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Exploring practical issues in children's anthropometric measurements: A qualitative descriptive study involving Indonesian health professionals and community health workers

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Abstract

Background: Anthropometric measurements during early childhood are critical as they represent the initial stages at which nutritional status is determined. Practitioners who measure children's growth must have similar and adequate skills in anthropometric measurement to ensure the validity of data regarding children's nutritional status, particularly concerning stunting prevalence.

Objective: This study aimed to explore the measurement practices conducted by community health workers (CHWs) in Indonesia, who are responsible for providing data related to children's growth and, consequently, their nutritional status.

Methods: A qualitative descriptive design was employed using online focus group discussions ranging from 1 to 1.5 hours. Data were collected from ten health professionals and eight CHWs, with analysis performed using thematic analysis.

Results: Four themes emerged: barriers to measurement accuracy, varied skills in measurement, mothers' behavior influenced by children's reactions, and strategies for dealing with traumatized children.

Conclusion: Practical issues that arose during routine anthropometric measurements included the reliability of measurements, the skill levels of examiners, the interplay between mothers' and children's reactions, and approaches to managing traumatized children during measurements. To effectively enhance integrated health posts (*Posyandu*) services, it is crucial to maintain calibrated, validated equipment and implement comprehensive training with periodic refreshers for CHWs. Additionally, improving facility infrastructure, fostering CHWs' communication skills, and simplifying child-friendly measurement procedures will collectively optimize service quality, promote cooperation, and strengthen community trust.

Keywords

anthropometry; child; community health centers; community health workers; growth

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Background

Anthropometric measurements in early childhood are essential, as this is the earliest stage at which nutritional status is determined. Anthropometric measurements, such as weight and length/height, serve as growth indicators to calculate a child's body mass index, which is recommended as the most cost-effective, efficient, and appropriate measure for assessing the nutritional status of children in primary healthcare practices (Carsley et al., 2019; Rae et al., 2023). Anthropometric measurements and growth monitoring are used in many developing countries to identify the risk of growth failure in young children and to improve growth trends through nutritional counseling and other health interventions (Pollifrone et al., 2020). The measurement process is vital, as accurate measurement is a fundamental indicator for obtaining reliable data (Pollifrone et al., 2020; Sunjaya et al., 2021).

Anthropometric measurements in healthy children in Indonesia are primarily conducted at integrated health posts for child health (*Posyandu* in Indonesian). The *Posyandu* is a community-based health program that extends the services of public health centers, where CHWs provide volunteer services under the supervision of professional healthcare providers (Hasanbasri et al., 2024). Since its inception in 1984, Indonesia has established 338,881 *Posyandu* as of 2023 (Alam, 2023). The decentralized *Posyandu* model aims to improve access to essential health services, including growth monitoring, for populations that might otherwise face barriers to care (Ministry of Health Republic of Indonesia, 2021). The widespread availability of health centers for monitoring children's health offers significant advantages for rural

communities, particularly for mothers, who often lack transportation access, live in areas with inadequate infrastructure, or have domestic obligations that hinder trips to more distant healthcare facilities (Pollifrone et al., 2020).

CHWs are responsible for conducting anthropometric measurements at public health centers. Most CHWs receive training from health professionals, while others are trained by senior CHWs (Sunjaya et al., 2021). However, many frontline workers struggle to accurately measure, record, and interpret children's growth, leading to particularly weak follow-up on growth monitoring in developing countries (Melkamu et al., 2019). A study identified the accuracy and precision of CHWs' measurement in Central Java provinces, Indonesia, and found that only 11.95% of CHWs measured accurately with good criteria according to WHO (Suyatno, 2022). A study in Nepal found that the skill level of frontline workers, including health officers and volunteer workers such as CHWs, is the most significant factor influencing the accuracy of anthropometric measurements in children (Pollifrone et al., 2020). Therefore, further investigation into the measurement methods employed by CHWs is necessary.

