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A Comparative Study of Early Childhood Teachers' Readiness to Implement Inclusive Education in Urban and Rural Indonesia

Aufa Wulandari[1], Riana Mashar[1,*], Dewi Eko Wati[1], Iyan Sofyan[1], Nordin Bin Mamat[2], & Maria Meredith[3]

[1]Department of Early Childhood Teacher Education, Universitas Ahmad Dahlan, Indonesia
[2]Centre of Pedagogical Research and Innovation, UPSI, Malaysia
[3]School of Education, Health and Science, University of Gloucestershire, United Kingdom

*Corresponding email: riana.mashar@pgpaud.uad.ac.id

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Abstract: Geographical differences between urban and rural areas are often assumed to influence teachers' readiness to implement inclusive education for young children. Inclusive education requires teachers to be prepared in terms of knowledge, skills, and attitudes to accommodate the diversity of children's learning needs. This study aims to analyze and compare the readiness levels of early childhood education (PAUD) teachers to implement inclusive education in these two contexts. The study employs a comparative descriptive design with the population comprising all PAUD teachers in Indonesia. The sample comprised 200 respondents, including 66 teachers from urban areas and 134 from rural areas. Data were collected using a structured questionnaire that measured three dimensions of readiness, with a reliability coefficient of 0.968, indicating very high internal consistency. Data analysis was conducted using the Mann–Whitney U test to identify differences between groups. As an additional analysis, ANCOVA was performed to examine the effect of age on teacher readiness, and a Chi-square test was conducted to examine the relationship between inclusive education training experience and teachers' readiness category. These findings suggest that geographic location does not significantly influence the level of readiness of early childhood education teachers in implementing inclusive education. Descriptively, teachers in rural areas had a slightly higher mean score (102.79) than those in urban areas (95.84), but the difference was not statistically significant. These results imply that geographical setting does not significantly affect teacher preparedness. ANCOVA results indicated that age had a significant effect on teacher readiness. The Chi-square test also showed no significant association between training participation and teachers' readiness category. Based on these findings, it can be concluded that the readiness of early childhood education teachers for inclusive education is relatively similar in urban and rural areas. This study was limited to measuring differences by geographic context; therefore, other factors that could influence teacher readiness were not analyzed and require further investigation.

Keywords: early childhood, inclusive education, teacher readiness.

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INTRODUCTION

Inclusive education emphasizes addressing barriers to participation and ensuring equitable learning opportunities for all learners across diverse educational contexts. International frameworks emphasize that inclusive education is not just about access, but also about meaningful participation and learning outcomes for every child (Ainscow, 2020). In Indonesia, the expansion of early childhood education (PAUD) institutions reflects a growing commitment to improving access to education. This expansion indicates a significant increase in the availability of early childhood education services, which, in turn, requires greater preparedness among educational systems and teachers to ensure that access is

accompanied by inclusive and equitable learning practices.

In Indonesia, the expansion of early childhood education (PAUD) institutions reflects a growing policy commitment to improving access to education for young children. However, increased access also raises questions about whether educational settings and teachers are adequately prepared to respond to diverse learning needs. Recent national data indicate that Indonesia has a substantial number of PAUD institutions, including institutions that provide services for children requiring additional support. According to the Ministry of Education and Culture (2025), Indonesia had 198,482 PAUD institutions in 2025, of which 13,010 provided services for children requiring additional support. As of September 2025, Dapodik data estimates that 37,095 children require special support. As the number of children identified as needing additional support continues to increase, inclusive early education requires not only institutional availability, but also teachers who are prepared to adapt learning, recognize diverse needs, and support equitable provision.

Inclusive education is therefore concerned not only with access to educational settings, but also with meaningful participation, belonging and learning for all children (Ainscow, 2020; UNESCO, 2020). When early childhood education systems are not designed inclusively, children who require additional support may face barriers to participation and may become vulnerable to wider social marginalization (UNICEF, n.d.; OECD, 2025). Inclusive education can be understood as an ongoing process of ensuring that all learners can access education, participate meaningfully in learning, and achieve valued outcomes without discrimination related to physical, intellectual, social, emotional, or other differences (OECD, 2023). In early childhood settings, teachers play a central role in translating these principles into everyday classroom practice

Teacher readiness in inclusive education is influenced by multiple interconnected factors, including pedagogical competence, professional training, institutional support, resource availability, and contextual educational conditions. Providing high-quality inclusive early education therefore requires comprehensive planning and management to ensure that all aspects of education function effectively. The provision of inclusive educational infrastructure is also a critical factor in ensuring equal access for all children across both urban and rural regions (Faragher et al., 2021). Child-friendly, accessible infrastructure can support the learning engagement of children who require additional support. Furthermore, continuous assessment is essential for monitoring children's progress and evaluating the extent to which learning targets have been achieved. Evaluations must account for differences in children's individual abilities and need to ensure more objective outcomes that support their development. The adoption of inclusive approaches in early childhood education is influenced by learners' individual characteristics and their environmental context (Nelis et al., 2023).

Internal factors include teachers' competence and understanding of inclusion and diversity, the flexibility of the curriculum and instructional materials, the presence of qualified support personnel, including psychologists, therapists, and special education teachers, the management of learning activities, the documentation of children's progress, and the adequacy of infrastructure and facilities that support access for children requiring additional support (Shofa, 2018). External factors include adequate resourcing, professional learning opportunities, the availability of teaching assistants, curriculum adaptation support, collaboration with colleagues, and sufficient time for planning and instruction (Chow et al., 2024), as well as community awareness, an inclusive culture within the school environment, and collaboration with

parents as important pillars of inclusive education practice (Simon et al., 2022). Teacher readiness in inclusive education is influenced by multiple interconnected factors, including pedagogical competence, professional training, institutional support, resource availability, and contextual educational conditions.

Teacher readiness is a primary factor in the successful implementation of inclusive education. Previous studies have identified teacher readiness as a key determinant of teachers' ability to adapt instruction, manage diverse classrooms, and provide equitable learning opportunities (Adams et al., 2021). Teacher readiness encompasses not only pedagogical knowledge, but also practical skills and attitudes toward diversity (Moosa et al., 2020). Similarly, Ainscow (2020) emphasizes that inclusive practice requires teachers to develop competencies that respond to the needs of diverse learners.

Teachers must therefore possess the knowledge and skills to manage learner diversity and implement learning strategies that respond to children's individual needs (Vantieghem et al., 2023). This expectation is also reflected in Article 8 of Law No. 14 of 2005 on Teachers and Lecturers, which emphasizes teachers' pedagogical competence, including the ability to understand students' characteristics and design learning that meets their needs. At the early childhood education level, teacher readiness is shaped by multiple interrelated factors, including professional training, institutional support, resource availability, and policy frameworks (Florian & Spratt, 2013; Kuyini et al., 2020).

