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Planning Model for Early Childhood Education (Pendidikan Anak Usia Dini/PAUD) and Non-Formal Education Based on National Standards Through Regional Needs Analysis in Tanah Bumbu Regency, South Kalimantan

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ABSTRACT

Purpose: This study mapped PAUD compliance with the eight National Education Standards (SNP) in Tanah Bumbu Regency and developed an evidence-based planning framework for improving institutional quality toward National Standard School status. **Methods:** A quantitative descriptive-analytical survey was conducted across 325 PAUD units in 12 sub-districts. Stratified purposive sampling yielded 36 nominated schools subjected to four data streams: (1) an 80-item SNP self-assessment instrument (score range 80–400); (2) Academic Ability Tests (TKA) across audio, visual, and kinesthetic domains; (3) direct Facilities and Infrastructure (SAPRAS) observation; and (4) BAN-PDM accreditation records. Weighted aggregation based on Rasch Model logit person measures (Winsteps) produced a psychometrically calibrated institutional ranking. **Findings:** Average SNP compliance was approximately 65.5%. The three lowest-performing standards were Facilities and Infrastructure (50%), Educator and Education Personnel (55%), and Graduate Competency (60%). Cluster analysis yielded three institutional categories: Ready, Developing, and Needs Intervention. A three-phase planning framework (2026–2030) projects overall compliance reaching 83–85% under consistent implementation. **Research Implications:** The gap-based framework offers a replicable model for district-level PAUD planning. Key limitations include potential social desirability bias in self-assessment data, a sampling procedure biased toward higher-performing units, and the absence of longitudinal follow-up. **Originality:** The study integrates multi-source triangulation with Rasch-based institutional ranking to generate a cluster-differentiated, phased planning framework advancing beyond prior district-level SNP compliance surveys by translating gap profiles directly into measurable, standards-linked KPIs.

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INTRODUCTION

Early Childhood Education (Pendidikan Anak Usia Dini/PAUD) plays a strategic role in strengthening human capital and ensuring equitable access to quality education. Globally, early childhood education is recognized as a foundational developmental stage that significantly shapes cognitive, social, and emotional trajectories, with direct implications for long-term socio-economic outcomes (UNESCO, 2021). In Indonesia, PAUD is formally positioned as an integral component of the national education system under Government of the Republic of Indonesia (2003), which mandates quality assurance through a national standards framework.

The National Education Standards (Standar Nasional Pendidikan/SNP) consist of eight interrelated components covering inputs, processes, and outputs of education, regulated through Government of the Republic of Indonesia (2021). These standards provide a systems-based quality assurance framework that links institutional capacity, governance, and learning outcomes. Despite regulatory clarity, however, empirical challenges persist at the regional level: disparities in teacher qualifications, limited infrastructure, insufficient managerial capacity, and inconsistent funding mechanisms continue to hinder effective implementation (Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi, 2023).

Three theoretical perspectives ground this study. Human Capital Theory frames PAUD investment as a long-term economic strategy that generates measurable returns through improved labor market outcomes and reduced social inequality (Becker, 2009; Heckman & Mosso, 2014). Decentralization Theory provides an analytical lens for understanding regional quality disparities: while fiscal and administrative decentralization under Government of the Republic of Indonesia (2014) enhances local responsiveness, it also produces inequality when institutional capacities differ significantly (Faguet, 2014). The Education Governance Model complements both by emphasizing that governance quality through regulation, institutional leadership, accountability, and stakeholder participation determines whether policy frameworks translate into improved learning outcomes (World Bank, 2018).

Prior studies have examined SNP compliance in Indonesian PAUD institutions (Hermawan, 2019; Iskandar, 2022; Mulyani, 2024), school clustering models (Putra & Rahayu, 2020; Wijaya, 2021), and regional education planning roadmaps (Prasetyo & Widodo, 2023). Existing district-level SNP compliance surveys, however, have not integrated multi-source data triangulation with psychometrically calibrated institutional ranking to produce a cluster-differentiated planning framework with standards-linked KPIs. This study addresses that gap by generating a gap profile, a cluster classification, and a phased intervention framework grounded in four data streams rather than self-assessment alone. This study addresses three objectives: (1) to map PAUD compliance across the eight SNP components in Tanah Bumbu Regency; (2) to identify institutional clusters based on multi-source performance profiles; and (3) to develop an evidence-based planning framework with measurable KPIs targeting National Standard School (SSN) achievement.

