. Kegiatan dilaksanakan dengan sasaran ibu yang memiliki bayi dan balita. Metode yang digunakan meliputi penyuluhan kesehatan, diskusi interaktif, serta evaluasi menggunakan pretest dan posttest. Instrumen evaluasi berupa kuesioner yang terdiri atas 20 pertanyaan terkait pencegahan stunting, nutrisi anak, dan klasifikasi NOVA. Hasil kegiatan menunjukkan adanya peningkatan pengetahuan peserta setelah mengikuti edukasi. Nilai rata-rata pretest sebesar 61,5% meningkat menjadi 70,13% pada posttest, dengan selisih peningkatan sebesar 8,63%. Temuan ini menunjukkan bahwa edukasi berbasis klasifikasi NOVA efektif dalam meningkatkan

pemahaman orang tua mengenai pemilihan makanan yang lebih sehat bagi anak. Program ini berpotensi menjadi salah satu strategi edukatif yang mendukung upaya pencegahan stunting melalui peningkatan literasi gizi keluarga di tingkat masyarakat.

ABSTRACT

Stunting remains a major public health problem that adversely affects physical growth, cognitive development, and future human resource quality. One of the contributing factors to stunting is the limited nutrition literacy of parents in selecting healthy and nutritious foods for their children. This community service program aimed to improve parents' nutrition literacy through NOVA classification education on child food selection as an effort to prevent stunting in Batee Linteung Village, Simpang Tiga District, Aceh Besar Regency. The participants were mothers with infants and toddlers. The program employed health education, interactive discussions, and knowledge evaluation using a pretest-posttest design. The evaluation instrument consisted of a questionnaire containing 20 questions related to stunting prevention, child nutrition, and the NOVA food classification system. The results demonstrated an improvement in participants' knowledge following the educational intervention. The mean pretest score increased from 61.5% to 70.13% in the posttest, indicating an average improvement of 8.63 percentage points. These findings suggest that NOVA classification-based education is effective in enhancing parents' understanding of healthier food choices for children. The program has the potential to serve as an educational strategy that supports stunting prevention efforts through the enhancement of family nutrition literacy at the community level.

INTRODUCTION

Stunting remains one of the most pressing public health challenges affecting child growth and development worldwide, particularly in low- and middle-income countries. It is characterized by impaired linear growth resulting from chronic undernutrition, recurrent infections, and inadequate health care and caregiving practices during the critical stages of early childhood. Beyond its impact on physical growth, stunting has profound long-term consequences for cognitive development, educational achievement, immune function, and economic productivity, ultimately influencing the quality of human capital. The first 1,000 days of life, from conception until a child's second birthday, represent the most critical window for preventing stunting because nutritional deficiencies during this period may lead to irreversible developmental impairment. Consequently, effective stunting prevention requires comprehensive interventions that extend beyond ensuring adequate nutrient intake to strengthening parental knowledge, food selection skills, and feeding practices that shape children's dietary behaviors (Bagaskara, 2025; World Health Organization, 2023).

Indonesia continues to experience a considerable burden of stunting despite sustained governmental efforts to improve maternal and child nutrition. Through Presidential Regulation Number 72 of 2021 concerning the Acceleration of Stunting Reduction, the Indonesian government has adopted a multisectoral strategy involving health, nutrition, sanitation, education, and community empowerment. Complementing this policy, the Ministry of Health has strengthened maternal and child health services, nutrition counseling, and community-based health promotion initiatives. Although national indicators demonstrate gradual improvement, the prevalence of stunting remains relatively high in many rural areas where limited access to nutrition education and healthy food choices constrains parents' ability to provide optimal diets for their children. This situation indicates that stunting is not merely a consequence of food insecurity but also reflects persistent gaps in parental nutrition literacy and household decision-making regarding child feeding practices (Pemerintah Republik Indonesia, 2021; Kementerian Kesehatan Republik Indonesia, 2024).

Evidence from previous studies demonstrates that stunting is a multifactorial condition influenced by biological, environmental, and behavioral determinants. Maternal nutritional status before and during pregnancy, maternal age, low birth weight, recurrent infectious diseases, poor sanitation, and inappropriate complementary feeding practices consistently increase the likelihood of growth faltering among children. Likewise, inadequate dietary diversity and poor caregiver knowledge frequently contribute to suboptimal nutritional intake during infancy and early childhood. These findings reinforce the importance of empowering parents with practical competencies that enable them to select appropriate foods and establish healthy feeding behaviors during the most critical stages of child development (Endartiwi & Ma'rifah, 2024; Febrianti & Dewi, 2023; Nasitoh & Handayani, 2022).

