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(REVIEW ARTICLE)

Case report: Exclusive breastfeeding practice: a solution to overcome the risk of overnutrition in babies

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Abstract

Objectives: Exclusive breastfeeding during the first six months of a baby's life is crucial for optimal growth and long-term health. Breast milk provides complete nutrition and has significant health benefits, such as boosting the immune system and preventing various diseases. In contrast, uncontrolled formula feeding can increase the risk of overnutrition and health issues in infants.

Case Series: This case report analyzes the practice of breastfeeding and formula feeding in baby A, who was at risk of overnutrition due to a higher proportion of formula feeding compared to breastfeeding. Through educational intervention and family support, the frequency of exclusive breastfeeding increased from 40% to 100% within less than six months. Monitoring results showed an improvement in baby A's nutritional status, with a reduction in body mass index (BMI) from the overweight category to normal.

Conclusion: Exclusive breastfeeding for the first six months is essential for optimal growth, preventing obesity, and supporting long-term health. Success can be achieved through maternal education, proper breastfeeding techniques, and effective family support. A holistic approach has proven to improve the quality of life for both mothers and babies.

Keywords: Exclusive Breastfeeding; Formula Feeding; Overnutrition; Education; Nutrition; Breastfeeding Techniques

1. Introduction

The baby formula milk industry in Indonesia has experienced significant growth. In 2023, the baby formula milk market in the Asia-Pacific region, including Indonesia, was valued at approximately USD 50.52 billion, with projections indicating continued rapid growth1. This growth is driven by increased parental awareness of baby's nutrition and easier product access through various distribution channels, such as supermarkets and digital platforms1,2. According to the Indonesian Ministry of Health Regulation No. 39 of 2013, baby formula milk is a specially designed milk product intended as a substitute for breast milk (ASI) for babies up to six months of age. Typically available in liquid or powdered form, baby formula milk serves as an alternative when breast milk is unavailable or insufficient.

A 2018 report by the United Nations Children's Fund (UNICEF) identified Indonesia as one of the largest markets for baby formula milk. However, improper formula feeding whether in terms of frequency, dilution, or hygiene can lead to nutritional issues in babies, ranging from undernutrition to overnutrition3. According to Indonesia's 2010 health profile data, the nutritional status of children under five (based on weight-for-age measurements) showed that 4.9% suffered from severe malnutrition, 13% were undernourished, 76.2% had normal nutrition, and 5.8% were overweight4. The 2023 Basic Health Research (Riskesdas) survey reported a stunting prevalence of 21.6% among Indonesian children

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under five, marking an improvement from 24.4% in 2021. Additionally, the survey found that the prevalence of severely underweight children (very low weight-for-age) had decreased to 3.6%, indicating progress in child nutrition.

Globally, the demand for baby formula milk continues to rise. In 2021, Euromonitor International reported that the global babies formula market was valued at approximately USD 55 billion. This growth is fueled by increased awareness of babies nutrition and evolving dietary trends among young parents. Despite the rising consumption of baby formula in developing countries, UNICEF and WHO continue to emphasize the importance of exclusive breastfeeding for the first six months of life2,5. In the United States, around 60% of babies receive formula within their first year, with approximately 75% of six-month-old babies being formula-fed. Of these, 42.7% receive only formula, while 31.9% are given both breast milk and formula. In Indonesia, the 2023 Indonesian Health Survey (SKI) reported that only 55.5% of babies aged 0-6 months receive exclusive breastfeeding, falling short of the national target of 80%. Improper formula preparation either too diluted or too concentrated remains a significant concern, as it directly impacts babies nutrition6.

A recent study by Zhang et al. (2023) in Nutrition Reviews revealed that babies who consume formula are at a higher risk of obesity in later life, particularly when formula feeding is not properly regulated. This risk is attributed to the higher calorie, protein, and fat content in formula compared to breast milk7. Furthermore, a study in the Journal of Pediatric Gastroenterology and Nutrition highlighted that although formula can meet an baby's nutritional needs, excessive protein and mineral intake can lead to growth and health complications8.

