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Evaluation of the Use of Child Length Mat as A Stunting Early Detection Tool on Children Under Two in Kulon Progo Regency, Yogyakarta

Evaluasi Penggunaan Tikar Pertumbuhan Sebagai Alat Deteksi Dini Kejadian Stunting pada Baduta di Kabupaten Kulon Progo, Yogyakarta

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ABSTRACT

Background: Stunting prevention leads to the initiation of child length mats as an early detection tool and the assignment of human development workers as community initiators. There are differences in policy implementation regarding these innovations, particularly in the use of length mats.
Objectives: To evaluate the use of a length mat as a stunting early detection tool on children under two in Kulon Progo Regency.
Methods: A qualitative research with a case study approach was conducted in two stunting locus villages in Kulon Progo Regency. Data were collected using key informant in-depth interviews, document analysis, and reflective journals. Respondents were recruited using the maximum variation sampling technique, and data were analyzed using thematic analysis in accordance with the theory of diffusion of innovation.
Results: Stakeholder acceptance of the length mat was relatively poor. Factors that influenced its adoption in Kulon Progo regency include the pre-existing situation (lack of accurate instruments to measure child length), the easy use of the length mat, and prescribed training. Whereas, factors affecting its rejection include issues related to its relative advantage and validity. This refusal was caused by suboptimal campaigns and a lack of support from the local government. However, the length mat remains in use following its function as a prerequisite for the village fund disbursement.
Conclusions: Suboptimal use of the communication channel to introduce the length mat and lack of support from the local government caused the innovation to fail to diffuse at the district level. Hence, strengthening the campaign and inter-stakeholder communication is necessary to improve acceptance and adherence.

INTRODUCTION

Stunting remains a persistent health problem in Indonesia. Although the national prevalence of stunting has decreased, it remains high at 21.5%, according to the 2023 Indonesian Health Survey[1]. Stunting is a condition of impaired growth resulting from chronic malnutrition and recurrent infections during the critical first 1,000 days of life[2,3]. Children experiencing stunting face significant physical and cognitive developmental setbacks, particularly during this period of rapid growth and development, often referred to as the "golden age"[4-6]. To prevent children from experiencing these adverse effects in the future, it is important to prevent stunting before the golden period of the first 1,000 days of life passes[4].

To address stunting, the Indonesian government has prioritized stunting prevention as a national agenda by enacting the National Strategy for Stunting Prevention Acceleration, which includes the five main pillars of stunting reduction. This initiative primarily targets pregnant women and children aged 0-2 years, encompassing integrated nutritional interventions that are both specific and sensitive. It employs multi-sectoral and convergence approaches by integrating programs from the national government to the village level[2]. A critical component of this program is the early detection of stunting, aimed at identifying children at risk of stunting more promptly to facilitate immediate intervention and case management. To do this, Human Development Workers (HDW) are appointed as the responsible agents to conduct field measurements, whereas the child length mats are distributed as screening tools[7].

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The policy regarding the use of child length mats as stunting early detection tools has elicited varied responses from the local governments. For instance, the Bantul Regency government has decided to adopt the child length mat, whereas the Kulon Progo Regency government declined it, as outlined in the Circular No. 440/4323 concerning Anthropometric Measurements (Height and Length) for Children Under Five at Posyandu (growth monitoring clinics) in Kulon Progo Regency[8,9]. Hence, we examine how the Kulon Progo Regency government's decision is implemented at the operational level, the factors influencing the policy implementation, and the differences in innovation adoption between stunting locus and non-locus areas. This investigation is critical, considering the fluctuating prevalence of stunting in the regency over the years[10,11]. Furthermore, understanding the experiences of policymakers and field implementers in conducting early stunting detection is essential to identify and mitigate the challenges associated with these activities. This study is expected to serve as a reference for the government and health practitioners in formulating policies and programs that promote early detection of stunting and improve case management.

METHODS

This study employed a qualitative approach with a case study method conducted in two stunting locus villages in Kulon Progo Regency from February to July 2021. The research commenced with a preliminary study to assess its feasibility by considering the severity and spread of COVID-19 cases in the research locations. Data collection was conducted through in-depth interviews with key informants, document analysis, and reflective journals maintained by the researchers. The research informants included implementing staff at the regency and village levels who were involved and competent in addressing stunting-related issues, healthcare professionals or nutritionists responsible for monitoring child growth and development, as well as community health workers in the two villages (consisting of Human Development Workers/HDW and cadres from posyandu). The villages were selected based on their alignment with the research objectives and their conducive situation regarding the spread of COVID-19. Informants were selected using the maximum variation sampling technique.