Indonesia needs to raise awareness about the importance of anthropometric measurements given its high prevalence (21.5%) of stunting, with 23 out of 37 (62.1%) provinces having higher prevalence than the national number (Ministry of Health Republic of Indonesia, 2023). The stunting indicators used by the Ministry of Health reports are derived from measurements conducted at the *Posyandu*, which are then reported to public health centers and subsequently to the Ministry of Health (Makripuddin et al., 2021). However, if the measurements are inaccurate, the calculated stunting rate may also be inaccurate. Furthermore, imprecise measurements could result in the misclassification of patients' weight and lead to unnecessary interventions, referrals, and concerns for both patients and parents (Carsley et al., 2019).

Despite the importance of anthropometric measurements, our search of the literature has not revealed any study that addresses this issue using a qualitative approach from the perspectives of both health professionals and CHWs. It is crucial to explore the perceived challenges or issues encountered during measurements, as reported by CHWs, and to conduct a comprehensive review of the supervision and training provided to them by health professionals. Thus, our study aimed to explore the anthropometric measurements conducted by CHWs in Indonesia from the perspective of health professionals and CHWs who are responsible for providing data to the Ministry of Health related to children's growth.

The conceptual framework for this research focuses on routine growth measurement in children and atraumatic care as a fundamental philosophy in pediatric nursing. High-quality anthropometric measurements of children's growth require meticulous attention to detail concerning equipment, calibration, measurement techniques, training, quality control, and data recording (Diyan et al., 2024; Rae et al., 2023). Measuring weight and length/height or weight necessitates an atraumatic care approach, which aims to minimize physical and psychological distress experienced by children and their families. The principles of atraumatic care include reducing physical stressors, preventing separation from parents, fostering a sense of control, minimizing pressure or pain, and providing emotional support (Calisir & Karatas, 2019; Hockenberry et al., 2022). These principles often operate as implicit interventions in pediatric care, leading to a lack of awareness among nurses and other health professionals regarding their significance (Calisir & Karatas, 2019; Carvalhais et al., 2021; Handayani & Daulima, 2020). Barriers to implementing atraumatic care in pediatrics fall into three categories: insufficient human resources, suboptimal service management, and limitations in the physical environment and equipment (Carvalhais et al., 2021).

Methods

Study Design

We conducted a qualitative descriptive study according to the interpretivist paradigm. The interpretive approach is believed to be a rigorous approach in applied disciplines when the research aim is to improve disciplinary practice through the development of practical knowledge (Thorne, 2016). Furthermore, a qualitative descriptive study facilitates the exploration of human nature and related phenomena (Doyle et al., 2020). In this study, we aimed to investigate the practical issues that frequently arise when taking routine anthropometric measurements of children at the *Posyandu* in Indonesia. This qualitative research adhered to the Standards for Reporting Qualitative Research (OBrien et al., 2014).

Participants

Participant selection was conducted through purposive sampling. The researcher employed this technique to select individuals anticipated to provide rich information (Tajik et al., 2024). This study included health professionals and CHWs, with inclusion criteria set as: 1) having at least 1 year of experience in conducting anthropometric measurements in children, and 2) actively engage in *Posyandu* located in Depok City, West Java, Indonesia, while the exclusion criteria was the health professionals or CHWs whom could not be contacted until the day the FGDs being held.

Initially, the researchers contacted health professionals, who then recommended suitable CHWs for participation in the study based on the inclusion criterion. Following the participants' consent, the researchers and participants agreed on a schedule for the online FGDs. None of the potential participants contacted declined to participate, and no participants dropped out.

The sample size was evaluated using the concepts of data saturation and information power. Data saturation was achieved when no new themes emerged during the FGDs, indicating that sufficient data had been collected to answer the research questions (Ministry of Health Republic of Indonesia, 2021). Additionally, the construct of information power suggests that a smaller sample can be justified when the research has a focused purpose, a specific and relevant sample, high-quality dialogue, and a clear analysis strategy (Malterud et al., 2021). In this study, saturation of codes was achieved during the fourth FGD of health professionals and CHWs. This could occur due to the focused objectives and the homogeneity of the participants' professional backgrounds, which contributed to a high level of information power. Therefore, the sample size was deemed adequate to ensure the depth and credibility of the findings.