In recent years, nutrition science has increasingly recognized that evaluating food quality should not rely exclusively on nutrient composition but should also consider the extent and purpose of industrial food processing. One of the most widely discussed frameworks addressing this perspective is the NOVA food classification system, which categorizes foods into four groups according to their processing level: unprocessed or minimally processed foods, processed culinary ingredients, processed foods, and ultra-processed foods. This framework has been widely adopted in nutrition research and public health because it provides a practical means of helping consumers identify healthier dietary patterns while encouraging greater consumption of minimally processed foods and limiting ultra-processed products. Foods classified within NOVA

Group 1 generally retain their natural nutritional characteristics and are recommended as the foundation of healthy diets, whereas ultra-processed foods often contain excessive amounts of added sugars, sodium, unhealthy fats, and cosmetic additives while providing comparatively low nutritional value (Monteiro et al., 2019; Food and Agriculture Organization of the United Nations, 2019).

Despite its growing international acceptance, the NOVA classification system continues to generate considerable scientific debate. Supporters argue that NOVA offers an accessible and behavior-oriented framework capable of translating complex nutrition concepts into practical guidance for consumers, thereby complementing conventional nutrient-based dietary recommendations. From this perspective, food processing represents an important determinant of dietary quality that deserves greater attention within nutrition education and public health policy. Conversely, critics argue that categorizing foods primarily according to processing levels may oversimplify dietary assessment because some processed foods remain nutritionally beneficial, whereas nutritional quality is also determined by food composition, portion size, dietary diversity, and overall eating patterns. Accordingly, many scholars emphasize that NOVA should not replace nutrient-based dietary guidelines but rather function as a complementary framework that strengthens public understanding of healthy food choices. This balanced perspective is particularly relevant in community nutrition education, where practical decision-making often determines whether nutritional knowledge is translated into healthier eating behaviors (Food and Agriculture Organization of the United Nations, 2019; Monteiro et al., 2019; Shim, 2025).

METHOD

This community service program was conducted in Batee Linteung Village, Simpang Tiga District, Aceh Besar Regency, Indonesia. The target participants were mothers who had infants and toddlers, as they play a central role in determining children's dietary intake and feeding practices within the household. The program was designed to improve parental nutrition literacy regarding child food selection through education on stunting prevention and the NOVA food classification system. By targeting mothers of young children, the activity aimed to strengthen knowledge and awareness related to healthy food choices that support optimal growth and development during early childhood.

The implementation of the program employed a participatory educational approach consisting of three main methods: health education, interactive discussion, and knowledge evaluation. Health education was used to deliver information regarding the causes, consequences, and prevention of stunting, as well as the importance of adequate nutrition during the first years of life. In addition, participants were introduced to the NOVA food classification system, including explanations of unprocessed or minimally processed foods, processed culinary ingredients, processed foods, and ultra-processed foods. Interactive discussions were conducted to encourage active participation and allow participants to ask questions, share experiences, and discuss challenges related to child feeding practices and food selection in their daily lives. This approach was expected to facilitate better understanding and increase participant engagement throughout the activity.

The implementation process consisted of three stages. The first stage was preparation, which involved coordinating with village officials and community representatives in Batee Linteung Village to determine the schedule, venue, and participant recruitment process. Educational materials and evaluation instruments were also prepared during this stage. The

second stage was program implementation, during which educational sessions on stunting prevention and the NOVA classification system were delivered to participants. Educational materials were presented through lectures and supported by interactive discussions to enhance comprehension. The third stage was evaluation, which aimed to assess changes in participants' knowledge after the educational intervention.

Program evaluation was conducted using a pretest–posttest design. Participants completed a pretest before the educational session and a posttest immediately after the completion of the activity. The evaluation instrument consisted of a structured questionnaire containing 20 questions related to stunting prevention, child nutrition, and the NOVA food classification system. The questionnaire was designed to measure participants' understanding of healthy food selection and the role of nutrition in preventing stunting. The effectiveness of the program was determined by comparing participants' pretest and posttest scores to identify improvements in nutrition literacy following the educational intervention.

