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Justifying the Needs for the Development of Crisis and Emergency Management Training Module for Science Teachers in Secondary Schools: A Systematic Literature Review

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Abstract

This systematic review collated past studies on crisis and emergency management training in schools to inform the development of a training model tailored to the context of Katsina State, Nigeria, a region facing severe security threats. Following the PRISMA 2020 guidelines, 35 out of 356 peer-reviewed studies (2015-2025) met the inclusion criteria. The review found that there is a global focus on crisis preparedness, but a significant gap in local training, with only three studies conducted in Nigeria. Models identified as effective include a robust crisis life cycle framework, crisis response teams, vulnerable leadership, and disaster preparedness frameworks; however, these models are rarely adapted for academics or those with high levels of violence. The review stressed the urgent need to adapt these plans to the context, incorporating specific laboratory safety protocols, community engagement with safety stakeholders, and integrating social support to improve teacher preparation and school resilience.

Keywords: Crisis management, emergency preparedness, science teachers, secondary schools, systematic review, Nigeria

Introduction

In recent years, schools have become increasingly targeted by violent conflicts, transforming the learning environment into vulnerable and vulnerable places. Traditionally considered a safe haven for academic and personal development, schools are now frequently disrupted by emergencies, ranging from natural disasters and disease outbreaks to deliberate acts of violence (Lazarus, 2025; Sokola et al., 2021; Samawi, 2021). Worldwide, these disruptions include mass shootings, bomb threats, and student suicides (Courson, 2020; Rider, 2015). In Nigeria, the situation is even worse, exacerbated by ongoing threats such as Boko Haram insurgency, armed robbery, kidnapping, and attacks on students and teachers, particularly in the northern regions. Over the past decade, hundreds of schools in northern Nigeria have been forced to close due to security threats (Ogbo & Chukwuemeka, 2024). A series of kidnappings, including the 2014 Chibok schoolgirl abduction, the 2020 Kankara school attack in Katsina State, the 2025 kidnapping of 25 students from Maga Government Secondary School in Kebbi State, and the kidnapping at St. Mary' s Catholic School in Baberi, Niger State which led to the closure of at least ten federal colleges across the country have created a climate of fear in educational institutions. Science teachers, who often conduct theoretical and practical classes and conduct dangerous laboratory sessions, are at increased risk during such emergencies (Rivera & Manalastas, 2025). Their dual role of ensuring security and facilitating learning in a changing environment highlights the importance of targeted conflict preparedness.

Irrespective of increasing efforts by governments and NGOs to improve school safety through policies and infrastructure, many secondary schools still lack adequate training for staff in crisis and emergency management (Orelo & Twain, 2021). While priority is given to primary and secondary prevention efforts, such as improving school security and early warning systems, the focus on secondary school prevention, which includes responding to and recovering from crises when they occur, remains limited (Wilson, 2021; Lokuisa, 2017). Without adequate training, teachers may struggle to cope with trauma, protect students during emergencies, or ensure the continuity of teaching and learning. Research shows that untreated trauma resulting from incidents such as kidnappings or school attacks can lead to long-term psychological distress, academic decline, and school dropout (Wilson, 2021; Stevenson, 2024). Therefore, science teachers must be given not only academic tools but also practical skills to manage crises and emergencies to protect lives and build resilience in the face of adversity.

This systematic review seeks to critically examine the existing literature on crisis and emergency management training in schools, with a focus on its relevance and adaptation to the specific needs of secondary school science teachers. As frontline educators, often responsible for teaching principles and hazardous laboratory environments, science teachers must be prepared to respond to emergencies, ranging from natural disasters to violent attacks. However, in Nigeria, especially in areas where terrorism, armed robbery, and kidnapping of students are common, teachers face dangerous challenges without access to training or preparedness protocols. Despite numerous global efforts to establish safe school programs,

current interventions often ignore the unique role of science teachers and fail to provide practical, local solutions for areas affected by insecurity. This systematic review aims to identify good international models, identify gaps in conflict preparedness for science teachers, and compile evidence-based strategies that can contribute to the development of a comprehensive training framework that is relevant to the context. Finally, the report emphasizes the urgent need to equip science teachers with the skills, knowledge, and confidence needed to protect students and sustain educational progress in the face of school-related conflicts in Nigeria.