Data Collection

The data collection was conducted in August-September 2023. The researchers extended invitations to all participants; however, coordinating simultaneous attendance proved challenging. Consequently, the meeting was conducted virtually using Zoom's video recording feature. The first author facilitated the FGDs with health professionals, whereas the last author facilitated the FGDs with CHWs. The researcher used an interview guide during the FGDs, which included the following questions: 1) How do CHWs measure children's weight and length/height? 2) What is the role of health professionals from public health centers in anthropometric measurements within a community setting? and 3) What challenges do anthropometric measurements face in community settings? Two FGDs in Bahasa Indonesia were conducted for health professionals and two for CHWs, each lasting 1.5 to 2 hours. During the FGDs, all participants were actively involved in the discussion, and most of the time, they complemented or strengthened each other's comments. Throughout the FGD sessions, the researchers took additional field notes to enhance the data.

Data Analysis

No qualitative research software was used for the analysis in this study. A thematic analysis using Braun and Clarke's six-phases of thematic analysis was conducted, which is suitable for qualitative descriptive research designs (Braun & Clarke, 2006). The analysis commenced with the creation of verbatim transcripts from the FGDs for familiarization with the data (Phase 1). The researchers reread the transcripts and reviewed the field notes to identify any additional information that needed to be annotated. The finalized transcripts from each FGD were then examined to identify meaningful discourse related to the research objectives. Coding from the FGDs of both health professionals and CHWs was developed by three researchers independently, and then they met to compare codes. There were 143 codes developed (Phase 2). In the meeting, the three researchers iteratively refined the coding that did not match among the researchers. Then, all coding was combined to form categories, sub-themes, and themes (Phase 3-5). At the end, the researchers produced the analysis report by reviewing the research objectives and literature (Phase 6). All data analysis phases were conducted in Bahasa Indonesia; only quotes used in the manuscript were translated to English.

Rigor

The rigor of a qualitative study enhances its credibility, confirmability, dependability, transferability, and reflectivity (Lincoln et al., 1985). The rigor of this study was ensured through prolonged engagement, which facilitated rich and thorough descriptions of the research process. Rich descriptions encompassed the data collection procedures and data analysis, detailing how themes and subthemes emerged from the transcripts. To minimize bias, three qualitative researchers participated in the data analysis, engaging in periodic discussions and reflections to enhance objectivity.

Member checking was employed to obtain confirmation from the participants regarding the subthemes and themes identified in the research. Most participants (15 out of 18 participants) responded positively, affirming that the subthemes and themes were appropriate and did not require revision. This process confirmed the alignment of the research results with the participants' perspectives.

Transferability was achieved by writing detailed research results validated in the previous stage, specifically addressing the variations in the participants' characteristics to ensure the applicability of the results to other contexts with a similar background. These variations included factors such as gender, age, and the role of the participants in conducting anthropometric measurements of young children (i.e., as CHWs performing the measurements or health professionals supervising the process).

To minimize potential bias, the FGD moderator wrote reflexivity notes during the discussion process and engaged in regular debriefing sessions with co-authors. The reflexivity process began with documenting notes during data collection. These notes served as a guide during coding and theme analysis, reflecting the meaning of the participants' statements. Additionally, the recorded FGD acted as a reference in developing research themes, helping to contextualize the discussions and the atmosphere at that time. The authors then applied bracketing during data analysis to avoid excessive identification with the participants' perspectives. The first author is an associate professor with a strong background in qualitative research methods, having completed her PhD dissertation project in this area. The second and last authors have conducted several qualitative research projects as principal investigators. The members of the research team were all female and had no prior relationship with the participants.

