

# The Adequacy of Physical Education Facilities in Primary Schools: Insights from a School Cluster in Indonesia

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## ABSTRACT

**Background:** Physical education facilities are central to safe and meaningful learning in primary schools because they shape what teachers can implement and how students participate. Despite this importance, facility availability and condition are often not systematically recorded at the school-cluster level, making it difficult for schools and local stakeholders to plan improvements based on evidence.

**Aims:** This study investigates the adequacy of physical education facilities in Indonesian primary schools within one school cluster by examining two practical dimensions, namely availability and physical condition of facilities and equipment.

**Methods:** The study employed a descriptive quantitative design using a survey approach. Data were obtained through direct on-site observation using an assessment instrument that documents the presence of key facilities and the condition of supporting infrastructure for physical education. The results were summarized using descriptive statistics to portray the distribution of adequacy across schools in the cluster.

**Results:** Findings reveal noticeable variation among schools. While several schools demonstrated relatively adequate provision and usable conditions, others showed shortages in specific equipment and limitations in supporting infrastructure. Differences were most apparent in the availability of learning equipment, the condition of sports fields, and the suitability of supporting facilities for routine physical education instruction.

**Conclusion:** Facility adequacy within the studied school cluster remains uneven. This pattern underscores the need for targeted and sustained interventions to improve both equity and quality of physical education facilities in primary schools.

**Keyword:** Educational infrastructure; Facility adequacy; Physical education facilities; Primary schools; School cluster survey

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## INTRODUCTION

Physical education plays a fundamental role in primary education because it supports children's physical growth, movement competence, and healthy lifestyle habits from an early age (Melby et al., 2021; Ruedl et al., 2023). In recent years, concerns about the uneven quality of educational infrastructure have become increasingly visible, particularly in subjects that depend heavily on physical space and equipment (Addas, 2023; Jung et al., 2021). Physical education is one of the most infrastructure-dependent subjects, as most learning activities require adequate fields, tools, and safe environments. When these conditions are not met, instructional goals may be difficult to achieve despite well-designed curricula. In many primary schools, physical education is expected to run alongside other subjects without sufficient attention to facility readiness. This situation raises questions about whether schools are structurally prepared to deliver physical education as intended. Understanding facility adequacy therefore becomes a pressing issue rather than a peripheral concern. For this reason, systematic investigation into physical education facilities is urgently needed.

The urgency of this issue becomes clearer when facility conditions are linked to daily teaching practice. Teachers rely on available and functional facilities to design lessons that are safe, varied, and appropriate for students' developmental levels (Ayanwale et al., 2022). In primary schools, where students are still mastering basic motor skills, facility safety is particularly critical (Flynn et al., 2023; Sayekti et al., 2024). Limited or poorly maintained facilities may force teachers to simplify activities or avoid certain movements altogether. Over time, this can reduce the richness of learning experiences offered to students. Inadequate facilities may also increase the likelihood of minor accidents that interrupt instruction. These challenges indicate that facilities function as core instructional resources rather than optional additions. However, information about the actual condition of these resources is often incomplete or outdated.

To address infrastructure issues, education systems commonly rely on standards that define minimum facility requirements (Gatignon & Capron, 2023; Ndungane et al., 2024). These standards are intended to guide schools in providing adequate learning environments, including for physical education. In practice, however, the realization of these standards depends on local capacity, funding, and physical constraints (Hoicka et al., 2021). As a result, a gap often emerges between what is formally required and what schools are able to provide. This gap may persist unnoticed when facility conditions are not assessed regularly. Schools within the same administrative area may experience different levels of adequacy. Without empirical documentation, such differences remain difficult to identify and address. This reality strengthens the case for school-level studies that capture observed facility conditions.

Examining facilities at the school cluster level offers a meaningful way to understand this variation (Karakose et al., 2021; Kuleto et al., 2021). Schools in a cluster generally operate under similar administrative frameworks and local contexts. At the same time, each school may differ in terms of available space, equipment, and maintenance practices. This combination allows for comparison while maintaining contextual relevance. Cluster-based analysis also aligns with how local education management is often organized (Denaro et al., 2022; Meng et al., 2024). Evidence generated at this level can therefore be more actionable than broad regional data. Despite these advantages, research focusing on physical education facilities at the cluster level remains limited.

