



The Pagih book: An early detection and intervention instrument nutrition-monitoring for preventing the triple burden malnutrition in the golden age

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ABSTRACT

Background: The triple burden of malnutrition, encompassing undernutrition, micronutrient deficiencies, and overnutrition, remains a major nutritional problem in Indonesia, particularly among pregnant women and young children. Based on the 2023 Indonesian health survey, the prevalence of chronic energy deficiency (CED) among pregnant women reached 16.9%, anemia 27.7%, and exclusive breastfeeding was only 66.4% according to the 2024 Indonesian Nutritional Status Survey/*Survei Status Gizi Indonesia* (SSGI). These data indicate that the risk of malnutrition, especially among pregnant women from lower-middle socioeconomic backgrounds, remains high and has not been optimally addressed. **Methods:** This paper uses a literature review and conceptual paper approach, employing a gap analysis method for existing nutrition monitoring media. Data was obtained from scientific journals, national reports, and observations of nutrition worker needs in primary health care. **Findings:** Findings show that the Pagih Book is designed with three main functional components, namely recording daily nutritional intake through simple food notes and visualization of MyPlate contents, monitoring nutritional status and risk through the wrap-around curve of pregnant women's weight gain and micronutrient deficiency checklist, and integration of education and continuous nutritional interventions until the exclusive breastfeeding and early complementary feeding/*Makanan Pendamping Air Susu Ibu* (MP-ASI) phases. **Conclusion:** The Pagih Book is a comprehensive and innovative integrated nutrition monitoring tool that addresses critical gaps in maternal and child nutrition monitoring during the first 1,000 days of life by systematically combining dietary intake recording, nutritional risk monitoring, and ongoing nutrition education within a single, user-centered framework. **Novelty/Originality of this article:** This article lies in the development of a book-based nutritional monitoring media that is not only educational, but also integrates quantitative-qualitative intake recording, risk monitoring, and continuity of nutritional interventions from pregnancy to the golden age of children in one integrated instrument.

KEYWORDS: 1000 HPK; nutritional monitoring; PAGIH book; pregnant women; triple burden malnutrition.

1. Introduction

A woman is declared pregnant from the moment the egg and sperm meet, known as fertilization, until delivery. Antenatal Care (ANC) check-ups are required at least six times during pregnancy: two in the first trimester, one in the second trimester, and these three check-ups aim to identify pregnancy problems, especially if the pregnancy is high-risk. The Triple Elimination script test is one of the ANC service packages (Yulfiana et al., 2025). Pregnancy is a physiological process that brings about changes in both the mother and her

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environment. Pregnancy causes a woman's bodily systems to undergo fundamental changes to support the needs and development of the fetus in the womb. Pregnancy, labor, and delivery are philosophical processes and can have serious impacts on pregnant women (Syaiful et al., 2019). Pregnant women are the most vulnerable group to health problems or malnutrition due to their increased need for micro and macronutrients. The nutritional adequacy standards for pregnant and breastfeeding women refer to the nutritional adequacy figures for women aged 19-29 and 30-49 years, as stipulated in Minister of Health Regulation Number 28 of 2019 concerning the Nutritional Adequacy Intake/*Angka Kecukupan Gizi* (AKG). Details of the daily nutritional needs of pregnant and breastfeeding women can be seen in Table 1.

Table1. Daily nutritional requirements for pregnant and breastfeeding women based on the AKG

Nutrients	Nutritional Adequacy		Average
	Pregnant mother	Breastfeeding mothers	
Energy (kkal)	2,460	2,565	2,513
Proteins (grams)	77	78	78
Fat (grams)	62	62	62
Carbohydrate (grams)	385	400	393
Fiber (grams)	35	37	36
Calcium(mg)	2,650	3,150	2,900
Iron (mg)	44	18	31
Vitamin a (re)	900	950	925
Vitamin c (mg)	85	120	103
Folate(mcg)	600	500	550
Vitamin b12 (mcg)	4.5	5	4.7

(Nutrition standards guidebook for the free nutritious meal program)

The term “the three burdens of malnutrition” describes the three main forms of nutritional problems: undernutrition (such as stunting and wasting), micronutrient deficiencies or hidden hunger, and overnutrition (overweight or obesity). These three forms can occur simultaneously and reflect the complexity of nutritional problems influenced by an unbalanced diet, socioeconomic conditions, and limited access to nutritious food. According to Rogacion (2023), these three forms of nutritional problems have a significant impact on pregnant women and fetuses. During pregnancy, nutritional needs increase to support fetal growth and maintain the mother’s health. If these needs are not met, pregnant women become vulnerable to health issues with both short-term and long-term consequences.

