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Teacher Preparedness, Inclusive Education Gaps, and ADHD Support in Rural and Urban Schools: A Mixed-Methods Study in Ghana

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Abstract

Background: Attention-Deficit/Hyperactivity Disorder (ADHD) is a leading neurodevelopmental condition affecting children worldwide, with significant implications for learning and social development. In Ghana and other low- and middle-income countries, teacher preparedness and institutional capacity remain critical yet underexamined determinants of effective classroom support. A prior qualitative study identified that only one-third of Ghanaian educators had received formal inclusive education training, signalling a systemic professional development deficit. This study builds on that finding by systematically examining disparities in teacher preparedness, knowledge, attitudes, and ADHD support practices across rural and urban school contexts in Ghana.

Methods: An explanatory sequential mixed-methods design was employed. The quantitative phase involved 200 primary and junior high school teachers (100 rural, 100 urban) recruited through stratified purposive sampling who completed the Teacher Knowledge and Attitudes about ADHD Scale (KAADS) and a school resource inventory. Hierarchical regression identified predictors of effective ADHD support practices. The qualitative phase comprised six focus group discussions with purposively selected teachers to contextualise the quantitative findings, analysed using Braun and Clarke's thematic framework.

Results: Urban teachers demonstrated significantly higher mean ADHD knowledge scores than rural teachers (62.4 vs. 54.7; $t(198) = 4.83$, $p < .001$, $d = 0.68$). Formal training (beta = .41, $p < .001$) and access to specialist support staff (beta = .29, $p < .001$) were the strongest predictors of effective ADHD classroom practices. Only 38% of the total sample had received any ADHD-specific training. Qualitative themes identified five systemic barriers: absent or superficial pre-service training; absence of referral systems particularly in rural areas; structural impossibility of individualised support under large-class conditions; cultural stigma and family resistance to ADHD labelling; and urban teachers remaining underprepared despite better resource access.

Conclusion: Teacher preparedness, rather than school location per se, is the principal determinant of effective ADHD support. Addressing the training deficit and structural inequities between rural and urban schools is essential for strengthening inclusive education and improving ADHD outcomes in Ghana. Policy reforms should prioritise mandatory pre-service and in-service ADHD training, specialist staffing in rural schools, and culturally responsive awareness campaigns.

Keywords: ADHD, teacher preparedness, inclusive education, rural-urban disparities, Ghana, mixed-methods

1. Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is among the most prevalent neurodevelopmental disorders globally, affecting an estimated 5 to 7 percent of school-aged children and adolescents [1,2]. Characterised by persistent and clinically impairing patterns of inattention, hyperactivity, and impulsivity, ADHD exerts significant adverse effects on academic achievement, social relationships, and long-term functional outcomes [3,4]. While its neurobiological and genetic underpinnings are well established, the manner in which ADHD is identified, supported, and managed is profoundly shaped by the educational environment in which affected children spend the majority of their formative years [5].

Teachers occupy a uniquely influential position in the ADHD support ecosystem. As the adults who observe children's behaviour across extended periods of structured activity, teachers are frequently the first professionals to identify patterns consistent with ADHD and to initiate referral pathways [6]. Beyond identification, teachers implement classroom-level accommodations, behavioural management strategies, and modified instructional approaches that constitute the primary non-pharmacological support most children with ADHD receive on a daily basis [7]. The quality of this teacher-mediated support is therefore a critical determinant of how well children with ADHD are able to engage academically and socially in the school setting.

However, teacher preparedness for supporting learners with ADHD remains a persistent and globally documented challenge. Systematic reviews and meta-analyses have consistently demonstrated that teacher knowledge about ADHD is limited, that misconceptions are common, and that many teachers feel insufficiently equipped to manage ADHD-related behaviours in the classroom [8,9]. Studies from both high-income and low- and middle-income country contexts report that ADHD-specific content is largely absent from pre-service teacher education programmes, and that in-service professional development opportunities are inadequate in both frequency and depth [10,11]. In Ghana specifically, a recent qualitative study found that only one-third of surveyed educators had received formal inclusive education training, and identified teacher knowledge gaps and absent referral systems as critical obstacles to ADHD support [12]. This finding, derived from a broader examination of social changes and ADHD outcomes, pointed explicitly to the need for a dedicated investigation of teacher preparedness as a primary research problem.