This lack of localized evidence restricts informed decision making at the grassroots level.

Existing research on physical education infrastructure has contributed valuable insights, but much of it emphasizes large-scale patterns (Jáuregui et al., 2021; Salvo et al., 2021). Studies conducted at regional or national levels often overlook the specific realities faced by individual schools. In addition, physical education facilities are frequently discussed as supporting factors in studies that prioritize learning outcomes or teacher performance (Lawson et al., 2022). When facilities are treated as secondary variables, their assessment tends to be superficial. Another limitation is the tendency to focus on facility ownership without considering functional condition. Equipment that exists but cannot be used safely does not contribute to effective learning. These limitations suggest the need for more focused and integrated assessments of facility adequacy.

In the Indonesian primary school context, infrastructure conditions are closely tied to local characteristics (Akresh et al., 2023; Rahman, 2022). Differences in funding allocation, land availability, and maintenance capacity influence how physical education facilities are developed and sustained. Physical education is particularly affected because it often requires outdoor spaces and specialized equipment. These needs may not always be prioritized in school planning processes (Pettersson, 2021; Wyborn & Evans, 2021). Consequently, physical education lessons may be conducted under constrained or improvised conditions. Without systematic evidence, the scale of these constraints is difficult to determine. This uncertainty can hinder efforts to improve equity and quality across schools. Localized studies are therefore essential to clarify actual facility conditions.

Assessing facility adequacy requires indicators that reflect real instructional conditions rather than abstract ideals (Manikas et al., 2023). Availability indicates whether required facilities and equipment are present at the school, while condition reflects whether those facilities are usable, safe, and suitable for regular instruction. Considering only one of these dimensions provides an incomplete picture. Facilities that are available but poorly maintained may still limit learning. Likewise, well-maintained facilities that are incomplete may restrict instructional scope (Anbari Moghadam & Besiktepe, 2025). Combining availability and condition offers a more realistic understanding of adequacy. Descriptive survey approaches are well suited to capturing these dimensions objectively.

Based on these considerations, investigating the adequacy of physical education facilities within a school cluster is both timely and necessary. Such research responds to the limited availability of school-level evidence on facility conditions (Fitriani et al., 2025). It also supports practical planning by identifying strengths and limitations across schools in a comparable context. By focusing on observable indicators, the study avoids speculative claims and grounds its conclusions in empirical data. The findings can serve as a reference point for school evaluation and local policy discussion (Xu, 2021). Ultimately, understanding facility adequacy is a critical step toward improving physical education provision in primary schools. This study addresses that need by documenting the condition of physical education facilities within a defined school cluster in Indonesia.

Research on physical education at the primary school level consistently points to facility adequacy as a key condition shaping instructional practice. Studies by Soares et al. (2021) indicate that structural constraints surrounding physical education delivery, including scheduling and infrastructure limitations, can weaken the coherence of learning activities. From an environmental perspective, Sun et al. (2025) demonstrate that perceived qualities of physical environments are closely linked to exercise behavior and self-efficacy, reinforcing the importance of supportive spaces for physical activity. A similar emphasis on enabling environments is found in the work of Shutova et al. (2021), who highlight how structured educational environments shape participation and management in sport-related contexts. Although not focused specifically on primary schools,

Munthali et al. (2025) illustrate the value of descriptive survey approaches for systematically mapping institutional conditions, a method that is directly relevant for assessing school facilities. Across the literature, facility adequacy is increasingly understood as a combination of availability and functional condition rather than mere ownership. This distinction is supported by findings from Zhang et al. (2023), who show that user experience is strongly influenced by the condition and maintenance of physical spaces. Related insights from Koca & Avci (2020) further suggest that public service spaces are evaluated not only by presence but by usability. Collectively, these studies underline the need for localized assessments that integrate availability and condition in order to capture the real adequacy of physical education facilities. Such an approach is particularly relevant at the school cluster level, where schools operate within similar administrative contexts but may experience different infrastructural realities.