Ethical Considerations

This study was approved by the Ethics Committee of the Faculty of Nursing Universitas Indonesia (approval number: KET-200/UN2.F12.D1.2.1/PPM.00.02/2023, date of approval: 07 August 2023). The participants were provided with detailed information about the research, including the researchers' occupations, which were outlined in the informed consent form and briefly reiterated during the opening of the FGD session. Prior to the FGDs, the researcher gave a brief explanation of the study and asked the participants to confirm their willingness to participate, noting that the sessions would be recorded with their faces visible on the screen. All participant statements were used solely for research purposes. The participants' identities are kept confidential, and their data are not fully disclosed in the research publication. Access to all data is restricted to the researchers.

Results

Ten health professionals (one male and nine females) participated in the health professionals' FGDs. Among them, two were general practitioners, three were midwives, one was a nurse, three were dietitians, and one was a public health worker. Their ages ranged from 26 to 59 years, with varied educational backgrounds including diplomas, bachelor's, and master's degrees. In the CHWs' FGDs, eight CHWs (all female) participated, with ages ranging from 30 to 57 years. The participants had varying durations of experience in anthropometric measurement. Demographic data of the participants are presented in **Table 1**.

Table 1 Characteristics of the participants

Occupation	Age (years)	Education	Sex	Experiences doing anthropometric measurement
CHW	41	Bachelor's degree	Female	3 years
CHW	51	High School	Female	24 years
CHW	47	High School	Female	21 years
CHW	47	High School	Female	8 years
CHW	57	Vocational Education	Female	5 years
CHW	52	High School	Female	13 years
CHW	41	Vocational Education	Female	2 years
CHW	30	Vocational Education	Female	2 years
Midwife	59	Master's degree	Female	23 years
Nurse	26	Bachelor's degree	Female	8 years
General Practitioner	51	Master's degree	Female	20 years
Dietician	28	Bachelor's degree	Female	1 year
Midwife	25	Vocational Education	Female	5 years
Dietician	53	Vocational Education	Female	5 years
Dietician	39	Vocational Education	Female	1 year
Public Health Worker	45	Bachelor's degree	Female	13 years
General Practitioner	52	Master's degree	Male	10 years
Midwife	46	Vocational Education	Female	8 years

The results reveal challenges faced by the CHWs when measuring the children's weight and length/height. Health professionals concurred with the challenges raised by the CHWs. These challenges are categorized into four themes: 1) barriers to measurement accuracy, 2) varied skills in measurement, 3) mothers' behavior influenced by children's reactions, and 4) strategies for dealing with traumatized children. Themes and subthemes were derived from discussions among both health professionals and CHWs, except for one theme, which involved varied skills in measurement. The interactions among the themes are illustrated in **Figure 1**.