RESULT AND DISCUSSION

Results

Characteristics of Community Service Participants

The community service program was conducted in Batee Linteung Village, Simpang Tiga District, Aceh Besar Regency, involving ten mothers who had infants and toddlers. These participants were selected as the primary target group because mothers play a central role in determining household food choices, preparing meals, and implementing feeding practices during early childhood. As the main caregivers, mothers significantly influence children's nutritional intake and overall growth and development. The participants represented families residing in the village who were willing to attend the educational session on stunting prevention and the application of the NOVA food classification system in selecting appropriate foods for children.

Prior to the implementation of the educational intervention, all participants completed a pretest designed to assess their baseline knowledge regarding child nutrition, stunting prevention, and food selection based on the NOVA classification system. The pretest results revealed considerable variation in participants' levels of knowledge. Three participants achieved relatively high scores ranging from 90% to 95%, indicating a strong understanding of nutritional concepts and healthy feeding practices. Several participants demonstrated moderate levels of knowledge, with scores ranging from 45% to 80%. However, a number of participants obtained relatively low scores, ranging from 20% to 30%, suggesting limited awareness of stunting risk factors, appropriate nutritional intake, and the health implications of food processing levels.

The distribution of pretest scores indicates that nutrition literacy among participants was heterogeneous. Such variation is commonly observed in community-based settings where educational backgrounds, access to health information, socioeconomic conditions, and exposure to health promotion activities differ among households. Mothers with higher pretest scores may have previously received information from health workers, integrated health service posts (Posyandu), maternal and child health programs, or digital media. In contrast, participants with lower scores may have had limited opportunities to access accurate nutrition information, particularly regarding the distinction between minimally processed foods and ultra-processed foods. These findings highlight the importance of targeted educational interventions that address existing knowledge gaps within the community.

Following the completion of the educational session, participants were asked to complete a posttest using the same questionnaire. The results demonstrated changes in participants'

knowledge levels after exposure to the educational materials. Most participants experienced improvements in their scores, indicating enhanced understanding of stunting prevention and healthy food selection. Participants who initially recorded lower pretest scores generally exhibited greater improvements than those who already possessed relatively high baseline knowledge. This trend suggests that the educational intervention was particularly beneficial for participants with limited prior understanding of nutrition-related concepts.

The average pretest score among participants was 61.5%, reflecting a moderate level of nutrition literacy before the intervention. Although some participants possessed substantial knowledge regarding child nutrition, the overall mean score indicates that significant opportunities remained for improving community awareness and understanding. The educational program was therefore designed to strengthen participants' knowledge regarding balanced nutrition, the prevention of stunting, and the practical application of the NOVA classification system in everyday food selection. Through lectures, discussions, and interactive learning activities, participants were introduced to the characteristics of minimally processed foods, processed foods, and ultra-processed foods commonly consumed by children.

Participant engagement throughout the educational session was generally high. During interactive discussions, mothers actively shared their experiences regarding child feeding practices, food purchasing decisions, and challenges in providing nutritious meals for their children. Many participants expressed interest in learning how to identify healthier food options and distinguish nutritious foods from highly processed products frequently marketed to children. This level of engagement indicated that the educational topic was relevant to participants' daily experiences and nutritional concerns.

The characteristics of the participants also reflect the importance of involving parents, particularly mothers, in community-based nutrition interventions. Since feeding decisions are largely made at the household level, improving parental nutrition literacy has the potential to influence dietary practices and promote healthier food environments for children. By focusing on mothers of infants and toddlers, the program targeted a population group that directly contributes to shaping children's eating habits during a critical period of growth and development.

The findings from this community service activity demonstrate that the participants represented a relevant target population for nutrition education initiatives aimed at preventing stunting. The variation in baseline knowledge levels and the active participation observed during the program indicate the continuing need for educational interventions that provide practical and accessible nutrition information. Strengthening nutrition literacy among parents is expected to support informed decision-making regarding child feeding practices and contribute to improved nutritional outcomes among infants and toddlers in the community.

The participant characteristics identified in this program provide important insights into the nutritional challenges faced by families with young children. The moderate average baseline knowledge score indicates that although some mothers have already been exposed to nutrition information, substantial knowledge gaps remain regarding healthy food selection and stunting prevention. Previous studies have emphasized that parental knowledge is one of the key determinants of child nutritional status because parents directly influence dietary intake, feeding behavior, and health-seeking practices. Inadequate parental understanding of nutrition may contribute to inappropriate feeding patterns that increase the risk of growth faltering and stunting among children (Nasitoh & Handayani, 2022; Bagaskara, 2025).