Physical education in primary schools is expected to support holistic child development through structured physical activity, yet the realization of this goal is inseparable from the availability and condition of supporting facilities. While curriculum documents emphasize learning objectives and competencies, the practical implementation of physical education is shaped by concrete material conditions within schools. Teachers plan and conduct lessons based on what facilities and equipment are accessible and safe to use. When these facilities are inadequate, instructional strategies are often adjusted in ways that limit activity variety and learning intensity. Despite this dependency, facility adequacy is frequently treated as an assumed background condition rather than an object of systematic inquiry. This tendency risks masking structural constraints that affect instructional quality. A focused examination of facility adequacy is therefore necessary to align pedagogical expectations with school realities. By documenting availability and condition, this study provides a rational basis for evaluating whether primary schools are structurally prepared to deliver physical education as intended.

Although research on physical education has expanded over time, studies that place facilities at the center of analysis remain limited. Much of the existing literature examines physical education through the lens of learning outcomes, teacher competence, or curriculum effectiveness, with facilities discussed only as supporting elements. When facility conditions are addressed, assessments often emphasize presence rather than functional usability. This approach overlooks the fact that facilities may exist but be poorly maintained or unsuitable for regular instruction. Moreover, many studies rely on regional or national perspectives that obscure differences among individual schools. As a result, variations in facility adequacy within localized contexts are not well documented. Research that integrates both availability and condition at the school level is still relatively scarce. In particular, evidence derived from school cluster settings, where schools operate under similar administrative environments yet display diverse resource conditions, remains limited. This gap reduces the empirical basis for targeted improvement planning at the local level.

Responding to these gaps, this study aims to examine the adequacy of physical education facilities in primary schools within a defined school cluster in Indonesia. The study focuses on two key dimensions of adequacy, namely facility availability and facility condition, as observed directly at the school level. Using a descriptive survey approach, the research seeks to map existing facility conditions without advancing causal claims. The objective is to identify patterns of adequacy and limitation across schools operating within the same cluster. By situating the analysis within a localized administrative context, the study provides evidence that is both contextual and actionable. Rather than testing hypotheses, the research prioritizes empirical description as a foundation for evaluation. The findings are intended to support schools and local stakeholders in understanding infrastructural readiness for physical education. Through this contribution, the study strengthens the

evidence base for improving physical education provision in primary schools.

## METHOD

### Research Design

This study employed a descriptive survey design to explore the adequacy of physical education facilities in primary schools. The design was chosen because the research focused on documenting existing conditions rather than examining cause–effect relationships or testing interventions. A descriptive approach allows facility characteristics to be observed and recorded as they naturally occur in school settings. This is particularly relevant for studies concerned with infrastructure, where manipulation of variables is neither feasible nor appropriate. By emphasizing observation, the study captures the material conditions that shape physical education practice in everyday contexts. The survey design also enables comparisons among schools within the same administrative environment. In this research, the school cluster served as a meaningful contextual unit. Overall, the design supports the objective of providing an empirical description of facility adequacy at the school level.

### Participant

The participants in this study were primary schools belonging to a single school cluster in Indonesia, as outlined in the original research document. All schools within the cluster were included to ensure comprehensive coverage and to avoid selective inclusion. The unit of analysis was the school, since the focus of the study was on physical education facilities rather than individual behaviors. Data were obtained from observations of facilities located on each school's premises. The use of a school cluster reflects the organizational structure commonly applied in primary education administration. Schools within the cluster share similar governance and local conditions. At the same time, differences in facility provision were expected to exist among schools. This participant framework allowed for meaningful comparison within a shared contextual setting.