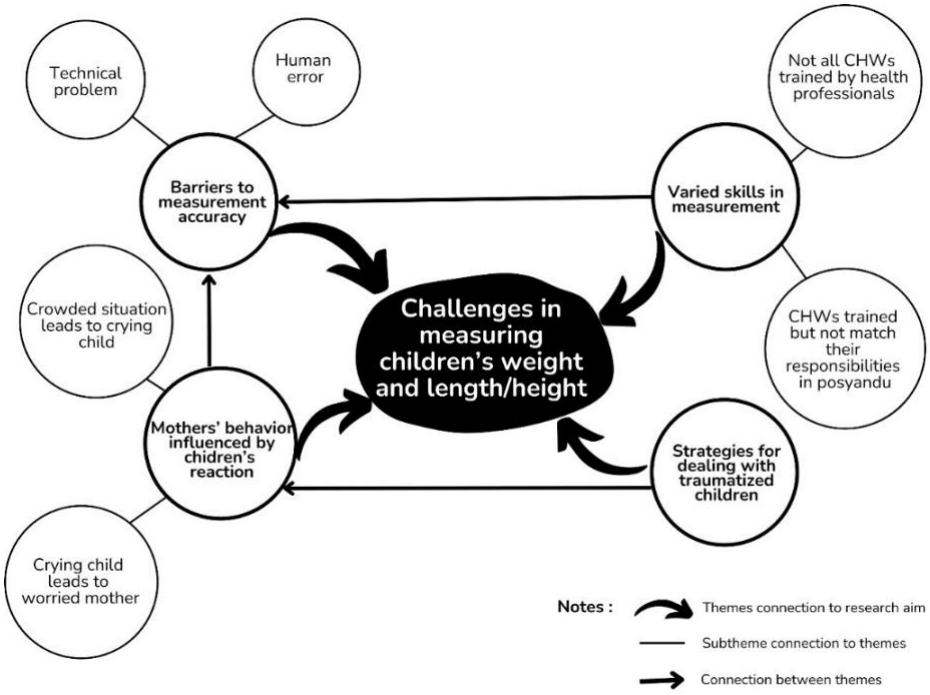

Figure 1 Interconnectedness of themes and subthemes

Theme 1: Barriers to measurement accuracy

In overseeing anthropometric data collection at the *Posyandu*, the CHWs observed issues with measurement accuracy. Potential contributing factors included skills in using digital scales, as well as improper calibration or installation of devices. Depleted power sources for the measurement tools also appeared to undermine reliability. These technical weaknesses and implementation inconsistencies likely led to erroneous readings.

FGD-3, CHW1: *The tool* [scales] *is digital, so when the child gets on* [the scales], *it seemed that* [the number] *changed* [easily] *like that. Then, there was an error, and it went back down to 0. Then, when the child gets on again, the number changes. For example, last month he was 10.1, then when he was weighed again, it was eight something.*

FGD-3, CHW3: *We had to wait for it to go down to 0 first, then there was an "R" error message. It was a new tool* [the scales] *that had been provided with batteries, but it turned out the batteries were dead, so the cadres had to wait to buy new batteries.*

The CHWs reported that the scale frequently displayed erratic and fluctuating readings each time a child was weighed. Technical issues with the scale were also noted, such as regularly resetting to zero and displaying error codes. Additionally, depleted batteries were identified as the root cause of the tool's unstable performance. Moreover, human error in reading the results might also have affected the measurement accuracy.

> FGD-1, HP6: *Some of them* [CHWs] *could not read* (the measurement result) *properly. When our eyes are not aligned with the line in the microtoise, for example, the eyes are higher, then the height can be shorter than it should be. When the eyes are lower, the height can be taller.*

> FGD-2, HP7: *What happens in my district is quite similar to what has been said by the midwife in District X. Some CHWs attended training. However, the problem is that the CHWs are old,* so *they could not see the lines clearly.*

Health professionals raised concerns regarding the CHWs' ability to accurately read measurement results, attributing this to their body position and decreased visual acuity. They noted that the age of the CHWs correlates with their visual capabilities.

Theme 2: Varied skills in measurement

Healthcare professionals and CHWs expressed concerns that, before measuring the children's weight and height/length, only some CHWs received training from health professionals at public health centers due to budget and time constraints. In these instances, participants reported that a multilevel training approach was adopted to address this issue. Initially, two or three CHWs attended training at public health centers, and these CHWs were responsible for training other CHWs in the surrounding area. The participants expressed concerns that the multilevel training might increase the risk of low fidelity due to the lack of standardized training for all CHWs, resulting in variability in skill levels in anthropometric measurements.

> FGD-2, HP3: *For 0–2-year-old children, difficulty arises when measuring sleeping children. Sometimes it is difficult when the child cries. Thus,* [the CHWs] *had three people holding the child to straighten their legs. If not monitored, the result becomes incorrect. When I validate* it [the result of the measurement]*, I keep asking how the results differ.*

The Health Professional described her experience measuring a child's length after the CHWs had measured the same child. She questioned why the results were different. Her experience highlighted the challenges of measuring children's length or height when they cry. Other health professionals suggested that training can help maintain the CHWs' skills and ensure accurate measurements.