In-depth interviews were conducted via telephone, Zoom meetings, or in person, depending on the preferences of the informants and the developments of COVID-19 cases in the research locations. Each interview lasted between 40 to 60 minutes using a prepared interview guide based on the Diffusion of Innovations Theory[12]. Table 1 shows the characteristics of the informants involved in the in-depth interviews. Each interview was recorded and transcribed verbatim. Document analysis was performed on written documents such as government regulations, technical guidelines, government circulars, and activity reports. We also maintained reflective journals on each activity to reflect upon the data obtained. Iterative data analysis was employed, involving deep reflection processes and prompt data reviews[13]. Data were analyzed manually using thematic analysis based on the framework of the Diffusion of Innovations Theory[12]. Member checking as well as triangulation of sources and methods were conducted to ensure data trustworthiness. Source triangulation was performed by comparing information obtained from different informants, while method triangulation was conducted by employing more than one data collection technique[14].

We obtained ethical approval and clearance from the Ethics Committee of the Faculty of Medicine, Public Health, and Nursing at Universitas Gadjah Mada, with the reference number KE/KF/0094/EC/2021, on February 17, 2021. Prior to data collection, all informants were provided with an explanation of the research objectives and procedures. Then, they were asked to provide written consent to participate in the study (informed consent). Participation was voluntary and conducted with consideration of the informants' comfort regarding the timing and duration of the interviews. The audio recordings and transcripts of the interviews were accessible only to the research team and were stored anonymously on the researchers' personal computers, secured with access codes. In presenting the research findings, no information that could identify individual informants was disclosed to maintain the confidentiality of their identities.

Table 1. Identities of the key informants of in-depth interview

Institution	Gender	Years of Service
Regency government 1	Male	4 years
Regency government 2	Female	11 years
Regency government 3	Male	3 years
Village government 1	Male	11 years
Village government 2	Male	2 years
Health workers 1	Female	12 years
Health workers 2	Female	15 years
Health workers 3	Female	3 years
Health workers 4	Female	1 years
Health workers 5	Female	38 years
Health workers 6	Female	23 years

RESULTS AND DISCUSSIONS

The Kulon Progo Regency has been designated as a locus area for stunting reduction since 2017. Previous surveys reported that the prevalence of stunting in this regency is fluctuating. The Basic Health Research in 2013 reported a stunting prevalence of 26.31%, which was

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decreased to 22.65% in 2018[15] and then rose to 27.2% in 2019[16]. In 2021, stunting in this regency decreased to 14.9%[10] but increased slightly to 15.8% in 2022[11] and further increased to 21.2% in 2023[1]. Villages were selected within the regency to encourage a more integrated and coordinated effort to accelerate stunting reduction. Ten villages designated as stunting loci in 2021 included Nomporejo Village, Tuksono Village, Karangsari Village, Sendangsari Village, Donomulyo Village, Kebonharjo Village, Sidoharjo Village, Gerbosari Village, Ngargosari Village, and Pagerharjo Village.

The Acceptance of Child Length Mats

The Kulon Progo Regency government has initiated efforts to address stunting through the enactment of Decree 6/2020, which amended Decree 37/2018 concerning stunting reduction. This decree outlines the eight stages of converging actions to accelerate stunting reduction, including the assignment of community health workers. These workers are tasked with assisting the village government in implementing integrated nutrition interventions (Article 5A, paragraph 2, point e) as well as monitoring child growth and development (Article 5A, paragraph 2, point g). The assignment of community health workers is further detailed in Article 12, paragraph 4 of the decree, which mentions cadres, early childhood education and development (ECED) teachers, human development workers (HDW), and others as part of the community health workers responsible for managing stunting intervention in the village.

Human Development Workers (HDW) were assigned to conduct early stunting detection using child length mats and monitor stunting reduction indicators using a village scorecard. HDW members were drawn from the community members, which might include community health workers, ECED teachers, and others [17]. Their responsibilities include measuring children's height/length alongside community health workers and/or midwives, who would provide consultations regarding the results. The measurement data were then recorded and reported to the village head to maintain accountability. The child length mat served as a qualitative tool for detecting stunting, indicating the achievement of normal height (or height-for-age) for children aged 3, 6, 9, 12, and 15 months [18]. The child length mat was introduced in Indonesia in 2018 and implemented nationally in 2019. Several advantages of this instrument include its practical design, appealing visuals, and the ease of results interpretation for both cadres and parents [19-21]. During the trial phase, several challenges or obstacles emerged, such as cadres' tendency to pull the child's toes to reach the normal threshold and the use of age intervals that create difficulties for measurers to monitor the growth of children outside the age intervals [20,22].