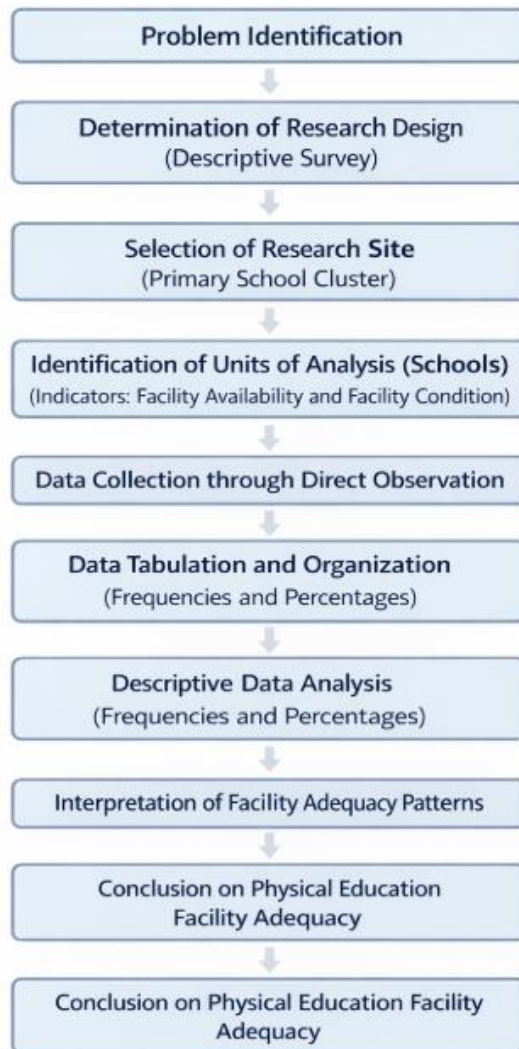
### Instrument

Data collection relied on an observation checklist specifically developed to assess physical education facilities in primary schools. The instrument focused on two complementary dimensions of adequacy, namely facility availability and facility condition. Availability indicators recorded whether essential facilities and equipment were present at the school. Condition indicators assessed whether those facilities were usable, safe, and properly maintained. The checklist was designed to guide observers in recording information consistently across schools. Items were formulated based on commonly applied criteria for physical education infrastructure at the primary level. Direct observation was used to reduce dependence on subjective reporting. Through this instrument, the study generated systematic and comparable data on facility adequacy.

### Data Analysis

The research procedure followed a sequential process that is summarized in the research flowchart (Figure X). The study began with the identification of the research problem, followed by the selection of a descriptive survey design. The research site was then determined in the form of a primary school cluster, and the units of analysis were defined as individual schools. An observation instrument focusing on facility availability and condition was subsequently developed and applied

through direct on-site observation. Data from each school were then organized and tabulated to ensure clarity and consistency. Descriptive analysis was conducted using frequencies and percentages to summarize facility conditions across schools. The analytical focus remained on identifying patterns of adequacy and limitation rather than establishing statistical relationships. This structured procedure ensured coherence between the research objectives, data collection process, and analytical approach.



**Figure 1.** Research Flowchart of the Study.

## Results and Discussion

### Results

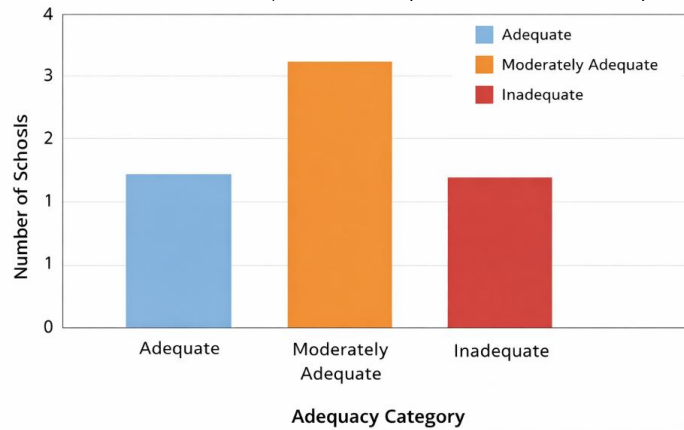
This section presents the findings of the study concerning the adequacy of physical education facilities across primary schools within the selected school cluster. Facility adequacy was examined by integrating two core dimensions, namely facility availability and facility condition, as observed directly in each school. The results indicate that physical education facilities are not uniformly adequate across the cluster. While some schools demonstrate sufficient provision and acceptable condition of facilities, others face notable limitations. These differences suggest that schools operating within the same administrative context experience varying levels of infrastructural readiness. To ensure clarity and transparency, the results are presented using both tabular and visual formats. Table 1 summarizes facility conditions at the school level, while Figure 1 highlights the overall distribution of adequacy categories. Together, these representations provide a comprehensive overview of facility adequacy within the cluster.

