

Environmental Health Risk Assessment in Childcare Facilities: A Review of Existing Assessment Tools and the Case for a Context-Specific, Multi-Domain Framework in Nigeria

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Abstract: *Childcare facilities bring infants and young children together in shared indoor and outdoor spaces for long periods each day. This matters because children are especially vulnerable to environmental hazards due to their physiology, behavior, and stage of development. Based on literature and policy materials, this review found no published and validated multi-domain tool for assessing and prioritizing environmental health risks across childcare facilities in Nigeria. The review focused on four areas: (1) why children are particularly susceptible to environmental hazards; (2) existing childcare environmental health assessment and checklist approaches; (3) early-childhood standards and environmental health evidence relevant to Nigeria and sub-Saharan Africa; and (4) established methods such as the Delphi technique, Analytic Hierarchy Process (AHP), and content-validity assessment that could support framework development. The tools available at the time were mainly checklist or compliance based and generally did not produce a weighted overall risk score. Oversight was also often split among licensing, health, building, and other authorities, making it difficult to assess environmental risks across several domains at once. Nigeria had national minimum standards for early child-care centers covering health, sanitation, nutrition, safety, and related conditions, but the literature reviewed did not identify a validated environmental health risk-scoring tool designed specifically for Nigerian childcare facilities. Established Delphi, AHP, and content-validity methods offered a sound basis for developing one. The review therefore identified a clear methodological and practice*

gap and provided the rationale for developing and validating a context-specific, multi-domain, weighted environmental health risk-assessment framework for Nigerian childcare facilities.

Keywords: *childcare facilities; environmental health; risk assessment; Delphi method; Analytic Hierarchy Process; Nigeria; sub-Saharan Africa*

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1.0 Introduction

Children are not simply smaller versions of adults in relation to environmental exposures. Their physiological characteristics, developmental stage, behavior, and dependence on caregivers can increase their susceptibility to environmental hazards. Developing organs and immature metabolic and detoxification systems may alter the way environmental contaminants are absorbed, distributed, metabolized, and eliminated. In addition, children generally breathe more air, consume more food and water, and have greater exposure relative to body weight than adults. Their frequent hand-to-mouth behavior, tendency to play close to floors and other surfaces, and limited ability to recognize or avoid environmental hazards may further increase exposure (Agency for Toxic Substances and Disease Registry [ATSDR], n.d.; Etzel & Landrigan, 2014; U.S. Environmental Protection Agency [EPA], n.d.). These characteristics make environmental

conditions in places where young children spend substantial amounts of time particularly important to public-health protection.

The environmental health of children has consequently become an important area of preventive research and policy. Landrigan et al. (1998) identified environmental exposures as important contributors to childhood disease and disability and called for a stronger prevention-oriented research agenda focused specifically on children. This perspective was subsequently incorporated into broader international environmental-health initiatives. The World Health Organization (WHO, 2002), through its *Healthy Environments for Children* initiative, emphasized coordinated action to reduce children's environmental disease burden and recognized homes, schools, childcare facilities, and other settings in which children live, learn, and play as important locations for intervention.

Childcare facilities are particularly relevant because young children may spend several hours each day within shared indoor and outdoor environments. During this time, they may be simultaneously exposed to drinking-water and sanitation conditions, food-preparation practices, indoor air quality, cleaning chemicals, physical and structural hazards, contaminated surfaces, pests and vectors, waste, and inadequate hygiene facilities. Because many children occupy the same facility, an environmental hazard can potentially affect several children at the same time. Consequently, environmental health assessment in childcare settings requires an approach that extends beyond individual hazards and considers the facility as an integrated exposure environment.

Existing evidence indicates that environmental health assessment in childcare settings has traditionally relied on checklists, standards, inspection procedures, self-assessment tools, and site-selection approaches. The Eco-Healthy Child Care program, for example, provides environmental health

recommendations and a checklist designed to help childcare providers identify and reduce potentially harmful environmental exposures (Children's Environmental Health Network [CEHN], n.d.). Such instruments are valuable for awareness creation, routine monitoring, and identification of specific deficiencies. However, a checklist does not necessarily establish the relative importance of different hazards or provide a quantitative representation of the overall environmental health risk of a facility.