Micronutrient deficiency, also known as hidden hunger, is a condition caused by low intake of vitamins and minerals in the body (Tanoto Foundation, 2025). This condition does not result from a lack of food quantity, but rather from inadequate nutritional quality. A person, including children, may consume sufficient or even excessive amounts of food, yet still be at risk of malnutrition if their diet lacks sufficient and balanced micronutrients. This indicates that energy intake alone is insufficient to ensure good nutritional status, as the body still requires various micronutrients to support metabolic functions, growth, and the immune system. Hidden hunger is often unrecognized because its symptoms are not immediately apparent, unlike those of severe malnutrition. This condition can persist for a long time undetected, so its effects only become evident once more serious health issues have developed. Beyond these general impacts, deficiencies in specific micronutrients can also lead to specific health disorders. Iron deficiency can cause anemia, characterized by fatigue, reduced concentration, and decreased immune function. Iodine deficiency can cause thyroid disorders that affect brain growth and development. Meanwhile, vitamin A deficiency can lead to vision impairment and even blindness in severe cases. These conditions demonstrate that hidden hunger is a serious nutritional problem with long-term consequences. Therefore, addressing hidden hunger requires a comprehensive approach, including improved access to nutritious food, nutrition education for the public, and routine monitoring of nutritional status (Yilmaz & Yilmaz, 2025). Early intervention, particularly

during pregnancy and the first 1,000 days of life, is a key factor in preventing broader impacts. Through integrated efforts, it is hoped that micronutrient deficiencies can be reduced and public health can be optimally improved.

Overnutrition (overweight or obesity) is caused by low nutrient intake but high energy intake (UNICEF, 2023). Overnutrition in pregnant women can lead to various health problems for both the mother and the fetus. The effects of overnutrition on pregnant women and their fetuses include an increased risk of pregnancy complications, gestational diabetes, preeclampsia, sleep apnea, miscarriage, preterm birth, macrosomia, blood clotting, and labor difficulties. Generally, these three conditions share common underlying factors, including poverty, which limits access to nutritious food. The majority of people with lower-middle economic status face limitations in obtaining food with sufficiently high nutritional value. Consequently, they tend to purchase whatever food is available without considering the nutritional status of those foods (de Lima Pereira et al., 2026). Yet, pregnant women have a high urgency to consume nutrient-dense foods to support their health and optimize fetal growth. Consequently, the triple burden of malnutrition frequently occurs in low-to-middle-income communities due to limited access to nutritious food. Furthermore, poor food choices due to a lack of knowledge and monitoring of balanced nutrition are also major contributors to these nutritional issues. Individuals with low educational attainment are often limited in their understanding of nutrition tailored to their specific needs. They tend to view food merely as a necessity to satisfy hunger. In reality, food is the primary means of meeting their nutritional needs and serves as a key factor in supporting their overall health. Moreover, food systems that provide affordable food but with low nutritional quality are also widespread. Yet, if utilized effectively, such systems could have a significant positive impact on public health, particularly for pregnant women and children who urgently require optimal nutritional intake. Consequently, the benefits of such systems can be sustained over the long term.

The PAGIH Book (Nutritional Intake Monitoring for Pregnant Women During the First 1,000 Days of Pregnancy) is an innovation in the field of nutritional monitoring, specifically designed to help pregnant women manage and monitor their nutritional intake independently and sustainably. This book serves not only as a record-keeping tool but also as a comprehensive educational resource for pregnant women. Functionally, the PAGIH book serves several important roles. First, as a practical nutrition guide that presents information on the nutritional needs of pregnant women in simple, easy-to-understand language (Rattan & Kaur, 2022). Second, as an educational tool that enhances pregnant women's knowledge regarding the importance of a balanced diet and the fulfillment of essential nutrients during pregnancy. Third, as a preventive tool for monitoring nutritional status, enabling early detection of potential nutritional issues before they develop into more serious conditions. Additionally, this book serves as an instrument for systematically monitoring a pregnant woman's daily dietary patterns, thereby facilitating periodic evaluation and control of nutrient intake. Beyond focusing solely on the pregnancy period, the PAGIH book is also designed to support nutritional monitoring through the postpartum period to assist mothers in monitoring their child's nutrient intake and achieving optimal growth. This is demonstrated by the inclusion of features for monitoring exclusive breastfeeding and the introduction of complementary foods/*Makanan Pendamping Air Susu Ibu* (MP-ASI) (Remensiwyaty & Magdalena (2023).