Objectives

The primary aim of this systematic review is to evaluate existing literature on crisis and emergency management training with specific attention to its applicability for science teachers in secondary schools, particularly in conflict-prone regions. The following specific objectives were raised to:

i. Examine the models and approaches of crisis and emergency management documented in the literature in relation to secondary school settings.

ii. Determine the extent to which crisis and emergency management training programmes have been tailored to meet the specific needs of science teachers in secondary schools.

iii. Identify gaps in the existing literature regarding context-specific crisis and emergency training models for teachers in region affected by insecurity like kidnapping and other school-targeted violence.

To achieve these objectives, the following research questions guided the study:

i. What models and approaches of crisis and emergency management training have been documented in relation to school settings?

ii. To what extent have crisis and emergency training programs been tailored to the needs of science teachers in secondary schools?

iii. What gaps exist in the current literature regarding context-specific training modules in regions affected by insecurity, such as terrorism, banditry, and school-targeted violence?

Methodology

This study adopted the Preferred Reporting Items for Review and Systematic Reviews (PRISMA) to guide the systematic review process. PRISMA is well-known in educational and social science research for its systematic and objective approach to identifying, evaluating, and summarizing relevant literature (Page & McKenzie, 2020; Utaminingsih et

al., 2023). Using this approach allows for the synthesis of empirical evidence from different studies, allowing for a more in-depth analysis of how emergency and critical care training is conceptualized, implemented, and evaluated, particularly in the context of secondary education.

Search Strategy

A structured three-phase search strategy, identification, screening, and eligibility was employed to locate and evaluate studies relevant to the research questions.

Identification Phase

In the identification phase, a carefully selected list of keywords and search terms was compiled to improve the retrieval of relevant articles. This approach aligns with the recommendations of Fajri et al. (2024) and Komalasari et al. (2023), who emphasized the importance of a comprehensive keyword strategy in systematic reviews. The following online databases were searched for peer-reviewed literature: Google Scholar, Academia, and ERIC (Educational Resources Information Center). The search terms used included combinations of phrases such as "crisis and emergency management in schools," "teacher training and response in schools," and "emergency preparedness for science teachers." These search terms were combined using the logical conjunctions (and, or) to enhance the accuracy and clarity of the search results. A summary of the keywords and the number of articles found is presented in Table 1.

Table 1: Articles Identified from the Systematic Review

Database	Keywords	Identification
Google Scholar	□Crisis and Emergency Management in Schools□	214
Academia	□School-based Crisis Response Training for Teachers□	82
ERIC (Education Resource Information Centre)	□Science Teachers Emergency Preparedness□	60
Total		356

Screening Phase

During the screening process, all articles retrieved from Google Scholar, Academia, and ERIC databases were thoroughly reviewed to remove irrelevant or ineligible studies. The researcher conducted a thorough search to remove duplicate articles and those that did not meet the objectives or scope of the review. In particular, 136 duplicate articles were identified and removed. In addition, articles written in languages other than English were excluded due to language limitations. After an initial review of their titles and abstracts, 122 articles were excluded because they were considered irrelevant to the focus on training secondary school science teachers in problem solving and emergency management. Another 19 articles were excluded because their research did not exceed the scope of the current study. After this screening process, 35 articles were retained and advanced to the eligibility stage for further detailed evaluation.

