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The Effectiveness of Website-Based Educational Media on the Knowledge and Skills of Cadres in Stunting Prevention in the Kapuas River Border Region

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ABSTRACT

Stunting telah menjadi perhatian dunia seperti yang terlihat dari inisiatif perbaikan gizi secara global. Dalam upaya mendeteksi dan mencegah kejadian stunting, diperlukan kerjasama dengan berbagai Stakeholder salah satunya adalah kader. Kader harus memperoleh keterampilan informasi dasar berbasis teknologi informasi dalam upaya pencegahan stunting. Penelitian ini memiliki tujuan untuk melihat efektivitas media edukasi berbasis website pada pengetahuan dan keterampilan kader. Penelitian ini adalah quasy experiment dengan pendekatan pre-test post-test with control group, pengambilan sampel menggunakan Total Sampling dengan 100 responden yang di bagi menjadi 2 kelompok. 45-60 menit persesinya. Instrumen penelitian menggunakan kuesioner pengetahuan dan keterampilan kader kesehatan tentang pencegahan stunting. Hasil penelitian dengan uji marginal homogenity diperoleh nilai p 0,000 (p < 0,05), menunjukkan bahwa ada efektivitas penggunaan media edukasi berbasis website terhadap tingkat pengetahuan dan keterampilan kader tentang deteksi dini stunting dibandingkan dengan kelompok kontrol yang menggunakan media Leaflet. Penggunaan media edukasi berbasis website terbukti efektif terhadap peningkatan pengetahuan kader serta keterampilan kader dalam cara deteksi dini stunting yang meliputi identifikasi kurva pertumbuhan dan perkembangan anak berdasarkan usianya. Penelitian ini menyarankan kerja sama lintas sektor untuk meningkatkan akses internet, mendampingi kader, dan mengintegrasikan media edukasi digital agar pencegahan stunting lebih efektif.

ABSTRAK

Stunting has become a global concern, as reflected in worldwide nutrition improvement initiatives. In efforts to detect and prevent stunting, collaboration with various stakeholders is required, one of whom is community health cadres. Cadres need to acquire basic information and technology-based skills to support stunting prevention. This study aimed to examine the effectiveness of website-based educational media on cadres' knowledge and skills. The research employed a quasi-experimental design with a pre-test post-test control group approach. Total sampling was used, involving 100 respondents divided into two groups, with sessions lasting 45–60 minutes each. Research instruments included questionnaires assessing cadres' knowledge and skills related to stunting prevention. The results, analyzed using the marginal homogeneity test, showed a p-value of 0.000 ($p < 0.05$), indicating the effectiveness of website-based educational media in improving cadres' knowledge and skills regarding early detection of stunting compared to the control group that used leaflet media. Website-based educational media proved effective in enhancing cadres' knowledge and skills in early stunting detection, including identifying child growth curves and developmental milestones according to age. This study recommends cross-sectoral collaboration to improve internet access, provide continuous cadre assistance, and integrate digital educational media into community health programs to optimize stunting prevention.

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Introduction

Stunting, also known as low height-for-age, is a clinical manifestation reflecting chronic undernutrition during critical periods of childhood growth. In recent years, stunting has garnered significant global attention, evidenced by worldwide nutritional improvement initiatives. The objective of these efforts is to reduce the incidence of childhood stunting, which has become the primary focus of the global nutrition target to achieve a 40% reduction in the number of children under 5 years of age by 2025 (Leroy & Frongillo, 2019).

Indonesia is a developing nation grappling with a high prevalence of stunting, currently ranking among the top five countries globally in terms of stunting case numbers out of 88 assessed nations. Data from 2015 indicated that approximately 37.8% of children in Indonesia were reported as stunted, a figure that saw a reduction to 31% by 2018 (Kemenko, 2021). Despite an average annual decline of 7.3% in stunting prevalence between 2013 and 2018, this achievement remains low when benchmarked against World Health Organization (WHO) standards (Titaley et al., 2019).

Specifically, West Kalimantan Province exhibits a considerably high stunting prevalence of 29.8%. A granular view at the sub-district level shows that East Pontianak records 100 stunted children under two years old (12.84%) (Dinkes Pontianak, 2021). Furthermore, preliminary studies conducted in 2023 along the primary healthcare centers (Puskesmas) bordering the Kapuas River reported 87 cases of stunting, largely attributed to issues related to pregnancy and maternal and child nutrition. Although this number shows a slight decrease, it remains relatively high against the WHO's recommended standard of 22% (Mediani, 2020).