The involvement of mothers as the primary participants is particularly relevant because maternal knowledge and caregiving practices play a significant role in supporting child growth

and development. Research has demonstrated that maternal factors, including nutritional awareness and health literacy, are associated with children's nutritional outcomes and overall well-being. Mothers who possess adequate knowledge regarding balanced nutrition and appropriate feeding practices are more likely to provide foods that meet the nutritional requirements of infants and toddlers during critical growth periods (Endartiwi & Ma'rifah, 2024; Natasha et al., 2021).

The observed variation in participants' baseline knowledge also reflects differences in access to health information and exposure to nutrition education. National stunting reduction initiatives have emphasized the importance of community education and communication strategies in improving public awareness of child nutrition. However, information dissemination remains uneven across communities, particularly in rural areas. Consequently, community-based educational programs continue to play an important role in bridging knowledge gaps and supporting government efforts to accelerate stunting reduction (Pemerintah Republik Indonesia, 2021; Mulyadi et al., 2022).

The relevance of introducing the NOVA food classification system to participants is supported by growing evidence regarding the health implications of food processing. Recent studies indicate that increased consumption of ultra-processed foods is associated with poor dietary quality and adverse health outcomes among children. Parents who understand the differences between minimally processed foods and ultra-processed foods are better positioned to make informed dietary choices that support healthy growth and development. Therefore, strengthening parental nutrition literacy through NOVA-based education represents a promising approach to improving child nutrition and supporting long-term stunting prevention efforts.

Improvement of Parents' Nutrition Literacy Following NOVA Classification Education

The effectiveness of the community service program was evaluated by comparing participants' knowledge scores before and after the educational intervention. A pretest was administered before the educational session to assess participants' baseline understanding of stunting prevention, child nutrition, and the NOVA food classification system. Following the completion of the educational activities, participants completed a posttest using the same questionnaire. The comparison of pretest and posttest results was used to determine the extent to which the educational intervention improved parents' nutrition literacy regarding healthy food selection for infants and toddlers.

Table 1. Pretest and Posttest Scores of Participants

No	Participant	Pretest (%)	Posttest (%)	Difference
1	Fitriani	95	90	-5
2	Juariah	95	85	-10
3	Nurul Aida	90	90	0
4	Ayu Mauliana	80	95	+15
5	Diana	60	83	+23
6	Junaida	50	70	+20
7	Mega Survia	50	55	+5

8	Nur Baiti	45	55	+10
9	Umami Salamah	30	45	+15
10	Rusna	20	33.3	+13.3
Mean (%)		61.5	70.13	+8.63

As presented in Table 1, the overall mean pretest score was 61.5%, indicating that participants possessed a moderate level of knowledge regarding child nutrition, stunting prevention, and food classification prior to the intervention. Following the educational session, the mean posttest score increased to 70.13%, resulting in an average improvement of 8.63 percentage points. This increase demonstrates that the educational activities contributed positively to enhancing participants' understanding of nutrition-related topics and healthy food selection practices.

The individual participant results revealed varying degrees of improvement. Most participants showed positive gains in their posttest scores, suggesting that they successfully absorbed the information presented during the educational session. The largest improvement was observed in Diana, whose score increased from 60% to 83%, representing a gain of 23 percentage points. Junaida also demonstrated substantial improvement, with her score increasing from 50% to 70%, while Ayu Mauliana and Umami Salamah experienced gains of 15 percentage points each. Rusna, who initially obtained the lowest pretest score of 20%, improved to 33.3% in the posttest, indicating enhanced understanding despite still requiring additional educational support.

Interestingly, a small number of participants exhibited no improvement or slight decreases in their posttest scores. Nurul Aida maintained the same score of 90% in both assessments, suggesting that she already possessed a strong understanding of the material before the intervention. Meanwhile, Fitriani and Juariah experienced minor reductions in their posttest scores. Given their exceptionally high pretest scores of 95%, these decreases may reflect test-related variability rather than a decline in knowledge. Overall, the majority of participants demonstrated positive learning outcomes, indicating that the educational intervention was generally effective in improving nutrition literacy.