> FGD-1, HP6: *Some are already very skilled at measuring, such as how to hold the child's knees, straighten the child's body, and so on, but this varies. Perhaps, they should always be monitored or attend training. When a different person performs the measurement, the result might also be different.*

> FGD-2, HP8: *Generally, as mentioned by the nurse earlier, when we conduct a training, the leader of each Posyandu will decide who will attend the training. Sometimes, the one who comes does not match her responsibilities in the Posyandu. For example, the training is about measuring weight, but the CHW who come is the one responsible for documentation. However, at the end of the year, we always conduct an evaluation with all CHWs to identify problems and to ensure they have a similar understanding about everything.*

From this statement, the Health Professional noted that the training provided for the CHWs did not meet its objectives, as the attendees were not appropriately matched to their roles. As a result, the information given during the training could not be sustained. The varying skills in measuring children's length and height may contribute to the stunting rates in certain districts.

Theme 3: Mothers' behavior influenced by children's reaction

CHWs in each *Posyandu* carry out anthropometric measurements for 70–300 children under 5 years of age, depending on the *Posyandu* area, within a 2-h window from 9 to 11 a.m. The *Posyandu* conducts monthly anthropometric measurements in specific public places, such as a mosque courtyard, a small building used for community events, or a room belonging to the district government. Due to the limited time (only 2 hours) when the children gather, the area can become crowded. Sometimes, when one child starts to cry because they do not want to be measured by the CHWs, it triggers another child to cry as well. When this happens, mothers may rush the CHWs to hasten the measurements so they can take their children home.

> FGD-1, HP7: *Yes, the place was crowded and unconducive. This situation stimulated the children to cry. Sometimes I observed the influence of parents who felt that their child would cry, and this feeling influenced the child as well. The child then cried. Well, because the child was already crying, the parents said, "No need to do it"* [measure the weight and height]*, because they could not bear seeing their child* [crying]*. Finally, these measurements were not optimal.*

The Health Professional described the chaotic environment during the anthropometric measurements, highlighting the cause-and-effect relationships among the crowded situation, crying children, and worried mothers, which can lead to inaccurate results. Another health professional and CHW provided further insights on the emotional connection between mothers and their children.

> FGD-2, HP6: *It was indeed a chaotic situation, the child is crying, the mother becomes worried, and doesn't allow their child to be weighed.*

> FGD-3, CHW4: *Well, sometimes there is because the child is already crying, the parents are already struggling, many are like that; they don't have the heart to see their children, so we just measure as much as we can.*

The crowded environment can create insecurity for the children, who do not understand what is happening, leading to feelings of anxiety. This uncertainty can cause inconvenience to mothers and prompt CHWs to hasten the measurement process, ultimately resulting in flawed measurements.

Theme 4: Strategies for dealing with traumatized children

In crowded situations, CHWs may need to force a child to stay still to measure their weight and height/length. This practice can lead to a traumatic experience for the child, which may be evident when they return to the *Posyandu* a month later. The

child might visibly fear being measured by CHWs. Consequently, the CHW faces the challenge of managing a traumatized child appropriately. Some may soften their voices, although this can be difficult in crowded environments, while others might offer toys or food to comfort the child.

> FGD-3, CHW2: *An interesting tool* [for measuring height and weight] *may be helpful. It seems that children have been traumatized. By looking at the scales and measurements, they have been traumatized. Therefore, it is usually a place that has sounds and music, with many toys,* and *with colorful measuring instruments that may help*.

> FGD-3, CHW1: *The children were afraid to step on the scales. Some children did not want to be measured because they were already worried. We persuaded them until they were brave enough, and sometimes we persuaded them with their favorite food*.

Both CHWs noted that the children who visited the *Posyandu* were traumatized by the measurement procedure, primarily by simply looking at the scales used by the examiners. The CHWs employed several strategies to approach the children, such as playing music or offering toys and food. However, these strategies were not always effective. The comments from both CHWs emphasized their awareness that the measurement process caused trauma for the children, and they felt compelled to find ways to support them.