West Kalimantan is iconic for the Kapuas River, a region characterized by its unique riverbank environment. Residents of the Kapuas River border area typically live modestly and come from diverse cultural backgrounds, including Malay, Chinese, Javanese, Dayak, Bugis, and Sundanese ethnic groups, with the Malay community forming the majority. The general characteristics of this population include lower-to-middle socioeconomic status, lower education levels, and a strong adherence to their traditional cultures.

Stunting is caused by various multidimensional factors, extending beyond poor nutritional status in children and pregnant women. Key contributors to the high prevalence of stunting include poor parenting practices, limited access to essential healthcare facilities (including specialized Antenatal Care or ANC services for pregnant women), restricted availability of nutritious food for families, and limited access to clean water (Huriah & Nurjannah, 2020). Moreover, the early introduction of solid complementary feeding (CF) can lead to digestive disturbances such as diarrhea, vomiting, and constipation. Inadequate CF practices may also hinder a baby's ability to learn chewing, make the transition to solid foods difficult, and elevate the risk of malnutrition (Habimana & Biracyaza, 2019). The long-term consequences of stunting often result in suboptimal work quality, leading to reduced economic productivity (Cameron et al., 2021).

Effective detection and prevention of stunting require collaboration across various stakeholders, not only healthcare professionals but also community cadres and village officials. Posyandu (Integrated Health Post) cadres and local village administrators maintain close relationships with the community and serve as intermediaries for health personnel in addressing maternal and child health issues. This cooperation is strategically vital, as these local figures are ideally positioned to address stunting within their capacity (Shen et al., 2020).

Currently, health cadres must acquire basic information technology-based skills to assist the community in obtaining healthcare, such as recording and monitoring health data. The utilization of technology is crucial in the current era to ensure all program activities proceed according to plan. Therefore, it is imperative for health cadres to first understand, master, and be proficient in leveraging technology for health services before the general public, thereby ensuring that communication, information, and education on community and family health are delivered effectively and accurately (Odendaal et al., 2020).

More innovative and engaging educational and learning media can be delivered through website-based educational media. Websites are a form of edutainment-based technology that has been widely implemented

abroad and holds significant potential for application in Indonesia (Lathifa & Mahmudiono, 2020). Survey data confirms the continuous annual growth of internet users in Indonesia; in 2017, the number of internet users reached an unprecedented 143.26 million. Of the devices used, 44.16% accessed the internet via smartphones, 4.49% used computers/laptops, and 39.28% used both (Paterson, 2019).

The selection of website-based educational media aligns with research findings. A study by Kolbe (2019) in Indiana, USA, demonstrated that respondents gained a better understanding of health, encompassing health education; physical education and activity; nutrition services and environment; health services; counseling, psychological, and social services; physical environment; social and emotional climate; family engagement; community involvement; and employee wellness. Furthermore, other research indicates that website-based education is effective in broadening communication among stakeholders to support public health education and promotion initiatives (Stellefson et al., 2020).

Existing research on stunting prevention predominantly focuses on face-to-face interventions or the use of printed media such as leaflets and booklets. Conversely, the implementation and effectiveness of website-based educational media for health cadres, particularly in riverbank areas characterized by limited information access, remain significantly under-explored. This highlights a critical research gap concerning the efficacy of digital media in enhancing cadre knowledge and skills, despite the vital role of cadres in the early detection and prevention of stunting.

Therefore, this study was designed to fill this gap by testing the effectiveness of website-based educational media in the Kapuas River border region. The developed website-based educational media contains information on stunting prevention, providing guidelines for balanced nutrition, recipes for healthy menus for breastfeeding mothers, and explanations regarding anxiety issues that can affect parenting patterns. Additionally, the website will be supplemented with a digital pocketbook file and learning videos, which were previously validated in the researchers' earlier studies.

The ultimate objective of this research is to develop the "Stunting Care" website-based educational media and evaluate its effectiveness. This tool, created by the researchers, serves as a proactive preventative and promotive effort against stunting, aiming to increase stunting awareness through an approach tailored to the local culture and the specific characteristics of the region and its population, as outlined above.

Methods

Research Design

This study employed a quantitative research design utilizing a quasi-experimental approach with a pre-test post-test with control group structure. The primary objective was to determine the effectiveness of the "Peduli Stunting" (Stunting Care) website-based educational media on enhancing the knowledge and skills of health cadres in the Kapuas River Border Region of Pontianak City.

In the Intervention Group, education was delivered via the website medium over a period of two weeks, with a frequency of two sessions per week, each lasting 45–60 minutes. The sessions utilized a laptop, projector, and an internet connection. Conversely, the Control Group received education using a leaflet medium, with sessions lasting 30–45 minutes.