Governmental inspection systems have similarly focused on regulatory compliance and specific environmental hazards. Somers et al. (2011), for example, described the Screening Assessment for Environmental Risk (SAFER) initiative as a non-regulatory approach for identifying environmental concerns during the selection and siting of childcare centers. Such approaches are important because environmental risks can sometimes be prevented by considering site characteristics before a childcare facility begins operation. However, site-suitability or siting assessments address a different question from the ongoing assessment of environmental health conditions within an operating childcare facility.

The fragmentation of environmental oversight presents another challenge. Building safety, fire protection, sanitation, food hygiene, water quality, environmental contamination, waste management, and licensing may be addressed through different regulatory requirements or inspection processes. Compliance with one requirement therefore does not necessarily indicate that the overall environmental health condition of a childcare facility is satisfactory. A facility may, for example, have acceptable sanitation facilities but poor indoor air quality, inadequate food hygiene, unsafe play areas, or inappropriate storage of chemicals. Consequently, domain-specific assessments may fail to capture the cumulative or



interacting nature of environmental health risks.

Evidence from other child-serving environments in sub-Saharan Africa further demonstrates the importance of integrated assessment. Morgan et al. (2017) evaluated water, sanitation, and hygiene conditions in schools across Ethiopia, Kenya, Mozambique, Rwanda, Uganda, and Zambia and found that combined access to basic water, sanitation, and handwashing services was substantially lower than access to individual components considered separately. Although schools differ from childcare facilities, the findings demonstrate an important principle: satisfactory performance in one environmental-health domain does not necessarily indicate satisfactory overall facility conditions. Integrated assessment is therefore important when several environmental health determinants coexist within the same institution.

Nigeria has had a formal policy and standards framework for early childhood care for many years. The *National Minimum Standards for Early Child Care Centres in Nigeria*, developed by the Nigerian Educational Research and Development Council (NERDC) with support from UNICEF, established minimum expectations for early-childhood facilities and addressed areas including health, nutrition, sanitation, safety, facilities, staffing, protection, and the developmental environment (Nigerian Educational Research and Development Council [NERDC] & United Nations Children's Fund [UNICEF], 2007). The standards provide an important foundation for protecting children and improving the quality of early-childhood services.

Nevertheless, the existence of minimum standards does not necessarily guarantee uniform implementation or acceptable environmental health conditions across facilities. Odiagbe (2015), for example, reported variations in the implementation of the National Minimum Standards for Early Child

Care Centres and identified deficiencies in aspects of pre-primary education in Edo State. Similarly, Salami (2016) highlighted challenges associated with the implementation of Nigerian early-childhood education policies and practices. These studies suggest that policy and standards provide an essential framework but require effective facility-level monitoring and assessment to determine the extent to which prescribed conditions are actually achieved.

Importantly, the Nigerian standards were developed primarily as minimum standards and operational guidance. They were not designed as a comprehensive, validated environmental health risk-assessment instrument in which multiple environmental hazards are represented by measurable indicators, assigned relative weights, and combined into an overall facility-level risk score. Thus, standards compliance and environmental health risk characterization represent related but distinct concepts.

Despite increasing recognition of children's environmental vulnerability and the existence of childcare standards and environmental health checklists, an important methodological gap remained in the literature available before 2022. Existing approaches generally emphasized individual hazards, regulatory compliance, minimum standards, site selection, or unweighted checklists. They did not adequately integrate multiple environmental health domains into a single, context-specific, validated and weighted assessment framework capable of characterizing the overall environmental health risk of a childcare facility.

For Nigeria specifically, the literature available up to 31 December 2021 demonstrated the existence of national minimum standards and evidence of variable implementation, but did not identify a published and validated instrument specifically designed to integrate major environmental health domains in childcare facilities and convert observations into a weighted composite risk score. In



particular, the reviewed literature did not identify a standardized approach for simultaneously assessing domains such as water, sanitation and hygiene; food safety; structural and physical safety; indoor environmental quality; chemical hazards; and biological or vector-related hazards, while assigning relative importance to these domains according to their potential contribution to environmental health risk.