According to Pershina's theory, teacher readiness in inclusive education encompasses three main aspects: cognitive understanding, practical skills, and attitudes. These aspects clearly demonstrate that teacher readiness cannot be assessed solely based on academic training or certification; it also requires an awareness of the value of inclusion and practical implementation in the classroom to achieve holistic readiness. In line with this, research consistently demonstrates that teacher readiness for inclusive education cannot be reduced to academic qualifications alone, but must integrate cognitive, attitudinal, and practical dimensions as interconnected foundations for effective inclusive practice (Nissim & Shamma, 2025).

Research conducted by Rabi et al. (2018) confirms that teacher skills are a key component of successful inclusive learning, including the ability to design varied teaching methods, conduct fair assessments, collaborate with special education teachers, manage an adaptive learning environment, and adapt learning materials and resources. In addition to skills, teachers' positive attitudes and openness toward diversity also play a crucial role in supporting the optimal development of all students, including children with special needs (Mudhar et al., 2024). However, in practice, many early childhood educators still face various challenges in implementing inclusive education, including inadequate comprehension of the needs and characteristics of children requiring special support, insufficient training, inadequate resource support, and a lack of appropriate facilities (Taneja-Johansson et al., 2023).

Recent national data indicate that teacher qualifications remain an important issue in Indonesia, with 177,393 teachers still not holding a bachelor's degree or four-year diploma (Dapodik, 2025). Government programs such as PKA and Teacher Professional Education (PPG) have sought to strengthen teacher qualifications and professional competence, including among kindergarten, elementary, and special education teachers. However, because inclusive education requires teachers to adapt pedagogy, assessment, and classroom support for learners with diverse needs, the relevance of these programs to inclusive PAUD should be explained in relation to teachers' preparedness for inclusive practice (Florian &

Spratt, 2013; Forlin et al., 2014; Novrizal & Manaf, 2024).

This policy context is also reflected in the Ministry of Education, Culture, Research, and Technology Regulation No. 48 of 2023, which emphasizes the provision of reasonable accommodation for students with disabilities in formal PAUD, primary, secondary, and higher education settings. In this context, teachers are a key human resource for implementing inclusive education. Previous research has affirmed that teachers play a pivotal role in ensuring the successful implementation of inclusive education within preschool settings, and that pedagogical competence is a critical prerequisite for translating inclusive education policy into effective classroom practice (Yýlmaz Atman & Karasu, 2026). Differences in educational context, including urban and rural settings, may also shape access to trained teachers, facilities and institutional support for inclusive education.

The quality of infrastructure, resource allocation, teacher training and opportunities for professional development are important factors in supporting inclusive education in Indonesia (Handayani et al., 2023). These factors are often discussed in relation to differences between urban and rural schools, particularly because geographical context may shape access to trained teachers, facilities and institutional support. However, further analysis is needed to understand whether, and to what extent, urban and rural context is associated with PAUD teachers' readiness to implement inclusive education. This perspective aligns with broader research suggesting that teacher preparedness is shaped by a complex interaction among professional training, institutional support, and contextual factors, rather than by geography alone (Forlin et al., 2014).

For example, Sepadi (2025) found that structural constraints often associated with rural settings do not necessarily reduce teachers' readiness to adapt when systematic support and locally relevant training are available. Conversely, although urban settings may provide greater access to infrastructure and professional resources, teacher readiness may also depend on individual competence, school leadership, and institutional policy. This suggests that readiness for inclusive education is a complex issue that should not be explained solely by geographical location.

Previous studies have examined inclusive education in relation to teacher competence, professional development, and regional educational conditions. However, fewer studies have specifically compared PAUD teachers' readiness to implement inclusive education across urban and rural contexts. In this study, geographical location is treated as a contextual variable to be examined empirically in relation to teachers' reported readiness for inclusive education. Accordingly, this study aims to investigate, through empirical analysis, the variations and the degree of preparedness among PAUD teachers in urban and rural contexts in implementing inclusive education, while taking into account the influence of various factors related to teacher readiness.

This study is conducted to develop a comprehensive understanding of the actual conditions in the field, thereby serving as a reference for policymakers, educational institutions, and training providers in designing more appropriate, regionally aligned intervention programs. For early childhood education institutions, the results obtained are expected to support the development of reflective practice and internal school evaluation to identify teachers' readiness levels, formulate strategies to strengthen educators' competencies, and develop inclusive learning practices that are more responsive to students' needs.

This study aims to contribute to a clearer understanding of PAUD teachers' readiness to

implement inclusive education in urban and rural contexts. The findings may provide useful information for policymakers, educational institutions, and training providers by identifying whether teachers' reported readiness varies by geographical context. For early childhood education institutions, the results may also support reflection on teachers' readiness levels and inform strategies for strengthening inclusive practice in ways that respond to local needs. As an additional analysis, this study examines the effect of age on teacher readiness and explores the association between participation in inclusive education training and teachers' readiness category.

Based on the theoretical framework and previous studies discussed above, this study examines the readiness of early childhood education (PAUD) teachers to implement inclusive education in urban and rural areas. The study addresses the following research question: Are there significant differences in PAUD teachers' reported readiness to implement inclusive education between urban and rural areas? To answer this research question, the following hypotheses are proposed:

H0: There is no significant difference in the reported readiness of PAUD teachers to implement inclusive education between urban and rural areas.

H1: There is a significant difference in the reported readiness of PAUD teachers to implement inclusive education between urban and rural areas.

As an additional analysis, the following hypotheses are proposed regarding the association between inclusive education training participation and PAUD teachers' readiness category:

H0: There is no significant association between inclusive education training participation and PAUD teachers' readiness category.

H1: There is a significant association between inclusive education training participation and PAUD teachers' readiness category.

As an additional analysis, the following hypotheses are proposed regarding the effect of age on PAUD teachers' readiness:

H0: Age has no significant effect on PAUD teachers' readiness to implement inclusive education.

H1: Age has a significant effect on PAUD teachers' readiness to implement inclusive education.

METHOD

Participants

The target population for this study was early childhood education (PAUD) teachers in Indonesia. However, due to practical limitations in accessing a comprehensive national sampling frame, the study employed a non-probability convenience sampling approach. Participants were recruited through collaboration with early childhood teacher organizations, including IGABA, as well as through professional networks and voluntary participation. Data were collected online via Google Forms, enabling participation by teachers across regions.