The rural-urban dimension adds a further layer of complexity to teacher preparedness in Ghana. Rural schools operate under conditions of structural disadvantage that systematically constrain support capacity: larger class sizes, higher teacher-to-pupil ratios, restricted access to educational psychologists, speech therapists, and school counsellors, and weaker institutional links to the healthcare services that provide ADHD diagnosis and treatment [13,14]. These resource disparities are compounded by geographic isolation, which limits rural teachers' access to continuing professional development opportunities and specialist consultation. Urban schools, while generally better resourced, face their own challenges, including severe classroom overcrowding, high-stakes examination pressure, and the persistent tension between inclusive education ideals and the competitive academic culture that pervades many Ghanaian schools [15].

Despite the clear relevance of these dynamics to ADHD support, the existing literature contains a notable gap: no study has systematically examined and compared teacher knowledge, attitudes, and classroom

practices related to ADHD across rural and urban schools in Ghana, or used regression modelling to identify the specific predictors of effective teacher-level ADHD support. The few Ghanaian studies that address inclusive education do so at a general level, without attention to neurodevelopmental conditions specifically, and without the mixed-methods depth required to understand both the magnitude and the mechanisms of the rural-urban disparity [16,17].

The present study addresses this gap through an explanatory sequential mixed-methods design that integrates a quantitative survey of 200 teachers with qualitative focus group discussions. It is guided by three research objectives: (1) to assess and compare ADHD-related knowledge and inclusive education practices among teachers in rural and urban schools in Ghana; (2) to identify the structural and attitudinal predictors of effective ADHD classroom support; and (3) to generate evidence-informed recommendations for teacher training policy and school-based intervention design. In addressing these objectives, the study extends a prior qualitative investigation by the same author [12] and contributes to a growing body of evidence on inclusive education in sub-Saharan Africa.

2. Methods

2.1 Research Design

This study employed an explanatory sequential mixed-methods design [18], in which a quantitative survey phase was conducted first to establish the prevalence and magnitude of teacher knowledge and practice disparities, followed by a qualitative focus group phase designed to explain and contextualise the quantitative findings. This sequence is appropriate when, as in this study, the primary aim is to measure group differences and identify predictors of outcomes, with qualitative inquiry serving to illuminate the mechanisms and contextual factors underlying those patterns. Integration of the two data strands occurred at the interpretation phase through joint display analysis [19].

2.2 Setting

The study was conducted in the Greater Accra and Central Regions of Ghana, selected to provide variation in urbanisation levels, school resource environments, and proximity to specialist support services. Within these regions, the Accra Metropolitan and Ga West Municipal areas represented the urban context, characterised by relatively well-resourced schools with established links to district health services. The rural context was represented by schools in the Awutu Senya East and Gomoa East Districts, where access to educational psychologists and specialist healthcare is limited and where school-community infrastructure is less developed.

2.3 Participants

Phase 1 (Quantitative): Two hundred primary and junior high school teachers (Grades 1 to 9) were recruited through stratified purposive sampling across 20 schools (10 rural, 10 urban). Within each context, schools were selected to represent public and private institutions. The target sample of 200 was determined by power analysis for multiple regression ($f2 = 0.15$, alpha = .05, power = 0.90, 7 predictors), which required a minimum of 153 participants; the achieved sample of 200 provided adequate power (estimated 0.96) and allowed for potential non-response attrition.

Phase 2 (Qualitative): Six focus group discussions (FGDs) were conducted with a purposively selected subsample of 48 teachers from Phase 1 (approximately 8 per group), with groups stratified by location (3 rural, 3 urban) and further differentiated by ADHD knowledge score tertile (low, moderate, high) to ensure variation in perspectives. This sampling strategy enabled exploration of how teachers with different knowledge levels experienced and explained the structural barriers identified quantitatively.