The government's efforts to improve maternal and child health have been implemented through various programs, one of which is the use of the Maternal and Child Health/*Kesehatan Ibu dan Anak* (KIA) Handbook as a health monitoring tool. Through the KIA book, health workers can monitor pregnancy progress, the mother's condition, and the child's growth and development on a regular and structured basis. Additionally, this handbook helps raise family awareness regarding the importance of routine health check-ups during pregnancy and postpartum. However, despite its crucial role in the healthcare system, this handbook still has several limitations, particularly regarding the specific and in-depth monitoring of a pregnant woman's daily nutritional intake. One of the main

weaknesses of the MCH handbook is the lack of a dedicated section that allows for detailed and systematic recording of daily nutritional intake.

2. Methods

2.1 Research design, data source, and conceptual approach

To improve the scientific quality, the author should add a structured sub-section (sub-bab) detailing the Gap Analysis Framework, explaining the specific criteria used to evaluate the KIA Handbook against the proposed PAGIH Book. This would clarify the "scientifically informed and clinically relevant" claims mentioned in the methods. This study utilized a Literature Review and Conceptual Paper Development design. The methodological approach centered on rigorous Gap Analysis followed by Idea Synthesis, which aimed to establish a conceptually sound, creative, and actionable problem-solving model for nutritional monitoring. This design was selected because the primary deliverable is the PAGIH Book conceptual framework, which is constructed from the logical synthesis of current scientific evidence and observed clinical needs. The research relied on a combination of primary (qualitative) and secondary (literature) data to ensure the conceptual model was both scientifically informed and clinically relevant.

Table 2. Data types and sources

Data Type	Collection Method	Data Focus	Source Justification
Primary (Qualitative)	Structured Interviews and In-depth Observation	Field challenges faced by nutritionists, the practical needs for nutritional monitoring media, and the usability of current nutrition education tools.	Gathered from nutritionists and health personnel at Primary Health Care Centers/ <i>Pusat Kesehatan Masyarakat</i> (Puskesmas) who are the intended key stakeholders for the tool's implementation.
Secondary (Literature)	Documentation and Systemic Review	Concepts surrounding the 1,000 First Days of Life/ <i>Hari Pertama Kehidupan</i> (HPK), detailed parameters of the Triple Burden of Malnutrition (under-nutrition, micronutrient deficiency, over-nutrition), efficacy of existing nutritional media, and relevant policy implementation guidelines.	Derived from peer-reviewed scientific journals, official reports from the Ministry of Health, and established nutritional guidance books.

2.2 Conceptual development procedures

The development of the PAGIH Book concept adhered to a systematic, three-stage procedure to ensure a robust and logical sound transition from problem analysis to the proposed solution as follows. Stage first, pre-design (identification and analysis). Problem identification is process analyzing the critical urgency of the triple burden of malnutrition in pregnant women as the foundational problem within the 1,000 HPK framework (Hartini et al., 2023). Then, Media gap analysis performing a comparative assessment of existing health monitoring media (e.g., book KIA) against the specific requirements of nutritionists for quantitative and qualitative intake documentation and risk-based tracking. Conceptual

framework formulation is establishing the core multi-functional roles of the PAGIH Book: as an integrated tool for education, nutritional intake logging, breastfeeding/MPASI monitoring, and early risk detection throughout the 1,000 HPK period.

Table 3. Gap analysis between the KIA handbook and the proposed PAGIH handbook

Aspects analyzed	Information in the KIA handbook	Discovered gaps	Development in the PAGIH handbook
Nutritional information for pregnant women	Contains general guidelines regarding the nutritional needs of pregnant women and also recommendations for consuming healthy foods.	The information is still general and does not explain in detail examples of menus or variations of food recommended every day.	Adding a more detailed explanation of nutritional needs, examples of balanced menus, and guidelines for selecting good and correct food ingredients, as well as providing a schedule for regular monitoring of maternal nutrition through a food record form and child nutritional development (especially exclusive breastfeeding and complementary feeding practices), documented in the PAGIH Book, as well as a mechanism for follow-up on nutritional interventions during the 1,000 HPK phase.
Monitoring maternal health	There are records of pregnancy checks such as weight, blood pressure and antenatal check-ups.	There has not been an in-depth explanation regarding the interpretation of the examination results by the mother	Providing a personalized Pregnancy Weight Gain Curve with simple explanations of the meaning of test results so mothers can understand their health condition, as well as a checklist for monitoring symptoms experienced during pregnancy to ensure prompt intervention.
Education on preventing health problems	Contains basic information about danger signs during pregnancy	Educational information is still limited and is not equipped with illustrations or practical explanations.	Add a brief explanation using illustrations or examples of situations that are easy to understand

Stage second, model design (conceptualization). Structural design is conceptualizing the PAGIH Book structure into two chronologically distinct yet integrated phases: the pregnancy phase (270 days) and the post-partum phase (730 days), covering the lactation, Exclusive breastfeeding, and early complementary feeding periods. Innovative content formulation–pregnancy phase is determining the key monitoring indicators as follows. Personalized gestational weight gain (GWG) curve for individualized, risk-based growth

monitoring; simplified food record to track adherence to macro/micronutrient recommendations; the self-assessment visual module/utilizing the *Isi Piringku ibu hamil* guide, allowing mothers to self-evaluate and visually document their dietary portions against ideal standards.