The sample size of 200 participants was determined based on recommendations for descriptive quantitative survey research, in which samples of 100–124 participants are commonly considered adequate, indicating that this sample size is appropriate for the present study (Mursa et al., 2025). The final sample comprised 200 PAUD teachers, including 66 from urban areas and 134 from rural areas. The imbalance between the two groups was not predetermined, but reflected differences in accessibility and response rates, with rural teachers showing higher participation through organizational networks.

The classification of urban and rural areas was based on the location of the school where

each teacher worked, in accordance with the Central Statistics Agency (BPS) Regulation No. 120 of 2020. Urban areas were characterized by higher population density, more varied non-agricultural livelihoods, and greater access to public infrastructure. In comparison, rural areas were characterized by lower population density, fewer public facilities, and more agriculturally based livelihoods.

In this analysis, several provinces were selected based on regional divisions: Western Indonesia (North Sumatra, West Sumatra, South Sumatra, the Special Region of Yogyakarta, Central Java, East Java); Central Indonesia (South Kalimantan, West Kalimantan, Central Sulawesi, South Sulawesi, West Sulawesi, and West Nusa Tenggara (NTB)); and Eastern Indonesia (East Nusa Tenggara (NTT), Maluku, North Maluku, Central Papua, West Papua, and Papua). Early childhood education (PAUD) units located in Central Java, East Java, Special Region of Yogyakarta, Central Sulawesi, Aceh, Lampung, West Sumatra, South Kalimantan, West Kalimantan, Riau, Papua, and West Nusa Tenggara that are situated in cities or regencies with urban status are categorized as urban teachers. Meanwhile, PAUDs in Papua, Maluku, Sulawesi, NTT, Sumatra, Central Java, and Yogyakarta located in hamlets or villages with rural status are classified as rural.

Research Design and Procedures

This study employed a quantitative approach with a descriptive-comparative research design. This design was selected because the study aimed to describe PAUD teachers' readiness to implement inclusive education and compare readiness levels between teachers in urban and rural areas. The study also examined readiness across three dimensions: knowledge, skills, and attitudes. The use of a questionnaire enabled data to be collected from a relatively large number of respondents and analyzed using descriptive and inferential statistical techniques, as applied in previous studies on inclusive education in Indonesia (Padmadewi et al., 2024).

The study was conducted over ten months, from March to December 2025. The research procedures were carried out in several stages. First, the research instrument was developed and adapted based on relevant theoretical frameworks. Second, the instrument was validated through expert assessment and empirical testing. Third, data were collected through an online questionnaire distributed via Google Forms, with assistance from members of the IGABA Central Office. Before participating, respondents were informed about the research objectives and provided consent to ensure voluntary participation. Finally, the collected data were screened, coded, and analyzed using statistical techniques to compare readiness levels between urban and rural teachers.

Instrument

The instrument used in this study was a structured questionnaire designed to measure teachers' readiness to implement inclusive education. The instrument was adapted from previous studies on teacher readiness in inclusive settings, particularly Moosa et al. (2020), and was based on the conceptual framework proposed by Pershina et al. (2018). Moosa et al. (2020) noted that the instrument's reliability was very high, with a Cronbach's alpha (CR) of 0.940 (knowledge and skills) and 0.918 (attitudes). The instrument measured three dimensions of teacher readiness:

1. Knowledge (Cognitive Dimension)

This dimension reflects teachers' understanding of inclusive education concepts and their ability to recognize diverse learning needs. Indicators: understanding of inclusive education concepts, identification of children with special needs, and curriculum adaptation. Example item: "I understand the meaning of inclusive education."

2. Skills (Behavioral/Practical Dimension)

This dimension refers to teachers' ability to implement inclusive practices in classroom settings. Indicators: ability to design adaptive learning, manage inclusive classrooms, and apply appropriate teaching strategies. Example item: "I can maintain positive relationships between regular students and students with special needs to support inclusive education."

3. Attitudes (Affective Dimension)

This dimension reflects teachers' beliefs, acceptance, and willingness toward inclusive education. Indicators: openness to diversity, acceptance of children with special needs, and willingness to implement inclusive practices. Example item: "I care about the achievements of students with special needs."

The instrument was designed as a Google Forms-based questionnaire comprising 24 statements, developed across three dimensions of teacher readiness, as shown in Table 1.

A questionnaire consisting of 24 items on a five-point Likert scale was used with the following categories: 1 (Strongly Disagree), 2 (Disagree), 3 (Somewhat Agree), 4 (Agree), and 5 (Strongly Agree). An item was considered valid if the r value obtained exceeded the critical value in the r table ($r = 0.138$; $df = n - 2 = 198$; $p < 0.05$).

Table 1. Grid of kindergarten teacher readiness in implementing inclusive education

Variable	Aspect	Item Number	Amount
Teacher Readiness to Implement Inclusive Education	Knowledge and understanding	3,5,7,9,11,12,15,17,19	9
	Skills and abilities	1,2,4,6,8,10,13,14,16,	9
	Attitudes	18,20,21,22,23,24	6
Total			24

The test results indicate that all items in the kindergarten teacher readiness instrument met the validity criteria; therefore, the instrument is valid and ready for use. Therefore, the final analysis was conducted using the 24 items that met the validity criteria. Instrument validity refers to the extent to which an instrument accurately measures the intended variable. In this study, content validity was employed to assess whether the instrument adequately represents the concepts being measured. This process was conducted using expert judgment, with experts evaluating each

Table 2. Validity test

Item	R Count	R Table	Description	Item	R Count	R Table	Description
Item 1	0.814	0.138	Valid	Item 13	0.818	0.138	Valid
Item 2	0.761	0.138	Valid	Item 14	0.803	0.138	Valid
Item 3	0.747	0.138	Valid	Item 15	0.846	0.138	Valid
Item 4	0.781	0.138	Valid	Item 16	0.820	0.138	Valid
Item 5	0.829	0.138	Valid	Item 17	0.784	0.138	Valid
Item 6	0.715	0.138	Valid	Item 18	0.802	0.138	Valid
Item 7	0.752	0.138	Valid	Item 19	0.791	0.138	Valid
Item 8	0.752	0.138	Valid	Item 20	0.824	0.138	Valid
Item 9	0.849	0.138	Valid	Item 21	0.779	0.138	Valid
Item 10	0.673	0.138	Valid	Item 22	0.718	0.138	Valid
Item 11	0.719	0.138	Valid	Item 23	0.461	0.138	Valid
Item 12	0.766	0.138	Valid	Item 24	0.682	0.138	Valid

item's alignment with the research objectives and the indicators being measured. Instrument validation encompasses three main aspects: content, construct, and technical validity. After the instrument was deemed appropriate following expert validation, empirical validity testing was conducted in SPSS version 27.