The latest market data indicates a surge in global infant formula sales. In 2023, the Asia-Pacific region led by China and India dominated the market, with an estimated value of USD 50.52 billion. Key drivers behind this growth include demographic changes, increased awareness of babies nutrition, and the expansion of the middle class. Additionally, WHO has noted that digital marketing has become a powerful tool for formula companies, allowing them to directly influence parents' feeding choices through highly personalized advertising strategies1,2. The marketing and increased use of infant formula, particularly for babies under six months old, have raised concerns about its impact on baby nutrition. Incorrect formula preparation whether too diluted, leading to insufficient nutrition, or too concentrated, increasing the risk of overnutrition remains a critical issue.

Furthermore, improper feeding practices, including both breastfeeding and formula feeding, affect baby dietary intake. Despite improvements, challenges persist, as around 35% of babies aged 0-23 months still receive pre lacteal feeding, with the formula being the primary choice. Of those receiving pre lacteal feeding, approximately 60% are given formula9. Additionally, the 2023 SKI survey found that 52% of six-month-old babies receive complementary feeding, reflecting increased awareness of the transition from exclusive breastfeeding to solid foods. However, further efforts are needed to promote healthy baby feeding practices. Ideally, babies aged 0-6 months should receive exclusive breastfeeding, followed by the introduction of complementary foods alongside continued breastfeeding until the age of 24 months.

Overnutrition in infancy can affect physical and motor development. Babies who are overweight may struggle with age-appropriate motor skills and face a higher risk of long-term health complications, such as type 2 diabetes, glucose metabolism disorders, heart disease, and vascular blockages in adulthood10.

This case report aims to analyze breastfeeding and formula-feeding practices among babies while identifying factors influencing a baby's nutritional status to prevent obesity. It will evaluate the impact of exclusive breastfeeding on baby nutrition, including stunting and malnutrition prevalence, as well as the challenges faced by mothers in providing breast milk. The report will also explore interventions to enhance breast milk production, such as proper breastfeeding techniques, lactation support methods, and social support. Increasing parental awareness of the importance of exclusive breastfeeding and proper formula preparation will be a key focus, to develop recommendations to prevent obesity and promote healthy weight gain in young children. Ultimately, this effort seeks to contribute to improving child nutrition in Indonesia.

2. Case series

Baby A, a 3-month-old male infant, was assessed on September 4, 2024. He was born on June 2, 2024, at 40-41 weeks of gestation, weighing 3038 grams, with a length of 47 cm and a head circumference of 35 cm. He is the first child of Mrs. A (25 years old) and Mr. R (28 years old). During pregnancy, Mrs. A had no health complications and attended six Antenatal Care (ANC) check-ups at the community health center and Midwifery Clinic, all of which showed normal results.

Mrs. A visited Midwifery Clinic to consult about Baby A's growth and development. At the time of assessment, baby A weighed 7 kg, had a length of 59 cm, and a head circumference of 41 cm. His BMI was within the >+1 SD to +2 SD range, indicating a risk of overnutrition. Hearing assessment results were normal, and the Developmental Pre-Screening Questionnaire for 3-month-olds showed that baby A successfully performed 9 out of 10 activities, with only the ability to lift his head to 45 degrees not yet fully developed.

Mrs. A reported that she started supplementing baby A with formula milk at 2 months old due to her return to work as a private-sector employee. She works from 08:00 to 16:00 WIB, during which time baby A is cared for by his grandmother. Since Mrs. A expressed breast milk was insufficient, the grandmother supplemented with formula milk 3-4 times daily, with a 120 ml serving per bottle. The feeding ratio was 60% formula and 40% breast milk. At night, when baby A was with his mother, he was exclusively breastfed. However, due to limited time for pumping at work—only once during lunch break Mrs. A's milk supply started decreasing despite consuming a balanced diet rich in vegetables, fruits, fish, and nuts. She was unsure how to increase her milk production to ensure exclusive breastfeeding.