METHOD

Research Design

This study employed a quantitative descriptive-analytical survey design (Creswell & Creswell, 2022). The approach was chosen because the primary aim was to map baseline compliance levels across a defined population and derive evidence-based planning priorities, rather than to test causal hypotheses.

Population and Sampling

The study population comprised 325 PAUD units distributed across 12 sub-districts in Tanah Bumbu Regency, based on Dapodik (Education Data Pokok) records. A two-stage stratified purposive sampling procedure was employed. In Stage 1, all 325 units completed an SNP self-assessment facilitated by four internal assessors per school: the principal, one classroom teacher, one supervisor, and one school committee representative. Schools were ranked by aggregated self-assessment score within each sub-district. In Stage 2, the three highest-scoring units per sub-district were selected as nominated schools for deeper analysis, yielding 36 units (Sugiyono, 2022). It is acknowledged that selecting top-performing units in Stage 2 produces a sample biased toward higher-capacity institutions, which limits the representativeness of deeper-analysis findings for the full district population. This constraint is reflected in the interpretation of results.

Data Collection Instruments

Four instruments were employed across the 36 nominated schools:

1. SNP Self-Assessment Instrument: An 80-item questionnaire covering all eight SNP components (10 items per standard), scored on a 1–4 Likert scale (total range: 80–400). The instrument was developed with reference to Peraturan Menteri Pendidikan, Kebudayaan, Riset, dan Teknologi Nomor 22 Tahun 2023. Content validity was established through review by three PAUD education supervisors and two academic experts prior to deployment.
2. Academic Ability Test (TKA): A child developmental assessment covering three learning-modality domains *auditory, visual, and kinesthetic* aligned with developmental benchmarks for the early childhood age range. Tasks were administered as structured play-based activities appropriate to early childhood developmental standards.
3. Facilities and Infrastructure (SAPRAS) Observation Protocol: A structured checklist completed by a trained external observation team, referencing construction and safety standards SNI 1726:2019, SNI 2847:2019, SNI 1729:2020, and SNI 8460:2017.
4. Accreditation Records: Institutional accreditation status obtained from BAN-PDM (National Accreditation Board for Early Childhood Education and Non-Formal Education) was converted to a numeric scale: A = 4, B = 3, C = 2, Not Yet Accredited = 1.

Data Analysis

Analysis proceeded through five sequential stages. First, all 325 units were ranked by SNP self-assessment score. Second, the 36 nominated schools' self-assessment rankings were cross-validated against TKA results, SAPRAS quality scores, and accreditation status to assess consistency and detect response bias (Widoyoko, 2022). Third, all

four data streams were integrated using a weighted aggregation procedure based on Rasch Model logit person measures computed with the Winsteps 5.x application (Sumintono & Widhiarso, 2021). Rasch analysis confirmed adequate item fit (mean square infit and outfit within 0.5–1.5) and satisfactory instrument reliability (person reliability > 0.80) for the SNP self-assessment instrument. Fourth, the weighted composite scores produced a psychometrically calibrated institutional ranking. Fifth, ranked units were classified into three intervention clusters Ready, Developing, and Needs Intervention using tertile cut-points on the composite score distribution. Planning framework derivation and KPI targets were then grounded in the gap profiles of the Developing and Needs Intervention clusters, ensuring that recommendations reflect sub-standard institutional conditions rather than best-case performance (Zulkardi & Retta, 2024).

Ethical Considerations

The study was conducted under institutional authorization from Lambung Mangkurat University and the Tanah Bumbu Regency Education Office. All school principals and teachers provided written informed consent to participate. For the Academic Ability Test administered to children, written parental or guardian consent was obtained prior to any child participation. Data were anonymized at the school level for analysis and reporting purposes. The TKA was administered by trained assessors as structured play-based activities consistent with developmentally appropriate practice for early childhood learners.

RESULTS

SNP Compliance Baseline Profile

Analysis of the 325 PAUD units' self-assessment data, cross-validated with TKA, SAPRAS, and accreditation records for the 36 nominated schools, produced the SNP compliance profile presented in Table 1. The overall average compliance was approximately 65.5% (mean scale score ≈ 2.62 on a 1–4 scale), placing the district in the low-moderate range below the national minimum adequacy threshold.