Following the launch of the child length mat in 2019, the Kulon Progo Regency government issued Circular No. 440/4323 concerning Anthropometric Measurements (Height and Length) for Children Under Five at Posyandu in Kulon Progo. This circular recommended against using the child length mat to measure the height of children under two. However, the circular did not explicitly prohibit the use of the child length mat as an early detection tool for stunting (Circular No. 440/4323, point 4). Subsequently, the decision regarding its use was left to the discretion of each village government or cadre.

"We are allowed to use it [the child length mat], which means that the regency government does not prohibit the use of the child length mat. Moreover, it is [the use of a child length mat] mandatory." (Regency government 1)

"Whether or not the child length mat will be used in the future, or how it will be used, will be determined by the community health workers or Human Development Workers (HDW) who are mentored by staff from the primary health centers." (Regency government 3)

The Implementation of Early Detection of Stunting Using Child Length Mats

The adoption of child length mat as a tool for stunting detection was analyzed using the stages of innovation adoption based on the Diffusion of Innovation theory. In this theory, adoption of innovation encompasses the stages of knowledge, persuasion, and decision-making. Table 2 presents an analysis of the decision-making process regarding the use of child length mats as a tool for early detection of stunting in two villages, using constructs from the Diffusion of Innovation theory. We compared the situation between a village that decided to adopt the child length mat and another that chose not to adopt it.

Table 2. Analysis of the adoption of child length mats as stunting screening tools

No.	Constructs of the Diffusion of Innovation Theory	Successful Adoption	Failed Adoption
1.	Prior Condition	Child length was measured using metline and sewing meter *(previous practice, problem)* Lack of accurate instruments to measure child length *(problem)*	Child length was measured using the anthropometry *kit (previous practice)*
2.	Knowledge	Lack of knowledge regarding the function of child length mat	
3.	Persuasion	1. Ease of use *(relative advantage)* 2. Clear and quick visualization of results *(observability)* 3. Compatibility with anthropometric	1. Quality of materials and design *(complexity)* 2. Lack of opportunity to practice *(trialability)*

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No.	Constructs of the Diffusion of Innovation Theory	Successful Adoption	Failed Adoption
		guidelines *(compatibility)* 4. Opportunity to practice *(trialability)*	
4.	Communication Channels	Training from relevant agencies, circulars, and HDW's guide books Peer-to-peer training / cascade training	

According to the Diffusion of Innovation theory, adoption of an innovation occurs through several stages: knowledge, persuasion, and decision-making. These stages are preceded by a prior condition, which is the situation experienced by an organization or community group before adopting an innovation[23,24]. This prior condition may include previous practices, existing needs or problems, the degree of creativity or the ability of the decision-making unit to innovate, and prevailing social norms. We found that the village adopting the child length mat lacked of accurate height measurement tools before the introduction of the child length mat. In this village, a metline or sewing meter was used as a height measurement tool for children under two. They were used as substitutes for the length board, which is the standardized tool for measuring child height, since some posyandu had no access to the board due to budget constraints for procurement. Metline, itself presented several limitations due to its material's inherent properties and its tendency to shift, which could affect accuracy, although some community health workers have tried to mitigate the problem and ensure that it could still be used effectively. This demonstrated the prior condition regarding stunting detection in the village concerning the lack of appropriate instruments, difficulties in obtaining accurate height measurements, and a high demand for standardized quantitative height measurement tools. Consequently, after the child length mat was introduced, its use often deviated from the intended use as a qualitative stunting detection kit. Instead, it was utilized as a height measurement tool by sticking the metline to its flat surface with adhesive to obtain results in metric.