At the first visit, when baby A was 3 months and 2 days old, breast milk accounted for 40% of his nutrition, while formula remained dominant at 60%. His weight was recorded at 7 kg, with a BMI of 20.1 kg/m^2, indicating a risk of overnutrition (>+1 SD). By the second visit, at 3 months and 15 days old, breast milk intake increased to 50%, with a weight of 7.3 kg, length of 60 cm, head circumference of 42 cm, and BMI of 20.3 kg/m^2, though the risk of overnutrition persisted. At the third visit, at 4 months old, breast milk intake further improved to 60%, while formula decreased to 40%. His weight increased to 7.6 kg, length to 62 cm, and BMI dropped to 19.8 kg/m^2, approaching the normal category (+1 SD).

by 4 months and 15 days, through telehealth consultation, breast milk intake had reached 80%, and formula was reduced to 20%. His weight was recorded at 7.8 kg, length at 63 cm, head circumference at 43 cm, and BMI at 19.6 kg/m^2, now within the normal category (+1 SD). By 5 months and 15 days, with continuous support, including education, infant massage, and lactation management, exclusive breastfeeding was successfully achieved at 100%, with no formula supplementation. His weight increased to 8.2 kg, length to 65 cm, head circumference to 43.5 cm, and BMI to 19.4 kg/m^2, confirming normal nutritional status per WHO standards. This progress demonstrated the effectiveness of interventions in supporting exclusive breastfeeding until 5.5 months.

The intervention included educating Mrs. A on the benefits of exclusive breastfeeding, such as optimal nutrition for infant growth, long-term health benefits, obesity prevention, and immune system enhancement. She was also guided on proper breastfeeding techniques, including correct positioning, good latch techniques, and the importance of direct breastfeeding to stimulate milk production. Additionally, she learned effective pumping techniques and proper storage of expressed milk to ensure a sufficient supply for baby A during work hours.

Family support, particularly from the grandmother, was maximized during the intervention. The grandmother was educated on prioritizing breast milk over formula and ways to assist Mrs. A in time management and baby care that promotes exclusive breastfeeding. The intervention also focused on improving feeding practices to address signs of overnutrition, such as regulating formula feeding schedules and ensuring appropriate portion sizes.

The primary goal of the intervention was to ensure baby A received balanced nutrition to support optimal growth and development while preventing long-term health risks such as obesity. The results showed a successful transition from 40% breastfeeding at the start of the intervention to 100% exclusive breastfeeding by 5.5 months. Another key success indicator was the normalization of the baby's nutritional status, with BMI shifting from >+1 SD to the normal range per WHO standards. This outcome highlights the effectiveness of education, family support, and baby massage in promoting exclusive breastfeeding and healthy growth.

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3. Discussion

Mrs. A faced challenges in breastfeeding, as her milk supply was insufficient to meet Baby A's needs, leading to a higher intake of formula milk. Breast milk production is significantly influenced by a nutritious diet. Research by Holliday & Mason (2020) and Chen et al. (2021) indicates that consuming nutrient-rich foods high in protein, healthy fats, and adequate hydration contributes to increased milk volume and quality7,11. Additionally, a study found that omega-3 supplementation improves breast milk composition, which plays a crucial role in baby brain development12.

For mothers experiencing breastfeeding difficulties, increasing the frequency of nursing and regularly pumping especially at night can help stimulate milk production. This aligns with Ahmed., et al. (2023) who confirmed that exclusive breastfeeding supports a baby's physical and cognitive health, thanks to its DHA and omega-3 content, which are vital for neuron formation13.

Proper breastfeeding techniques are essential for successful lactation. Recommended techniques include ensuring a comfortable position for both mother and baby, positioning the baby at breast level, and ensuring a wide mouth latch to properly grasp the areola. A study found that these techniques reduce pain, improve milk flow, and help babies suckle more effectively, leading to greater success in exclusive breastfeeding14.