Table 1. SNP Compliance Profile for PAUD Units in Tanah Bumbu Regency, 2025

Nu.	National Education Standard	Compliance (%)	Scale Score (1–4)	Category	Priority Level
1	Content Standards	75%	3.00	Moderate	Secondary
2	Process Standards	70%	2.80	Moderate	Secondary
3	Graduate Competency Standards	60%	2.40	Low	Priority 3
4	Educator and Education Personnel Standards	55%	2.20	Low	Priority 2
5	Facilities and Infrastructure Standards	50%	2.00	Very Low	Priority 1
6	Management Standards	72%	2.88	Moderate	Secondary
7	Financing Standards	68%	2.72	Moderate	Secondary
8	Assessment Standards	74%	2.96	Moderate	Secondary

Content Standards (75%; scale score 3.00) and Assessment Standards (74%; 2.96) recorded the highest compliance, indicating that most units maintain basic curriculum documentation and child developmental evaluation mechanisms. Process Standards (70%), Management Standards (72%), and Financing Standards (68%) were in the moderate range, reflecting administrative systems that exist but are not yet data-driven. The three lowest-performing standards Facilities and Infrastructure (50%; 2.00), Educator and Education Personnel (55%; 2.20), and Graduate Competency (60%; 2.40) constitute the priority gap areas.

Development of Early Childhood Education (PAUD) and Early Childhood Education (PNP) Based on Regional Needs

Research results show that the development of Early Childhood Education (PAUD) and Non-Formal Education in Tanah Bumbu Regency has experienced a quantitative increase in the number of educational units and students over the past five years. However, this growth has not been fully accompanied by equitable distribution of quality across sub-districts. This condition aligns with the finding that the expansion of PAUD institutions in the regions often outpaces improvements in service quality and educational governance (Susanto & Nurhadi, 2019). This disparity demonstrates the importance of a needs-based planning approach.

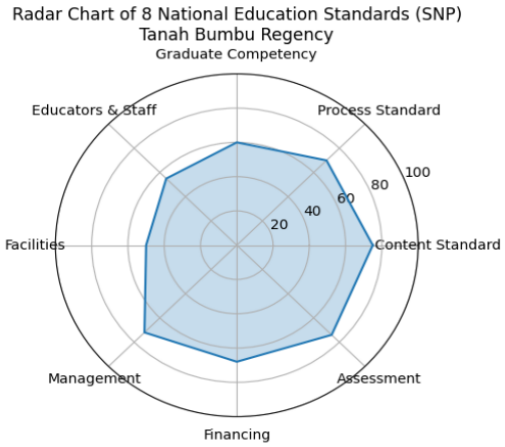

Figure 1. Radar chart of SNP compliance for PAUD in Tanah Bumbu Regency, 2025

The radar chart visualizes the imbalance between standards: the three priority gaps produce pronounced indentations toward the centre of the polygon, confirming that quality improvement has not proceeded systematically or equitably across SNP components. The radar chart shows the level of compliance with the eight National Education Standards (SNP) for Early Childhood Education (PAUD) and Non-Formal Education (Non-Formal Education) in Tanah Bumbu Regency as a comparative percentage. Overall, the visual pattern reveals an imbalance between standards, indicating that quality improvement has not been implemented systematically and equitably.

Institutional Cluster Classification

Cross-validation of self-assessment scores against TKA, SAPRAS, and accreditation data revealed a significant misalignment: schools with high self-assessed SNP scores did not consistently demonstrate strong accreditation status or SAPRAS quality ratings. This convergent validity gap signals a social desirability bias in internal assessments, consistent with findings by Widoyoko (2022). Rasch-based weighted aggregation partially corrected for this bias by anchoring composite scores to externally validated data streams.

Tertile classification of the 36 nominated schools yielded three intervention clusters. The Ready cluster comprised institutions with consistently strong profiles across all four data sources. The Developing cluster contained institutions with adequate self-assessment scores but identifiable gaps in infrastructure, accreditation, or TKA outcomes. The Needs Intervention cluster included units with low compliance across multiple indicators. District-wide accreditation data indicate that 41.6% of the 325 PAUD units hold C-level or unaccredited status, and 476 teachers predominantly in private institutions do not meet the minimum S1/D-IV academic qualification requirement.