Discussion

Our qualitative study enhances the understanding of the perspectives of health professionals and CHWs regarding anthropometric measurements. We identified key factors influencing measurements at the *Posyandu* for monitoring child health status. Our analysis revealed four themes that reflect the views of health professionals and CHWs: barriers to measurement accuracy, varied skills in measurement, mothers' behavior influenced by children's reactions, and strategies for dealing with traumatized children.

Our findings highlighted how inaccuracies in anthropometric tools can negatively impact the monitoring of children's measurements. In Indonesia, anthropometric assessments commonly rely on manual methods using scales, tapes, and height boards. This time-consuming approach decreases efficiency and yields unreliable results (Gupta et al., 2020). Imprecise readings can misrepresent nutritional status, undermining efforts to detect stunting or malnutrition. Contributing to these inaccuracies are the lack of standardization between equipment types and conditions, along with improper calibration, which can lead to unstable readings. Additionally, digital scales require power, limiting their use in areas without electricity, particularly in rural regions (Namene et al., 2024). Reliable data and planning necessitate standardized, regularly calibrated equipment and competent user training. Therefore, there is a recognized need to develop and validate technologies that are accessible, accurate, capable of producing consistent outcomes upon repetition, and inexpensive. Such tools must be able to automatically determine children's anthropometric measurements.

In our study, health professionals reported that the measurement skills of CHWs varied. This finding is consistent with a survey conducted in a district in West Java province, which indicated that CHWs' skills were inadequate prior to training (Sunjaya et al., 2021). In Indonesia, CHWs routinely take monthly anthropometric measurements of children under five years of age to monitor nutritional status (Nur et al., 2025). However, previous studies have indicated that some CHWs still exhibit inadequate skills in performing these measurements (Fitriani & Purwaningtyas, 2020; Novianti et al., 2021). Currently, various training initiatives are implemented to minimize measurement errors due to differences in personnel competence. Training programs comprising two sessions, comprehensive theoretical instruction through interactive lectures, and supervised practical exercises appear to be effective in enhancing CHWs' skills (Rahmadi et al., 2023). The designed training should consider several important topics, including child growth monitoring with subtopics such as methods for age determination and plotting data onto growth charts; practical procedures and techniques for accurate and precise anthropometric measurements in children (Suyatno et al., 2024). By delivering comprehensive material combined with hands-on practice, it is expected that CHWs will master both effective measurement procedures, thereby significantly improving the quality of services at the *Posyandu*.

Unlike developed countries, height and length measuring instruments have remained mostly unchanged for centuries, especially in low- and middle-income countries like Indonesia (UNICEF, 2023). While digital height and length measurement devices are widely utilized in the United States and other wealthy countries (Soller et al., 2023), there is a lack of equally advanced, portable, and field-adapted tools for population-level surveys in lower-income settings. For example, Neale et al. (2021) reviewed several portable anthropometric instruments based on laser and photographic technologies that might be appropriate for survey deployment. Consequently, it is crucial to advance the development of anthropometric measurement tools incorporating laser or photographic technologies within Indonesia.

Our study also indicated that a mother's attitude toward measurement can pose a challenge for both health professionals and CHWs. In the study we conducted, it was identified that the crowded conditions at the *Posyandu* constituted a principal factor contributing to the discomfort experienced by mothers during their visits. The locations of *Posyandu* vary widely, encompassing venues such as volunteers' verandas, prayer rooms, village halls, and multipurpose community centers, with spatial dimensions ranging from small to expansive (Hasanbasri et al., 2024). Typically, mothers tend to arrive concurrently with their children, which significantly increases the likelihood of congestion at individual service points, especially during critical activities such as weight and height measurements. Moreover, spatial limitations further constrain the operational efficiency of the five fundamental service stations: registration, anthropometric measurements, child health monitoring record documentation, healthcare provision, and health education sessions. Such spatial constraints result in service bottlenecks that potentially impede the smooth delivery of care. Consequently, the proactive engagement of policymakers and community leaders is imperative to ensure the provision of proper building for *Posyandu* facilities that can comfortably accommodate the volume of mothers and toddlers from the

catchment area. This strategic provision is essential to mitigate overcrowding and enhance user comfort. Additionally, the provision of adequate waiting seating is strongly advisable to prevent the congregation of queues at a single service point, thereby facilitating a more organized and pleasant service environment.