2.4 Instruments

Teacher Knowledge and Attitudes about ADHD Scale (KAADS): The KAADS is a 36-item validated instrument assessing three domains: factual knowledge about ADHD (20 items; true/false/do not know format; maximum score 20), classroom management confidence (8 items; 5-point Likert scale), and referral behaviour and practice (8 items; 5-point Likert scale) [8]. The composite knowledge score (0-20) served as the primary quantitative outcome variable. Internal consistency in the present sample was good for all subscales (Cronbach's alpha: knowledge = .78, confidence = .81, referral = .76). The KAADS was translated into Twi and piloted with 20 teachers outside the main sample, with minor linguistic adaptations made to ensure conceptual equivalence.

School Resource Inventory (SRI): A researcher-developed 15-item instrument assessed school-level resource availability relevant to ADHD support, including presence of a school counsellor, access to an educational psychologist, IEP policy implementation, class size, and availability of assistive or digital learning tools. Items were scored on a three-point availability scale (0 = not available, 1 = partially available, 2 = fully available), yielding a composite resource score (0-30).

Teacher Background Questionnaire: A structured questionnaire captured demographic information (age, sex, years of experience, school type and location), training history (whether any ADHD-specific, special educational needs, or inclusive education training had been received, and the format and duration of such training), and self-reported confidence in identifying ADHD in learners.

Focus Group Discussion Guide: The FGD guide comprised five thematic areas derived from the quantitative findings and the literature: (1) everyday classroom experiences of supporting learners with ADHD or attention difficulties; (2) knowledge sources and training experiences; (3) institutional and structural barriers to ADHD support; (4) cultural and community attitudes toward ADHD; and (5) perceived priorities for improving support. Each theme included two to four primary questions with follow-up probes.

2.5 Procedure

Ethical approval was obtained from the University of Education, Winneba Institutional Review Board prior to data collection. Written informed consent was secured from all participants. Anonymity was maintained through participant codes and data encryption. The quantitative survey was administered in group settings during school non-contact time, with a trained research assistant present to clarify items. Average completion time was 28 minutes. Focus group discussions were conducted in a quiet room on school premises, lasted between 60 and 90 minutes, were conducted in English and Twi as required, and were audio-recorded with participant consent. Recordings were transcribed verbatim and translated where necessary by a bilingual research associate.

2.6 Analysis

Quantitative analysis was conducted in SPSS Version 28. Descriptive statistics characterised the sample and main study variables. Independent samples t-tests compared rural and urban teachers on knowledge scores, training rates, resource scores, and confidence ratings. Cohen's d estimated effect sizes. Hierarchical multiple regression was used to identify predictors of effective ADHD classroom practices (dependent variable: KAADS referral and practice subscale composite), entered in three blocks: Block 1 (demographic controls: age, sex, years of experience, school type); Block 2 (training variables: ADHD-specific training received, duration of training, access to specialist staff); Block 3 (knowledge and attitude mediators: KAADS knowledge score, confidence score). Multicollinearity was assessed through tolerance and variance inflation factors (VIF).

Qualitative analysis followed Braun and Clarke's [20] six-step thematic analysis framework. Open coding was applied inductively to all transcripts, generating initial codes that were subsequently organised into candidate themes and reviewed iteratively by the research team to ensure coherence and distinctiveness. Investigator triangulation — achieved by having two independent coders analyse a 20% random subsample of transcripts with a minimum 80% initial agreement criterion — supported credibility and dependability. Divergences were resolved through discussion and consensus. NVivo 14 supported data organisation and audit trail management.

Integration of quantitative and qualitative findings was achieved through a joint display in which quantitative results and corresponding qualitative themes were presented in parallel, enabling convergent interpretation and identification of explanatory mechanisms.