Eligibility Phase

A qualitative screening process was used to screen 35 articles selected from the screening process, based on pre-defined inclusion and exclusion criteria, to ensure their relevance to the aims of this systematic review. A comprehensive assessment was conducted, including reviewing the title, abstract, and, where appropriate, the full text, to assess their relevance, methodological quality, and applicability in different contexts. The following inclusion criteria were used:

i. Published between 2015 and 2024 to maintain contemporary relevance.

ii. English as original language of publication

iii. Limited to articles published in peer-reviewed journals, including systematic reviews and experimental studies.

iv. Thematic areas of focus include emergency and contingency planning, teacher training, science education, or school safety, with a focus on contexts affected by kidnaping.

v. Directly applicable to secondary school teachers, with a preference for science teachers.

Conversely, publications were excluded based on the following criteria:

i. Non-peer-reviewed publications, such as books, book chapters, conference proceedings, and journal articles.

ii. Studies conducted outside the field of education.

iii. Articles that focused solely on student outcomes, without a strong focus on teacher training or professional development.

iv. Studies conducted outside the context of school safety or learning.

By carefully applying these criteria, only articles that met the research objectives were selected for data collection and subsequent analysis. This final literature review served as a pilot study to create a training program specifically designed for science education in conflict-affected secondary schools. This is depicted in Table 2 and the entire process is summarised in figure 1.

Table 2: Eligibility Criteria for Selecting Articles for Systematic Review

Criterion	Eligibility	Exclusion
Types of Literature	Research Articles	Books, reports, and documentaries
Language Choice	English Language	Other Languages
Time Range	2015-2025	2014 and earlier
Education	In-service Teachers teaching in Secondary Schools	Pre-service Teachers (Higher Education), Primary and Adult Education

