Jurnal Keperawatan Suaka Insan (JKSI)
Volume 11, No 1, June 2026
P-ISSN : 2527-5798, E-ISSN : 2580-7633

Culturally Tailored Web-Based Education to Enhance Health Cadres' Skills in Early Stunting Detection: A Quasi-Experimental Study

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Article Info

Article history:

Received September 10, 2025
Accepted April 15, 2026

Keywords:

Stunting
Website education
Skills

ABSTRACT

In order to enable early detection and prevention of stunting, it is necessary to improve the early stunting detection skills of health cadres. Currently, research on stunting prevention and early detection generally still utilizes generic educational media and has not yet integrated local cultural approaches for multiethnic communities in the Kapuas River peripheral area. This study aimed to examine the effectiveness of a culture-based website media on the early stunting detection skills of health cadres. This study employed a quasi-experimental design using a pre-test and post-test with a control group approach. Sampling was conducted using a total sampling technique involving 110 respondents, who were divided into two groups. Statistical analysis included the Marginal Homogeneity test to assess differences in cadres' skills between the two groups, as well as the Mann–Whitney U test to compare post-test skills between the intervention and control groups. The research instrument was a questionnaire measuring health cadres' skills in early stunting detection. The results showed a significant improvement in cadres' skills in the intervention group, with the proportion of cadres in the good category increasing from 45.5% to 85.5%, compared to the control group, which experienced a decrease from 69.1% to 65.5%, although remaining within the good category. The Marginal Homogeneity test revealed a statistically significant result ($p = 0.001$; $p < 0.05$), indicating that the culture-based website media was effective in improving health cadres' early stunting detection skills. The use of culture-based website media was proven to be effective in enhancing cadres' skills in early stunting detection. This study recommends cross-sector collaboration to improve internet access, provide assistance to health cadres, and integrate digital educational media in order to enhance the effectiveness of stunting prevention efforts.

Dalam rangka mendeteksi dini serta mencegah stunting, diperlukan peningkatan keterampilan deteksi dini stunting oleh kader Kesehatan. Saat ini, penelitian tentang pencegahan dan deteksi dini stunting umumnya masih menggunakan media edukasi yang bersifat umum dan belum mengintegrasikan pendekatan budaya lokal pada masyarakat multietnis di wilayah pinggiran Sungai Kapuas. Penelitian ini memiliki tujuan untuk melihat efektivitas media website berbasis budaya pada keterampilan deteksi dini stunting oleh kader. Penelitian ini adalah quasy experiment dengan pendekatan pre-test post-test with control group, pengambilan sampel menggunakan Total Sampling dengan 110 responden yang di bagi menjadi 2 kelompok. Analisis statistik menggunakan uji Marginal Homogeneity untuk menilai perbedaan keterampilan kader antara kedua, serta uji Mann–Whitney U untuk membandingkan keterampilan post-test pada kedua kelompok. Instrumen penelitian menggunakan kuesioner keterampilan kader kesehatan tentang deteksi dini stunting. Hasil penelitian menunjukkan bahwa ada peningkatan signifikan keterampilan kader pada kelompok intervensi dalam kategori baik dari 45,5% menjadi 85,5% dibandingkan dengan kelompok kontrol yang mengalami penurunan dari 69,1% menjadi 65,5% walaupun tetap dalam kategori yang baik. Hasil uji Marginal Homogeneity menunjukkan nilai signifikan yaitu 0,001 ($p < 0,05$) dengan kesimpulan adanya efektivitas media website berbasis budaya dalam peningkatan keterampilan deteksi dini stunting oleh kader kesehatan. Penggunaan media website berbasis budaya terbukti efektif terhadap peningkatan keterampilan kader dalam cara deteksi dini stunting. Penelitian ini menyarankan kerja sama lintas sektor untuk meningkatkan akses internet, mendampingi kader, dan mengintegrasikan media edukasi digital agar pencegahan stunting lebih efektif.