Setting and Timeline

The research was conducted at the Tambelan Sampit Primary Healthcare Center (Puskesmas) for the intervention group and at the Saigon Puskesmas for the control group. Both Puskesmas are located within the East Pontianak area and are situated in the designated Kapuas River border region.

Population and Sampling

The participants in this study consisted of 100 Posyandu (Integrated Health Post) Cadres, who were equally divided into two groups: 50 respondents for the intervention group and 50 respondents for the control group, all operating in the East Pontianak Puskesmas service areas. The sampling method used was Total Sampling, including all actively serving health cadres at maternal and child Posyandus.

Before the educational intervention commenced, a pre-test was administered to assess the cadres' baseline knowledge and skills regarding stunting. Subsequently, the intervention group received the education via the website-based media, while the control group received education via the leaflet medium. Following the intervention period, a post-test was conducted on both groups to evaluate the change in their knowledge and skills related to stunting. To control for potential contamination between the groups, the researchers conducted the study in physically separate locations (different Puskesmas catchment areas) and scheduled the interventions at different times.

Research Instruments

Data collection utilized two primary instruments: a stunting knowledge questionnaire and a stunting prevention skills questionnaire for health cadres. Both questionnaires were tested for validity and reliability on a sample of 30 respondents. The validity result was 0.361 (with a significance value), and the reliability, assessed using Cronbach’s alpha, yielded a value of 0.959 (with a significance value).

The tools and materials employed in the study included the questionnaires and the "Peduli Stunting" website-based educational media. The website media for health cadres features several key components designed to effectively enhance their knowledge and skills. The main sections of the website include: Home, Stunting Material, educational content in various formats (including a digital pocketbook file and learning videos previously tested in the researchers' earlier work), quizzes to test cadre comprehension, a discussion forum, and contact information for the Puskesmas and the researchers.

Ethical Considerations

This research received ethical clearance from the Health Research Ethics Committee of STIKes Yarsi Pontianak, evidenced by the ethical approval certificate number: 056/KEPK/STIKes.YSI/V/2025. During the execution of the study, the researchers adhered strictly to research ethical principles, including respect for human dignity, respect for privacy and confidentiality, respect for justice and inclusiveness, and balancing harm and benefits.

Data Analysis

Data processing followed the sequential steps of editing, coding, entry, and cleaning. The statistical analysis began with the Marginal Homogeneity Test to examine the differences in the post-test knowledge and skill levels between the intervention and control groups. Subsequently, the Mc Nemar test was used to determine the difference in post-test knowledge and skills within each group.

Result

Table 1. Demographics Characteristics of Respondents (n=100)

Characteristics	Frequency	Percentage
Age		
< 40	33	33,0
> 40	67	67,0
Total	100	100,0
Education degree		
Elementary/Primary School	12	12,0
Senior High School	84	84,0
Bachelor's degree	4	4,0
Total	100	100,0
Work		
Housewife	88	88,0
Self-employed	12	12,0
Total	100	100,0
Ethnic		
Melayu	49	49,0
Madura	38	38,0
Bugis	13	13,0
Total	100	100,0
Been a cadre for a long time		
< 1O Years	18	18,0
> 10 Years	82	82,0
Total	100	100,0

Based on Table 1, it is shown that out of 100 respondents, most of the cadres were over 40 years old (67%), with the majority having a senior high school education (84%). Most of the cadres were housewives (88%), the majority belonged to the Melayu ethnic group (49%), and most had been serving as cadres for more than 10 years (82%).

Table 2. Frequency Distribution of Cadres' Knowledge Levels Before and After the Intervention Using Website-Based Educational Media (n=50 Intervention Group) and the Frequency Distribution of Cadres' Knowledge Levels Before and After the Intervention Using Leaflets (n=50 Control Group)

Group	Variables	Knowledge								*Mean*	*SD*	*p-value*
		Good		Fair		Poor		Total				
		n	%	n	%	n	%	n	%			
Intervention	Before Intervention	3	6,0	21	42,0	26	52,0	50	100,0	1,54	0,61	0,000
	After Intervention	39	78,0	11	22,0	0	0,0	50	100,0	2,78	0,42	
Control	Before Intervention	5	10,0	27	54,0	18	36,0	50	100,0	1,74	0,63	0,157
	After Intervention	3	6,0	35	70,0	12	24,0	50	100,0	1,82	0,52	