"Many posyandu have no length boards to measure children's height. Hence, we [cadre] often use what is available, such as metline or measuring tape, due to budget constraints. Some posyandu even creatively made their own measuring tools. For example, some cadres construct them [measuring tools] from wooden boards. They use flat, thin strips of wood to which they attach the measuring tape." (Health workers 1)

"We experience difficulties using measuring tape since it shifts and slides easily, so sometimes we have to hold it down with a book or ruler." (Health workers 3)

"The metric of the child length mat is unclear. It seems that we need to attach a measuring tape so that the metric measurements could be obtained." (Health workers 5)

We also found that the village that did not adopt the child length mat had been using anthropometry kits (the standardized height measurement tool) since before the introduction of the child length mat. The kits were distributed by the regency government through the primary health centers to all posyandu in the village. As the existing tools were deemed superior and more suitable for their needs, the child length mats were not well accepted. This demonstrates how innovations that are not aligned with the values present in the community, the past experiences or practices, and the needs of potential adopters will result in a lower chance for diffusion and adoption[25]. In this case, the village where better height measurement tools are widely available had not need to adopt the child length mat, even though the utilization of both tools is fundamentally different. A previous study highlighted the importance of using standardized measurement since improper measurement tools can lead to inaccurate data[22,26]. A metline or measuring tape is used to measure upper arm circumference, head circumference, waist circumference, and hip circumference, while sewing tape is used by tailors to measure body sizes. Neither of these tools is a standardized height or length measurement tool for children as defined by the WHO[27]. Additionally, improper use of the tools and inaccuracies of result could occur due to incorrect measurement techniques employed by the cadres[28,29].

According to the Diffusion of Innovation theory, the first step of innovation adoption is the knowledge stage. In this stage, an individual or group learns about the existence of an innovation and seeks information related to it. The decisions are made regarding the 'what, how, and why' the innovation works[30]. In both villages, we found that the decision-making units misunderstood the purpose of the child length mat by comparing the measurement results obtained from the child length mat with those obtained from the standardized tools. This comparison is unintended since the child length mat was intended solely as a tool for early detection of stunting, producing qualitative data, and was not meant to be used for measuring the height/length of children under two. The lack of understanding was further evidenced by the ongoing debates at the village government level regarding the quality of data produced by the child length mat.

"The cadres in our posyandu currently measure child height using anthropometric tools. Thus, we decided not to use the child length mat, as we think it was a step backward. Our anthropometric tools offer more accurate measurements, much clearer metrics, as well as better consistency and quality than the child length mats. Besides, oftentimes, it [the child length mat] is made of stretchy materials." (Village government 2)

"We provided the child length mats, and it turned out that these mats provided more valid measurement

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results." (Village government 1)

Rogers (1983) postulated that inadequate knowledge of an innovation often results in rejection or unsustainable adoption of the innovation[12]. This aligns with our findings, in which the child length mat was not adopted properly as a tool for early detection of stunting due to misunderstanding. It was also evidenced by the way in which cadres attached metline/measuring tape to the child length mat to obtain data on child height in metrics. This practice contradicts the HDW Pocket Book, which serves as a guide for HDW, that emphasizes that the child length mat should not be used to collect data on children's height but should only be used to screen stunting among children under two qualitatively. The child length mat also can be used as an instrument to raise awareness about stunting within the community[7].

The second step in the adoption process is the persuasion stage, characterized by positive or negative attitudes toward the innovation. These attitudes, however, do not always directly lead to a decision to adopt or reject the innovation[30]. As opposed to the knowledge stage, in which the reactions are more cognitive in nature, in the persuasion stage, the reactions are more related to feelings or the affective aspects. During this stage, individuals actively seek information to reduce their uncertainties, leading to the emergence of selective perceptions towards the innovation. This is often depicted through the attributes or characteristics of the innovation, which include relative advantage (degree of relative benefit), compatibility (degree of suitability), complexity (degree of difficulty), trialability (degree of limited testing of the innovation), and observability (degree to which results can be observed)[12].

The attributes of an innovation might influence the adoption process[30]. According to a study by Scott et al. (2017), innovation attributes such as relative advantage and observability positively affect people intention to adopt[31]. Innovations offering obvious and significant advantages will be adopted and utilized more successfully. Likewise, a higher compatibility level of an innovation means that the decision-making unit would only need to spend minimal effort to integrate it with existing technologies, thus creating higher expected benefits among the adopters[25]. Furthermore, innovations that can be tested prior to full adoption will be adopted more quickly, as they allow the decision-making unit to gain experience in operating the innovation, explore its capabilities in greater depth, and resolve any issues encountered before fully adopting the innovation[30]. However, the complexity of an innovation would hinder its adoption, as this implies that more time would be required to learn about the innovation[12].