Phased Planning Framework (2026–2030)

The three-phase planning framework was derived from the gap profiles of the Developing and Needs Intervention clusters. Phase priorities were ordered by the magnitude of compliance deficits and the upstream causal relationship between standards (e.g., educator qualification gaps directly constrain graduate competency outcomes). Table 2 presents the full framework.

Table 2. Phased Planning Framework for PAUD Quality Improvement in Tanah Bumbu Regency (2026–2030)

Phase	Period	Priority Standards	Main Strategies	Performance Targets	Projected Avg. SNP
I	Years 1–2	Facilities & Infrastructure; Educators & Staff; Graduate Competency	(a) S1/D-IV qualification upgrading and pedagogical training; (b) minimum infrastructure fulfillment per SNI standards; (c) structured early literacy and numeracy programs	70% of units meet minimum compliance on three priority standards	±72%
II	Years 2–3	Process; Management; Financing	(a) regular academic supervision cycles; (b) data-based management via quality dashboard; (c) financing diversification through CSR, village funds, and regional partnerships	Evidence-based planning operational in ≥75% of units	±78–80%

Phase	Period	Priority Standards	Main Strategies	Performance Targets	Projected Avg. SNP
III	Years 4–5	Holistic integration of all 8 SNP	(a) digitalization of authentic assessment systems; (b) quality clustering and peer-learning networks; (c) roadmap integration into RPJMD	≥85% of units reach National Standard School category	±83–85%

Key Performance Indicators per SNP (2026–2030)

Table 3 presents operationalized KPIs for each of the eight SNP components, with phased targets for 2026, 2028, and 2030. Note: Educator and Education Personnel Standards (SNP 4) carries two KPI rows — one for qualification attainment and one for professional development participation — both of which are sub-components of the single standard.

Table 3. Key Performance Indicators (KPI) per SNP Component, Tanah Bumbu Regency (2026–2030)

Nu.	National Education Standard (SNP)	Performance Indicator	Unit	Target 2026	Target 2028	Target 2030
1	Content Standards	Unit has contextual operational curriculum	% unit	75%	85%	95%
2	Process Standards	Documented play-based and differentiated learning	% unit	70%	82%	90%
3	Graduate Competency Standards	Children achieve BSH level in literacy & numeracy	% student	65%	75%	85%
4	Educator & Education Personnel Standards	Teachers hold minimum S1/D-IV qualification	% teacher	60%	75%	90%
5	Educator & Education Personnel Standards	Teachers complete in-service training ≥1×/year	% teacher	70%	85%	95%
6	Facilities & Infrastructure Standards	Unit meets minimum infrastructure per regulations	% unit	65%	80%	95%
7	Management Standards	Data-based planning (RKS/RKAS via needs analysis)	% unit	70%	85%	95%
8	Financing Standards	Digitalized transparent financial reporting	% unit	60%	80%	95%
9	Assessment Standards	Systematic, documented authentic assessments	% unit	75%	85%	95%

note: SNP 8

The KPI framework demonstrates that quality improvement is designed as an integrated, cross-standard effort rather than isolated programmatic interventions. Standards with the largest gaps (Facilities, Educators, Graduate Competency) carry accelerated targets in Phase I because addressing structural deficits in human resources and infrastructure is a prerequisite for improvement in downstream standards such as Process, Management, and Graduate Competency outcomes.

DISCUSSION

Why Quality Lags Behind Institutional Growth

The PAUD expansion in Tanah Bumbu reflects a national pattern in which quantitative institutional growth outpaces quality distribution (Susanto & Nurhadi, 2019; Hidayat & Prasetyo, 2021). The operative mechanism is not simply resource insufficiency but a planning architecture that has historically prioritized access metrics enrollment rates, unit counts over quality metrics such as educator competency and infrastructure adequacy. Human Capital Theory suggests

this is a strategic misallocation: if early childhood institutions cannot deliver minimum-quality stimulation, the developmental returns on enrollment access are substantially diminished (Becker, 2009; Barnett, 2011).