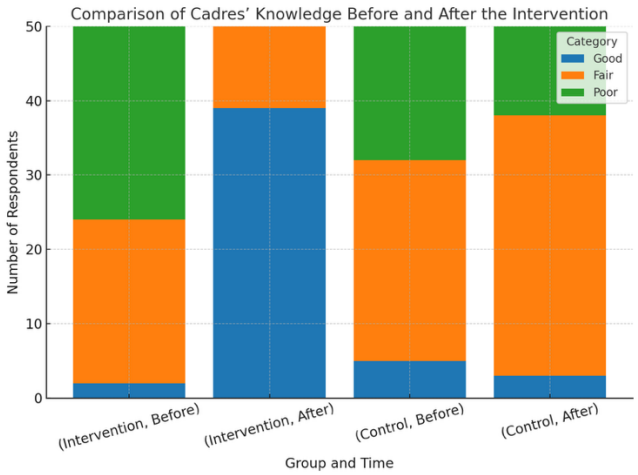

Figure 1. Changes in Cadres' Knowledge Levels Before and After the Intervention

The results of the study showed that before the intervention, most of the cadres in the intervention group had knowledge in the poor category, with 26 respondents (52%). After receiving the intervention using the website-based educational media *'Peduli Stunting*,' the majority of respondents demonstrated good knowledge, with 39 respondents (78%). In the control group, before the intervention using leaflet-based educational media, most cadres had fair knowledge, with 27 respondents (54%). After receiving education through leaflets, the majority of respondents still had knowledge in the fair category, with 35 respondents (70%). The analysis of differences between the knowledge levels of cadres before and after the intervention in the intervention group using the website-based educational media *'Peduli Stunting'* showed a significant value of 0.000 ($p < 0.05$), indicating a significant difference in cadres' knowledge levels before and after the intervention. Meanwhile, the analysis in the control group using leaflet media showed no significant difference in cadres' knowledge levels before and after the intervention, with a value of 0.157 ($p > 0.05$).

Table 3. Frequency Distribution of Cadres' Skills Before and After the Intervention Using the Website-Based Educational Media *'Peduli Stunting'* (n=50 Intervention Group) and the Frequency Distribution of Cadres' Skills Before and After the Intervention Using Leaflets (n=50 Control Group)

Group	Variables	Skill						*Mean*	*SD*	*p-value*
		Good		Fair		Poor				
		n	%	n	%	n	%			
Intervention	Before Intervention	22	44,0	28	56,0	50	100,0	1,44	0,50	0,000
	After Intervention	47	94,0	3	6,0	50	100,0	1,94	0,24	
Control	Before Intervention	20	40,0	30	60,0	50	100,0	1,40	0,49	0,317
	After Intervention	17	34,0	33	66,0	50	100,0	1,34	0,48	

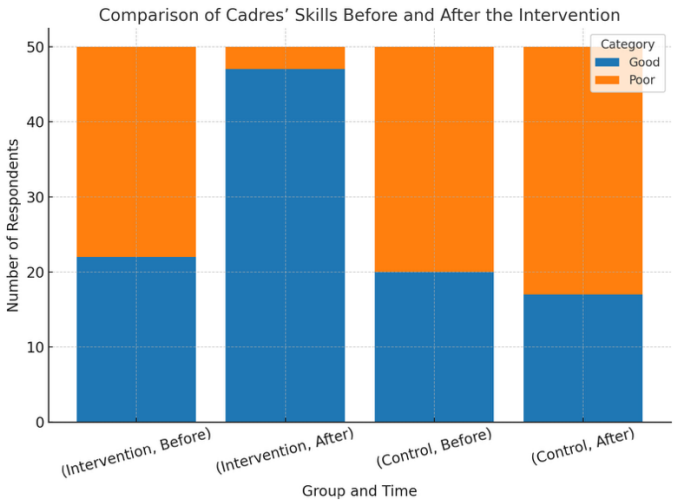

Figure 2. Changes in Cadres' Skill Levels Before and After the Intervention

The results of the study showed that before the intervention, most cadres in the intervention group had skills in the poor category, with 28 respondents (56%). After receiving the intervention using website-based educational media, the majority of respondents demonstrated good skills, with 47 respondents (94%). In the control group, before the intervention using leaflet-based educational media, most cadres had poor skills, with 30 respondents (60%). After receiving education through leaflets, the majority of respondents still had skills in the poor category, with 33 respondents (66%). The analysis of differences in cadres' skill levels before and after the intervention in the intervention group using website-based educational media showed a significant value of 0.000 ($p < 0.05$), indicating a significant difference in cadres' skill levels before and after the intervention. Meanwhile, the analysis in the control group using leaflet media showed no significant difference in cadres' skill levels before and after the intervention, with a value of 0.317 ($p > 0.05$).