This gap is important because a simple count of deficiencies assumes that all problems have similar significance. In practice, however, an inadequately protected drinking-water source, exposure to hazardous chemicals, poor ventilation, unsafe electrical installations, and inadequate handwashing facilities may differ substantially in their potential health implications. A useful risk-assessment framework therefore requires not only identification of hazards but also a transparent mechanism for determining their relative importance.

The aim of this review was to examine the environmental health assessment approaches available before 31 December 2021 for childcare and early-childhood facilities, with particular emphasis on Nigeria, and to determine whether a published, validated, multi-domain and weighted instrument existed for characterizing environmental health risk in Nigerian childcare facilities.

The review also examined established methodological approaches that could provide a defensible basis for developing such an instrument, particularly the Delphi technique, content-validity assessment, and the Analytic Hierarchy Process (AHP).

The significance of this review lies in its identification of the methodological requirements for moving from conventional compliance-based inspection toward integrated, risk-based environmental health assessment in childcare facilities. A validated and weighted assessment framework could provide environmental-health practitioners,

childcare regulators, facility managers, public-health authorities, and policymakers with a standardized mechanism for identifying deficiencies, comparing facility-level risk, and prioritizing corrective actions.

Such an instrument would also have practical value in the Nigerian context, where childcare facilities may differ substantially in infrastructure, resources, environmental conditions, and regulatory compliance. Rather than treating every deficiency as equally important, a weighted framework could help direct limited resources toward hazards with greater potential public-health significance. The review therefore provides the conceptual and methodological basis for developing a context-specific environmental health risk-assessment framework for Nigerian childcare facilities.

2.0 Methods

This narrative review examined literature and policy materials available up to 31 December 2021. The review was designed to characterize the methodological and practice gap in environmental health assessment of childcare facilities rather than to estimate pooled effects or conduct a formal systematic review.

Targeted searches were conducted using PubMed, Google Scholar, and relevant institutional and government repositories. Search terms were combined in different configurations and included *childcare, daycare, early child care, environmental health assessment, environmental health risk, Nigeria, sub-Saharan Africa, WASH, water sanitation hygiene, Delphi method, Analytic Hierarchy Process, AHP, and content validity*.

Sources were considered relevant when they addressed one or more of the following areas: (a) physiological, developmental, or behavioral factors contributing to children's susceptibility to environmental exposures; (b) environmental health assessment tools, checklists, inspection procedures, licensing requirements, or siting approaches applicable to childcare or early-



learning environments; (c) early-childhood standards, environmental health regulations, WASH conditions, or facility-quality evidence relevant to Nigeria or sub-Saharan Africa; or (d) established methodological approaches for developing multi-criteria health or environmental assessment instruments, particularly Delphi, content-validity assessment, and AHP.

Foundational methodological publications were retained where they provided the conceptual basis for instrument development, even when they predated the principal review period. No publication or policy document issued after 31 December 2021 was used as evidence for the findings or conclusions of the review.

The literature was synthesized narratively according to five themes: children's environmental vulnerability; existing childcare environmental assessment approaches; Nigerian early-childhood standards and implementation; methodological approaches for multi-criteria assessment; and evidence for or against the existence of an integrated, weighted environmental health risk-assessment instrument for Nigerian childcare facilities.

Because the objective was to characterize the nature of the methodological gap rather than to identify every publication addressing childcare environments, the review did not follow a PRISMA-based systematic-review protocol and did not undertake meta-analysis.

Fig.1 illustrates the literature review and evidence-synthesis pathway used to identify existing environmental health assessment approaches, examine the Nigerian policy and implementation context, evaluate relevant methodological precedents, and establish the knowledge gap that provides the basis for developing an integrated environmental health risk-assessment framework for childcare facilities.

The review process progressed from formulation of the review question and definition of the pre-2022 evidence scope

through targeted database and repository searches, source screening, thematic categorization, and narrative synthesis. Evidence was organized around children's environmental vulnerability, existing childcare assessment approaches, Nigerian early-childhood standards, environmental health conditions in child-serving institutions, and framework-development methodologies. The synthesized evidence was then used to determine the limitations of existing approaches and identify appropriate methods for developing and validating a context-specific risk-assessment framework.