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Background

Stunting has become an issue of global concern, as reflected in various initiatives focused on comprehensive nutritional improvement (Vaivada et al., 2020). These efforts aim to reduce the prevalence of stunting among children, which has become one of the primary targets in global nutrition policy, with a target reduction of up to 40% by 2025 among children under five years of age (Leroy & Frongillo, 2019). Indonesia is among the countries with a fairly high prevalence of stunting. Currently, Indonesia ranks among the top five out of 88 countries with the highest number of stunting cases. Although there has been an average annual decline of 7.3%, this achievement remains relatively low when compared to the standard set by the WHO of 22% (Titaley et al., 2019). In the city of Pontianak, specifically in East Pontianak District, stunting cases were recorded at approximately 12.84% (Rizky & Marlenywati, 2023). Based on a 2023 survey, the number of children experiencing stunting across several Puskesmas (community health centers) located along the banks of the Kapuas River in Pontianak reached 87 children. Several factors contribute to this high prevalence of stunting, including limited access to information (Huriah & Nurjannah, 2020).

The city of Pontianak is well known for the Kapuas River, which serves as the area's main landmark, with settlements characteristically located along its banks. The communities residing there come from diverse cultural backgrounds, with the Malay ethnic group constituting the largest population, followed by Chinese, Javanese, Dayak, Buginese, and Sundanese communities. Most residents live in lower-middle economic conditions, have relatively low levels of education, and remain strongly attached to the cultural values and traditions they uphold. Not infrequently, the cultural practices adhered to by communities along the Kapuas riverbanks can have a negative impact on maternal and child health.

In efforts to detect and prevent stunting, collaboration with various stakeholders is required (Sutrio et al., 2021). The relevant stakeholders include not only health workers but also community health cadres. Cadres are individuals who are closely connected to the community and serve as intermediaries between health workers and the community in addressing maternal and child health issues (Chabibah & Agustina, 2023). Collaboration can be strategically positioned as a means of helping to address the problem of stunting according to each party's capacity (Shen et al., 2020). At present, health cadres do not yet fully understand how to carry out accurate early detection. Limited knowledge and skills in identifying early signs of stunting have resulted in delayed preventive interventions (Rohmah & Arifah, 2021). Posyandu (integrated health post) cadres, who should be at the forefront of monitoring child growth, often rely solely on weight and height measurements without understanding how to assess nutritional status holistically (Pasaribu et al., 2023). Furthermore, the lack of interactive and sustainable training makes it difficult for cadres to apply appropriate screening methods in the field (Septiyono et al., 2024). Health cadres need to understand, master, and become skilled in utilizing technology for health services ahead of the general public, in order to ensure that communication, information, and education regarding community and family health are delivered effectively and accurately (Odendaal et al., 2020).

A learning medium suited to the current era of digitalization is one that is website-based. A website is one form of educational medium based on edutainment technology that has been widely implemented globally (Lathifa & Mahmudiono, 2020). Website-based media can enhance public understanding and awareness of health issues, particularly stunting. A culture-based website enables the development of content that is more relevant and aligned with the culture, habits, and social characteristics of the people of Pontianak, making the message conveyed easier to understand and accept (Simanjuntak, 2024). This is supported by the Health Belief Model (HBM) theory, which posits that media grounded in local culture can help communities better understand health information, thereby making them more motivated to apply the information provided (Green et al., 2020). By understanding local values, language, and patterns of community interaction, this website can present information that is more personal and closely connected to people's daily lives (Meikendi et al., 2023). The website-based educational medium developed contains information on how to conduct early detection of stunting based on a cultural approach relevant to communities along the Kapuas riverbanks, how to measure children's height and weight, how to record these measurements in the Maternal and Child Health Handbook (Buku KIA), and how to interpret the results. In addition, the website content adapts to local culture by addressing both false and accurate myths about stunting. For example, in Malay culture there is a common myth that a small-bodied child will "grow quickly once they reach adulthood," and this website seeks to correct such

misconceptions through simple, evidence-based explanations. With this strategy, the educational content is not only informative but also culturally relevant, thereby increasing the likelihood of behavioral change related to stunting prevention.

To date, numerous studies have examined stunting prevention through face-to-face interventions or the use of printed media such as leaflets and booklets. Meanwhile, the use of culture-based websites for health cadres, particularly in Pontianak, where access to information remains limited, has rarely been studied. Specifically, no research has yet been found that develops and tests a website integrating Malay cultural myths and values characteristic of Pontianak with stunting-related issues, such as anthropometric indicators and early detection criteria. This indicates a research gap concerning the use of culture-based digital media to improve the skills of health cadres, despite the fact that cadres play a crucial role in early detection and prevention efforts within the community. Therefore, this study was conducted to address this gap by examining the effectiveness of a culture-based website medium tailored to the ethnic and local cultural characteristics of Pontianak.