Information obtained from the village that adopted the child length mat revealed a more positive perception of the advantages of the child length mat. In this village, the mat was considered to have a primary advantage in its ease of use. Relative advantage refers to the degree to which an innovation is perceived as better than the existing ideas in terms of economic benefits, status conferred, and other advantages[12]. The child length mat was regarded as more practical, and its lightweight material made it easy to be mobilized. The images, design, and color combinations used on the child length mat provide clearer visualizations that improve its readability among the community health workers and parents. The ability of the child length mat to visualize stunting can aid in interpreting measurement results and enhance understanding of stunting among community health workers and parents[7]. This explanation not only underscores the relative advantage of the child length mat as an innovation for stunting prevention but also elucidates the aspect of observability of the tool. Observability is the degree to which the results of an innovation can be easily seen, allowing those results to be effectively communicated to various stakeholders[12].

"In my opinion, the child length mat is quite a simple tool, practical, and easy to use. Since we only use it [child length mat] once a month, it does not wear out quickly." (Health workers 3)

"The child length mat is good; the measurement results can be seen immediately. We can see immediately which kids are stunted, which are not, and which are short but not yet classified as stunted (those in the yellow zone of the child length mat)." (Health workers 5)

The next attribute that encourages adoption of an innovation is compatibility. Compatibility refers to the degree to which an innovation is perceived as consistent with the existing sociocultural values and beliefs, previous ideas/concepts, and the needs of potential adopters[12]. The use of the child length mat, which involves laying it flat on a surface and measuring children in a supine position, was in line with the existing guidelines for anthropometric measurements for children under two that have been implemented at posyandu. This technique also follows the height measurement guidelines for children under two set by the WHO[27].

"The child length mat is suitable for measuring children aged 0-23 months as it measures in a supine position." (Health workers 3)

Other attributes that also influence adoption are trialability and complexity. Trialability refers to the ability of an innovation to be implemented on a limited scale, while complexity pertains to the level of difficulty encountered when applying the innovation[12]. In this study, we found that before the child length mat was widely used for early detection of stunting, the community health workers were given the opportunity to practice using the mat, facilitated by staff from the district health office, on several children under two residing in the village. This allowed the community health workers to learn and master the steps of using the mat on a small and manageable scale. This practice enables cadres to overcome any errors or challenges that may arise during measurement. Rogers explained that innovations that can be tried out beforehand are generally adopted more successfully[12].

On the contrary, the village that decided against using the child length mat refused to adopt the mat because the local health workers and village government

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perceived the complexity of the mat perusal. In this village, the mat was deemed to complicate gaining accurate measurements due to the characteristics of the material and its less-than-ideal shape. The child length mat was printed with the dimensions of 125 cm x 80 cm, made of acrylic on the top part and flexy material on the printed surface. This material, doubled with its storage method, which involved rolling the child length mat, often creates creases on the printed surface when the mat is laid out. The creases were likely to reduce the accuracy of the measurement results. Therefore, the cadres needed to ensure that there were no creases on the printed surface of the mat before each measurement was taken to maintain accurate readings or interpretations of the results.

"Yes, we taught them how to use the child length mat. As an HDW, we have friends among community health workers in the hamlets. We invited them one by one for the training and explained how to use the child length mats." (Health workers 3)

"We need quite a large space to use the child length mat because the size is rather wide." (Health workers 4)

"We would rather not use the child length mats as they were made of stretchy material that can easily elongate." (Village government 2)

Following the knowledge and persuasion stages, the final step of innovation adoption is the decision stage. In this stage, a decision-making process occurs at the individual or the decision-making unit to engage in activities that lead to a choice of adopting or rejecting the innovation [12]. The Kulon Progo Regency government initially decided to adopt the child length mat as a tool for early detection of stunting by procuring the mats as well as appointing and training the HDW on the use of the mat. However, the regency government later identified potential issues within the community and subsequently issued a circular advising against using the mat. In fact, the decision whether to use the child length mat was returned to the cadres or village government. Among the two villages studied, one village decided to adopt the child length mat, while the other village chose to reject its use.