Maintaining proper breast care and using effective breast massage techniques are key to ensuring smooth milk production and preventing infections such as mastitis. Oxytocin massage has been proven to significantly stimulate oxytocin release, enhancing milk flow and reducing maternal stress. Oxytocin massage not only increases milk production but also alleviates maternal anxiety and improves mood, ultimately boosting breastfeeding confidence15,16. Additionally, this massage supports postpartum uterine involution and enhances maternal comfort during breastfeeding. Since milk production tends to be higher at night, Mrs. A was advised to increase direct breastfeeding sessions during these hours.

Educating mothers about the benefits of breastfeeding is crucial for successful nursing. Mothers who receive comprehensive breastfeeding education are more likely to practice exclusive breastfeeding. Well-informed mothers are better prepared to face breastfeeding challenges and effectively address issues such as low milk supply17.

Healthcare professionals play a vital role in providing clear and practical guidance on breastfeeding techniques and the importance of exclusive breastfeeding. Emotional support from family, particularly from the spouse, also significantly enhances maternal confidence. Family motivation strengthens breastfeeding success, while a mother's understanding of breastfeeding practices is strongly linked to smooth lactation and reduced dependence on formula milk18. This was evident in Mrs. A's case, where continuous family support and education contributed to improved breastfeeding outcomes and reduced formula milk dependency.

In addition to breastfeeding, gross motor stimulation plays a critical role in physical development. Tummy time placing infants on their stomachs has been shown to strengthen neck and back muscles, which are essential for motor and cognitive milestones. Tummy time helps infants reach developmental milestones such as rolling over and sitting up. This physical interaction also supports brain development, as it encourages muscle control, benefiting both cognitive and sensory development. Therefore, it is the mother's need to engage in adequate and enjoyable physical interactions to optimize the baby's motor development19.

A comprehensive midwifery approach including breastfeeding education, proper nursing techniques, and practical interventions such as milk pumping yielded positive results for Mrs. A. Over time, exclusive breastfeeding rates increased, while formula dependency decreased. baby A's nutritional status also improved, with weight gain stabilizing and his BMI approaching the normal category.

A holistic approach that incorporates continuous lactation education, correct breastfeeding techniques, and emotional support from both family and healthcare providers is crucial for breastfeeding success and infant well-being. Recent studies confirm that these strategies significantly enhance breastfeeding outcomes and improve infant nutritional status. Therefore, integrating these aspects into midwifery care is essential for promoting exclusive breastfeeding and healthy infant development17.

4. Conclusion

Exclusive breastfeeding for the first six months of a baby's life is essential for optimal growth and development, strengthening the immune system, and preventing long-term health issues such as obesity and developmental disorders. Several factors influence the success of exclusive breastfeeding, including the mother's knowledge of lactation, proper breastfeeding techniques, and family support. In the case of Baby A, efforts to increase exclusive breastfeeding through intensive education and family support successfully reduced dependence on formula milk and improved the baby's nutritional status, as indicated by a decrease in BMI to a normal category. This success also highlights the crucial role of family support in ensuring effective breastfeeding and lactation management, which directly impacts both maternal and baby health.

A holistic approach that includes social support, education, and continuous monitoring has proven effective in overcoming challenges related to exclusive breastfeeding. Ultimately, this approach contributes to better breastfeeding success and enhances the overall well-being of both mother and baby.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that there are no conflicts of interest related to this research. All authors have actively contributed, reviewed, and approved the final version of the manuscript for publication.

Statement of informed consent

The patient has provided consent for their case to be published as part of this case series and has signed the required Consent to Publication form.

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Author Contribution

All authors played an active role in every stage of the research, including conceptualization, patient management, manuscript writing, and data analysis. Each author made meaningful contributions throughout the process, from inception to final publication in this case report.

Highlights

Describe the highlights of the manuscript, consisting of minimally two sentences.

- Exclusive breastfeeding supports optimal growth and prevents the risk of obesity in babies.

- Family support and proper education enhance breastfeeding success and reduce dependence on formula milk.