3.0 Existing Childcare Environmental Health Assessment Approaches

3.1 Checklist-Based Instruments

Checklist-based instruments have been widely used to support environmental health improvement in childcare settings. The Eco-Healthy Child Care program developed by the Children's Environmental Health Network provides recommendations and a checklist covering practices intended to reduce children's exposure to environmental hazards (CEHN, n.d.). Such instruments are useful because they translate technical environmental health recommendations into practical actions that childcare providers can understand and implement.

However, conventional checklists have an important methodological limitation. They generally indicate whether a particular condition is present, absent, or satisfactory without necessarily establishing the relative contribution of that condition to overall environmental health risk. Consequently, a facility with several relatively minor deficiencies could potentially receive a similar assessment to one with fewer but more consequential hazards. Checklists are therefore useful for hazard identification and corrective-action guidance but may be insufficient for comprehensive risk characterization unless they incorporate validated scoring and weighting procedures.



3.2 Government Inspection and Siting Approaches

Government inspection systems constitute another major approach to childcare environmental health protection. These systems commonly assess compliance with prescribed requirements relating to building

conditions, sanitation, fire safety, food hygiene, staffing, or other regulatory provisions. Such inspections are important for enforcing minimum standards, but their effectiveness in characterizing overall environmental health risk depends on the breadth and integration of the assessment domains.