Table 3. Comparison Test of Knowledge Improvement Between the Intervention Group and the Control Group (n=100)

Group	Knowledge								*p-value*
	Good		Fair		Poor		Total		
	n	%	n	%	n	%	n	%	
Intervension	39	78,0	11	22,0	0	0,0	50	100,0	0,000
Control	3	6,0	35	70,0	12	24,0	50	100,0	

The results presented in Table 3 show that there was a greater improvement in cadres' knowledge in the intervention group using website-based educational media, with an increase of 78%, compared to the control group, which showed an increase of only 6%. Further analysis using the marginal homogeneity test obtained a p-value of 0.000 ($p < 0.05$), indicating that the use of website-based educational media was effective in improving the knowledge of health cadres regarding early detection of stunting compared to the control group using leaflet media.

Table 4. Test of Differences in Skill Improvement Between the Intervention and Control Groups (n=100)

Group	Keterampilan Kader						*p-value*
	Good		Poor		Total		
	n	%	n	%	n	%	
Intervension	47	94,0	3	6,0	50	100,0	0,000
Control	17	34,0	33	66,0	50	100,0	

The results presented in Table 4 show that there was a greater improvement in cadres' skills in the intervention group using website-based educational media, with an increase of 94%, compared to the control group, which showed an increase of 34%. Further analysis using the McNemar test obtained a p-value of 0.000 ($p < 0.05$), indicating that the use of website-based educational media was effective in improving cadres' skills in the early detection of stunting, including the identification of growth curves and child development according to age, compared to the control group using leaflet media.

Discussion

Difference in Cadre Knowledge Levels Before and After Intervention with the "Stunting Care" Website-Based Educational Media

The results of the analysis indicate a substantial shift in cadre knowledge following the intervention. Prior to educational intervention using the "Peduli Stunting" (Stunting Care) website-based media, the highest proportion of cadres were in the poor knowledge category, totaling 26 respondents (52%). Post-intervention, the majority, 39 respondents (78%), were categorized as having good knowledge. This finding is corroborated by the research of Pratiwi et al. (2023), which stated that cadre knowledge in early stunting detection increased after an intervention using a Web-Based Application, resulting in a majority (80%) being in the good category.

Education level exhibits a significant correlation with an individual's knowledge base. Higher education frequently contributes to a more comprehensive understanding of various concepts, including health and nutrition, thereby enabling individuals to make more informed decisions regarding their own and their families' health (Umriaty et al., 2024). Conversely, a lower education level may limit access to and comprehension of such information. This indirectly affects the quality of human resources, particularly in regions where educational attainment is low (Amalia & Makkulawu, 2023). A study explained that education influences an individual's capacity to receive health information from various sources, including mass media and health professionals.

Beyond educational attainment, age is a demographic factor that influences knowledge, particularly concerning toddler nutrition. Age is often associated with greater life experience and broader exposure to information, which can contribute to a better understanding of appropriate feeding practices for infants and children (Baharuddin & Kongkoli, 2023). The knowledge possessed by Posyandu cadres is proven to play a crucial role in their effectiveness in the field (Tendean et al., 2024). Cadres with in-depth knowledge of nutrition and child health are typically better able to provide effective community outreach and appropriate support to families in need (Oktaviani et al., 2022). Furthermore, health cadres of adult age also demonstrate better levels of commitment, responsibility, and socialization skills compared to younger cadres.

In the context of stunting management, the knowledge of health cadres is crucial for the condition's early detection, management, and prevention (Sari et al., 2021). The findings of Husniyawati & Wulandari (2016) reinforce this, showing that active cadres tend to possess higher levels of knowledge and motivation. Similarly, other research by Fajar et al. (2024) indicates that cadres' understanding of stunting prevention and early detection contributes significantly to the success of maternal and child health programs. A Posyandu cadre's knowledge is influenced by a diverse range of factors, both intrinsic (internal) and extrinsic (external). Challenges such as limited exposure to information, difficulty in understanding material, constraints in receiving new information, and cognitive capacity in information processing can all impede the improvement of cadre knowledge. Conversely, adequate exposure to information related to nutrition and child growth and development is an external factor that can enhance cadres' understanding of stunting in toddlers (Damayanti et al., 2022).