The results also indicate that participants with lower baseline knowledge tended to experience greater improvements than those who already possessed high levels of understanding. This pattern suggests that the educational materials were particularly beneficial for mothers who had limited prior exposure to information regarding nutrition, stunting prevention, and food processing classifications. By introducing practical concepts such as the identification of minimally processed foods and ultra-processed foods, the intervention provided participants with new knowledge that could be directly applied in everyday food selection decisions.

During the educational session, participants were introduced to the NOVA classification framework and learned how foods are categorized according to their degree of processing. Discussions focused on helping mothers identify foods that are suitable for infants and toddlers, recognize highly processed food products commonly marketed to children, and understand the potential nutritional consequences of excessive consumption of ultra-processed foods. Participant responses during discussions indicated that many mothers had previously been unfamiliar with the concept of food processing levels, despite routinely purchasing packaged foods for their children. Consequently, the educational session addressed an important knowledge gap that may influence future dietary practices within households.

The observed improvement in posttest scores suggests that NOVA-based nutrition education can serve as an effective strategy for enhancing parental nutrition literacy in community settings. Improved understanding of food classification systems may enable parents to make more informed decisions regarding food purchasing, meal preparation, and feeding practices. Such knowledge is particularly important during early childhood because dietary habits established during this period can influence growth, development, and long-term health outcomes.

The increase in participants' knowledge following the intervention supports previous findings emphasizing the importance of nutrition education as a component of stunting prevention programs. Adequate parental knowledge is widely recognized as a prerequisite for appropriate feeding practices and healthy dietary behaviors among children. Parents who understand nutritional requirements and food quality are more likely to provide balanced diets that support optimal growth and reduce the risk of chronic malnutrition. Therefore, educational interventions that improve nutrition literacy can contribute significantly to broader efforts aimed at reducing stunting prevalence (Bagaskara, 2025; Kementerian Kesehatan Republik Indonesia, 2022).

The findings are also consistent with recommendations from national and international health organizations emphasizing the need to strengthen caregiver knowledge regarding child feeding practices. Appropriate complementary feeding and the provision of nutrient-dense foods are essential during the first years of life, a period recognized as critical for physical and cognitive development. Increased parental awareness regarding healthy food choices can support improved dietary quality and promote favorable growth outcomes among infants and toddlers (World Health Organization, 2021; World Health Organization, 2023).

Furthermore, the positive learning outcomes observed in this program highlight the relevance of incorporating the NOVA food classification system into nutrition education initiatives. The NOVA framework has gained increasing recognition as an effective tool for helping consumers understand the relationship between food processing and health. Studies have demonstrated that frequent consumption of ultra-processed foods is associated with lower dietary quality and various adverse health outcomes. Educating parents about the differences between minimally processed foods and ultra-processed products may therefore encourage healthier food choices and reduce children's exposure to nutritionally poor dietary options (Monteiro et al., 2019; Monteiro et al., 2018).

Recent evidence further suggests that excessive intake of ultra-processed foods can negatively affect appetite regulation, nutrient intake, and long-term metabolic health. Such foods often contain high levels of added sugars, sodium, and unhealthy fats while providing limited amounts of essential nutrients needed for growth and development. Consequently, increasing parental understanding of food processing categories may contribute to healthier dietary environments within households and support efforts to prevent both undernutrition and other nutrition-related health problems among children (Juul et al., 2021; Shim, 2025; UNICEF, 2022).

The improvement in participants' posttest scores demonstrates that NOVA classification-based nutrition education was effective in enhancing parents' nutrition literacy regarding child food selection. Although the magnitude of improvement varied among participants, the overall increase in knowledge indicates that community-based educational interventions remain a valuable strategy for empowering parents and strengthening local stunting prevention efforts. These findings reinforce the importance of continuing nutrition education programs that provide

practical, evidence-based information tailored to the needs of caregivers responsible for child feeding and nutrition management.

Discussion

The findings of this community service program demonstrate that NOVA classification-based nutrition education contributed positively to improving parents' nutrition literacy regarding child food selection for stunting prevention. The increase in the mean knowledge score from 61.5% before the intervention to 70.13% after the intervention indicates that the educational activities successfully enhanced participants' understanding of child nutrition, food processing categories, and the importance of selecting healthier foods for infants and toddlers. Although the magnitude of improvement varied among participants, the overall trend confirms that educational interventions remain an effective strategy for strengthening parental knowledge, which is one of the fundamental determinants of child nutritional status and growth outcomes (Bagaskara, 2025; Kementerian Kesehatan Republik Indonesia, 2022).