Innovative content formulation–post-partum phase, expanding key indicators to ensure continuity of care as follows. The exclusive breastfeeding monitoring module (0–6 months), including frequency logging and monitoring of the lactating mother's nutritional status. The MPASI readiness module (6–24 months), providing education and checklists for timely, appropriate type, frequency, and texture of complementary feeding to prevent stunting. Implementation procedure drafting: developing the standard operating procedures (SOPs) for the primary user (nutritionists), outlining the standardized schedule for periodic nutritional monitoring. The mechanism for evidence-based follow-up intervention based on data recorded in the PAGIH Book during both phases of 1,000 HPK.

Stage three, analysis and recommendation. Synthesizing idea analysis, critically analyzing theoretical feasibility and predicted impact of the comprehensive PAGIH Book model on the efficacy of nutritional programs throughout the entire 1,000 HPK period. This analysis demonstrated that the proposed model is a creative, idealistic, logically sound, and clinically realistic solution. Conclusion derivation, summarizing the analytical findings, ensuring the conclusions are directly and consistently linked to the identified problem and the conceptualized solution. Recommendation Formulation: Developing forward-looking recommendations that address the potential transferability of the concept, the likelihood of adoption by related health institutions (e.g., District Health Office), and the necessary steps for future empirical validation and pilot testing.

3. Results and Discussion

The 1,000th day of life is the most critical period for optimizing nutritional status to support children's growth and development. Nutritional deficiencies or excesses can have serious consequences during this period. A study by Hoffman et al. (2019) stated that the 1,000th day of life is a crucial period for influencing children's growth and development and can also be the most critical period for the risk of malnutrition. Therefore, systematic monitoring of maternal and child nutritional status is essential to prevent triple malnutrition from an early age (Prameswari, 2020).

This study in-depth examines various important indicators related to nutritional issues occurring in vulnerable groups, particularly pregnant women and toddlers, by referring to the results of the 2023 Indonesian Health Survey and the implementation of exclusive breastfeeding during the golden period of the First 1,000 Days of Life. Based on the findings of the 2023 Indonesian Health Survey, the ownership rate of Maternal and Child Health/*Kesehatan Ibu dan Anak* (KIA) books as a basic health monitoring instrument in Indonesia only reached 70.92%, indicating a persistent gap in access to health administration. This condition is exacerbated by the discovery of a very significant nutritional problem, namely the prevalence of Chronic Energy Deficiency in pregnant women with the lowest economic status, which reached 28%, a percentage that indicates a sharp gap in nutritional access based on socioeconomic strata.

Malnutrition during pregnancy is linearly correlated with newborn health, as reflected in documented data that record a prevalence of Low Birth Weight (LBW) of 6.1% and an incidence of Short Birth Length of 19.8%. In addition to challenges at birth, the fulfillment of sustainable nutrition through exclusive breastfeeding in Indonesia also faces significant obstacles, with a figure of 55.5%, indicating that nearly half of the infant population does not receive optimal nutritional intake according to medical standards. All of this data is summarized concretely from national health databases and a comprehensive report on Nutrition Problems in Indonesia in 2023, which emphasizes the need for more integrated and targeted intervention policies to improve the health of future generations.

Based on national survey data obtained from the 2023 SKI data, it is known that ownership of the KIA handbook is still 70.92%, which means that some people still do not

have this monitoring instrument. A journal uploaded by Khuzaiyah et al. (2018) explained that the utilization of the KIA handbook in Indonesia has still not reached at least 80% by pregnant women and families. Consequently, monitoring the health of mothers and children is still not optimal. This is evidenced by the majority of mothers who already have this instrument, but nutritional issues in pregnant women are still not properly addressed, so the risk of the double burden of malnutrition in mothers and children remains quite high. Furthermore, exclusive breastfeeding is still very low, this will certainly have a major impact on the growth and development of children in future generations. Therefore, the use of informative nutrition education media that can be a medium for monitoring nutritional status must be implemented properly. Furthermore, the role of other health workers, such as nutritionists, needs to be increased in routinely monitoring the nutritional status and nutritional intake of mothers during pregnancy and infancy.