Country Global

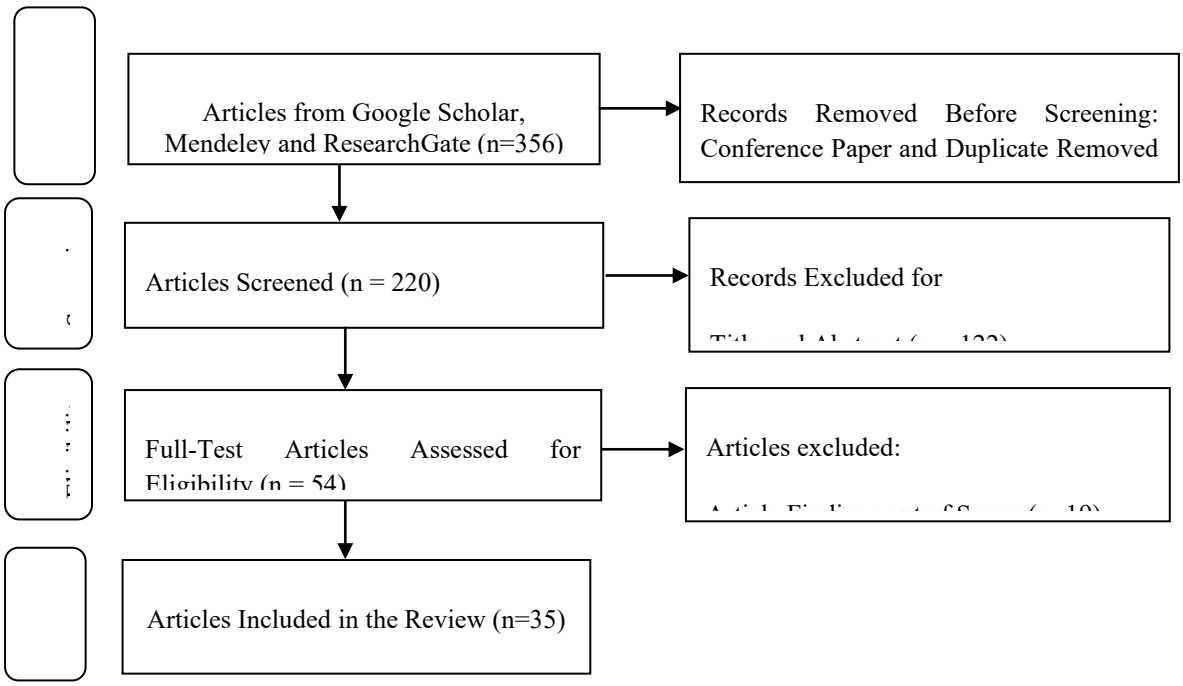

Figure 1: PRISMA Flow Chart

Data Extraction and Analysis

In this systematic review, data were extracted from studies that met the eligibility criteria, focusing on literature relevant to the training of secondary school teachers, especially science teachers, in the field of crisis and emergency management. Key information extracted from each study included: author(s), year of publication, title of the study, location of study, focus area, main findings, and discussion of crisis management or emergency preparedness strategies. This data extraction process provided a systematic way to assess how the selected studies contribute to building teachers' capacity to deal with emergencies and reduce the impact of kidnapping in schools as presented in table 3.

Table 3: Data Extraction and Analysis

SN	Authors & Year	Title of the Study	Location	Area of Focus
1	K. S. Tipler 2017	Emergency Preparedness and Response in New Zealand Schools	New Zealand	Students/Earth Quake
2	Samawi, F. 2021	Educational Crisis Management Requirements and its Relation to using Distance Learning Approach: A Cross-Sectional Survey Secondary Stage Schools in Al-Balqa' a Governorate During Covid-19 Outbreak from the Perspectives of Teachers	Jordan	Teachers/COVID-19
3	Albayrak, E. E. & Özdemir, M. 2024	The Relationship between Principals' Crisis Management Skills and School Health.	Turkey	Principals/Crisis Management
4	Alkhawlani et al. (2016)	Charisma Leadership an Important Determinant for the Crisis Management.	Yamen	Leaders/Crisis Management
5	Kedačić-Buzina, K. & Klarin, T. (2022).	Challenges of Crisis Management in Educational Institutions of the Republic of Croatia.	Croatia	Stakeholders/Crisis Management
6	Osegbue, G. C. (2025)	Crisis Intervention and Response in Educational Institutions: Developing and Implementing Plans in Developing Countries.	Nigeria	Stakeholders/Crisis Management
7	Çobanoğlu, N. & Demir, S. (2022).	Crisis management, agile leadership, and organizational culture in primary schools.	Turkey	Leaders/Crisis Management
8	Konakli, T., & Kaplan, P. (2019).	Emergency management in nursery schools: an analysis of experiences and opinions of Administrators in Turkey.	Turkey	Administrators/Natural Disasters
9	Courson, John (2020)	"Active Assailant Crisis Prevention and Response: An Analysis of Teacher Perceptions"	USA	Teachers/Active Shooter
10	Lazaris, D. (2025)	Crisis management in school environments: A holistic approach based on literature review.	Greece	Students/Crisis Management
11	Kelley, N. R. (2015)	Crisis response teams in the school setting: Best practices and lessons learned	USA	Crisis Response Team/Students
12	Aliyu, Y. A. (2021)	Crisis management curriculum for Nigerian Schools: The pros and cons of implementation.	Nigeria	Crisis Management/ Review
13	Saleri, A. M. (2024)	Disaster preparedness and safety standards in public secondary schools f Nairobi County, Kenya	Kenya	Diasaster Preparedness/ Students
14	Liou, Y.-H. (2015)	Liou, Y.-H. (2015) School Crisis Management: A Model of Dynamic Responsiveness to Crisis Life Cycle	USA	Crisis Management/ Stakeholders
15	Mehwish Jabeen et al. (2018).	Educational Crisis Management and Sustainable Development	Pakistan	Educational Crisis Management/Stakeholders
16	Karasavidou, E., & Alexopoulos, N. (2019).	School crisis management: Attitudes and perceptions of primary school teachers.	Greece	School Crisis Management/Teachers
17	Debeş, G. (2021)	Teachers' perception of crisis management in schools.	Cyprus	Crisis Management/ Teachers
18	Skoulidas et al. (2024)	Higher education students' perceptions of risk and crisis management in universities.	Greece	Crisis Management/Students