In efforts to enhance the quality of services at *Posyandu*, the effectiveness of communication by CHWs alongside health service delivery plays a crucial role. The knowledge and skills in effective communication possessed by CHWs constitute a key determinant in providing services for all parties related to CHWs' responsibilities that may contribute to increased satisfaction among mothers when they bring their children to the *Posyandu* (LeBan et al., 2021). Furthermore, within the context of community-based anthropometric measurements, experiences from South Africa demonstrate highly encouraging outcomes. Caregivers reported satisfaction and a sense of empowerment after gaining a deeper understanding of the appropriate communication skills and strategies employed during the anthropometric measurement process in children (Nur et al., 2025). By conducting two sessions focused on effective communication skills through the delivery of instructional materials and role-playing exercises, both verbal and non-verbal communication abilities of the CHWs can be significantly enhanced (Maryam, 2023).

Consistent with prior research, our findings indicate that some community nurses and CHWs struggle to adapt to the use of length measurements due to various factors, such as the child's discomfort and the mother's sensitivity to the child (Laar et al., 2018). Children often experience psychological trauma when they lack control over their environment, leading to feelings of worry, hostility, and anger (Hockenberry et al., 2022). Healthcare practitioners can play a crucial role in minimizing healthcare-induced trauma by designing simpler measurement methods.

One limitation of this study was that neither the researcher nor the note-taker could directly observe participants' gestures, except for those visible via video, as the FGDs were conducted online via Zoom. Nevertheless, this virtual format facilitated the inclusion of a larger and more diverse participant pool. Moreover, the participants' varied backgrounds potentially enriched the study's findings by providing multifaceted perspectives.

Implications for Nursing Practice

To enhance *Posyandu* services effectively, it is essential to implement regular calibration and maintenance schedules for all measurement equipment, alongside securing validated and affordable technologies that guarantee accuracy and reproducibility. Strengthening training programs by integrating comprehensive theoretical and practical sessions will equip CHWs with the necessary skills, supported by periodic refreshers to maintain their proficiency and update them on advancements.

Facility improvements are equally critical; *Posyandu* centers should be designed or renovated to ensure sufficient space for activities, with comfortable seating arrangements to minimize waiting congestion and enhance the client experience. Enhancing CHWs' communication skills through focused workshops that utilize role-playing and instructional materials will foster empathetic and clear interactions, building greater trust and adherence among caregivers.

Conclusion

Practical challenges in routine anthropometric measurements of children involve examiners, children, mothers, the environment, and the measurement process itself. Accurate measurements and varied skills in measurement provide precise data on children's nutritional status, which is crucial for understanding issues such as the prevalence of stunting in Indonesia. Providing calibrated and affordable technologies and simplifying anthropometric measurement procedures to be child-friendly and minimally distressing, with proper CHW training on these methods, will reduce trauma, increase cooperation, and improve data accuracy. Collectively, these measures will optimize *Posyandu* services, improve maternal and child health outcomes, and strengthen community engagement and trust.

Declaration of Conflicting Interest

The authors declare no conflicts of interest. The funders had no role in the design of the study; in the collection, analysis, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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Authors' Contributions

Conceptualization, D.W. and A.A.; methodology, D.W. and M.H.H.; validation, M.H.H. and R.A.; formal analysis, D.W. and A.A.; investigation, R.A., A.A.S., L.F.A., and A.M.A.; data curation, R.A., A.A.S., and L.F.A.; writing—original draft preparation, D.W., A.A., and M.H.H.; writing—review and editing, D.W.; visualization, A.A. and A.M.A.; supervision, D.W.; project administration, A.M.A.; funding acquisition, D.W. All authors have read and agreed to the published version of the manuscript.

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Data Availability

All data presented herein are available for certain requests to the corresponding author.

Declaration of Use of AI in Scientific Writing

Nothing to declare.

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