The development of Early Childhood Education (PAUD) and Non-Formal Education (Non-Formal Education) in Tanah Bumbu Regency reflects a national trend showing a quantitative increase in educational institutions, but their quality is uneven. This is consistent with research revealing that the development of early childhood education institutions does not always align with the equitable distribution of learning quality (Hidayat & Prasetyo, 2021). This disparity is evident between sub-district centers and remote villages in Tanah Bumbu, necessitating a differentiated approach to education planning.

Infrastructure and Educator Deficits as Structural Barriers

The convergence of low Facilities and Infrastructure compliance (50%) and low Educator and Education Personnel compliance (55%) is not coincidental. These two standards function as enabling conditions for all downstream quality indicators. Without adequate physical learning environments, process standards for play-based and differentiated learning cannot be met. Without pedagogically competent educators, graduate competency outcomes cannot be realized regardless of curriculum quality (Lestari & Putri, 2023; Maulida, 2021). The fact that 476 teachers across the district do not hold the minimum S1/D-IV qualification concentrated in private institutions, which are typically more resource-constrained indicates a structural human resource deficit requiring sustained policy attention rather than short-term training.

This pattern is consistent with Decentralization Theory: the transfer of planning responsibility to local governments under Government of the Republic of Indonesia (2014) has been accompanied by unequal local fiscal and institutional capacity (Faguet, 2014). Remote and lower-income sub-districts face compounding disadvantages in recruiting qualified educators, maintaining infrastructure, and sustaining governance systems. The planning framework responds to this by differentiating interventions by cluster category rather than applying uniform district-wide programs.

Increased community participation aligns with the policy agenda for expanding basic education services in Indonesia, including strengthening early childhood education. Active participation from parents and local stakeholders is a crucial driver of PAUD development because it strengthens the family learning base and creates synergy among stakeholders at the village level (Anugrah & Widiastuti, 2020). Therefore, the success of this participation is not only a quantitative aspect, but also the quality of community involvement in the learning process.

Validity of Self-Assessment Data and Measurement Implications

The misalignment between self-assessed SNP scores and accreditation outcomes raises a measurement concern central to evidence-based planning. If SNP self-assessment systematically overestimates compliance consistent with social desirability effects documented by Widoyoko (2022) then planning frameworks built solely on self-reported data will misidentify which schools require the most urgent intervention. The Rasch-based multi-source aggregation employed here partially addresses this limitation by weighting externally validated data streams. Future planning cycles should incorporate structured external moderation of annual self-assessments to improve data fidelity, particularly for schools in the Needs Intervention cluster.

Although content and process standards have begun to be implemented by many PAUD units, their implementation still shows variations in quality. Previous research has found that a well-documented and contextually implemented early childhood education curriculum can improve children's developmental outcomes, particularly in social, emotional, and early cognitive aspects (Iskandar, 2022). However, challenges arise when educators' capacity to implement the curriculum is uneven, slowing progress toward National Standard Schools.

Theoretical Contribution of the Planning Framework

The planning framework contributes to governance theory by operationalizing the Education Governance Model's claim that governance quality mediates between policy intent and learning outcomes (World Bank, 2018). The three-phase structure maps onto Fullan's (2016) continuous improvement logic: Phase I stabilizes enabling conditions; Phase II builds evidence-based management capacity; Phase III embeds systemic quality into regional institutional frameworks. This is methodologically distinct from prior district SNP surveys (Hermawan, 2019; Iskandar, 2022) because it translates a compliance gap profile directly into a cluster-differentiated, standards-linked KPI structure providing local planners with actionable, measurable targets rather than descriptive summaries.

Table 4. Synthesis of Discussion Themes: PAUD Quality Planning Toward National Standard Schools in Tanah Bumbu Regency