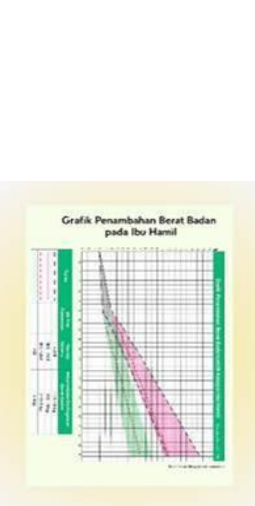
This statement is supported by a study of literature from previous research written by Azharani (2023), the results of this study prove that there is an increase in mothers' knowledge and attitudes about stunting prevention at the age of 1,000 HPK after participating in counseling using the Ethnic Booklet. So, in this case, nutrition education media plays a very important role in supporting the prevention of the double burden of malnutrition in mothers and children during the 1,000 HPK period (Martorell, 2017). The trend of using nutrition education media is very large in increasing mothers' knowledge and awareness of the importance of increasing supervision of the Double Burden of Malnutrition in children which can affect their growth and development in the long term.

A thorough analysis of national health monitoring instruments reveals significant gaps in the education and monitoring components of the Maternal and Child Health (MCH) handbook, currently the primary medium across Indonesia (Aziz et al., 2022). Despite its widespread use, this tool suffers from fundamental structural weaknesses, particularly in its presentation of nutrition education materials, which are considered less comprehensive, and the lack of detailed indicators for monitoring maternal nutritional status and nutrient intake. These limited monitoring features prevent the MCH handbook from functioning optimally as an early detection tool or providing adequate preventive measures to address the Triple Burden of Malnutrition that threatens mothers and children during the crucial first 1,000 days of life (MCH).

Significant gaps in the education and monitoring components of the Maternal and Child Health (MCH) handbook are a major obstacle to preventing nutritional problems across Indonesia. Although the instrument has been widely implemented, fundamental structural weaknesses remain, particularly in the presentation of nutrition education materials, which are considered less comprehensive, and the lack of detailed indicators to monitor maternal nutritional status and specific daily nutrient intake. These limited monitoring features hinder the MCH handbook's function as an optimal early detection tool, often resulting in delays in providing adequate preventive interventions to address the Triple Burden of Malnutrition. This malnutrition phenomenon, which includes undernutrition, micronutrient deficiencies, and overnutrition, is a serious threat that can cause permanent damage if not addressed during the golden period of the First 1,000 Days of Life (HPK).

As a strategic solution to the limitations of these conventional instruments, an innovation emerged in the form of the PAGIH (Monitoring of Nutritional Intake of Pregnant Women 1,000 HPK) handbook, which was systematically designed as a monitoring instrument and integrated nutrition education media. This PAGIH book facilitates regular monitoring of nutritional intake through the daily Simple Food Record feature and visualization of "*Isi Piringku*" (My Plate) meal portions, so that pregnant women have an applicable guide in maintaining the quality of their health and that of their fetus from pregnancy to postpartum. With a more comprehensive and systematic approach, the use of this innovative media is expected to be a fundamental step in mitigating the risk of malnutrition early through continuous individual risk monitoring. The presence of this book directly closes the gap in nutritional information that has not been fully accommodated in conventional monitoring systems, in order to ensure optimal child growth during the critical period of 1,000 HPK.

Table 4. Component of PAGIH book

Component	Functional Purpose	Innovative Content	Component Design
Maternal Nutritional Intake (Pregnancy and Breastfeeding Phase)	Record daily nutritional input in a structured manner for early detection of the risk of nutritional deficiency or excess	Simplified Food Record Daily or Weekly: Record portions of main meals and snacks. Apart from monitoring the mother's food portions, this instrument is also very necessary to understand the mother's eating habits and consumption patterns.	
		Specific checklist for critical nutrients (Animal Protein, Iron, Iodine, Green Vegetables) to prevent micronutrient deficiencies. Fulfillment of micronutrients greatly influences fetal development and has an important influence on improving maternal health during pregnancy.	
		The Portion Visualization tool based on "Isi Piringku" is a comprehensive recording of a mother's meal portions based on "Isi Piringku". This tool allows nutritionists and healthcare professionals to monitor a pregnant woman's nutritional intake based on her eating habits. This tool is created by the pregnant woman drawing the daily portion sizes on a plate provided, along with a description of each food item. If a woman's meal portion exceeds or falls below the "Isi Piringku" set by the Ministry of Health, the nutritionist will recommend starting a new habit by adjusting the mother's meal portions to the "Isi Piringku".	
Monitoring Nutritional Status and Risks (Pregnancy and Postpartum Phase)	Early detection of the risk of triple burden (undernutrition, overnutrition, micronutrient deficiencies) and continued monitoring of	Weight gain curve: Chart for monitoring pregnant women's weight gain based on pre-pregnancy BMI status. This instrument is intended to monitor maternal nutritional status during pregnancy to determine the risk of Triple Burden Malnutrition. Furthermore, this instrument is essential for determining	

nutritional
fulfillment

appropriate interventions for the mother's condition during pregnancy.