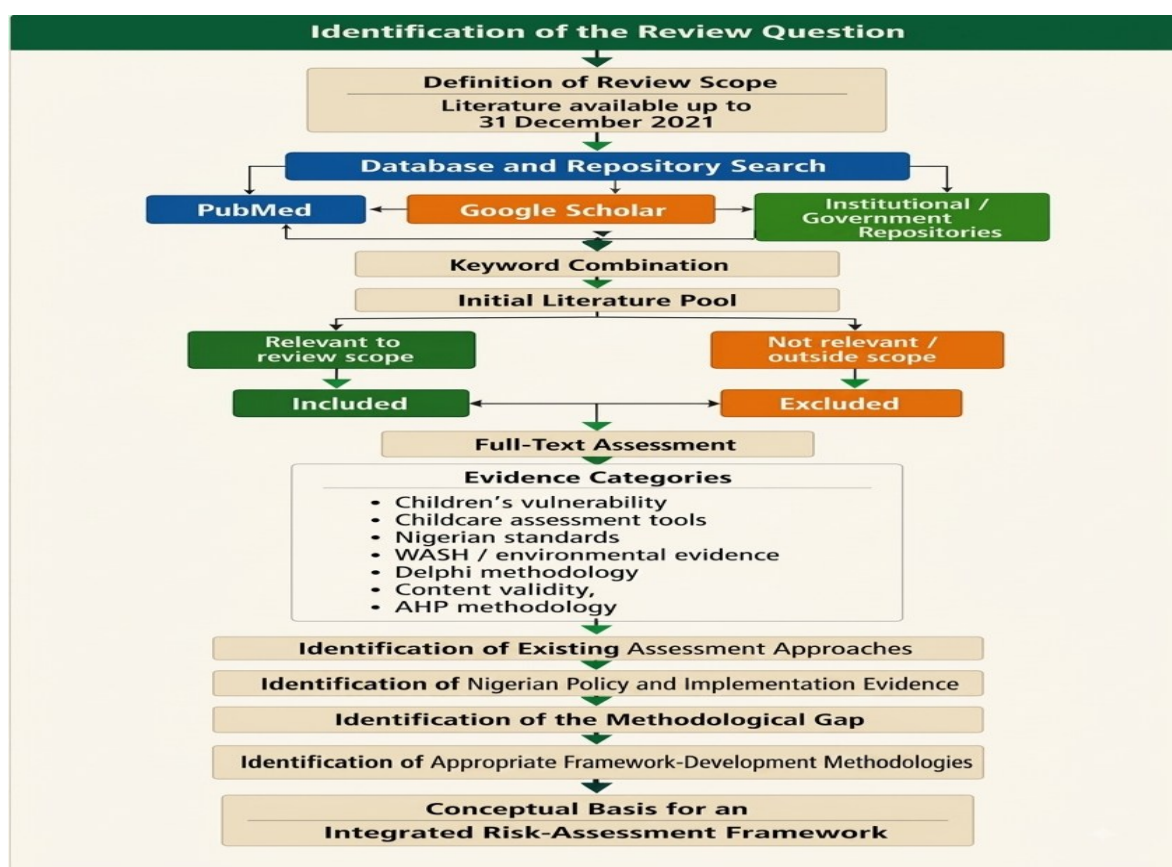


Fig. 2: Literature review and evidence-synthesis pathway

Siting assessments represent a complementary but distinct approach. Somers et al. (2011) described the SAFER initiative as a non-regulatory strategy for identifying environmental concerns during childcare-center siting. The approach demonstrated the value of incorporating environmental considerations before a facility is established. Nevertheless, siting assessment cannot substitute for periodic assessment of environmental conditions within an operating childcare facility. A facility that is

appropriately located may subsequently develop problems involving water quality, sanitation, indoor air, food handling, chemical storage, structural safety, or vector control.

3.3 Fragmentation of Environmental Health Oversight

Environmental health oversight in childcare settings can also be fragmented across multiple regulatory and professional responsibilities. Building authorities may address structural safety, fire services may address fire protection, health authorities may assess sanitation,



environmental agencies may address pollution or hazardous substances, and education or licensing authorities may evaluate compliance with childcare standards.

Although specialization is necessary, fragmented assessment may make it difficult to obtain a single, integrated representation of environmental health risk. The absence of an overarching risk score may also limit the ability of regulators and facility managers to compare facilities and prioritize interventions. An integrated framework could complement, rather than replace, existing regulatory inspections by providing a common structure for interpreting observations across different environmental health domains.

3.4 Evidence from Child-Serving Institutions in Sub-Saharan Africa

Evidence from other child-serving institutional settings provides additional support for integrated environmental assessment. Morgan et al. (2017) demonstrated that individual WASH indicators can provide a misleading impression of overall service adequacy when they are considered independently. Access to water, sanitation, and handwashing facilities may each appear relatively acceptable while the combined level of basic WASH service remains inadequate.

Although the study focused on schools rather than childcare facilities, its implications are relevant to early-childhood environments. Environmental health is multidimensional, and satisfactory performance in one domain cannot compensate automatically for severe deficiencies in another. This reinforces the need for assessment frameworks capable of considering several environmental health domains simultaneously.

4.0 Early-Childcare Standards and the Nigerian Context

4.1 National Minimum Standards for Early-Childcare Centres

Nigeria had an established policy foundation for early-childhood care before 2022. The

National Minimum Standards for Early Child Care Centres in Nigeria provided requirements relating to the physical environment, health, nutrition, sanitation, safety, facilities, staffing, child protection, and the broader developmental environment (NERDC & UNICEF, 2007).

The standards represent an important policy instrument because they recognize that the quality of childcare is inseparable from the conditions in which children are cared for. They provide benchmarks against which facilities can be evaluated and offer a foundation for regulatory oversight and facility improvement.

Nevertheless, minimum standards and risk-assessment instruments serve different purposes. Standards specify desirable or minimum conditions, whereas a risk-assessment instrument should identify deficiencies, determine their relative importance, combine information across domains, and characterize the overall risk profile of a facility. The Nigerian standards therefore provide important source material for indicator development but do not, by themselves, constitute a weighted environmental health risk-assessment tool.

4.2 Evidence of Implementation and Facility-Level Variation

Evidence available before 2022 suggested that the existence of national standards did not ensure uniform implementation. Odiagbe (2015) examined the National Minimum Standards for Early Child Care Centres in relation to the status of pre-primary education in Umunwode Local Government Area of Edo State and reported deficiencies in aspects of implementation. Salami (2016) similarly discussed challenges associated with Nigerian early-childhood education policies and practices.

These findings are important because they demonstrate the continuing need for facility-level assessment. National standards establish



expectations, but routine and standardized assessment is required to determine whether individual facilities meet those expectations and to identify areas requiring intervention.

The reviewed Nigerian literature therefore suggested a distinction between the presence of a policy framework and the availability of an operational environmental health risk-assessment methodology. While the former existed, evidence of the latter was not identified within the literature reviewed up to 31 December 2021.