The improvement observed among participants is particularly important because nutrition literacy directly influences parental decision-making regarding food purchasing, meal preparation, and feeding practices. Parents serve as the primary gatekeepers of children's diets, especially during the first years of life when children are highly dependent on caregivers for nutritional provision. Inadequate parental knowledge often leads to inappropriate feeding behaviors, including the introduction of foods with low nutritional quality, insufficient dietary diversity, and excessive reliance on commercially processed products. Consequently, enhancing nutrition literacy among parents can improve household food environments and support healthier dietary patterns that promote optimal child growth and development (Nasitoh & Handayani, 2022; Natasha et al., 2021).

The results also highlight the significance of educational interventions during the early stages of child development. The first 1,000 days of life are widely recognized as a critical window for preventing growth faltering and stunting. Nutritional deficiencies experienced during this period can have irreversible consequences for physical growth, cognitive development, educational achievement, and future economic productivity. Therefore, interventions that improve caregivers' understanding of proper nutrition during infancy and toddlerhood have substantial potential to contribute to long-term health outcomes. The World Health Organization emphasizes that appropriate complementary feeding, dietary diversity, and nutrient adequacy are essential components of stunting prevention strategies worldwide (World Health Organization, 2021; World Health Organization, 2023).

The findings of this program are consistent with national efforts to accelerate stunting reduction in Indonesia. The Indonesian government has identified stunting as a priority public health issue and has implemented multisectoral interventions through Presidential Regulation Number 72 of 2021 concerning the Acceleration of Stunting Reduction. These policies emphasize the importance of integrating nutrition-sensitive and nutrition-specific interventions, including health promotion, community empowerment, and behavior change communication. The educational approach applied in this community service program aligns closely with these national priorities because it focuses on improving knowledge and encouraging healthier dietary behaviors among caregivers of infants and toddlers (Pemerintah Republik Indonesia, 2021; Direktorat Jenderal Pelayanan Kesehatan, 2024).

One of the most significant contributions of this program is the introduction of the NOVA food classification system as a practical educational framework for parents. Conventional

nutrition education often focuses primarily on nutrients, food groups, and balanced diet recommendations. While these aspects remain important, many parents continue to face difficulties in identifying healthy food choices within increasingly complex food environments characterized by the widespread availability of processed and ultra-processed products. The NOVA classification system provides a practical approach by categorizing foods according to the degree and purpose of industrial processing. Through this framework, parents can more easily distinguish between minimally processed foods that support healthy growth and ultra-processed foods that may compromise dietary quality (Monteiro et al., 2016; Monteiro et al., 2019).

The relevance of NOVA-based education has become increasingly evident in recent years due to the rapid growth of ultra-processed food consumption among children. Ultra-processed foods are often heavily marketed, highly palatable, convenient, and relatively affordable, making them attractive options for families. However, these products frequently contain excessive amounts of added sugars, sodium, saturated fats, preservatives, and artificial additives while providing limited amounts of essential nutrients. As a result, regular consumption of ultra-processed foods may displace healthier dietary options and reduce overall nutritional adequacy. The educational intervention conducted in this program helped participants understand these risks and provided practical guidance for identifying healthier alternatives in everyday food choices (Food and Agriculture Organization of the United Nations, 2019; Monteiro et al., 2018).

The positive outcomes observed among participants may also be explained by the contextual nature of the educational content. Rather than presenting nutrition concepts solely from a theoretical perspective, the program connected the NOVA classification system to foods commonly consumed within the local community. This practical approach likely facilitated participant understanding and enabled mothers to relate the educational material directly to their daily experiences. Community-based educational interventions are generally more effective when they address real-life situations and provide actionable recommendations that participants can immediately implement within their households (Mulyadi et al., 2022; RI, 2018).

Another important consideration is the relationship between food quality and the multifactorial causes of stunting. Stunting does not occur solely as a consequence of inadequate food intake but is influenced by a combination of biological, environmental, socioeconomic, and behavioral factors. Maternal nutritional status during pregnancy, maternal age, low birth weight, infectious diseases, and inadequate feeding practices all contribute to growth failure among children. Several studies have demonstrated that children born with low birth weight face a higher risk of experiencing stunting, particularly when nutritional support during infancy is inadequate. Similarly, recurrent infections can interfere with nutrient absorption and utilization, further increasing the likelihood of growth faltering. Therefore, improving parental nutrition literacy represents one important component within a broader framework of stunting prevention strategies (Endartiwi & Ma'rifah, 2024; Febrianti & Dewi, 2023).