Monitoring module for routine exclusive breastfeeding every 1 day to monitor compliance with routine exclusive breastfeeding. This instrument can be used to minimize non-compliance in providing exclusive breastfeeding to children.

Nutritional Risk Form: Checklist of General Symptoms of microdeficiency or indications of overeating. This form is also very useful for improving monitoring of early detection of serious health problems in pregnant women.

Questionnaire sheet for giving MP - early breast milk (6 - 24 months) regarding the texture, frequency and diversity of children's food, as a further effort to prevent stunting. This instrument aims to determine the level of understanding mothers regarding providing complementary foods to children according to their age category and can increase mothers' readiness in providing complementary foods to their children.

Nutrition
Education
Intervention

Increase and knowledge, maternal nutritional compliance, and provide targeted intervention guidance

Nutritional Adequacy Intake/Angka Kecukupan Gizi (AKG). guide during pregnancy and breastfeeding: Provides a reference for the average adequacy of intake during pregnancy and breastfeeding. This guide was created so that mothers can have knowledge about nutritional intake that suits their needs so that they can later apply it in their daily lives.

Nutrition education regarding the contents of my plate for pregnant women: Providing

KELUHAN IBU HAMIL

Keluhan	Kategori	
	Iya	Tidak
Pusing		
lelah cepat		
mual/melis		
lelah cepat		
kelelahan berlebihan		
perut kembung atau sakit		
rasa tidak enak di perut		
perut kembung sering, sering		
kelelahan fisik dan kelelahan		
tidak nafsu makan atau berat		
gangguan psikologis		
kelelahan		
kelelahan kronis		

LEMBAR KUISISONER PEMERIAN MP - ASI

Petunjuk pengisian lembar kuisisoner

1. Isilah dengan benar dan jujur sesuai dengan kenyataan yang sebenarnya.

2. Isilah dengan benar dan jujur sesuai dengan kenyataan yang sebenarnya.

3. Isilah dengan benar dan jujur sesuai dengan kenyataan yang sebenarnya.

4. Isilah dengan benar dan jujur sesuai dengan kenyataan yang sebenarnya.

5. Isilah dengan benar dan jujur sesuai dengan kenyataan yang sebenarnya.

6. Isilah dengan benar dan jujur sesuai dengan kenyataan yang sebenarnya.

7. Isilah dengan benar dan jujur sesuai dengan kenyataan yang sebenarnya.

8. Isilah dengan benar dan jujur sesuai dengan kenyataan yang sebenarnya.

9. Isilah dengan benar dan jujur sesuai dengan kenyataan yang sebenarnya.

10. Isilah dengan benar dan jujur sesuai dengan kenyataan yang sebenarnya.

TABEL KECUKUPAN GIZI SEHARI IBU HAMIL DAN MENYUSUI BERDASARKAN AKG

Jenis Gizi	Kecukupan Gizi		Batas - Atas
	10-14 kg	15-20 kg	
Energi (kcal)	1800	2100	2400
Protein (gram)	55	65	75
Lemak (gram)	65	75	85
Karbohidrat (gram)	240	260	280
Serat (gram)	10	15	20
Kalsium (mg)	1000	1200	1400
Zat Besi (mg)	18	24	30
Vitamin A (IU)	4000	5000	6000
Vitamin C (mg)	80	100	120
Vitamin E (mg)	10	15	20
Vitamin B1 (mg)	1.5	2.0	2.5
Vitamin B2 (mg)	1.0	1.5	2.0
Vitamin B6 (mg)	0.5	0.7	1.0
Vitamin B12 (mg)	0.5	0.7	1.0

Keterangan: Angka kecukupan gizi adalah angka rata-rata yang dibutuhkan oleh ibu hamil dan menyusui.

education regarding portion references according to balanced nutrition. This education is used with the aim of helping mothers meet their needs according to the correct and appropriate food portions in accordance with the balanced nutrition recommendations according to the Ministry of Health.



Guide to Giving MP-ASI: Providing education regarding texture, frequency, recommended ingredients, method of preparation, and percentage of MP-ASI intake according to age category.