Reliability refers to the consistency of an instrument in producing stable results under similar conditions. In this study, reliability was assessed using Cronbach's Alpha to evaluate the instrument's internal consistency. A coefficient of á e" 0.70 indicates acceptable reliability (Arikunto, 2019). The closer the value is to one, the higher the level of reliability. Each dimension was analyzed separately to assess the consistency among items. The results showed that the Cronbach's Alpha value for the kindergarten teacher readiness variable was 0.968, based on the study's own database of 200 respondents, indicating a very high level of reliability. Therefore, the instrument is considered reliable and suitable for data collection.

Data Analysis

Data analysis was conducted using descriptive and inferential statistical techniques with SPSS version 27. Descriptive statistics, including mean, percentage, and standard deviation, were used to describe teachers' readiness levels. Prior to inferential analysis, prerequisite tests were performed. The normality of the data was assessed using the Shapiro-Wilk test, while homogeneity of variance was tested using Levene's test. The results indicated that the data were not normally distributed ($p < 0.05$); therefore, a non-parametric test was selected.

The Mann-Whitney U test was used to assess whether teacher readiness differed between urban and rural groups, with a significance level of 0.05. In addition to overall readiness scores, the analysis examined the three areas of readiness: knowledge, skills, and attitudes. To better understand how age affects teacher preparedness, an Analysis of Covariance (ANCOVA) was done. In this analysis, age was used as a covariate, and geographical location was treated as a fixed factor. As part of a further look into the data, a Chi-square test was conducted to assess whether there is a relationship between teachers' experience with inclusive education training and their readiness level. The results were evaluated for significance, and a p-value < 0.05 was used to determine statistical significance.

■ RESULT AND DISCUSSION

Demographic characteristics of respondent

This study involved 200 PAUD teachers from urban and rural areas. Data were collected via a questionnaire and presented descriptively prior to the inferential analysis. Respondents' demographic and professional characteristics are presented across four figures. Figure 1 illustrates the age distribution of respondents in urban and rural areas. Figure 2 presents the proportion of respondents holding an educator certificate. Figure 3 displays respondents' highest level of education, and Figure 4 shows respondents' experience of attending training related to inclusive education.

Figure 1 shows the age distribution of respondents in urban and rural areas. In both groups, teachers aged 45 and older constitute the largest group, accounting for 36.36% of urban respondents and 36.57% of rural respondents. The second-largest group in both areas is teachers aged 41 to 45 (26.12%), comprising 25.76% of urban respondents and 26.12% of rural respondents. Teachers aged over 40 collectively represent the majority in both urban and rural areas. Younger teachers, particularly those under 23, are underrepresented in both groups. The age profiles of urban and rural respondents generally appear comparable, with no substantial differences in distributions across age categories.

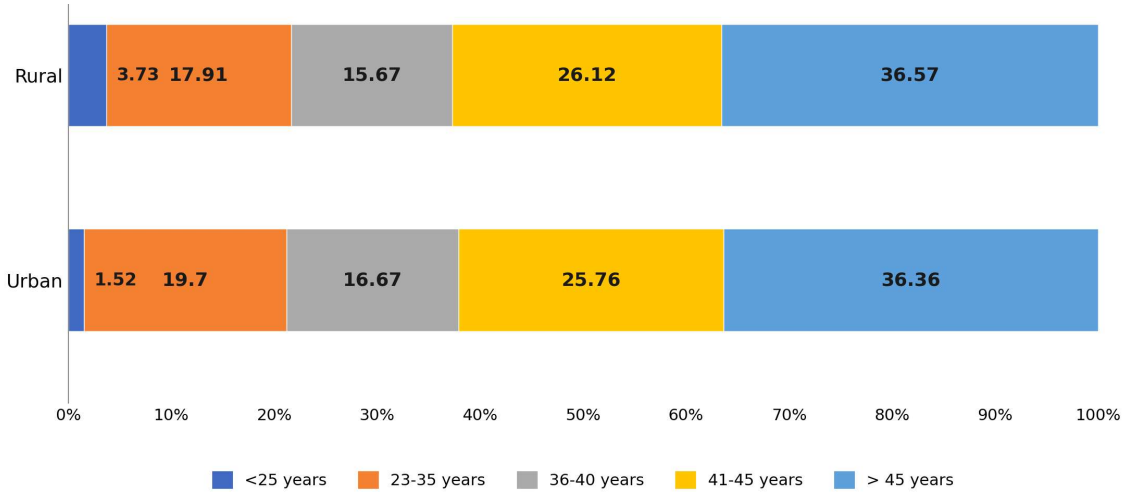

Figure 1. Characteristics of respondents based on age

Figure 2 presents the proportion of respondents holding an educator certificate in urban and rural areas. In the urban group, the distribution was evenly split, with exactly 50% of respondents holding a teaching certificate and 50% not holding one. In the rural group, the distribution was nearly equivalent, with 50.75% holding a certificate and 49.25% not holding one. The proportions of certified and non-certified teachers were thus highly similar across both urban and rural settings.

Figure 3 shows respondents' experience of attending training related to inclusive education. In this sample, a higher proportion of rural

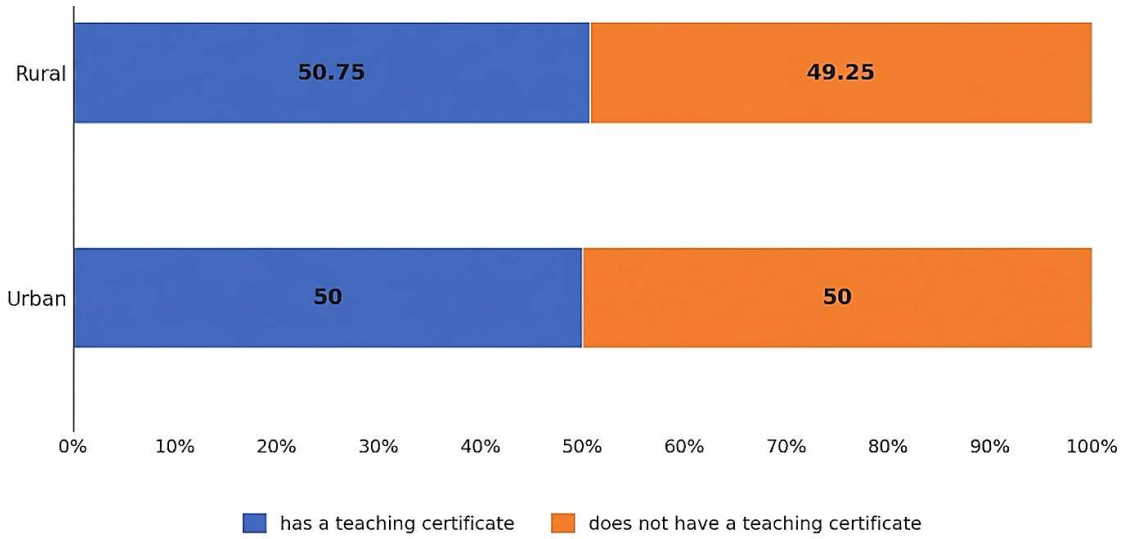

Figure 2. Characteristics of respondents based on educator certificate

respondents reported having attended inclusive education training compared with urban respondents. Specifically, 59.70% of rural respondents had attended training, compared with 42.42% of urban respondents. Conversely, 57.58% of urban respondents and 40.30% of rural respondents reported not having attended such training. These findings describe the training experience of respondents in this study and should interpreted in relation to the sampling approach.