5.0 Methodological Precedent for Framework Development

The absence of a childcare-specific weighted environmental health instrument did not imply that suitable development methods were unavailable. Several established methodological approaches could be combined to construct and validate such a framework.

5.1 Delphi Technique

The Delphi technique is a structured approach for obtaining and refining expert consensus through successive rounds of consultation. It is particularly useful when a research problem involves multiple disciplines and when empirical evidence alone is insufficient to determine the most appropriate indicators (Hsu & Sandford, 2007).

For a childcare environmental health framework, Delphi consultation could involve experts in environmental health, public health, child health, early-childhood education, sanitation, food safety, building safety, environmental protection, and relevant regulatory fields. Experts could review proposed domains and indicators, identify omissions, remove redundant indicators, and refine definitions and scoring criteria.

5.2 Content-Validity Assessment

Content validity concerns the extent to which the indicators of an instrument adequately represent the construct that the instrument is intended to measure. Lynn (1986) provided a

structured approach for determining and quantifying content validity through expert assessment.

In the proposed context, content-validity assessment could be used after preliminary indicator development to determine whether each environmental health indicator is sufficiently relevant and representative. Indicators receiving inadequate expert support could be modified or excluded. This process would strengthen the conceptual validity of the resulting assessment instrument before field testing.

5.3 Analytic Hierarchy Process

The Analytic Hierarchy Process, developed by Saaty (1980), provides a structured approach for organizing complex decisions into hierarchical criteria and sub-criteria and deriving relative priorities through pairwise comparison. AHP is particularly appropriate where multiple criteria contribute to a decision but do not necessarily have equal importance.

For childcare environmental health assessment, AHP could be used to assign relative weights to major domains and their constituent indicators. For example, water, sanitation and hygiene; food safety; structural and physical safety; indoor environmental quality; chemical hazards; and biological or vector hazards could be organized within a hierarchical structure. Expert pairwise comparisons could then be used to determine the relative importance of these domains.

5.4 Integration of Delphi, Content Validity and AHP

The three methods can serve complementary functions rather than competing purposes. Delphi can be used to generate and refine the indicator set through expert consensus. Content-validity assessment can subsequently establish whether the proposed indicators adequately represent environmental health risk in childcare settings. AHP can then determine the relative weights of validated domains and indicators.



Evidence from the pre-2022 literature demonstrates the feasibility of combining expert consensus with multi-criteria weighting. Shahbod et al. (2020), for example, used the Delphi method to identify environmental performance criteria, sub-criteria, and indicators in urban medical centers and subsequently applied fuzzy AHP to rank the factors and establish a balanced scoring system. Although medical centers differ substantially from childcare facilities, the study provides methodological precedent for integrating expert consensus and hierarchical weighting within a complex institutional environmental assessment framework.

The combination of these approaches could therefore provide a transparent pathway from conceptualization to instrument development: indicator generation, expert consensus, content validation, weighting, scoring, reliability assessment, and field validation.

6.0 Synthesis of the Identified Knowledge Gap

The evidence reviewed produced four principal findings. First, the scientific basis for treating children as a population with distinctive environmental vulnerability was well established. Physiological immaturity, developmental characteristics, behavior, exposure patterns, and dependence on caregivers increase the importance of controlling environmental hazards in settings where children spend prolonged periods (ATSDR, n.d.; Etzel & Landrigan, 2014; Landrigan et al., 1998; U.S. EPA, n.d.).

Second, environmental health assessment approaches available before 2022 were predominantly checklist-based, compliance-oriented, siting-focused, or restricted to individual environmental domains. These approaches were useful for identifying particular hazards and supporting corrective action, but they generally did not provide a validated and weighted composite

representation of facility-level environmental health risk.

Third, Nigeria had national minimum standards for early-childhood centers that incorporated important health, sanitation, safety, nutritional, and facility requirements (NERDC & UNICEF, 2007). However, implementation evidence indicated variability in the extent to which facilities achieved prescribed standards (Odiagbe, 2015; Salami, 2016). The existence of standards therefore did not eliminate the need for standardized environmental health risk characterization.