The PAGIH book concept is designed in such a way as to create an early prevention instrument for the Three Burdens of Malnutrition in the 1,000 HPK. Several important components in the PAGIH book media include recording maternal intake during pregnancy, monitoring nutritional status, self-education, and feeding practices for infants and toddlers (exclusive breastfeeding and complementary feeding), making it a comprehensive control tool for health workers (Friska, 2024). The potential for implementing the PAGIH book is very large in primary health care, especially if supported by adequate infrastructure, such as the role of nutritionists directly in monitoring and educating mothers and children about nutritional intake during the 1,000 HPK period.

The table above outlines three interconnected components that form the core structure of a digital nutrition-monitoring application designed to support mothers throughout pregnancy, breastfeeding, and the postpartum period (Brink et al., 2022). The first component, Maternal Nutritional Intake, focuses on capturing what a mother eats on a daily or weekly basis so that nutritional deficiencies or excesses can be identified before they become serious problems. This component contains three linked tools. A simplified food-recording feature lets a mother log the portions of her main meals and snacks, generating a picture of her overall eating habits and consumption patterns over time. Complementing this, a targeted checklist tracks intake of nutrients that carry the highest risk when insufficient: animal protein, iron, iodine, and green leafy vegetables; because deficiencies in these micronutrients can directly affect fetal growth and the mother's health during pregnancy. The third tool, a portion-visualization instrument built around the Ministry of Health's "*Isi Piringku*" (My Plate) guideline, asks the mother to sketch her actual meal portions onto a plate diagram along with a short description of each food item. Nutritionists then compare this drawing against the official "*Isi Piringku*" standard; where portions fall short of or exceed the recommendation, they can recommend adjustments and help the mother build healthier eating habits.

The second component, monitoring nutritional status and risks, shifts the focus from daily intake to ongoing health surveillance across pregnancy and the postpartum period (Setiana, 2022). Its purpose is to catch early warning signs of what is known as the "triple burden of malnutrition", the coexistence of undernutrition, overnutrition, and micronutrient deficiency, and to track whether nutritional needs continue to be met after birth. A weight-gain curve chart, calibrated to the mother's pre-pregnancy BMI, plots weight

changes over time to flag malnutrition risk and inform the type of intervention needed. A daily exclusive-breastfeeding monitoring module helps reduce lapses in adherence to exclusive breastfeeding recommendations. A nutritional risk form works as a checklist of general symptoms linked to micronutrient deficiency or overeating, supporting earlier detection of more serious health complications. Finally, a structured questionnaire evaluates how complementary foods (MP-ASI) are introduced to infants aged 6–24 months, covering texture, frequency, and dietary diversity to gauge how well mothers understand age-appropriate feeding practices and to strengthen stunting-prevention efforts.

The third component, Nutrition Education and Intervention, is designed to build maternal knowledge and encourage sustained compliance with nutritional recommendations through targeted guidance. It includes a Nutritional Adequacy Intake/*Angka Kecukupan Gizi* (AKG) reference guide for pregnancy and breastfeeding so mothers understand how much of each nutrient they need and can translate that into daily practice; an educational module on “*Isi Piringku*” that teaches balanced portion sizes based on Ministry of Health guidance; and a complementary-feeding (MP-ASI) guide that explains recommended textures, feeding frequency, ingredient choices, and appropriate preparation methods according to the infant's age category. Together, these three components form a continuous cycle of recording intake, monitoring risk, and delivering education that supports early detection of nutritional problems and helps prevent stunting from pregnancy through the postpartum period.

Some of these components are listed in the table above. The implementation of the PAGIH (Monitoring of Nutritional Intake of Pregnant Women 1,000 HPK) book is strategically designed for primary health care, specifically through *Posyandu* activities held regularly for pregnant women, infants, and toddlers. Within this service ecosystem, the role of health cadres and village midwives is crucial as the frontline, tasked with verifying data at each visit and conducting regular anthropometric examinations to monitor physical growth (Meri & Delvira, 2020). Through a structured monitoring system, every development in the health condition of participants can be well documented, thus enabling early detection of any nutritional abnormalities. The use of this instrument also strengthens the function of self-monitoring by families accompanied by professionals, so that the process of preventing nutritional problems does not only rely on medical interventions, but also on strengthening awareness of parenting and dietary patterns at the household level.

Furthermore, the effectiveness of the PAGIH book as an intervention instrument is supported by the role of nutrition experts who are specifically tasked with conducting in-depth analysis and determining follow-up actions based on the results of the initial assessment recorded in the book. Cross-sector coordination and synergy of various health worker competencies—from cadres, midwives, to nutritionists—are key to creating a sustainable and targeted long-term nutrition monitoring system (Rahmawati et al., 2022). With the integration of comprehensive nutritional intake data and clinical status, health workers can collaborate optimally to provide specific interventions tailored to individual needs. Thus, the PAGIH book is transformed into an integrated medium capable of optimizing prevention efforts and early detection of the risk of Triple Burden of Malnutrition in Indonesia, which ultimately contributes significantly to improving the quality of life of future generations during the golden period of the First 1,000 Days of Life.