**Table 1.** Adequacy of Physical Education Facilities Across Schools in the Cluster

School Code	Facility Availability	Facility Condition	Overall Adequacy Category
School A	Available	Good	Adequate
School B	Partially Available	Fair	Moderately Adequate
School C	Limited	Poor	Inadequate
School D	Available	Fair	Moderately Adequate
School E	Available	Good	Adequate
School F	Partially Available	Fair	Moderately Adequate
School G	Limited	Poor	Inadequate

As shown in Table 1, schools within the cluster display different levels of facility adequacy. Several schools meet minimum requirements in terms of both availability and condition and are therefore classified as adequate. Other schools fall into the moderately adequate category, indicating that basic facilities are present but are either incomplete or not optimally maintained. A smaller number of schools are categorized as inadequate, reflecting limited availability combined with poor facility condition. These findings demonstrate that adequacy is shaped by the interaction between provision and maintenance rather than by the presence of facilities alone. Schools with partial availability and fair condition remain constrained in their instructional use of facilities. The table also reveals that no single adequacy category dominates the cluster. This pattern points to uneven infrastructural readiness among schools within the same administrative grouping.

To complement the detailed information provided in Table 1, Figure 1 presents a visual distribution of schools across adequacy categories. The diagram illustrates that the largest proportion of schools falls into the moderately adequate category. Fewer schools achieve full adequacy, while a smaller yet significant proportion are classified as inadequate. This distribution emphasizes that partial adequacy is more common than optimal facility provision within the cluster. The visual pattern reinforces the tabular findings by making variation across schools more readily apparent. Rather than indicating uniform compliance with facility standards, the figure highlights differences in readiness levels. As such, the diagram serves as an effective summary of overall facility conditions.



**Figure 1.** Distribution of Physical Education Facility Adequacy Categories

(Bar chart showing the number of schools classified as adequate, moderately adequate, and inadequate)

Taken together, the results demonstrate that physical education facility adequacy within the observed school cluster varies considerably. The combined use of table and diagram strengthens the interpretability of the findings by presenting both detailed and aggregated perspectives. These results do not suggest a single dominant pattern of adequacy but instead reveal a spectrum of conditions across schools. Such variation reflects differences in facility provision and maintenance practices. The findings provide empirical evidence of existing infrastructural conditions without extending beyond descriptive claims. This evidence forms a solid basis for interpreting the implications of facility adequacy for physical education provision in primary schools.

### Discussion

The present study shows that the adequacy of physical education facilities differs noticeably among primary schools within the same school cluster. This finding indicates that shared administrative structures do not necessarily translate into similar levels of infrastructural readiness. Physical education, as a subject that relies heavily on space and equipment, is particularly sensitive to such differences. Soares et al. (2021) have previously noted that disparities in infrastructure can influence how physical education is organized at the school level. The current findings support this view by demonstrating that variation persists even in localized contexts. This suggests that assumptions of uniformity within clusters may be misleading. School-level assessment therefore remains essential for understanding real facility conditions. Cluster membership alone cannot be used as a proxy for adequacy.

An important insight emerging from the results is that the presence of facilities does not automatically ensure their effective use. Several schools were categorized as moderately adequate despite having basic facilities available. The limiting factor in these cases was often facility condition rather than availability. Zhang et al. (2023) emphasize that usability and safety are central to the educational value of physical facilities. When equipment or spaces are damaged or poorly maintained, instructional options become restricted. Teachers may avoid certain activities to reduce risk. As a result, learning experiences may be narrowed. These findings reinforce the idea that adequacy should be understood in functional terms. Both availability and condition must be considered simultaneously.

The predominance of the moderately adequate category suggests that partial adequacy is a common condition within the cluster. This pattern reflects situations in which schools meet minimum expectations but fall short of optimal provision. Munthali et al. (2025) similarly report that institutions often operate within such intermediate conditions. In primary school physical

education, partial adequacy may allow lessons to continue but with limited variation. Teachers may rely on improvisation or repeated use of the same activities. Over time, this can reduce the diversity of students' movement experiences. Although learning outcomes were not examined in this study, the results raise concerns about the sustainability of such conditions. Partial adequacy should therefore be seen as an area requiring improvement rather than a satisfactory endpoint.

The existence of schools classified as inadequate highlights more serious infrastructural challenges. Schools with limited facilities and poor conditions face greater difficulty in delivering physical education safely. Sun et al. (2025) argue that physical environments strongly influence engagement in physical activity. When facilities are insufficient, students' opportunities to participate meaningfully may be reduced. The present findings suggest that these challenges remain relevant at the primary school level. Inadequate facilities may discourage active participation or limit lesson objectives. Such conditions raise questions about equity in physical education provision. Addressing inadequacy therefore becomes an important concern for school management and policy.