Fourth, established methodological approaches were available for addressing this gap. Delphi techniques could support multidisciplinary consensus, content-validity assessment could establish indicator relevance and representativeness, and AHP could provide a transparent mechanism for assigning relative weights (Hsu & Sandford, 2007; Lynn, 1986; Saaty, 1980). The application of Delphi and fuzzy AHP in environmental performance assessment further demonstrated the feasibility of integrating expert consensus and multi-criteria weighting in complex institutional environments (Shahbod et al., 2020).

Overall, the literature available through 31 December 2021 did not identify a published and validated instrument specifically designed to characterize environmental health risk across multiple domains in Nigerian childcare facilities using a weighted composite scoring system. The gap was therefore not simply an absence of environmental standards. Rather, it was the absence of an integrated, context-specific and risk-based mechanism for converting observations from several environmental health domains into a defensible facility-level risk profile and a prioritized basis for corrective action.

Fig. 2 presents the conceptual pathway derived from the reviewed literature, illustrating how evidence of children's environmental vulnerability, limitations of existing childcare environmental health assessment approaches,



and the identified methodological gap provide the basis for developing an integrated, multi-domain, and weighted environmental health

risk assessment framework for Nigerian childcare facilities.

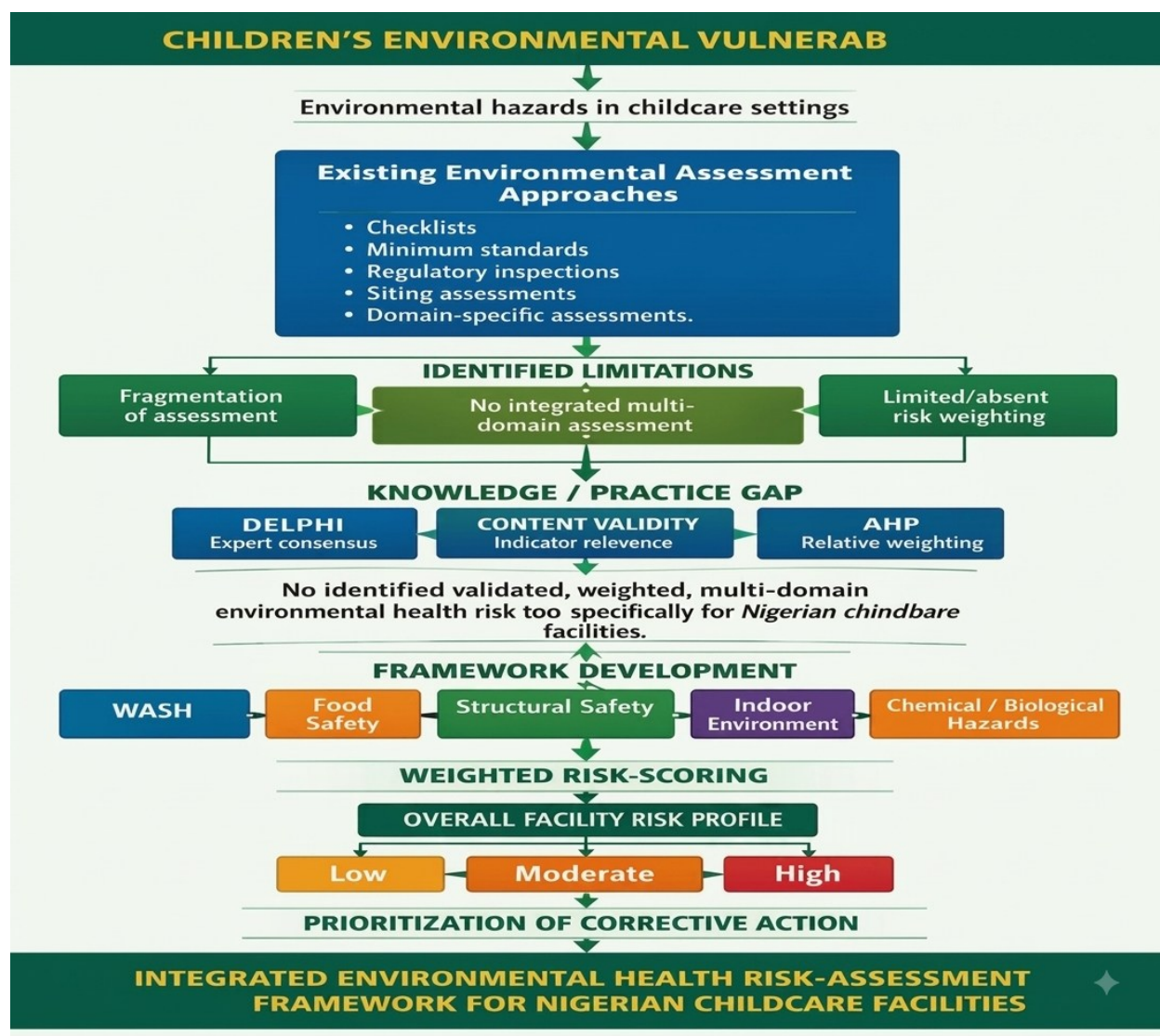


Fig. 2: Conceptual pathway for developing an integrated environmental health risk-assessment framework for Nigerian childcare facilities

As shown in Fig. 3, the proposed framework-development process progresses from identification of children's environmental vulnerabilities and existing assessment limitations to systematic indicator selection, expert consensus through the Delphi technique, content-validity assessment, and relative weighting using the Analytic Hierarchy

Process (AHP). The resulting domains and indicators would form the basis for facility-level risk scoring, risk classification, prioritization of corrective actions, and subsequent reliability and field validation. This pathway emphasizes that the proposed framework is a development model requiring



empirical validation rather than an already validated instrument.

7.0 Implications for Framework Development

The evidence suggests that the development of an environmental health risk-assessment framework for Nigerian childcare facilities should proceed through several complementary stages. First, relevant environmental health domains and candidate indicators should be identified from existing Nigerian standards, international childcare environmental-health guidance, and the scientific literature. The proposed domains should reflect the specific characteristics of Nigerian childcare environments and the potential pathways through which children may encounter environmental hazards.