2.7 Ethical Considerations

The study was conducted in accordance with the Declaration of Helsinki. Ethical approval was granted by the University of Education, Winneba Institutional Review Board (Ref: UEW/IRB/2024/018). All participants provided written informed consent before participation, and were free to withdraw at any time without penalty. Confidentiality was preserved through pseudonymisation of all participant data and secure encrypted storage. Focus group participants were reminded of confidentiality expectations within the group at the outset of each session. No incentives were provided to participants.

3. Results

3.1 Sample Characteristics

Table 1 presents the demographic profile of the quantitative sample. Of the 200 participants, 118 (59.0%) identified as female and 82 (41.0%) as male. The mean age was 34.6 years (SD = 7.2), with a range of 24 to 56 years. Mean teaching experience was 9.8 years (SD = 6.1). Urban teachers were more likely to hold postgraduate qualifications (34.0% vs. 18.0%) and to be teaching in private schools (42.0% vs. 16.0%). Critically, only 38.0% of the total sample had received any form of ADHD-specific, special educational needs, or inclusive education training. This proportion was higher among urban teachers (44.0%) than rural teachers (32.0%), though both figures confirm a pervasive training deficit across contexts.

Table 1
Demographic Characteristics of Participants by School Location

Characteristic	Total (N=200)	Rural (n=100)	Urban (n=100)
Sex			
Female	118 (59.0%)	58 (58.0%)	60 (60.0%)
Male	82 (41.0%)	42 (42.0%)	40 (40.0%)
Age, M (SD)	34.6 (7.2)	35.1 (7.8)	34.1 (6.6)
Teaching Experience, years, M (SD)	9.8 (6.1)	10.2 (6.4)	9.4 (5.8)
Highest Qualification			
Diploma / Certificate	74 (37.0%)	46 (46.0%)	28 (28.0%)
Bachelor's Degree	78 (39.0%)	36 (36.0%)	42 (42.0%)

Postgraduate	48 (24.0%)	18 (18.0%)	34 (34.0%)
School Type			
Public	129 (64.5%)	84 (84.0%)	45 (45.0%)
Private	71 (35.5%)	16 (16.0%)	55 (55.0%)
Any Inclusive/ADHD Training Received	76 (38.0%)	32 (32.0%)	44 (44.0%)
Access to School Specialist (counsellor/psychologist)	74 (37.0%)	22 (22.0%)	52 (52.0%)

Note. Values are n (%) unless otherwise indicated. M = mean; SD = standard deviation. Any Inclusive/ADHD Training includes formal pre-service modules, in-service workshops, or certified courses on special educational needs, inclusive education, or ADHD specifically.

3.2 ADHD Knowledge and Classroom Practice Scores

Table 2 presents the comparative descriptive statistics and inferential test results for rural and urban teachers across all KAADS subscales and the school resource inventory. Urban teachers demonstrated significantly higher mean ADHD knowledge scores than rural teachers (62.4% vs. 54.7% of maximum; $t(198) = 4.83$, $p < .001$, $d = 0.68$), representing a moderate effect size. Significant differences in the same direction were observed for classroom management confidence ($t(198) = 3.61$, $p < .001$, $d = 0.51$) and referral practice scores ($t(198) = 4.12$, $p < .001$, $d = 0.58$). Mean school resource scores were substantially higher in the urban context (17.8 vs. 10.4 out of 30; $t(198) = 9.27$, $p < .001$, $d = 1.31$), confirming the structural resource disparity that motivated the rural-urban comparative design.

Table 2
Comparison of Rural and Urban Teachers on KAADS Subscales and School Resource Scores

Variable	Rural M (SD)	Urban M (SD)	t(198)	p	d
ADHD Knowledge Score (0-20)	10.94 (2.38)	12.48 (2.11)	4.83	< .001	0.68
Management Confidence Score (8-40)	24.3 (5.1)	27.6 (5.8)	3.61	< .001	0.51
Referral Practice Score (8-40)	22.7 (4.8)	26.1 (5.5)	4.12	< .001	0.58
Self-Rated Confidence in ADHD ID (1-5)	2.4 (0.9)	2.9 (0.8)	3.98	< .001	0.56
School Resource Score (0-30)	10.4 (3.6)	17.8 (4.2)	9.27	< .001	1.31

Note. ADHD ID = ADHD identification. d = Cohen's d effect size. All p-values are two-tailed. Effect size benchmarks: small = 0.20, medium = 0.50, large = 0.80 (Cohen, 1988).