The behavioral indicators in the nutrition assessment tool in the PAGIH book serve to describe an individual's food consumption patterns and eating habits. These indicators provide insight into behavioral factors that influence nutritional status and are important in primary health care. Understanding these indicators requires a comprehensive approach, taking into account the individual's life context. One approach is to use a wrap-around curve, which shows the range of normal behaviors based on population data. An individual's position on the curve can indicate their risk of nutritional problems. For nutrition professionals, this curve serves not only as a diagnostic tool but also as a guide to designing nutritional interventions.

4. Conclusions

This study successfully developed the conceptual framework for the PAGIH (Prevention of the Triple Burden of Malnutrition) Handbook, an innovative integrated nutrition monitoring tool designed to address critical monitoring gaps in maternal and child health services. The key finding of this conceptual paper is that current general health documentation is insufficient for the early and specific detection of the Triple Burden of Malnutrition during the critical 1,000 Days of Life. The PAGIH Book makes a significant contribution to applied nutrition science by establishing a comprehensive platform for personalized nutrition monitoring. This is primarily achieved through its three innovative components: the Adjusted Gestational Weight Gain (GWG) Curve, which shifts monitoring from general status recording to risk-based and individualized tracking; Integrated Simple Food Records, which provide evidence-based data for targeted nutrition counseling; and an expanded 1,000-day continuity log, ensuring seamless nutritional monitoring from conception through infancy. Ultimately, the PAGIH Handbook offers practical and scientific solutions that strengthen healthcare providers' ability to deliver timely and specific nutritional interventions, thereby moving beyond mere symptom management toward proactive prevention of malnutrition in high-risk populations. With the introduction of this new resource—the PAGIH Book—there is great hope that it will serve as a participatory bridge between nutritionists and other health workers to foster a more resilient public health system, starting with optimal nutritional fulfillment during the first 1,000 days of life.

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Author Contribution

D.A.V.P., contributed to the study conceptualization, literature review, development of the PAGIH framework, and manuscript drafting. S.S.P., contributed to data collection, synthesis of previous studies, and methodological design. H.F.AF., contributed to manuscript editing, critical revision, and visualization of the conceptual model. All authors reviewed and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

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Ethical Review Board Statement

Not available. This study is a conceptual paper based exclusively on the review of scientific literature, national guidelines, and conceptual design media. It did not involve any human subjects, animals, or primary data collection concerning public health and safety, thus ethical clearance from an Institutional Review Board was not required.

Informed Consent Statement

Not available. This research is a conceptual paper that focuses on the development and theoretical justification of the PAGIH Book Media monitoring tool, utilizing secondary data from scientific literature and national guidelines. Concept development was carried out through a comprehensive literature review and a concentration on survey data references as a theoretical framework in creating media that suits the needs of respondents in

obtaining information and the needs of health workers in analyzing triple burden malnutrition risk data. Conceptually and data review in the design did not use biological objects or collect identifiable personal information from research participants, so informed consent was not required

Data Availability Statement

The data that support the findings of this study are available within the article and its supplementary materials. As this research is a conceptual paper based on a literature review and gap analysis, the primary data sources analyzed—including Gestational Weight Gain (GWG) standards, national guidelines, and Nutritional Adequacy Intake/*Angka Kecukupan Gizi* (AKG)—are publicly available scientific literature and official reports cited in the References section. All novel materials generated during the study (the conceptual design and components of the PAGIH Book Nutri-Monitoring tool) are fully presented and described in detail within the Methods and Results sections of this manuscript, thus allowing for replication of the conceptual model. No restricted or private datasets were created or analyzed.

Conflicts of Interest

Authors declared that the development of the conceptual thinking of the PAGIH book discussed in this article is not influenced by any conflict of interest, including commercial interests, external funding, or affiliations that could affect the objectivity of the research conducted. The design of the conceptual framework of the PAGIH book is a series of academic and research activities. The entire research and reporting process is carried out independently and objectively.

Declaration of Generative AI Use

The authors states that technology-based artificial intelligence was used to a limited extent in the preparation of this manuscript, specifically only to improve grammar or translation from Indonesian to English. This article is the result of the author's thoughts and full responsibility for thinking and generating creative ideas in developing concepts and innovations regarding the findings of the PAGIH book as an instrument for early detection of malnutrition in the golden age of 1,000 HPK. In this manuscript, artificial intelligence (AI) does not replace the author's role in the conceptual preparation process, research process, analysis process, and academic decision making.

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