This study aims to examine the effectiveness of a culture-based website medium in improving the early detection skills of stunting among health cadres in Pontianak. The website was developed by the researcher as a preventive and promotive effort against stunting and to raise awareness of stunting through a local cultural approach that takes into account the regional and population characteristics described above.

Research Methodology

Research Design

This study is a quantitative study employing a quasi-experimental design with a pre-test post-test with control group approach. This study aims to examine the effectiveness of a culture-based website medium in improving early detection skills among health cadres in Pontianak. In the intervention group, education was delivered through the website medium over a period of 2 weeks, with a frequency of 2 sessions per week and a duration of 45–60 minutes per session, using a laptop and projector connected via an internet network. In the control group, education was delivered through leaflet media for 30–45 minutes.

Research Location and Time

The initial step in identifying research respondents began with gathering information on stunting cases from the East Pontianak Puskesmas, followed by focusing on data regarding health cadres who were actively involved in maternal and child Posyandu. Subsequently, the researcher visited the homes of cadre leaders to explain the purpose and objectives of the study and to request their willingness to participate as respondents. The sample size was calculated based on data from a preliminary study, yielding 110 respondents from 2 different locations. The sample was then evenly divided into an experimental group and a control group, each consisting of 55 respondents. The researcher separated the time and location of implementation as a strategy to prevent interaction between respondents. Specifically, the intervention group's sessions were conducted in the first and second weeks of August 2025, followed by the control group in the subsequent week.

Population and Sample

The population in this study consisted of 110 active Posyandu cadres from 2 Puskesmas in the East Pontianak area. The entire population was used as the sample through a total sampling method. Respondents were divided into 2 groups: 55 individuals in the intervention group and 55 individuals in the control group. The sample criteria included health cadres who were actively serving in maternal and child Posyandu. In the intervention group, education was delivered through the culture-based website medium, while the control group received education using the standard stunting leaflet routinely used by the Puskesmas. The leaflet contained information on stunting prevention, including nutritional fulfillment for pregnant women and infants, exclusive breastfeeding, appropriate complementary feeding (MPASI), and the maintenance of environmental hygiene and maternal health. Data collection was carried out through pre-test and post-test stages to measure cadres' skills in the early detection of stunting. Prior to the intervention, all respondents completed a pre-test. Subsequently, the intervention group received education through the culture-based website medium, while the control group received education using the leaflet. Following the intervention, a post-test was conducted for

both groups to assess changes in skills. To minimize the potential for contamination between groups, the researcher established a separation of locations, with the intervention and control groups located in the working areas of different Puskesmas. In addition, the implementation schedules for the interventions were also arranged at different times.

Research Instrument

Data collection in this study employed a questionnaire measuring health cadres' skills in the early detection of stunting, supplemented by direct observation of early detection practice simulations and a re-checking technique to ensure cadres' understanding and ability to apply these skills. The questionnaire instrument underwent validity and reliability testing involving 40 respondents. Validity testing was conducted using the Pearson Product Moment correlation, yielding a validity coefficient of 0.361, while reliability was assessed using Cronbach's alpha, yielding a value of 0.959. These values exceeded the r-table value (0.312; $\alpha = 0.05$), indicating that all statement items were valid. The tools and materials used in this study consisted of a questionnaire, the culture-based website medium, instruments for measuring children's height and weight, and the Maternal and Child Health Handbook (Buku KIA). The educational intervention using the website medium was administered over a period of 2 weeks, with a frequency of 2 sessions per week lasting 45–60 minutes each. The culture-based website medium for health cadres incorporates several key features and content designed to effectively enhance cadres' skills. The main sections of the website include a Home page; information on accurate and inaccurate myths related to stunting, the content of which was validated by representative health cadres from the Malay, Madurese, Dayak, and Buginese ethnic groups to ensure cultural appropriateness and relevance to the local context; Stunting Materials, comprising educational materials in various formats, including a pocketbook and instructional videos that had previously been tested in the researcher's earlier study; questions to assess cadres' comprehension; a discussion forum; and contact information for the Puskesmas and the researcher.