Second, a multidisciplinary expert panel should review and refine the proposed indicators. A structured Delphi process could be used to achieve consensus on the inclusion, definition, and importance of indicators. Content-validity assessment should then be used to determine whether the final indicators adequately represent the environmental health construct being assessed.

Third, the validated indicators should be organized hierarchically and assigned relative weights using AHP or an appropriate variant of AHP. Weighting would prevent all deficiencies from being treated as equivalent and would allow the resulting instrument to distinguish between relatively minor deficiencies and hazards with greater potential public-health significance.

Fourth, the resulting instrument should undergo empirical testing in operational childcare facilities. Reliability assessment should determine whether the instrument produces consistent results, while field validation should examine its ability to characterize environmental conditions and discriminate between facilities with different levels of environmental health risk. Inter-rater reliability should also be considered if the

instrument is intended for use by different inspectors or environmental health practitioners.

Finally, the framework should be designed to support practical decision-making rather than merely generate a numerical score. Risk categories should be linked to clearly defined corrective actions, allowing facility managers and regulators to identify priority interventions. In this way, the framework could complement existing Nigerian minimum standards and inspection systems by providing an integrated mechanism for risk characterization, comparison, monitoring, and prioritization.

8.0 Conclusion

The literature available up to 31 December 2021 established a strong scientific and policy basis for protecting children from environmental hazards and demonstrated the importance of safe environments in childcare settings. Nigeria had national minimum standards for early-childhood centers, while international and national initiatives provided checklists, inspection approaches, and environmental-health guidance. However, these approaches did not provide an integrated, validated, multi-domain and weighted instrument specifically designed to characterize environmental health risk in Nigerian childcare facilities.

The identified methodological gap can potentially be addressed by combining Delphi consensus, content-validity assessment, and AHP-based weighting. Such an approach would provide a systematic pathway for developing an evidence-informed and context-specific instrument capable of translating multiple environmental health observations into an overall facility-level risk profile. Before practical implementation, however, the resulting framework would require reliability assessment, field validation, and evaluation of its usefulness for prioritizing corrective actions.



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The authors declared no conflict of interest

Author Contributions

All components of the work were carried out by the author