3.3 Predictors of Effective ADHD Classroom Practices: Hierarchical Regression

Table 3 presents the results of the hierarchical regression analysis predicting the KAADS referral and practice composite score. Block 1 demographic variables accounted for a modest but significant proportion of variance ($R2 = .07$, $F(4,195) = 3.68$, $p = .006$). The addition of training and specialist access variables in Block 2 produced a substantial and significant incremental variance explanation (delta $R2 = .28$, $p < .001$), with formal ADHD/inclusive education training (beta = .41, $p < .001$) and access to

specialist support staff (beta = .29, p < .001) emerging as strong, independent predictors. Block 3 addition of the KAADS knowledge and confidence scores produced a further significant increment (delta R2 = .09, p < .001), bringing the total explained variance to R2 = .44. Knowledge score (beta = .22, p = .001) and management confidence (beta = .18, p = .003) were significant independent predictors in this final model. No VIF values exceeded 2.8, indicating acceptable multicollinearity levels.

Table 3

Hierarchical Regression Analysis: Predictors of Effective ADHD Classroom Practices (N = 200)

Predictor	B	SE B	beta	t	p
Block 1: Demographics					**R2 = .07***
Age	0.06	0.09	.05	0.67	.506
Sex (1 = female)	0.84	0.71	.08	1.18	.239
Years of Experience	0.21	0.10	.16	2.10	.037
School Location (1 = urban)	1.42	0.72	.14	1.97	.050
Block 2: Training & Resources					**delta R2 = .28****
ADHD/Inclusive Training Received	4.11	0.74	.41	5.55	< .001
Training Duration (hours)	0.04	0.02	.11	2.00	.047
Access to Specialist Support	3.02	0.76	.29	3.97	< .001
Block 3: Knowledge & Confidence					**delta R2 = .09****
KAADS Knowledge Score	0.88	0.26	.22	3.38	.001
KAADS Management Confidence	0.41	0.14	.18	2.93	.003
Total R2					**.44****

Note. B = unstandardised regression coefficient; SE B = standard error; beta = standardised regression coefficient. *p < .05; **p < .01; ***p < .001. All predictors in earlier blocks retained in subsequent blocks.

3.4 Qualitative Findings: Thematic Analysis

Five interconnected themes emerged from the focus group discussions, providing explanatory context for the quantitative patterns and revealing structural and cultural mechanisms underlying the observed disparities.

Theme 1: Absent and Superficial Pre-Service Training. Participants across all six focus groups expressed that their initial teacher education had provided little or no meaningful preparation for supporting learners with ADHD or other neurodevelopmental conditions. This pattern was consistent regardless of school location, although rural teachers were more emphatic about the complete absence of such content. Participants described training that had been theoretical, brief, and disconnected from classroom realities. One rural teacher reflected: "In college, they mentioned special needs in one lecture. One. And that was about physical disability, nothing about behaviour or attention." An urban teacher similarly noted: "I graduated thinking inclusion meant making space for students in wheelchairs. I had no idea there were children in my class every day with ADHD until someone told me years later." This theme corresponded

directly to the quantitative finding that only 38% of the sample had received any relevant training, and that training receipt was the strongest predictor of classroom practice.