The educational intervention may also contribute indirectly to addressing the emerging double burden of malnutrition. In many developing countries, including Indonesia, undernutrition and overnutrition increasingly coexist within the same communities and even within the same households. UNICEF has highlighted concerns regarding the rising prevalence of childhood overweight and obesity alongside persistent undernutrition. Excessive consumption of ultra-processed foods has been identified as a contributing factor to both problems because such foods may simultaneously promote excessive calorie intake while providing insufficient micronutrients. Consequently, educating parents about food processing levels may help prevent not only stunting

but also obesity and other diet-related health conditions among children (UNICEF, 2022; Shim, 2025).

The scientific rationale for limiting ultra-processed food consumption is supported by growing evidence regarding its physiological and metabolic effects. Research suggests that ultra-processed foods may alter satiety mechanisms, influence appetite regulation, increase energy intake, and encourage unhealthy eating behaviors. Furthermore, the additives, refined ingredients, and altered food matrices commonly found in ultra-processed products may negatively affect metabolic health over time. These mechanisms provide further justification for incorporating food processing awareness into nutrition education programs targeting families with young children. By helping parents recognize the characteristics and potential risks of ultra-processed foods, educational initiatives can contribute to healthier dietary behaviors and improved nutritional outcomes (Juul et al., 2021; Shim, 2025).

The context of Batee Linteung Village further underscores the importance of locally tailored nutrition education. Community data indicate the ongoing need to strengthen awareness regarding child nutrition and healthy feeding practices among parents of infants and toddlers. Although health information is increasingly accessible through digital platforms and public health campaigns, disparities in knowledge and health literacy continue to exist within rural communities. The variation in baseline knowledge observed among participants in this program reflects these disparities and highlights the need for continuous educational support that is culturally appropriate and responsive to local conditions (Pemerintah Desa Batee Linteung, 2025; Kementerian Kesehatan Republik Indonesia, 2024).

Despite the positive outcomes achieved, several limitations should be acknowledged. The number of participants was relatively small, and the evaluation focused primarily on short-term knowledge improvement measured through pretest and posttest assessments. Consequently, the findings do not necessarily reflect long-term changes in feeding behaviors or nutritional outcomes among children. Future community service programs should consider incorporating follow-up evaluations, household observations, and behavioral assessments to determine whether improved nutrition literacy translates into sustained dietary changes and measurable reductions in stunting risk. Expanding the program to include fathers, grandparents, and other family members involved in child care may also enhance its effectiveness by fostering a more supportive household environment for healthy feeding practices.

The findings indicate that NOVA classification-based nutrition education represents an innovative, relevant, and practical strategy for strengthening parental nutrition literacy in community settings. By integrating contemporary knowledge regarding food processing with established principles of child nutrition and stunting prevention, the program provides a comprehensive educational model that addresses current nutritional challenges facing families. The observed improvement in participants' knowledge suggests that such interventions can contribute meaningfully to broader efforts aimed at reducing stunting prevalence, improving dietary quality, and promoting healthier growth and development among children. Consequently, the integration of NOVA-based nutrition literacy education into community health promotion programs may serve as a valuable complement to existing national stunting reduction initiatives in Indonesia.

CONCLUSION

This community service program demonstrated that NOVA classification-based nutrition education effectively improved parents' nutrition literacy regarding child food selection for

stunting prevention in Batee Linteung Village, Simpang Tiga District, Aceh Besar Regency. The increase in the average knowledge score from 61.5% in the pretest to 70.13% in the posttest indicates that the educational intervention successfully enhanced participants' understanding of child nutrition, healthy feeding practices, and the importance of distinguishing between minimally processed and ultra-processed foods. These findings suggest that integrating the NOVA food classification system into nutrition education can serve as a practical and relevant approach to strengthening parental awareness and supporting healthier dietary choices for infants and toddlers.

Furthermore, the program highlights the importance of parental nutrition literacy as a key component of community-based stunting prevention efforts. By improving parents' knowledge and understanding of food quality and processing levels, the intervention has the potential to encourage healthier feeding behaviors and contribute to better nutritional outcomes among children. Although the evaluation focused on short-term knowledge improvement, the positive results indicate that NOVA-based education can complement existing nutrition and health promotion programs aimed at reducing stunting and improving child growth and development within rural communities.

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