Ethical Considerations

This study has obtained ethical clearance from the Health Research Ethics Committee of STIKes Yarsi Pontianak, with approval number: 085/KEPK/STIKes.YSI/VII/2025.

Data Analysis

Data processing was carried out through the stages of editing, coding, entry, and cleaning. The Marginal Homogeneity test was used to examine differences in cadres' skills within the intervention and control groups before and after the intervention. Subsequently, the Mann-Whitney U test was used to examine differences in post-test skill scores between the two groups. In conducting this study, the researcher adhered to research ethics principles, including respect for human dignity, respect for privacy and confidentiality, respect for justice and inclusiveness, and balancing harms and benefits.

Research Results

Univariate Analysis

Table 1.
Frequency Distribution of Respondent Characteristics (n=110)

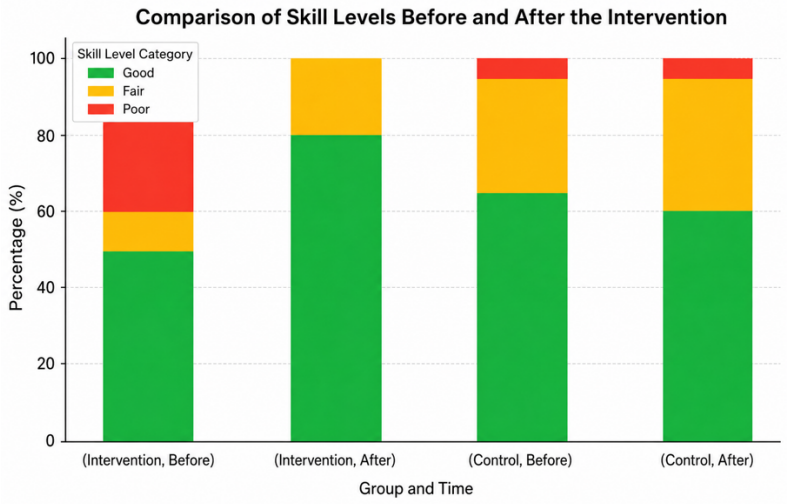
Characteristic	Frequency	Percentage
Cadre Age		
< 40 years	35	31,8
> 40 years	75	68,2
Total	110	100,0
Cadre Education		
Elementary School	7	6,4
Senior High School	103	93,6
Total	110	100,0
Cadre Occupation		
Housewife	99	90,0
Self-employed	11	10,0
Total	110	100,0
Ethnicity		
Melay	76	69,1
Dayak	7	6,3
Madura	17	15,4
Bugis	10	9,2
Total	110	100,0
Length of Service as a Cadre		
< 10 years	5	4,5
> 10 years	105	95,5
Total	110	100,0

Based on the results presented in Table 1, of the 110 respondents, the majority of cadres were over 40 years of age (68.2%), with most cadres having completed senior high school as their highest level of education (93.6%). Most cadres worked as housewives (90%), with the majority belonging to the Malay ethnic group (69.1%), while most had served as cadres for more than 10 years (95.5%).

Table 2.
Analysis of Cadres' Skill Levels Before and After the Culture-Based Website Intervention (n=55, Intervention Group) and Frequency of Cadres' Skill Levels Before and After the Leaflet Intervention (n=55, Control Group)

Group	Variable	Cadres' Skill							
		Good		Fair		Poor		Total	
		n	%	n	%	n	%	n	%
Intervention	Before Intervention	25	45,5	7	12,7	23	51,8	55	100,0
	After Intervention	47	85,5	8	14,5	0	0	55	100,0
Control	Before Intervention	38	69,1	13	23,6	4	7,3	55	100,0
	After Intervention	36	65,5	16	29,1	3	5,5	55	100,0

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



The results showed that, prior to the intervention, the majority of cadres in the intervention group had a good level of skill, with 25 respondents (45.5%) falling into this category. Following the intervention using the culture-based website medium, the majority of respondents in the intervention group showed improved skills, falling into the good category, with 47 respondents (85.5%); this figure increased from the previous 45.5% in the good skill category. In the control group, prior to the educational intervention using leaflet media, the majority of cadres already had good skills, with 38 respondents (69.1%). After the educational intervention using leaflet media, the majority of respondents still had skills in the good category, with 36 respondents (65.5%); however, this figure represented a decrease from the previous 69.1% in the good skill category.