"In early 2020, I forget the exact month, the village government procured the child length mats. We then distributed the mats to all posyandu; one mat per posyandu." (Village government 1)

"At that time, we decided against using the stunting [child length] mats." (Village government 2)

Diffusion is a type of communication involving the exchange of information that contains new ideas or concepts[12]. In the diffusion process, innovation is regarded as messages or concepts containing novelty, whereas individuals or units with prior knowledge or experience about the innovation are considered the message senders, and individuals or units lacking knowledge about the innovation are viewed as the message receivers. In this process, the communication channels connecting these two individuals or units are considered the media of communication[12]. Additionally, communication channels are the means used to convey messages related to the innovation from one individual to another, which include mass media and interpersonal communication channels[12]. In this study, we found that the child length mat was communicated to each village government and HDW through training that was organized by the District Office of Community Empowerment and Village, Population Control, and Family Planning of Kulon Progo Regency. In this training, the importance of the tool, how to use it, and the roles of HDW were discussed. The HDW Pocket Book is also considered one of the communication channels to introduce the child length mat, as it contains illustrations of the child length mat and information on how to use it.

In addition to the training conducted by the regency government, other methods were used to disseminate information regarding the child length mat. In the village that adopted the mat, training was conducted by HDW for the community health workers. This training facilitated face-to-face two-way communication, allowing for interpersonal information exchange. Contrastingly, in the village that decided to reject the child length mat, no training activities were conducted by HDW. In this village, the field measurement officers expressed that they had no experience using the child length mat because, during the introductory training, no practical session or trial was provided. Moreover, the village government, as the decision-making unit, did not receive adequate information regarding the purpose and procurement process of the child length mat. This situation demonstrates that suboptimal information dissemination led to the village government being unable to make informed decisions regarding the adoption of the child length mat, resulting in its refusal in that village.

"We have not tried it [the child length mat] yet. It was only a village-level training, so the participants were all parents. The community health workers only observed its [the child length mat] use during the training; no opportunity was provided to us to try measuring children using the mat." (Health workers 4)

"Our unit (the Family Health Division of the District Health Office), particularly the nutrition subunit, was not involved in the HDW training. We just learned about the existence of the child length mats from our friends at the primary health center." (Regency government 2)

"The accuracy of these child length mats is unclear; there are no clear technical guidelines." (Village government 2)

The Kulon Progo government also communicated the use of the child length mat through Circular Letter No. 440/4323. However, this circular was mainly focused on prohibiting the use of the child length mat for measuring the height of children under two, which is in line with the

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original purpose of the mat as stated in the HDW Pocket Book[7]. Considering the decision to adopt was left to the community health workers and the village government, this circular is deemed to have a contradictory message regarding the innovation and led to varying s of misunderstandings within the community. This situation was exacerbated by the assignment of HDW to use the child length mat for stunting detection, which was a prerequisite for the disbursement of village funds. The misunderstanding was shown, for example, in how data on stunting detection reported in the scorecard was filled out by converting the metric results from anthropometric measurements into qualitative data. The scorecard reports the implementation of stunting prevention at the village level aimed at the first 1,000 days of life population group. It was filled out and reported by HDW and the village government[2,17] containing information on the number of target populations, stunting detection results using the child length mat, the coverage of stunting prevention intervention for the targeted group, the degree of village convergence efforts, and the use of village funds for stunting prevention. This convergence report on stunting prevention is one of the requirements for the disbursement of village funds according to the Minister of Finance Regulation No. 193/PMK.07.2018, Article 21, Paragraph 1, and Article 24, Paragraph 2. Likewise, Article 29, Paragraph 2 of the regulation states that the village head must also submit a report on the use and impact of village funds on stunting prevention annually. This regulation underlines the purpose and urgency of using the child length mat.

"Using the child length mat to detect stunting was one of the requirements for the disbursement of village funds." (Regency government 1)

'The child length mats were used to ensure the disbursement of village funds. Thus, we need to do some adjustment with regards to the local policy [the prohibition of using the child length mats] because it is a prerequisite for the disbursement of the funds." (Village government 2)