Theme 2: Absent Referral Systems and Diagnostic Pathways, Especially in Rural Areas. A second prominent theme concerned the near-total absence of functional referral pathways for learners suspected of having ADHD, with rural teachers describing this absence as absolute and urban teachers describing it as inconsistent and unreliable. Participants reported that even when they recognised possible ADHD-related behaviours, they had no clear person to contact, no established protocol to follow, and no expectation that a referral would result in meaningful assessment or support. A rural school counsellor (whose role was primarily disciplinary rather than clinical) described the situation: "When I see a child who cannot sit, cannot focus, always disturbing, I want to refer somewhere. But where? The nearest psychologist is in Accra. The parents cannot afford the transport." An urban teacher observed: "There is a list on the wall for referrals but I have never seen anyone actually go through it and come back with a diagnosis." This theme aligned with the quantitative finding that access to specialist staff was the second-strongest predictor of effective classroom practice (beta = .29).

Theme 3: Structural Impossibility of Individualised Support Under Large-Class Conditions. Participants in both rural and urban contexts identified class size as a fundamental structural barrier to ADHD support, though the scale of the problem was reported as more acute in rural schools. Mean class sizes reported by participants were 48.3 pupils per class in rural schools and 36.7 in urban schools. Teachers described IEP-type accommodations as theoretically desirable but practically unworkable at these scales. One rural teacher stated: "An IEP is for one child. I have 52 children. Even if I wanted to, where do I find the time to monitor one child's behaviour plan while teaching 51 others?" Several urban teachers acknowledged that the smaller classes in private schools within their context made individualised approaches more feasible, highlighting how the rural-urban disparity is partly mediated by the public-private division within the urban context itself.

Theme 4: Cultural Stigma and Family Resistance to ADHD Labelling. Across all groups, participants identified cultural attitudes toward ADHD as a significant barrier to both identification and support. ADHD was frequently understood by families as reflecting poor upbringing, disobedience, or spiritual affliction rather than a neurodevelopmental condition. Teachers reported that raising concerns with parents about a child's attention or behaviour often prompted defensive or hostile responses, and that families in rural communities were particularly resistant to the idea of a medical or psychological label. A focus group participant summarised a common dynamic: "When you call a parent and say your child is struggling to pay attention and may need assessment, the first thing they say is 'are you calling my child stupid?' or 'this is not a problem, you just need to discipline them more'." Healthcare professionals consulted during instrument development for this study corroborated that cultural normalisation of hyperactive behaviour in boys and under-identification of inattentive presentations in girls compounded identification challenges.

Theme 5: Urban Structural Advantage Without Adequate Preparedness. The fifth theme captured a nuanced finding that complicated simple rural-urban comparisons: while urban teachers had access to better resources and marginally higher training rates, many urban teachers recognised that they remained substantially underprepared for ADHD support despite operating in more favourable conditions. Several expressed frustration that resource availability had not translated into knowledge or confidence, and that the absence of mandatory, specific ADHD training meant that even motivated urban teachers relied on informal learning, internet searches, and peer advice. As one urban teacher put it: "We have computers, we have a counsellor two days a week, we have access to the internet. But I still feel like I'm guessing

every day with some of my students. Knowing that something is there is not the same as knowing what to do." This theme underscored the quantitative finding that school location became non-significant in Block 3 of the regression when knowledge and confidence were entered, suggesting that the urban advantage in practice is largely mediated by training and knowledge rather than being a direct effect of location.

Table 4
Summary of Qualitative Themes, Representative Quotes, and Quantitative Correspondences

Theme	Representative Quote	Quantitative Correspondence
1. Absent pre-service training	"In college, they mentioned special needs in one lecture. Nothing about behaviour or attention." (Rural teacher)	Only 38% of sample received any relevant training; training was the strongest predictor (beta = .41)
2. No referral systems, especially rural	"The nearest psychologist is in Accra. The parents cannot afford the transport." (Rural counsellor)	22% of rural vs. 52% of urban schools had specialist access; specialist access beta = .29
3. Large classes prevent individualised support	"An IEP is for one child. I have 52. Where do I find the time?" (Rural teacher)	Rural mean class size 48.3 vs. urban 36.7; school resource score significantly lower in rural (10.4 vs. 17.8)
4. Cultural stigma and family resistance	"The first thing they say is 'are you calling my child stupid?'" (Urban teacher)	Cultural stigma not directly measured but corroborates low referral rates and low diagnosis-seeking behaviour
5. Urban advantage without adequate preparedness	"Knowing that something is there is not the same as knowing what to do." (Urban teacher)	School location non-significant in Block 3 regression; knowledge and confidence mediate urban advantage

Note. Quotes have been lightly edited for length. All participant identifiers are pseudonymised.