Bivariate Analysis

Table 3.
Analysis of the Effectiveness of the Culture-Based Website Medium (n=55, Intervention Group)

Group	Variable	Cadres' Skill								*P-Value*
		Good		Fair		Poor		Total		
		n	%	n	%	n	%	n	%	
Intervention	Before Intervention	25	45,5	7	12,7	23	51,8	55	100,0	0,001
	After Intervention	47	85,5	8	14,5	0	0	55	100,0	
Control	Before Intervention	38	69,1	13	23,6	4	7,3	55	100,0	0,258
	After Intervention	36	65,5	16	29,1	3	5,5	55	100,0	

The results of the analysis using the Marginal Homogeneity test indicated that the effectiveness of the culture-based website medium in improving health cadres' skills in the early detection of stunting yielded a significant value of 0.001 ($p < 0.05$), leading to the conclusion that the culture-based website medium was effective in improving health cadres' early detection skills. In the control group, the results of the analysis indicated that there was no effectiveness of leaflet media in improving health cadres' skills, with a value of 0.258 ($p > 0.05$).

Table 4.
Test of Differences in the Improvement of Health Cadres' Skills Between the Intervention Group and the Control Group (n=110)

Group	Cadres' Skill								*p-value*
	Good		Fair		Poor		Total		
	n	%	n	%	n	%	n	%	
Intervention	47	85,5	8	14,5	0	0	55	100,0	0,036
Control	36	65,5	16	29,1	3	5,5	55	100,0	

The results showed that there was an improvement in health cadres' skills in the early detection of stunting in the intervention group that used the culture-based website medium, with a value of 85.5%; this figure was higher compared to the control group, which recorded 65.5%. Further analysis using the Mann-Whitney U test yielded a p-value of 0.036 ($p < 0.05$), indicating that there was a significant difference in the improvement of health cadres' skills between the intervention group and the control group that used leaflet media.

Discussion

Differences in Cadres' Skill Levels Before and After the Intervention Using the Culture-Based Website Medium

The results of the study found that, prior to the intervention, the largest proportion of cadres in the intervention group already possessed skills in the good category, comprising 25 respondents (45.5%). Following the intervention using the culture-based website medium, the majority of respondents in the intervention group showed improved skills, falling into the good category, with 47 respondents (85.5%); this figure represented an increase from the previous 45.5% in the good skill category. This finding is consistent with the study by Al Jihad et al., (2022), which reported an improvement in cadres' skills in stunting prevention following a digital technology-based intervention, particularly one tailored to a cultural context.

Cadres' skills are closely related to the effectiveness of their role in providing services to the community. Cadres with good competence are generally more skilled in applying health communication, conducting early detection of nutritional problems, and delivering relevant education to families (Hidayati & Setyorini, 2020). Conversely, inadequate cadre skills can hinder the optimal delivery of health information and contribute to lower quality interventions at the community level (Tampubolon, 2024). One study indicated that cadres' skills are shaped not only by training but are also reinforced through direct field experience, which enhances both technical and social capabilities (Iskandar Munir, 2024). In this study, health cadres' skills were also influenced by age and length of service as a cadre, both of which contributed to skill improvement, as these two factors are related to experience, a sense of responsibility, and proficiency in establishing effective interaction with the community.

The role of health cadres' skills is highly important in supporting stunting prevention efforts, particularly through educational activities, effective communication, and family mentoring (Widiasih et al., 2025). This is reinforced by the findings of Putri & Dwihestie, (2020), which showed that cadres with good skills are better able to carry out early detection and follow-up optimally. In line with this, the study by Harna et al., (2025) confirmed that cadres' skills in education and monitoring of toddler nutrition produce significant results for the success of community nutrition health programs. Cadres' skill levels are influenced by various factors, both internal and external. Internal factors include motivation, experience, and a sense of responsibility, while external factors include training, supervision by health workers, and the availability of learning media (Fitriani et al., 2021). Several barriers that may affect cadres' skills include limited practical experience, inadequate facilities, and insufficient mentoring. Conversely, the provision of ongoing training, a supportive work environment, and effective educational media have been shown to improve cadres' skills in carrying out their role in stunting prevention (Kartika et al., 2024).