Nu.	Discussion Focus	Research Findings	Theoretical Analysis	Policy Implications	References
1	Institutional Growth	Quantitative expansion of PAUD units; quality distribution uneven across sub-districts	Expansion without quality assurance produces service inequality (Human Capital Theory)	Needs-based, differentiated planning rather than uniform expansion	Susanto & Nurhadi (2019)
2	Community Participation	Community and village-level support is increasing	Community involvement strengthens PAUD sustainability and effectiveness	Formalize school-community partnership mechanisms	Hidayat & Prasetyo (2021)
3	Content & Process Standards	National curriculum documented; implementation variability persists	Effective curriculum requires systematic management support beyond compliance	Structured academic supervision and curriculum monitoring programs	Iskandar (2022)
4	Literacy & Numeracy	Basic literacy and early numeracy achievement require strengthening	Early literacy demands directed, play-based, sustainable pedagogical strategies	PAUD literacy-numeracy strengthening programs with play-based pedagogy	Kusuma & Mulyani (2019)
5	Educator Qualifications	Uneven qualification levels; 476 teachers below S1/D-IV	Teacher quality directly and causally influences PAUD service effectiveness	Targeted credential upgrading and ongoing professional development	Lestari & Putri (2023)
6	Infrastructure Deficits	Facilities do not fully meet SNP minimums; worst in remote areas	Infrastructure disparities are a structural barrier to quality assurance (Decentralization Theory)	Prioritize regional infrastructure budgeting for lowest-scoring units	Maulida (2021)
7	School Clustering	Three-category cluster: Ready, Developing, Needs Intervention	Data-based quality mapping improves efficiency of resource allocation	Cluster-differentiated roadmap and resource targeting	Putra & Rahayu (2020); Wijaya (2021)
8	Governance & Decentralization	Mismatch between self-assessed scores and accreditation outcomes signals validity concern	Decentralization grants local discretion but requires accountability mechanisms (Faguet, 2014)	Integrate external moderation into annual self-assessment cycles	World Bank (2018)

Limitations

Four limitations should be noted. First, the Stage 2 sampling procedure selected the three highest-scoring units per sub-district; the deeper multi-source analysis therefore reflects the district's better-performing tail rather than the full quality distribution. Planning conclusions derived from this sample may underestimate the severity of deficits in the lowest-performing 60% of institutions. Second, the self-assessment instrument is subject to social desirability bias. Although Rasch aggregation mitigates this partially, it does not eliminate it. Third, the projection of 83–85% average compliance by 2030 assumes consistent annual improvement rates and does not model potential fiscal disruptions,

personnel turnover, or policy discontinuities. Fourth, the study does not capture classroom-level instructional quality, which is the most proximal determinant of child developmental outcomes. Future research should integrate structured classroom observation protocols and longitudinal child development tracking to assess whether structural improvements translate into learning gains.

CONCLUSION

This study mapped SNP compliance across 325 PAUD units in Tanah Bumbu Regency and classified 36 nominated schools into three intervention clusters using a multi-source, Rasch-calibrated assessment framework. Average district compliance was approximately 65.5% (mean scale score ≈ 2.62 on a 1–4 scale). The three lowest-performing standards Facilities and Infrastructure (50%; 2.00), Educator and Education Personnel (55%; 2.20), and Graduate Competency (60%; 2.40), were identified as priority gaps, while Content, Assessment, and Management Standards showed moderate compliance. Accreditation data confirmed that 41.6% of district PAUD units hold C-level or unaccredited status, and 476 teachers do not meet the S1/D-IV minimum qualification.

A three-phase evidence-based planning framework (2026–2030) was developed to address these gaps: Phase I targets structural enabling conditions (educator qualifications, infrastructure, early literacy and numeracy); Phase II advances data-driven governance and funding diversification; Phase III embeds holistic quality assurance into the regional RPJMD. Projected average SNP compliance of 83–85% by 2030 represents a realistic trajectory under consistent implementation.

The study contributes a replicable, gap-based planning framework for PAUD quality improvement in decentralized education systems, grounded in multi-source triangulation and cluster-differentiated targeting. A key limitation is that Stage 2 sampling was drawn from higher-performing institutions, which constrains the representativeness of deeper-analysis findings. Future research should address this by including representative sampling across the full quality distribution, integrating external classroom observation, and tracking child developmental outcomes longitudinally.

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AUTHOR CONTRIBUTION STATEMENT

Ambo Sakka the overall manuscript development and coordination of the writing process. Ahmad Suriansyah and Hasnah contributed to data interpretation, literature review, and manuscript drafting. All authors reviewed, revised, and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

AI DISCLOSURE STATEMENT

The authors declare that this research was prepared, researched, written, and edited without the aid of artificial intelligence (AI) techniques.

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