4. Discussion

This mixed-methods study provides the first systematic, comparative examination of teacher preparedness, school resources, and ADHD support practices across rural and urban schools in Ghana, building directly on a prior qualitative study that identified teacher training deficits as a critical gap in Ghanaian ADHD support systems [12]. The findings reveal a consistent and troubling pattern: across both rural and urban contexts, teacher preparedness for ADHD is inadequate, structurally constrained, and insufficiently addressed by current pre-service and in-service training provision. While rural teachers face greater structural disadvantages, the urban context is not characterised by adequate preparedness — merely by comparatively better conditions and marginally higher training rates that remain far below what inclusive education requires.

The finding that formal ADHD or inclusive education training was the strongest predictor of effective classroom practices (beta = .41) is consistent with a substantial international literature. Kos, Richdale, and Hay [8] demonstrated that teacher knowledge about ADHD is the primary determinant of confidence and practice, a finding replicated in systematic reviews by Moldavsky and Sayal [9] and in a large-scale multi-

country study by Ohan and colleagues [21]. What the present study adds to this literature is the demonstration that in a Ghanaian context, where baseline training rates are extremely low, the effect of training on practice is particularly pronounced, suggesting high marginal returns to even modest training investments. The hierarchical regression architecture further reveals that the apparent urban advantage in ADHD practice (significant at the Block 1 and Block 2 stages) was substantially attenuated and reduced to non-significance when ADHD knowledge and confidence were entered in Block 3, indicating that the rural-urban gap in practice is primarily mediated by the training and knowledge differential rather than being a direct effect of geographic location or resource availability per se. This finding has important policy implications: it suggests that targeted training delivery to rural teachers could substantially close the practice gap without requiring the extensive infrastructure investments that would be necessary to achieve urban-equivalent resource levels.

The near-universal absence of functional referral pathways, particularly in rural settings, represents a critical system-level failure that training alone cannot address. Access to specialist support was the second-strongest predictor of classroom practice in this study (beta = .29), and qualitative data revealed that even when teachers recognised possible ADHD-related behaviours, the absence of a clear referral route left them unable to translate awareness into action. This finding aligns with research from other low- and middle-income countries demonstrating that the diagnostic and support bottleneck in ADHD is not solely located at the teacher level but is embedded in the broader health-education interface [22,23]. In Ghana, the critical shortage of clinical psychologists and educational psychologists — estimated at fewer than 200 practising professionals for a population of over 32 million [24] — means that even well-intentioned referrals from trained teachers in rural areas face structural impossibility. Addressing this requires not only teacher training but also health workforce strengthening, telehealth expansion, and the formalisation of tiered support models that enable school-based interventions without requiring full diagnostic confirmation.

The cultural stigma theme identified in qualitative data extends and deepens findings from the prior qualitative study in this series [12] and resonates with a broader literature on ADHD-related stigma in West African and sub-Saharan African contexts [25,26]. The tendency to attribute ADHD-consistent behaviours to poor parenting, disobedience, or spiritual causes rather than neurodevelopmental aetiology creates multiple barriers: it reduces family willingness to seek assessment, creates resistance to school-based intervention, and can generate conflict between teachers and families that undermines the collaborative relationships that are essential for ADHD management. Importantly, the stigma barrier operates differently across gender lines, with boys' hyperactivity more likely to be normalised and girls' inattentive presentations more likely to be overlooked entirely, a pattern that mirrors the well-documented global trend of ADHD underdiagnosis in girls [27]. Future research in this context should explicitly examine gender as a moderator of identification and support, a recommendation that is reinforced by the largely undifferentiated treatment of ADHD presentation across gender in the current and prior study.