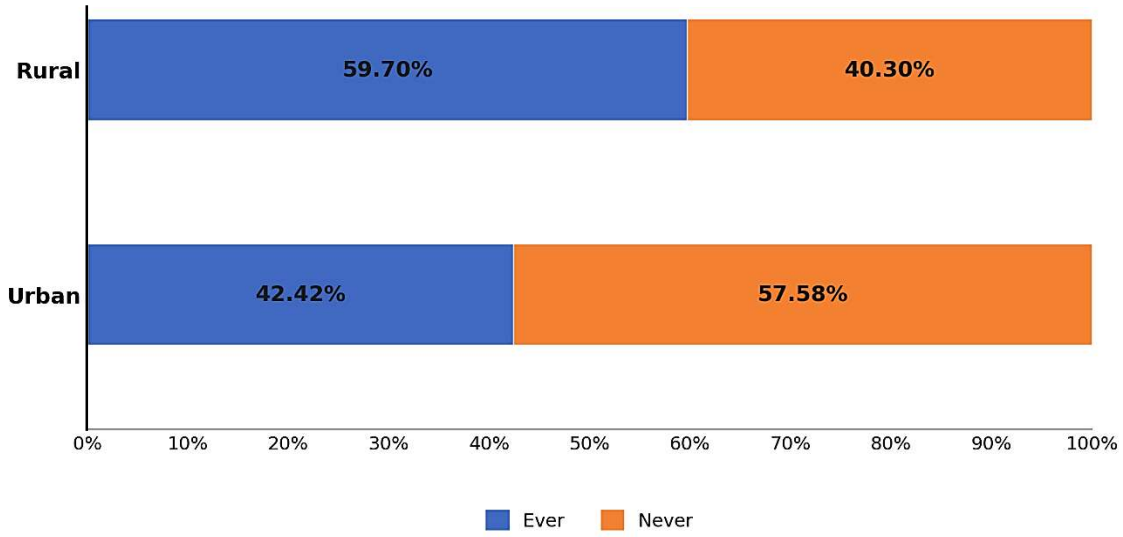

Figure 3. Characteristics of respondents based on their experience attending training related to inclusive education

Figure 4 presents respondents' highest level of education. In this sample, most respondents at the S1 level came from rural areas, although urban respondents were also well represented. Respondents with master's level qualifications were more frequently found in the urban group. In contrast, respondents with D2-D3 qualifications and those currently enrolled in college were more likely to be in the rural group.

Teacher Readiness Level

Teachers' readiness levels were categorized based on the median and interquartile range (IQR), calculated in SPSS version 27. For urban teachers, the median was 81.00, with Q1 = 72.00 and Q3 = 92.00. For rural teachers, the median was 84.00, with Q1 = 75.00 and Q3 = 92.00. Scores were grouped into three categories: low (X < Q1), moderate (Q1 d" X d" Q3), and high (X > Q3). The median and interquartile range were used as the basis for categorization, as data that do not follow a normal distribution should be presented using these measures rather than parametric statistics (Habibzadeh, 2024).

From this classification, it is evident that the majority of teachers in both urban and rural areas

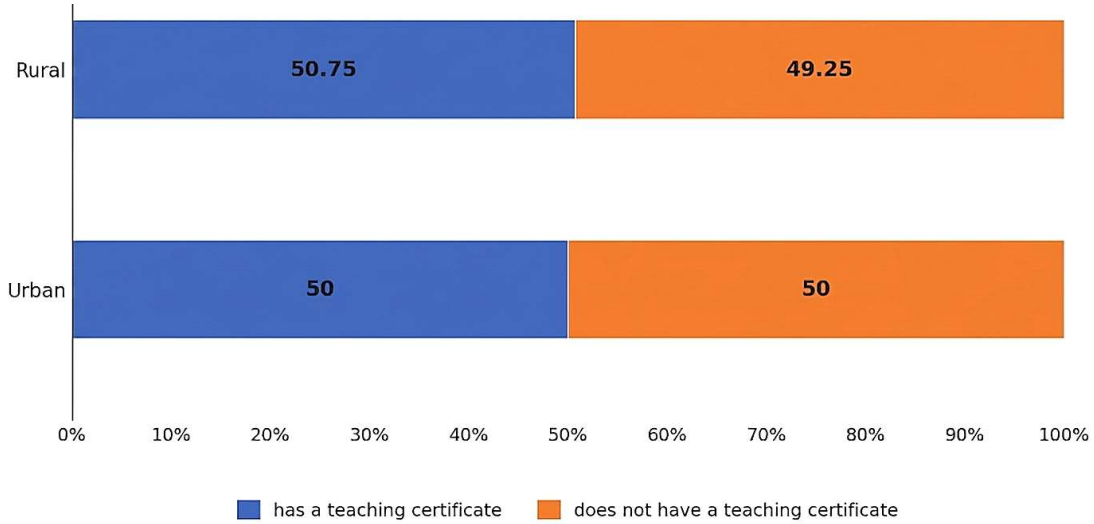

Figure 4. Characteristics of respondents by highest level of education

Table 4. Classification of teachers' readiness levels based on median and interquartile range (IQR)

Readiness level category	Urban			Rural		
	criteria	Number of teachers	Percentage	criteria	Number of teachers	Percentage
Low	X < Q1 (X < 72)	14	21.21%	X < Q1 (X < 75)	32	23.88%
Moderate	Q1 ≤ X ≤ Q3 (72 ≤ X ≤ 92)	37	56.06%	Q1 ≤ X ≤ Q3 (75 ≤ X ≤ 92)	74	55.22%
High	X > Q3 (X > 92)	15	22.73%	X > Q3 (X > 92)	28	20.90%
Total		66	100%		134	100%

fall into the moderate readiness category. Specifically, 56.06% of teachers in urban areas and 55.22% in rural areas are categorized as having moderate readiness. The proportion of teachers with high readiness is slightly higher in urban areas (22.73%) compared to rural areas (20.90%). Conversely, the proportion of teachers with low readiness is slightly higher in rural areas (23.88%) than in urban areas (21.21%). These descriptive differences indicate variation in distribution; however, they should be interpreted cautiously and in conjunction with inferential analysis, which shows that the differences between groups are not statistically significant.