Evaluation of Early Detection of Stunting

The use of the child length mat as a tool for stunting detection has been initiated since the early inception of stunting as a national priority. The mat has been utilized in various regions across Indonesia, although the levels of compliance and motivation for its use vary[8,33]. Our findings demonstrated that the policy to screen stunting using the child length mat in Kulon Progo Regency experiences challenges due to several reasons. First, the persuasion stage did not properly consider the attributes of the child length mat. For example, training was not conducted using appropriate techniques such as hands-on practice, which resulted in HDW missing the experience of trying the child length mat in a controlled setting where they could get direct feedback. Using the diffusion of innovation theory, this situation explained how an innovation failed to diffuse as the trialability attribute was not fulfilled. Concerning this attribute, ideally, HDW was provided with the opportunity to simulate or try the child length mat in a training setting. Previous research has shown that simulation methods are effective in enhancing the transfer of knowledge from instructors to participants. Knowledge transfer can be further improved if participants are given opportunities to practice repeatedly during simulations, receive direct feedback, and have standardized experiences across all participants[34,35]. This aligns with the study on the utilization of the child length mat in Bantul Regency, which found that the use of the child length mat was related to the internal motivation among officers, stemming from prescribed training [8]. Armini et al. (2020) and Prasetyorini et al. (2019) also highlighted the importance of providing ongoing training to cadres in the form of refresher training[36,37]. In addition, studies found that technical assistance and monitoring during training are also necessary to ensure skills development[35,38]. Hence, improving the training on the use of the child length mat is essential to strengthen and update the knowledge and skills of HDW and community health workers as field measurement officers. To ensure better case finding of stunting, the regular training should be supplemented with technical support from experts and close supervision.

Second, full adoption of the child length mat in Kulon Progo Regency was hindered by the communication channels used to convey the urgency of the child length mat, which were deemed suboptimal. In fact, the mats had been introduced by the regency government through various channels, such as training, guidebooks, and circular letters. The village government also had procured the child length mats and distributed them to the posyandu. Despite the efforts, its adoption as a tool for early detection of stunting was considered suboptimal. This situation happened due to the ineffectiveness of the communication channels employed and the messages conveyed. The official communication through circular letters, for example, was perceived to generate confusion within the community regarding the mat, as it contains contradicting messages. It stated that the child length mat should not be used to measure the length of children under two (circular letter, point 4), yet point 5 in the same document instructed on how to fill out the stunting scorecard report, which was obtained by using the child length mat. Consequently, some HDWs filled out the stunting scorecard report by conversing the metrics from a length measuring tool, not the child length mat. Some agencies viewed this decision as an indication that the Kulon Progo Regency government had not fully supported the policy of using the child length mat to detect stunting. The dissenting opinion regarding this circular letter shows problems with the messages conveyed and the limited understanding of policy among regional government and the implementing agencies.

The Government of Indonesia has documented details of policies and programs to reduce stunting by 2030 in the document the National Strategy for Stunting Prevention Acceleration. This document emphasizes the need for converging, coordinating, and consolidating national, regional, and community programs. Convergent interventions can be achieved by aligning planning, budgeting, execution, monitoring, and control of cross-sectoral activities as well as between levels of

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government and the community[2]. Support from the local governments for national programs plays a key role in accelerating the achievement of national targets. However, the authority of the local governments to determine the direction of health policies and programs according to regional needs has made it challenging for the national programs to be fully implemented in some situations. Therefore, appropriate steps should be taken to determine which policies or programs are suitable for regional situations. This should be considered carefully because decentralization limits the government's ability to elaborate on regional potentials and control the complexity of existing health issues to some extent, which can affect the attainment of the expected targets[39-41].

Suboptimal utilization of communication channels in introducing the child length mat in Kulon Progo Regency was also evident in the delayed procurement and distribution process. Since the beginning, several officials in the regency government responsible for addressing stunting did not receive sufficient information regarding the purpose of the mat as a stunting screening tool. Likewise, the technical guidelines on the proper use of the child length mat were also not disseminated evenly to all village governments. The ambiguity of information circulating about an innovation is known to affect decisions related to its adoption[12]. A study by Fry et al., found that lack of information and misconceptions about an innovation led to its rejection. These factors caused potential adopters to perceive a mismatch between the benefits offered by an innovation and their needs[42].

In this study, we found that lack of adequate information regarding the child length mat may cause variations in its perusal. The child length mat, which was intended to be used as a stunting screening tool, was, in practice, used as a height measurement tool. In one village, the tool was not used at all because it was considered not valid to measure height, thus it does not meet the needs of the potential adopters. To date, no diagnostic testing has been conducted to determine the validity of the child length mats that are already circulated in Indonesia against the existing standardized measurement tools. Validity testing for this prototype child length mat has been carried out in Cambodia, Guatemala, and Ghana. However, the differences in visual design on the printed surface of the mats, as well as the variations in designs, indicate that diagnostic testing is needed[8,22]. To address issues related to the use of the child length mat, improving communication among the district implementing agencies and other institutions involved in stunting management is important. Regarding this, *rembuk stunting* as a cross-sectoral and community-based official forum is essential in ensuring good coordination and implementation of stunting detection, particularly on the proper use of the child length mat. Likewise, intercommunication among staff or units within an organization is needed to ensure specific target achievements[43].