The finding that large class sizes constitute a structural barrier to individualised ADHD support is both practically significant and theoretically important. Mean class sizes of 48.3 in rural schools approach twice the recommended maximum for inclusive classrooms under UNESCO guidelines [28], and represent conditions under which the individualised monitoring, feedback, and adjustment that characterise effective ADHD management are essentially impossible for a single teacher to sustain. This finding raises important questions about the realism of policy recommendations for IEP implementation in contexts where class sizes and teacher-pupil ratios make such recommendations unfeasible without additional staffing.

Research on ADHD support in low-resource settings increasingly recognises the need for tiered, group-based intervention models that can deliver meaningful support without requiring one-to-one teacher attention [29,30]. The present study's findings reinforce the case for investment in learning support assistants, peer-mediated intervention models, and school-based group behaviour management programmes as complements to teacher training.

Several methodological strengths distinguish this study. The mixed-methods design enabled complementary and convergent evidence generation, with the qualitative findings providing mechanistic explanations for the quantitative patterns that would not have been accessible through survey data alone. The use of a validated, adapted instrument (KAADS) with good internal consistency in the present sample, combined with independent investigator coding and an 80% agreement threshold in the qualitative analysis, supports the credibility and dependability of the findings. The joint display integration approach facilitated rigorous rather than token integration of quantitative and qualitative data. Limitations include the cross-sectional design, which precludes causal inference; the restriction to two regions of Ghana, which may limit generalisability to other parts of the country; the self-report nature of the practice measures, which may overestimate actual classroom behaviour; and the absence of student-level data that would allow examination of teacher preparedness effects on ADHD outcomes.

5. Conclusions

This study demonstrates that teacher preparedness for ADHD support in Ghana is inadequate across both rural and urban contexts, and that formal training and access to specialist support staff are the principal modifiable determinants of effective classroom practice. The rural-urban disparity in ADHD support is real but is primarily mediated by differences in training and knowledge rather than by location per se, suggesting that targeted professional development investment could substantially narrow the gap. Five structural and cultural barriers — absent pre-service training, non-functional referral systems, large class sizes, cultural stigma, and urban resource advantage without adequate preparedness — interact to create a system in which children with ADHD receive inconsistent, poorly informed, and inequitable support.

These findings call for coordinated policy action across three domains. In teacher education, ADHD and neurodevelopmental conditions should be incorporated as mandatory content in pre-service teacher education programmes and standardised in-service continuing professional development curricula, with particular attention to practical classroom management strategies and referral pathway navigation. In health-education system integration, tiered referral models that do not require access to distant specialist services should be formalised, telehealth-based consultation options for teachers and families should be expanded, and the deployment of school-based mental health professionals to underserved rural areas should be prioritised. In community and cultural engagement, culturally responsive awareness campaigns addressing ADHD stigma and misconceptions should be co-designed with community leaders, parents, and local health workers to create the enabling environment in which teacher-level interventions can succeed.

6. Future Research Directions

Future research should adopt longitudinal designs to examine whether teacher training interventions produce sustained improvements in ADHD identification rates, referral behaviour, and student outcomes over time. Intervention studies that systematically evaluate the impact of structured ADHD training programmes on teacher practice and learner outcomes in Ghanaian and broader sub-Saharan African

contexts are particularly needed. Cross-national comparative studies that situate Ghanaian findings within the broader West African and pan-African context would enhance the generalisability and policy relevance of the evidence base. Additionally, gender-disaggregated analyses of ADHD identification and support are warranted to examine whether girls with predominantly inattentive presentations are disproportionately overlooked under current teacher identification practices. Research examining the cost-effectiveness of different models of specialist support delivery — including mobile outreach, telehealth consultation, and school-cluster specialist deployment — would provide actionable evidence for health workforce planning in resource-constrained settings.

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