The researchers hypothesize that the initially low knowledge levels observed in this study's respondents correlate with their living environment in the Kapuas River border region. This environment is strongly suspected to influence community knowledge, primarily due to the persistent influence of traditional beliefs and myths concerning feeding practices for toddlers. In reality, most foods prohibited by these beliefs are, in fact, essential sources of nutrition for a child's growth and development (Masmuri et al., 2023). Furthermore, this research found that cadres in this area had a limited understanding of exclusive breastfeeding, appropriate complementary feeding (CF), and early stunting detection. Considering this phenomenon, appropriate educational intervention must incorporate the characteristics of the local environment to effectively reduce the risk of stunting. The study specifically found that cadres lacked knowledge on crucial aspects such as providing exclusive breastfeeding, suitable complementary feeding, and identifying stunting early. The researchers suggest that the respondents' residential environment along the Kapuas River, which is still influenced by local

culture and myths, significantly impacts feeding practices for toddlers. Prior research has found that dietary prohibitions based on traditional beliefs actually hinder the fulfillment of essential nutrients for children. Therefore, to address stunting in this region, educational interventions tailored to the local environmental context are essential (Masmuri et al., 2024).

Stunting prevention requires a comprehensive approach, including the empowerment of health cadres as the vanguard of community education. Cadres require effective educational media to convey information accurately and comprehensibly to the target audience. Selecting the appropriate medium is crucial for the successful delivery of health messages, especially in counseling related to stunting prevention. Currently, health workers still largely utilize leaflets as the primary medium for stunting education. However, the use of leaflets has not optimally improved cadre comprehension due to several limitations inherent in the medium, such such as content that is too brief, requiring additional effort to understand. Additionally, most leaflets emphasize illustrations and images, and in some cases, the information provided is not fully aligned with the needs or characteristics of the targeted learners.

In this study, cadres showed an increase in knowledge through the "Stunting Care" Website-Based Educational Media, which included: Stunting Material, educational content in various formats, quizzes to test cadre comprehension, a discussion forum, and contact information for the Puskesmas and the researchers. The use of technology in the learning process aligns with digital advancements in the public health sector, which increasingly emphasizes the utilization of information technology for health promotion and education activities. This finding is supported by a number of previous studies demonstrating that technology-based approaches can help increase cadre knowledge and skills (Anjani et al., 2022). Thus, leveraging website media as an educational tool can be an effective and relevant strategy to support health cadre empowerment programs, particularly in preventing and managing stunting issues within the community.

Difference in Cadre Skill Levels Before and After Intervention with the “Stunting Care” Website-Based Educational Media

The analysis indicated that prior to the intervention using the "Peduli Stunting" website-based media, the largest proportion of cadres were in the poor skills category, totaling 26 respondents (52%). Post-intervention, the highest proportion shifted to the good skills category, with 47 respondents (94%). This result is consistent with the research of Hanifah & Hartriyanti (2023), who demonstrated a difference in cadre skills in stunting prevention before and after a website intervention.

Cadres are the primary source of health information for the community, necessitating that they possess sufficient knowledge and skills to educate the public on stunting prevention methods. A cadre's skill level can be influenced by several factors, including knowledge, education, experience, environment and facilities, habits, culture, and age. Cadres situated in the Kapuas River border region have diverse backgrounds in terms of both education and knowledge, leading to variations in their ability to perform primary and supporting activities. One effective way to enhance knowledge and skills is through education that utilizes current technological developments, ensuring information access is boundless and available to everyone (Fitriana, 2023). This is expected to elevate the skills of cadres who will collaborate with health personnel in addressing stunting. Enhanced cadre skills and knowledge about stunting will enable the community to better recognize the condition, thereby preventing the intergenerational consequences of stunting.

In this study, the "Peduli Stunting" website-based educational media included video simulations demonstrating how to conduct early stunting detection and assess a child's growth and development. This feature enabled cadres to know and understand each stage of the early stunting detection process and how to evaluate child growth and development. Based on the researchers' assumption, the increase in cadre skills was preceded by the increase in knowledge acquired by the respondents. This knowledge included the identification of child growth and development curves based on age, which was covered in the education. This increase in knowledge was

likely achieved through an active educational process involving discussions, direct practice, and the use of learning media relevant to the cadres' duties. When cadres better understand the signs of child growth and development, they become more confident and skilled in recognizing and monitoring children's condition. This validates that the education provided not only increased knowledge but also built the cadres' attitudes and skills in executing their role.

The improvement in cadre skills in this study was closely tied to the direct simulation of performing anthropometric measurements and plotting growth on growth charts for early stunting detection. The goal was to ensure cadres truly understood every step and method in the process of early stunting detection in children. Subsequently, Posyandu cadres were asked to re-demonstrate the anthropometric measurements as previously demonstrated, ensuring the acquired knowledge was optimally retained and understood. Previous research showed that cadre comprehension increased after participating in education with demonstrations on Complementary Feeding (CF), as seen in the comparison of pre-test and post-test scores (Subratha et al., 2023). Other research also states that educational methods supplemented with demonstrations are proven effective in increasing cadre knowledge and skills (Sitorus et al., 2021).