In this study, the improvement in cadres' skills following the intervention using the culture-based website medium indicates that this intervention was effective in strengthening cadres' capabilities. The use of digital website media combined with the local cultural context of Pontianak made it easier for cadres to understand the material, as the information presented was more relevant to the social conditions of the community they served. In addition, culture-based media may increase cadres' motivation to learn and practice the skills acquired, thereby producing a greater degree of change compared to before the intervention. This also indicates that a technology-based approach tailored to local cultural values can serve as an alternative strategy for improving the quality of health cadres at the community level.

The improvement in cadres' skills in this study was also influenced by direct simulation practice related to anthropometric measurement techniques and the completion of growth charts used to detect stunting at an early

stage. This activity was intended to enable cadres to gain a comprehensive understanding of each stage in the process of early stunting detection in children. Subsequently, health cadres were asked to redemonstrate anthropometric measurements in accordance with the procedures that had been modeled, as part of an active learning strategy emphasizing the direct involvement of participants. Through this simulation and redemonstration, cadres did not merely receive information passively but also practiced the skills directly, allowing the knowledge gained to be more firmly internalized, improving the accuracy of measurement implementation, and enabling more optimal application in daily Posyandu activities. This is supported by a previous study, which revealed an improvement in cadres' understanding after receiving education through a demonstration method regarding complementary feeding (MP-ASI), as reflected in the difference between pre-test and post-test scores (Subratha et al., 2023). Another study also reported that educational methods incorporating demonstration were proven effective in improving cadres' knowledge and skills (Sitorus et al., 2021).

The researcher assumes that the level of cadres' skills in this study is correlated with their residential environment along the banks of the Kapuas River. Environmental factors have a substantial influence on community knowledge, particularly given the persistence of traditional beliefs and myths related to infant and toddler feeding practices. Ironically, some of the foods prohibited by these beliefs are in fact essential sources of nutrition for children's growth and development (Masmuri et al., 2023). This study also indicated that the community in this area had limited knowledge regarding exclusive breastfeeding practices, the selection of appropriate complementary foods, and the ability to conduct early detection of stunting. The researcher assumes that the respondents' residential location along the banks of the Kapuas River, which remains influenced by local culture and food-related myths, plays an important role in shaping toddler feeding behavior. Consistent with previous research, restrictions on certain types of food due to traditional beliefs have been shown to hinder the fulfillment of children's nutritional needs (Masmuri et al., 2024).

In the control group of this study, after receiving education using leaflet media, the majority of respondents still demonstrated skills in the good category, with 36 respondents (65.5%); however, this figure represented a decrease from the previous 69.1% in the good skill category. This decrease is presumed to be related to the passive nature of learning through leaflet media, in which cadres act merely as recipients of information without interaction, feedback, or reinforcement of practical skills. In addition, the possibility of information fatigue may also have affected the effectiveness of the leaflet, particularly when the material presented only brief and simplified information. In fact, skills in the early detection of stunting are more effectively improved when cadres are engaged in an active and applied learning process. Furthermore, individual factors such as cadres' motivation and experience may also have influenced the results. Not all cadres possess the same ability to understand or retain written information presented in a leaflet. Some cadres may have only skimmed the content without examining it in depth, meaning that the knowledge gained was not well internalized into practical skills. Thus, although leaflets continue to serve a role as an educational tool, their effectiveness is limited when compared to interactive media such as websites, which are able to present more comprehensive and engaging information and encourage cadres' active involvement in learning (Nidia & Hayati, 2023).

Effectiveness of the Culture-Based Website Medium in Improving Health Cadres' Skills in the Early Detection of Stunting

The results of this study showed that the effectiveness of the culture-based website medium in improving health cadres' skills in the early detection of stunting yielded a significant value of 0.001 ($p < 0.05$), leading to the conclusion that the culture-based website medium was effective in improving these skills. This finding is supported by Anjani et al., (2025), who reported that the use of digital-based educational media improved health cadres' skills in conducting early detection of nutritional problems in toddlers, with a p-value of 0.001. Another study by Hidayat et al., (2024) similarly explained that website-based interventions make it easier for cadres to access information quickly, interactively, and repeatedly, thereby improving their skills in the practice of early detection of stunting.