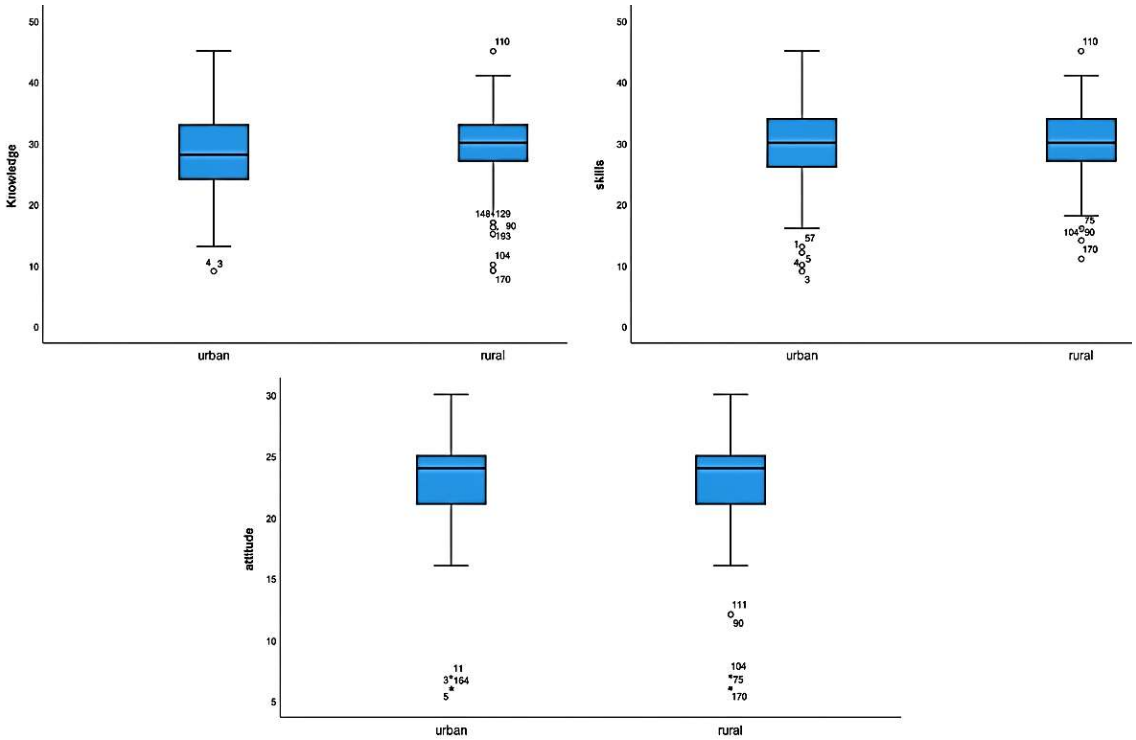

Figure 5. Comparison of teachers' readiness levels

Box plots provide a visual comparison of the distribution of scores between the two groups, including the median, range, and the presence of outliers. Overall, the distribution of knowledge, skills, and attitudes appears generally similar between urban and rural teachers. Rural teachers

showed slightly higher knowledge scores, while skill and attitude scores were relatively similar in both groups. Several outliers in the lower range were identified in both groups. An examination of the raw data indicates that these outliers correspond to respondents who scored at or near the theoretical minimum thresholds across all three dimensions (knowledge: 9–45; skills: 9–45; attitudes: 6–30). Following Ward & Meade (2023), such patterns of extreme responses may reflect less careful answers or truly represent a very low level of readiness among a small group of respondents. These cases were still included in the analysis because their scores fell within the instrument's valid response range, and the Mann-Whitney U test, as a nonparametric procedure, is robust to the influence of extreme values. However, this descriptive pattern requires inferential analysis to determine whether the observed differences are statistically significant.

Inferential Analysis: Mann-Whitney U Test

A normality test was conducted using the Shapiro-Wilk test. The results indicated that teacher readiness scores in urban and rural areas were not normally distributed ($p < 0.05$). Therefore, the analysis was conducted using the nonparametric Mann-Whitney U test. Tests of difference were conducted for each readiness dimension to provide an initial comparison, while the main analysis focused on the overall readiness score. The results for the overall readiness analysis are presented below.

The Mann-Whitney U test results for each dimension of readiness showed that rural teachers had slightly higher mean rank scores than urban teachers across knowledge, skills, and attitudes. However, these differences were not statistically significant ($p > 0.05$). This indicates that, within this sample, there were no statistically significant differences between urban and rural PAUD teachers in the three dimensions of readiness.

The Mann-Whitney U test was also applied to the total teacher readiness score, which combined knowledge, skills, and attitudes.

The results showed no statistically significant difference in readiness between urban and rural PAUD teachers ($U = 4{,}114.500$, $z = -0.799$, $p = 0.424$). Descriptively, the mean rank score of teachers in rural areas (102.79) was slightly higher than that of teachers in urban areas (95.84). The effect size was negligible ($r = 0.057$), indicating that the practical magnitude of the difference between groups was trivial. Although a difference was observed, it was not statistically significant.

Table 5. Mann-Whitney U test

Ranks				
	Region of teaching	**N**	**Mean Rank**	**Sum of Ranks**
Readiness level	Urban	66	95.84	6325.50
	Rural	134	102.79	13774.50
	Total	200		

Test Statistics[a]	
	Readiness level
Mann-Whitney U	4114.500
Wilcoxon W	6325.500
Z	-.799
Asymp. Sig. (2-tailed)	.424
a. Grouping Variable: Teaching area	

Consequently, the teaching location does not play a significant role in shaping teachers' preparedness for managing inclusive learning environments.

Additional analysis: ANCOVA

An Analysis of Covariance (ANCOVA) was conducted to examine the effect of age on teacher readiness while accounting for geographical location. The results indicated that age had a significant effect on teacher readiness, $F(1, 197) = 6.433$, $p = .012$, $çp^2 = .032$. In contrast, geographical location did not have a significant effect on teacher readiness after controlling for age, $F(1, 197) = 0.942$, $p = .333$, $çp^2 = .005$. These findings suggest that age contributes to variation in teacher readiness, whereas the similarity in readiness between urban and rural teachers persists after accounting for age.