Effectiveness of the "Stunting Care" Website-Based Educational Media on Cadre Knowledge and Skills

The results of the analysis for cadre knowledge using the Marginal Homogeneity Test yielded a p-value of . For cadre skills, the p-value was also . Since the p-values for both variables are less than 0.05 ($p<0.05$), the hypothesis is accepted, concluding that the "Peduli Stunting" website-based educational media is effective on both the knowledge and skill levels of the cadres. This finding is also supported by Fitriana (2023), where a study with a sample of 30 Posyandu cadres showed an increase in cadre knowledge and attitude towards stunting risk detection with a p-value of (0.000 ($p<0.05$).

In this study, the "Peduli Stunting" website-based educational media was designed with consideration for the community characteristics in the Kapuas River border region of Pontianak City. The content presented includes information on the definition of stunting, its causal factors, classification, impact, and symptoms. Furthermore, the website outlines prevention methods, meal portion guides for pregnant women, appropriate food selection, perceptions and erroneous myths regarding nutritional fulfillment, anxiety management for pregnant and breastfeeding mothers, and methods for early stunting detection. A website is a type of digital media used to disseminate information interactively via the internet. Website-based educational media utilizes web pages to deliver learning material systematically, flexibly, and easily accessible to users. Website-based educational media in the health sector also offers advantages in accessibility, ease of information updates, and the ability to be tailored to the target audience's needs and characteristics (Tran et al., 2024). In line with previous research, the use of websites in community education can enhance family and environmental support in the prevention and management of stunting in children (Rahma et al., 2022).

The cadre knowledge levels in this research were significantly influenced by their cultural beliefs. In certain cultural contexts, such as those adopted by some respondents, stunting or restricted child growth is often considered normal, or even believed to be part of "destiny." Such misconceptions can lead parents and cadres to feel that early stunting detection or prevention is unnecessary. Conversely, in some situations, child malnutrition is viewed as shameful. This can make parents reluctant to undergo examination or early detection due to fear of stigma or negative judgment from the community. In this study, the majority of respondents acting as cadres came from the Malay and Madurese ethnic groups, representing diverse cultural backgrounds. Some traditional beliefs in Madurese culture, for example, prohibit giving the first breast milk to a baby because it is considered dirty or contains bacteria. Additionally, infants are often given supplementary foods like "lothe" (banana mash) before six months of age, with the aim of making the baby less fussy. These beliefs and practices align with Mubarokah (2019), who demonstrated a connection between culture and maternal and child health in the Madurese community.

The use of the "Peduli Stunting" website-based educational media in this study not only improved knowledge but also enhanced cadres' skills in the procedures for early stunting detection. These skills include identifying the physical signs of a child with growth disturbances, such as height-for-age inadequacy; assessing the child's nutritional status; mastering anthropometric measuring tools like scales and height boards; and the ability to read growth curves or the KMS (Child Health Card). This is supported by a study showing that website-based educational media is effective in increasing Posyandu cadres' knowledge and skills in early stunting detection (Kurniawan et al., 2025). Another study conducted at Puskesmas Jatinagor, which tested the use of information technology on Posyandu cadres, resulted in a significant increase in skills and knowledge related to early stunting detection, including how to measure the length and weight of toddlers and how to identify the early signs of stunting (Alindariani et al., 2022). The use of the website as an educational medium increased cadre interest and comprehension because it featured various types of content (text, images, audio, and video). A study concluded that digital media like websites can overcome the limitations of face-to-face training resources in many areas of Indonesia and serve as an effective and practical means for community health education on stunting issues (Istianti et al., 2025).

The improvement in cadres' early stunting detection skills is expected to positively impact their practice in the field. With better capabilities, cadres can recognize the signs and symptoms of at-risk children faster, allowing for prompt and targeted management and intervention. This will undoubtedly strengthen the effectiveness of various stunting prevention programs at the Posyandu and wider community levels, contributing to the overall reduction in stunting rates. Furthermore, well-trained cadres will also be more confident in providing education and mentorship to parents, especially regarding the importance of balanced nutrition and routine child growth monitoring.

The phenomenon of low cadre skills in this study was influenced by factors such as knowledge, experience, and the length of time served as a cadre. Cadres who possess a good understanding of stunting risk factors, signs, and prevention methods are generally better able to perform early detection compared to cadres who lack sufficient foundational knowledge. Additionally, the longer an individual serves as a cadre, the more experience they typically gain, including in recognizing and handling stunting cases quickly and accurately (Sulistiyanto et al., 2023). The enhancement of cadres' early detection skills consequently improves their ability to provide appropriate education to pregnant women and mothers of toddlers. This aligns with the findings of Husnaniyah et al. (2020), which showed that accurate educational delivery directly by health cadres can assist mothers in maintaining child health, such as choosing nutritious foods and attending Posyandu regularly.