This study demonstrated that improvements in cadres' skills in the early detection of stunting can be achieved through the use of website-based educational media tailored to the cultural characteristics of the Pontianak community. The website content presented in this study focused not only on knowledge related to stunting but also addressed which myths regarding stunting were accurate and which were inaccurate, based on local wisdom and beliefs commonly held among several ethnic groups in West Kalimantan, particularly in Pontianak. In addition, the website content provided practical instructions for cadres, such as skills in conducting anthropometric measurements, completing growth charts, communicating effectively with the community, and applying nutrition counseling techniques. In this study, the researcher conducted interactive simulations and provided systematic guidance to facilitate cadres in carrying out repeated independent practice. As a digital medium, a website offers advantages in terms of ease of access, flexibility, and the ability to update information, allowing cadres' skills to continue developing in line with evolving field needs (Yenita et al., 2025).

One of the key strengths of the culture-based website in this study lies in its content, which was designed in accordance with the local context of the Pontianak community. The educational material regarding stunting prevention was directly linked to families' daily consumption patterns, for example through the use of river fish, local vegetables, and traditional foods that are familiar in everyday life. The website also included examples of complementary feeding practices using ingredients readily available in local markets and presented various myths concerning children's nutritional needs that were considered inaccurate. This made it easier for cadres to understand the material and subsequently convey this information to mothers attending the Posyandu. This culturally based interactive content not only made the learning process more enjoyable but also strengthened cadres' retention. Accordingly, the combination of cultural relevance, interactive visual presentation, and easy accessibility of information may explain why the intervention group experienced a more significant improvement in skills compared to the control group.

The improvement in cadres' skills in conducting early detection of stunting in this study encompassed accuracy in performing anthropometric measurements, the ability to assess children's nutritional status based on measurement results, the completion and interpretation of growth charts or the Maternal and Child Health Card (KMS), and the provision of basic counseling to parents regarding initial examination results. This finding is consistent with the study by Istianti et al., (2025) which reported that website-based digital educational media improved Posyandu cadres' skills in the early detection of stunting, including the observation of growth and development. A study by Hapsari et al., (2024) similarly demonstrated a significant improvement in cadres' skills following information technology-based training, particularly in measuring toddlers' length and weight and identifying early signs of stunting. The effectiveness of website media as an educational tool is considered to enhance cadres' motivation and understanding, as it presents material in various formats, such as text, images, audio, and video. This is reinforced by Wibowo et al., (2024) who stated that digital media, particularly websites, can serve as a solution to the limitations of face-to-face training across different regions and are effective in improving cadres' skills in health education programs related to stunting.

The use of culture-based website media may serve as an innovative approach to improving cadres' skills in conducting early detection of stunting. The design of a website that aligns with local values, language, and wisdom makes the information presented easier to understand and more relevant for cadres (Astuti et al., 2021). Educational material covering signs and symptoms of stunting, risk factors, and preventive measures, when presented through illustrations, videos, or stories relevant to the local culture, can help cadres master this knowledge and apply it in their daily practice (Efendi et al., 2024). Tailoring content to the community's cultural background also supports cadres in conveying health messages more persuasively to pregnant women and mothers of toddlers, particularly when confronting barriers shaped by traditional beliefs. The improvement in skills observed in this study not only strengthened early detection capabilities but also supported the effectiveness of cadres in providing health education to pregnant women and mothers of toddlers. Previous research further reinforces this finding, showing that direct education from cadres can help mothers select nutritious foods and increase participation in Posyandu activities (Husnaniyah et al., 2020).

The results of this study indicate that cadres' skills cannot be separated from the influence of the culture in which they live. Among the Malay community of Pontianak, a belief still persists that delayed growth in children is a normal occurrence, often regarded as a matter of fate, resulting in reduced attention to early detection and

prevention efforts for stunting. This misconception may diminish cadres' capacity to provide education and mentoring to families, as they themselves operate within a social environment shaped by these same beliefs. In addition, among parts of the Pontianak community, poor nutritional status is often perceived as a source of shame, causing parents to be reluctant to bring their children to the Posyandu or undergo examination. This indirectly limits the opportunities available for cadres to practice their early detection and nutrition counseling skills. This finding is consistent with a study confirming that cultural values and local beliefs exert a substantial influence on maternal and child health practices, while simultaneously posing a challenge for cadres seeking to optimize their skills in the field (Arman et al., 2025).