Additional analysis: chi-square test

As an additional analysis, a Chi-square test was conducted to examine whether teachers' prior participation in inclusive education training was associated with their readiness category. The results showed no statistically significant association between training participation and readiness ($÷^2 = 2.990$, $df = 2$, $p = 0.224$). This suggests that, in this sample, teachers' readiness levels did not differ significantly according to whether they had previously attended inclusive education training.

Overall Readiness and Geographic Context

This study examined differences in PAUD teachers' reported readiness to implement inclusive education in urban and rural settings, including the dimensions of knowledge, skills, attitudes, and overall readiness. The findings showed no statistically significant differences between the two groups, suggesting that teachers' reported readiness in urban and rural contexts was broadly comparable within this sample. This pattern is consistent with Kusin (2022), who found that teachers' teaching capability in urban and rural areas was broadly comparable. The similarity observed in the present study may reflect similarities in respondents' professional backgrounds, exposure to policy frameworks, or access to professional learning opportunities. However, these possible explanations should be interpreted cautiously because the study did not statistically control for these factors. In practical terms, teachers in rural areas may still face more complex infrastructure and resource constraints, even when their reported readiness appears comparable to that of urban teachers.

Knowledge Dimension

To better understand this overall pattern, each dimension warrants a more detailed discussion, starting with knowledge. In terms of knowledge, the results indicated no statistically significant difference between urban and rural teachers, suggesting that their reported conceptual understanding of inclusive education was relatively comparable within this sample. This pattern may reflect similarities in respondents' background characteristics. The role of age was further examined using ANCOVA, given theoretical and empirical evidence suggesting that age may influence teachers' readiness for inclusive education, as many teachers in both urban and rural areas were over 40 years old. The analysis revealed a significant effect of age on teacher readiness. At the same time, geographical location remained non-significant after controlling for age, suggesting that the comparable knowledge outcomes across locations were not solely attributable to age differences.

Nevertheless, this age group generally has extensive teaching experience, meaning their knowledge of student characteristics is derived not only from formal education but also from empirical classroom experience. This is further reinforced by the academic background of the

majority of teachers, who hold bachelor's degrees in Early Childhood Education (PGPAUD), which already includes foundational material on inclusive education. On the other hand, expanding access to digital information sources also helps narrow the knowledge gap between the two regions. In line with Lin et al. (2023), digital technology allows teachers in remote areas to access the same learning resources, even though infrastructure challenges remain. Additionally, teachers' readiness is shaped by factors such as teaching experience, professional preparation, and access to relevant knowledge and learning opportunities, all of which contribute to their confidence and capacity to implement inclusive practices (Wray et al., 2022).

Such conditions may help explain the relatively comparable levels of knowledge between teachers in urban and rural settings. This situation is further reinforced by the 2024 PPG program, which involved more than 606,601 participants and achieved a 98.6% graduation rate, including teachers in 3T regions, thereby ensuring that teachers' pedagogical competencies are developed more evenly across all regions.

Regarding training experiences, the Chi-Square test indicates no significant association between participation in inclusive training and teacher readiness ($\div^2 = 2.990$; df = 2; p = 0.224). This finding must be critically understood by examining the characteristics of the training programs available to date. The inclusive training typically attended by early childhood education (PAUD) teachers in Indonesia is short-term and non-sustained. Program Guru Belajar dan Berbagi Seri Pendidikan Inklusif (Direktorat GTK, 2021) covers topics such as identifying children with special needs and developing Individualized Education Programs (IEPs), delivered online. Meanwhile, the tiered inclusive training launched by the Ministry of Education, Culture, Research, and Technology in March 2024 through the Merdeka Mengajar (PMM) Platform consists of three levels: basic, advanced, and expert, with basic-level modules covering topics such as Student Diversity, Student-Centered Learning, and Collaboration for a Safe and Enjoyable Learning Environment. These modules can be studied independently or collaboratively by teachers, school principals, and supervisors throughout Indonesia, reflecting the government's commitment to broadening access to inclusive education training across regions. Given that these programs were openly accessible to all PAUD teachers across Indonesia, it is plausible that the training respondents attended in this study was of a similar nature, primarily focused on conceptual understanding rather than practical skill development.

However, Donath et al. (2023) assert that only long-term training with high practical relevance effectively facilitates the application of knowledge in the classroom. In contrast, short-term training impacts knowledge but is very limited in changing skills and attitudes. This is further supported by evidence from the Indonesian context, where Pornama et al. (2026) found that while the PMM inclusive education module successfully improved PAUD teachers' conceptual understanding, it demonstrated limited effectiveness in developing practical classroom skills, with only 24.39% of teachers able to independently develop inclusive lesson plans and only 34.15% feeling confident in applying inclusive teaching strategies in the classroom. This is particularly relevant given that the readiness instrument used in this study encompasses three dimensions: knowledge, skills, and attitudes, whereas short-term training primarily impacts the cognitive dimension of knowledge while producing minimal changes in practical skills and attitudinal beliefs. Consequently, teachers who attended training may have gained conceptual knowledge comparable to that acquired by their

peers through years of teaching experience, resulting in no statistically detectable difference between the two groups.

This interpretation is further supported by Galoviæ et al. (2014), who conclude that teachers' attitudes toward inclusion are shaped more by the quality of training experiences than by their quantity. Additionally, the Chi-Square test's sensitivity in identifying significant group differences may have been further limited because this study measured training participation dichotomously, that is, whether or not teachers had attended training without taking into consideration the kind, length, intensity, or quality of training. Rather than undermining the value of this study, this finding meaningfully contributes to the inclusive education literature by highlighting that access to training alone is insufficient, and that future policy and research must shift their focus toward the quality, continuity, and practical depth of professional development programs for PAUD teachers.

Skills Dimension

Turning from Knowledge to practical skills, the skills dimension reflects a comparable pattern. In terms of skills, the findings indicated that teachers in urban and rural areas reported relatively similar practical competencies for implementing inclusive education. The age distribution of respondents may provide one possible context for interpreting this finding, as teachers aged over 45 formed the largest group in both urban and rural settings. Extensive classroom experience may contribute to teachers' practical judgment and ability to respond to learner diversity, although this study did not directly test teaching experience as a predictor of skill. This interpretation is consistent with Karynbaeva et al. (2021), who highlight that teachers' preparedness for inclusive education is associated with professional competence developed through formal education and practice.