In this research, several potential biases and confounding factors need consideration. Differences in cadre background, including age, education level, experience, or initial proficiency in using technology, could affect the outcomes separately from the intervention. External factors such as uneven internet access, support from family or the environment, and the possibility of cadres obtaining health information from other sources outside the study may also influence the findings. Furthermore, interaction between the intervention and control group cadres poses a risk of contamination bias through information sharing. Limitations in field conditions, including variations in cadre learning motivation and differences in health facility resources at each location, may also impact the validity of the research results.

In the Kapuas River border region, local culture and community beliefs also influence cadres' skills in stunting management. For example, there is still a belief in some communities that children should not be given foods like meat or vegetables because they are considered to have too high a protein content. In fact, protein is crucial for children's growth during the developmental phase to prevent stunting (Ibrahim et al., 2021). Such beliefs can be a significant challenge for cadres in carrying out their duties. When the community holds views that contradict accurate health information, cadres must possess effective communication skills and a sensitive approach to convey essential messages about child nutrition. Resistance to recommendations for nutritious food, such as meat and vegetables, can impede stunting prevention efforts even when cadres have adequate knowledge. Therefore, educational interventions must focus not only on increasing cadre knowledge but also on strategies to overcome cultural and belief-based barriers in the community.

The results of this study cannot be directly generalized without careful consideration. Although the website-based educational media proved effective in the Kapuas River border region, its application in non-riverbank areas may differ due to contrasting environmental conditions. In non-riverbank areas, internet access, health facilities, and cadres' digital capabilities are typically better, potentially leading to a greater intervention impact. However, social, cultural, and local support factors will continue to influence program success. Therefore, these findings can be applied to other areas, but they need to be adapted to local conditions to remain effective.

Limitations of the Study

This research acknowledges several potential biases and limitations that must be considered when interpreting the findings. One primary limitation stems from the non-random assignment of participants to the intervention and control groups, introducing the possibility of baseline characteristic differences among cadres that may have influenced the outcomes independent of the intervention effect.

Additionally, there was a risk of information exchange between the groups, as the locations of the intervention and control cadres were geographically proximate, making communication between them difficult to entirely prevent. This condition potentially led to a contamination bias, which could dilute the true difference between the two groups and consequently impact the study's internal validity.

A further limitation resides in the measurement instruments utilized. The majority of data regarding cadres' knowledge and skills was collected through self-report questionnaires, rendering the results susceptible to subjective bias and the social desirability bias, the tendency of respondents to provide answers perceived as favorable. Although the assessment of skills was supplemented with direct observation, the scope of this observation was limited and may not have fully captured the true variation in real-world practice. Therefore, the results of this study should be understood in light of these instrument limitations. Future studies are recommended to employ more diverse and objective measurement methods to enhance the robustness of the findings.

Conclusion

The findings of this study demonstrate that the "Peduli Stunting" (Stunting Care) website-based educational media significantly influences the improvement of both knowledge and skills among health cadres in the Kapuas River border region. This is evidenced by the p-value of 0.000 ($p<0.05$) obtained for the intervention group, which confirms a statistically significant increase in both variables from pre- to post-intervention.

In contrast, the control group, which received education via leaflet media, showed no significant difference in cadre knowledge or skill levels before and after the educational session, with p-values of 0.157 and respectively ($p > 0.05$).

This research carries significant practical and policy implications. Since website-based educational media is proven effective in enhancing cadre knowledge and skills, it can be adopted as an innovative approach in stunting prevention efforts. For broader implementation, support from the local government and the health department is crucial. This support should involve ensuring equitable internet access, improving digital literacy among cadres, and integrating digital educational media into public health programs. With this institutional backing, the intervention will not only be relevant in riverbank regions but also holds the potential to be adapted and scaled up for application in other areas, provided it is tailored to fit local conditions.

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Conflict of Interest

The authors declare that they have no conflicts of interest in relation to this research. The processes of data collection, compilation, and reporting of the research findings were conducted independently and objectively, free from any external influence that could potentially affect the study's outcomes.

Author Contributions

The individual contributions of the authors are detailed as follows: Masmuri: Conceptualization, Data Curation, Article Writing, and Original Draft Preparation. Nurul Hidayah: Methodology, Validation, Data Acquisition, Writing - Review and Editing.Dodik Limansyah: Data Analysis, and Research Administration.

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