Information dissemination should include comprehensive technical guidelines on the use of the child length mat that is acceptable by all relevant stakeholders. It can be carried out by utilizing various available media to reach a wider audience and potential adopters[12]. Studies reported that mass media is faster and more efficient in reaching larger audience and providing general information, while interpersonal communication channels are more persuasive in convincing the audience to accept the innovations[31]. Mass media includes newspapers, television, radio, and the internet, while interpersonal communication channels include conferences, training, education programs, and others. To choose the most appropriate communication channels, the situations or contexts in which the innovation will be introduced should be taken into consideration. The internet, for example, is considered an effective communication channel to disseminate information in the Yogyakarta Province, due to its high usage trends among the working-age population[44]. Previous report shows that Yogyakarta Province ranks third in Indonesia in proportion of population using the internet, with a significant increase from 26.75% in 2015 to 61.73% in 2019. Considering this trend, social media could be utilized as a communication channel to spread information on the child length mat. The information on social media is mostly presented in the form of images, photos, and videos, which are more engaging and easier to understand. These features enhance interaction and facilitate better access to information among users[45].

The failure of an innovation to diffuse does not imply that the innovation or technology is entirely unadopted by individuals or systems; rather, it is defined as the diffusion that does not reach full adoption due to weaknesses in the concept itself, competition with other innovations, or lack of awareness or knowledge among the target groups[46]. Additionally, failure to diffuse can also be attributed to limited community participation. This is in line with studies in Peru that aim to introduce the concept of boiling water to improve health. This idea failed to diffuse and was rejected in a village due to a lack of knowledge and rampant stigma in the community. In this village, the researcher found that despite campaigns being conducted for two years to encourage people to boil their water, lack of support from the community members resulted in failure for the innovation to diffuse[30].

Our study employed a qualitative design that allowed for an in-depth analysis of complex phenomena, in this case a decision-making process at the subnational government level regarding the use of the child length mat as a tool for early detection of stunting. We also compared regions where the innovation successfully diffused with those where the innovation did not fully diffuse. However, this research has limitations that necessitate careful consideration when drawing conclusions and applying findings to decision-making. The scope of the study, which only involved two stunting locus villages, was not sufficient to fully reflect the situation regarding the policy of early detection of stunting in Kulon Progo Regency. Likewise, the study was conducted during the COVID-19 pandemic, with strict mobility restrictions, resulting in most interviews being conducted via mobile phones or Zoom meetings. This situation might hinder direct observation of the informants' expressions and non-verbal responses,

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although we had anticipated this by requesting informants to turn on their cameras. To address this limitation, we also made efforts to listen for other non-verbal cues during the interviews, such as paying attention to the changes in tone and speech pattern.

CONCLUSIONS

We reported that the innovation of the child length mat for early detection of stunting failed to fully diffuse in Kulon Progo Regency. Several factors influenced the adoption of the child length mat, including prior conditions, the ease of use, the suitability of the tool, and the availability of prescribed training. On the other hand, the child length mat failure to diffuse was associated with limited support from the local government, the absence of clear technical guidelines, and uncertainties regarding the validity of the child length mat. We also found that persuasion and communication related to the use of the child length mat need to be strengthened by optimizing the utilization of communication channels, developing more uniform and simplified messages, and conducting training that provides participants with opportunities to test the tool. Communication among district implementing agencies and between levels of government needs to be enhanced to improve the acceptance of the tool. This is important concerning the urgency of stunting, the trends in Kulon Progo Regency, lack of accurate measurement tools in the community, and limited anthropometric skills among community health workers. Moreover, the child length mat provides greater relative advantages to overcome issues in measurement, considering its ease of use, good visuals, and economic value.

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CONFLICT OF INTEREST AND FUNDING DISCLOSURE

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AUTHOR CONTRIBUTIONS

ESC: conceptualization, investigation, methodology, writing–original draft, data curation; MTPLK: conceptualization, methodology, supervision, formal analysis, funding acquisition, writing-review & editing; SH: writing-review & editing, supervision.

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