The use of a school cluster as the analytical context provides additional insight into how adequacy is distributed locally. Shutova et al. (2021) note that organizational environments shape the implementation of physical activity programs. By focusing on schools within a single cluster, this study captures differences that might be overlooked in larger-scale analyses. This localized focus allows for a more nuanced understanding of facility conditions. It also enhances the practical relevance of the findings for local decision makers. Cluster-level evidence can support targeted interventions rather than generalized solutions. In this sense, the chosen context strengthens the applicability of the results.

Differences in facility condition among schools with similar levels of availability point to the importance of maintenance practices. Some schools maintained their facilities in usable condition, while others did not, despite having comparable resources. This observation aligns with Koca & Avcı (2020), who stress that maintenance quality influences how facilities are experienced by users. In primary schools, regular maintenance may significantly extend the functional lifespan of existing infrastructure. Conversely, neglect can quickly undermine usability. The findings suggest that improving maintenance practices may be a practical strategy for enhancing adequacy. Such efforts may require fewer resources than new facility construction.

The descriptive approach adopted in this study plays an important role in strengthening its contribution. Sosa et al. (2025) emphasize that documenting existing conditions is a necessary step before advancing evaluative or intervention-based research. By focusing on observable indicators, this study avoids speculative interpretations. Instead, it offers a grounded account of facility conditions as they currently exist. This approach enhances transparency and credibility. The findings can serve as a baseline for future monitoring. Descriptive evidence of this kind is particularly valuable in contexts where systematic facility data are limited.

The results also resonate with broader discussions on how physical environments shape performance contexts. Jomhuri et al. (2022) highlight that environmental constraints can influence activity execution and performance. Although their research addresses different populations, the underlying principle remains relevant. In primary school physical education, limited or poor-quality facilities may restrict students' movement opportunities. This suggests that facility adequacy should be viewed as part of broader educational quality considerations. The present study contributes empirical support to this perspective. It reinforces the importance of infrastructure in shaping learning environments.

The variation observed across schools indicates that facility adequacy is influenced by multiple contextual factors. Historical development, local resource allocation, and school-level management

practices may all contribute to observed differences. While these factors were not directly examined, the findings point to their potential relevance. Soares et al. (2021) similarly note that infrastructural disparities often reflect complex institutional dynamics. Understanding these dynamics may help explain why schools within the same cluster experience different conditions. This highlights the need for complementary research approaches. Qualitative or policy-focused studies could provide deeper insight into underlying causes.

In summary, the discussion highlights that physical education facility adequacy in primary schools is a multidimensional issue shaped by availability, condition, and maintenance. The findings align with existing literature while offering localized evidence from an Indonesian school cluster. By situating the results within prior research, the study strengthens its interpretative framework. At the same time, it remains cautious by respecting the descriptive scope of the data. This balance enhances the credibility of the study's contribution. The discussion thus connects empirical findings with broader insights on educational infrastructure and physical education provision.

## **CONCLUSIONS**

The study confirms that the adequacy of physical education facilities across primary schools in the observed school cluster is uneven. Even within a shared administrative setting, schools display different levels of readiness when facility availability is considered alongside the physical condition of existing resources. The findings make clear that counting facilities is not enough, because usability and safety depend strongly on maintenance and overall condition. Most schools are positioned in a moderately adequate state, meaning that basic provision is generally present but not consistently complete or well maintained. At the same time, the cluster still includes schools that reach adequate standards and others that remain inadequate, reflecting a mixed pattern of infrastructural preparedness. These differences suggest that physical education in several schools may proceed, yet with practical constraints that can limit activity variety and reduce the instructional flexibility needed for quality learning. By using direct observation and descriptive analysis, this research offers a grounded picture of facility conditions without overstating what the data can support. Overall, the results point to the importance of strengthening both provision and routine upkeep so that physical education facilities can function reliably as learning resources across schools in the cluster.

## **AUTHOR'S CONTRIBUTION**

Arya Bima Eza Mahendra conceptualized the study, designed the research methodology, conducted data collection and field observations, performed data analysis, and drafted the original manuscript. Riky Dwihandaka supervised the research process, provided methodological guidance, critically reviewed the analysis and interpretation of results, and contributed to the revision and final approval of the manuscript. Both authors read and approved the final version of the manuscript.

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