References

[1] Insights FB. Infant Formula Market to Hit USD 178.83 Billion by 2032; Hectic Lifestyles and New Product Development to Boost the Market Growth. Fortune Business Insights [Internet]. 2025; Available from: https://www.fortunebusinessinsights.com/industry-reports/infant- formula-market-101498.

[2] World Health Organization (WHO). World Health Statistics 2022 [Internet]. World Health Organization (WHO). 2022 [cited 2024 May 20]. Available from: https://www.who.int/news/item/20-05-2022-world-health-statistics-2022

[3] Kementerian Kesehatan. Kementerian Kesehatan Republik Indonesia. Jakarta; 2017 Jul.

[4] Kementerian Kesehatan RI. Profil Kesehatan Indonesia 2019. 2020;

[5] UNICEF. Breastfeeding: A global perspective. United Nations Children's Fund (UNICEF) [Internet]. Available from: https://www.unicef.org/reports/breastfeeding-global-perspective

[6] Kementerian Kesehatan Republik Indonesia. Survei Kesehatan Indonesia (SKI) 2023 [Internet]. Badan Kebijakan Pembangunan Kesehatan; 2023. Available from: https://www.badankebijakan.kemkes.go.id/hasil-ski-2023/

[7] Chen H, Zhang T, Li Y. The Impact of Balanced Diet and Hydration on Breast Milk Production. Nutr Sci Res J. 2021;8(4):80–5.

[8] Laxmi A, Amanda L, B HY, Dolly D, Rubina G. Infant Feeding Practices: A Global Perspective. J Pediatr Gastroenterol Nutr. 2023;2(4).

[9] UNICEF. The State of the World's Children 2022: For Every Child, Health. United Nations Child Fund. 2022;

[10] Mulyana L, Farida E, Info A. Pola Pemberian Makan yang Tepat dalam Mengurangi Resiko Obesitas pada Balita. Indones J Public Heal Nutr. 2022;2(1):36–42.

[11] Holliday C, Mason G. Factors Affecting Breastfeeding Success: A Comprehensive Review. J Perinat Med. 2020;12(2):55–62.

[12] Firouzabadi F, Dehghani, Shab-Bidar S, Jayedi A. The effects of omega-3 polyunsaturated fatty acids supplementation in pregnancy, lactation, and infancy: An umbrella review of meta-analyses of randomized trials. Pharmacol Res. 2022;177.

[13] Osman S, Ahmed M, Ibrahim R, Abdelgader A, Abdelgader M, Ibrahim H, et al. Exclusive breastfeeding : Impact on infant health. Clin Nutr Open Sci [Internet]. 2023;51:44–51. Available from: https://doi.org/10.1016/j.nutos.2023.08.003

[14] Rayani T, Wijayanti A, Purwanti AS. The Relationship of Correct Breastfeeding Technique and The Incidence of Cracked Nipple in Postpartum Mothers at PMB Erlyn Ferryawati, Lumajang. J Nurs Care Biomol. 2024;9(2):70–6.

[15] Luh N, Ayuni L, Huriah T. Effectiveness of oxytocin massage for breast milk production : a literature review. J Aisyah J Ilmu Kesehat. 2023;8(2):275–86.

[16] Muhsanatia K. The effectiveness of oxytocin massage on breast milk production : A literature review. Malahayati Int J Nurs Heal Sci. 2024;7(2):214–23.

[17] Pérez-escamilla R, Tomori C, Hernández-cordero S, Baker P, Barros AJD, Bégin F, et al. Series Breastfeeding 1 Breastfeeding : crucially important , but increasingly challenged in a market- driven world. 2023;401:18–20.

[18] Dellen SA Van, Wisse B, Mobach MP, Dijkstra A. The effect of a breastfeeding support programme on breastfeeding duration and exclusivity : a quasi-experiment. BMC Public Health. 2019;1–12.

[19] Hewitt L, Kerr E, Stanley RM, Okely AD. Tummy Time and Infant Health Outcomes: A Systematic Review. BMC Pregnancy Childbirth. 2022;145(6).