This study has several potential sources of bias and confounding factors that need to be taken into account. Variations in cadre characteristics, such as differences in age, level of education, experience, and initial ability to use technology, may have influenced the study results independently of the intervention provided. External factors, such as unequal access to the internet, varying levels of support from family and the surrounding environment, and the possibility that cadres obtained health information from sources outside the study, may also have affected the findings. Furthermore, interaction between cadres in the intervention and control groups could have introduced contamination bias if an exchange of information occurred. The diverse field conditions, including differences in learning motivation among cadres and variations in health facilities across regions, also posed challenges that may have affected the validity of the study results.

The generalizability of these findings should be considered carefully. Although this culture-based website medium proved effective in Pontianak, its application in other regions may differ due to differing environmental conditions. In other areas, internet access, health facilities, and cadres' digital capabilities may generally be better, potentially resulting in a greater impact of the intervention. However, social, cultural, and surrounding support factors may still influence the success of the program. Therefore, while these findings may be applied in other regions, adjustments to local conditions would be necessary to maintain their effectiveness.

Research Limitations

This study has limitations regarding the generalizability of its findings, as the population studied was limited to health cadres in two Puskesmas within the East Pontianak area. Consequently, the results of this study may not necessarily be representative of all health cadres in Pontianak or in other regions with differing characteristics. To mitigate this limitation, the researcher took anticipatory measures by separating the intervention and control groups based on different Puskesmas locations and by scheduling the implementation of the interventions at separate times. These efforts were undertaken to minimize the possibility of contamination between groups, thereby ensuring that the study results maintained good internal validity despite the limited scope.

Conclusion

The results of this study indicate that the culture-based website medium has an effect on improving health cadres' skills in the early detection of stunting in Pontianak. This is evidenced by a p-value of 0.001 ($p < 0.05$) in the intervention group, indicating a significant improvement before and after the intervention. This study carries important implications, both practically and in terms of policy. The culture-based website educational medium has been shown to improve cadres' skills, and may therefore serve as an innovative approach to early stunting detection efforts. Tailoring content to the community's cultural background also supports cadres in conveying health messages more persuasively to pregnant women and mothers of toddlers, particularly when confronting barriers shaped by traditional beliefs. The improvement in skills observed in this study not only strengthened early detection capabilities but also supported the effectiveness of cadres in providing health education to pregnant women and mothers of toddlers. Therefore, the Pontianak City Health Office is recommended to integrate this culture-based website educational medium into the standard training curriculum for new Posyandu cadres, as well as into refresher training for active cadres, and to establish it as an official supporting medium for education and growth monitoring activities at the primary health care level.

Future research is recommended to explore the long-term retention of health cadres' skills, in order to assess the extent to which the effects of education through the culture-based website can be sustained after the intervention. In addition, future studies should also test the effectiveness of this intervention model using a randomized controlled trial (RCT) design, in order to obtain stronger evidence regarding the causal relationship between the use of culture-based media and the improvement of cadres' skills. This approach is expected to strengthen the generalizability of the results and provide a more comprehensive foundation for the development of health cadre training programs across various regions.

Acknowledgments

We would like to express our gratitude to Puskesmas Banjar Serasan and Puskesmas Saigon for their outstanding assistance and cooperation throughout this study. We would also like to thank the Ministry of Higher Education, Science, and Technology (Kemendiktisaintek) for the funding support provided for this study. We further extend our thanks to STIKes Yarsi Pontianak for its academic support, which enabled us to carry out this study smoothly.

Conflict of Interest

The researchers declare that there is no conflict of interest in this study. The processes of data collection, preparation, and reporting of the research results were carried out independently and objectively, free from any influence that could affect the outcomes of the study.

Author Contributions

Masmuri: Conceptualization, Data Curation, Article Writing, and Preparation of the Initial Draft. **Nurul Hidayah:** Methodology, Validation, Data Collection, Literature Review Writing, and Editing. **Dodik Limanysah:** Data Analysis, Research Administration.

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