Teachers' skills may also be considered in relation to inclusive education training, educator certification and professional experience. Previous research suggests that teacher readiness for inclusive education is associated with factors such as knowledge, self-efficacy, teaching experience and training participation (Adams et al., 2021; Kazanopoulos et al., 2022). In this sample, certification was relatively evenly distributed across urban and rural teachers, and differences in training participation did not correspond to statistically significant differences in readiness. However, this should not be interpreted as evidence that training is unimportant, as the analysis did not examine the quality, duration, or focus of training. Although rural teachers showed slightly higher descriptive skill scores, these differences were not statistically significant. This suggests that, within this sample, practical readiness for inclusive education was broadly comparable across urban and rural settings. Shared professional experiences, formal qualifications and the everyday demands of classroom practice may all contribute to these comparable skill levels, but further research is needed to examine these relationships directly.

Attitudes Dimension

In this study, teachers' attitude scores in both regions tended to be lower than their knowledge and skills scores, and no statistically significant differences were found between urban and rural teachers. This finding is consistent with previous studies suggesting that Indonesian teachers may hold generally positive views toward inclusive education, yet still experience tensions between understanding inclusion and confidently implementing it in practice (Adnyani et al., 2026). The pattern observed in this study may be understood in relation to respondents' professional backgrounds, including age, certification and training experience. However, these factors were tested as predictors of attitude.

The majority of teachers in both regions were over 40 years old and had extensive teaching experience. Long-standing professional routines may shape how teachers respond to the flexibility, openness and additional responsibilities associated with inclusive education. However, this interpretation should be treated with caution, as the study did not examine teachers' beliefs or Experiences in depth. Certification was also relatively balanced between rural and urban teachers. However, certification alone may not be sufficient to develop inclusive attitudes if professional learning focuses mainly on pedagogical and administrative competencies. As Singh et al. (2020) suggest, teachers' attitudes toward inclusion are shaped by professional values, beliefs about justice and practical experiences of inclusive education, rather than by formal certification alone.

The lower level of attitudinal readiness compared with knowledge and skills suggests that attitudes may be a particularly complex dimension of inclusive education readiness. Attitudes are closely linked to personal beliefs, emotional experiences, confidence, perceived workload and teachers' expectations of additional responsibilities. This is consistent with studies showing that teacher readiness for inclusive education is associated with self-efficacy, perceived institutional support and attitudes toward inclusion (Ediyanto et al., 2021; Jada et al., 2025). Therefore, strengthening attitudinal readiness may require more than information-based training. Reflective professional development, ongoing mentoring, and positive practical experiences of inclusive education may be needed to support teachers' confidence and openness toward diverse learners.

Implications

Overall, the findings across the dimensions of knowledge, skills, and attitudes reveal a relatively consistent pattern between urban and rural teachers. Based on the findings from this research, the absence of significant differences in teacher preparedness between urban and rural regions indicates that improvement strategies should not be based on geographic differences. Instead, the focus should be on developing competencies in a comprehensive and sustainable manner. At the governmental level, Isnawati et al. (2025) suggest ongoing, practice-focused teacher training, improvements to educational infrastructure, and initiatives to raise public awareness to create a more inclusive education system. Additionally, research suggests that teacher training programs that integrate both theoretical instruction and practical experience are more effective at fostering positive attitudes toward inclusion than those focusing solely on theory (Khamzina et al., 2024). Çelik and Tomris (2024) emphasized that strong home-school collaboration and active involvement of both teachers and parents contribute significantly to the quality of inclusive education and the learning development of children with special needs. School leaders are key in building a setting that truly meets the needs of children with special needs. At the local community level, changing how people think is crucial because negative views and stigma toward children with special needs still make it hard for inclusive practices to work effectively (Isnawati et al., 2025). By using this detailed approach that involves many different groups, we expect improvements in the quality of inclusive education to be more effective, efficient, and fair across various areas, without creating new divides between city and countryside communities.

Limitations

This study has several limitations that should be considered when interpreting the findings. First, the use of non-probability convenience sampling means that the sample may not fully represent the wider population of PAUD teachers

in urban and rural areas. Participants were recruited through professional networks and voluntary participation, which may have influenced who responded to the questionnaire. This limits the external validity of the findings and restricts the extent to which the results can be generalized to all PAUD teachers in Indonesia.

Second, the sample size was relatively modest, and the two groups were unbalanced, with 66 teachers from urban areas and 134 from rural areas. This may have reduced the statistical power of the analysis and increased the risk of a Type II error, in which a true difference between groups may not be detected. Therefore, the absence of statistically significant differences should not be interpreted as definitive evidence that urban and rural teachers are equivalent in their readiness. Rather, it should be understood as a finding based on the scope and limitations of the present sample.

Third, the cross-sectional design captured teachers' reported readiness at a single point in time. As a result, the study cannot draw causal conclusions or examine how teacher readiness may change over time. Future research should consider probability-based sampling, larger, more balanced samples, and longitudinal designs to strengthen the validity and generalisability of findings regarding PAUD teachers' readiness for inclusive education.

■ CONCLUSION

Overall, this study found that PAUD teachers' reported readiness to implement inclusive education was mostly moderate in both urban and rural areas. The statistical analysis showed no significant difference in overall readiness between urban and rural teachers. Although rural teachers showed slightly higher descriptive scores across knowledge, skills, and attitudes, these differences were not statistically significant. These findings suggest that geographical location alone may not be sufficient to explain variation in PAUD teachers' readiness for inclusive education within this sample.

The findings contribute to the literature by providing empirical evidence on PAUD teachers' readiness for inclusive education across urban and rural contexts in Indonesia. They suggest that efforts to strengthen inclusive early childhood education should focus on sustained professional development, equitable access to inclusive learning resources and institutional support for teachers in both urban and rural settings. Particular attention should be given to strengthening not only teachers' knowledge and skills, but also their attitudinal readiness and confidence in responding to diverse learning needs.

This study has several limitations. The sample consisted of 200 teachers recruited through teacher networks and voluntary participation, which limits the representativeness and generalisability of the findings. The study also focused on teachers' reported knowledge, skills, and attitudes and did not examine other factors that may shape inclusive practice, such as school leadership, resource availability, training quality, self-efficacy, or direct classroom experience. Future research should include larger, more diverse samples, employ more rigorous sampling strategies, and examine a wider range of individual, institutional, and contextual factors that influence PAUD teachers' readiness for inclusive education.

■ DECLARATION OF GENERATIVE AI USAGE IN THE WRITING PROCESS

During the preparation of this manuscript, the author used several AI tools to support the writing process: Consensus for searching and identifying relevant scientific references; ChatGPT for refining ideas; DeepL Translate for translating text; and Editpad for paraphrasing sentences for clarity. After using these tools, the author reviews

and revises the content as needed and takes full responsibility for the article's final content.

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