19	Stevenson, R. (2024)	A crisis in confidence: A collective case study approach to school security through teacher experiences.	USA	Teachers/Crisis Deterrents
20	Ismail et al. (2020).	The level of preparation for pandemic influenza (COVID-19) among early childhood education centre.	Malaysia	Pandemic/Early Child Education Centres
21	Lukwesa, M. (2017)	Crisis Management in Senior Secondary Schools in Kawambwa District of Luapula Province	Zambia	Stakeholders/Crisis Management Natural and Financial Crisis
22	Maghdid et al. (2022)	From crisis to crisis management; Causes and impacts of crises in the public sector.	Iraq	Crisis Management/Review
23	Sokola et al. (2021).	Crisis interventions in schools: A systematic review	USA	Crisis Interventions/Systematic Review
24	Perkins, J. C. (2018).	Preparing teachers for school tragedy: Reading, writing and lockdown	USA	Crisis preparedness/ Teachers
25	Robertson, N. C. (2017)	Principal preparedness for crisis management in urban high schools	USA	Crisis Management/ Principal Preparedness
26	Oreoluwa, F.-A. F. and Toyin, O. W. (2021).	Rethinking strategies on crisis/emergency and safety management in secondary school administration in Nigeria: Policy and planning implications.	Nigeria	Review/Crisis/Safety and Safety Management
27	Rørstad Welle, K. B. and Gunnulfsen, A. E. (2025).	School leadership: Dilemmas in dealing with crises.	Norway	School Leadership/Crisis
28	Shah et al. (2018)	Schools' flood emergency preparedness in Khyber Pakhtunkhwa Province, Pakistan.	Pakistan	flood emergency preparedness/Students
29	Alkhawlani, M. A. S. (2016)	The impact of the leadership styles on crisis management: A study at Yemen private and public institutions.	Yemen	Managers of Inst./Crisis Management
30	Lenihan et al. (2020)	Superintendent perceptions of school safety and arming teachers in public schools in Nebraska.	USA	School security and emergency management
31	Stephen, R. (2024)	Leading through crisis: Preparation, perception, and coping skills of secondary principals.	USA	Principals/Crisis
32	Seddighi et al. (2020).	Students' preparedness for disasters in schools: A systematic review protocol.	Iran	Systematic Review/Students' preparedness for disasters
33	Rider, C. F. (2015)	Teachers' perceptions of their ability to respond to active shooter incidents	USA	Teachers/Active Shooter
34	Warthen, S. (2024)	The impact of the ethical paradigms on decision-making in times of crisis.	USA	School Leaders/Crisis
35	Wilson, S. M. (2021)	Trauma-informed leadership for schools: A new vision for educational leadership and crisis management	USA	Pandemic/School Leaders

Results

The outcomes of the systematic review are presented below, organized according to the research questions posed during the review:

Research Question One: What models and approaches of crisis and emergency management training have been documented in relation to school settings?

Models and approaches of crisis and emergency management training documented in school settings from the reviewed literature include:

i. The Dynamic Crisis Life Cycle Model involves integrating chaos and complexity theory to facilitate adaptive and responsive management throughout crisis phases.

ii. Holistic Approaches emphasizing integrated planning involving multiple stakeholders.

iii. Crisis Response Teams with defined roles, communication channels, and post-incident evaluations.

iv. Trauma-Informed Leadership focuses on emotional safety, resilience, and recovery post-crisis.

v. Agile Leadership and Organizational Culture for flexible decision-making and quick adaptation.

vi. Charisma Leadership Model as a determinant of effective crisis leadership.

vii. Active Assailant Response Protocols emphasizing lockdown drills, communication readiness, and situational awareness.

viii. Disaster Preparedness Frameworks targeting specific hazards like floods, earthquakes, and fires, including evacuation plans and safety drills.

Research Question Two: To what extent have crisis and emergency training programs been tailored to the needs of science teachers in secondary schools?

Most programs address general school staff, principals, or broader educational stakeholders as presented in the pie-chart in figure 2.

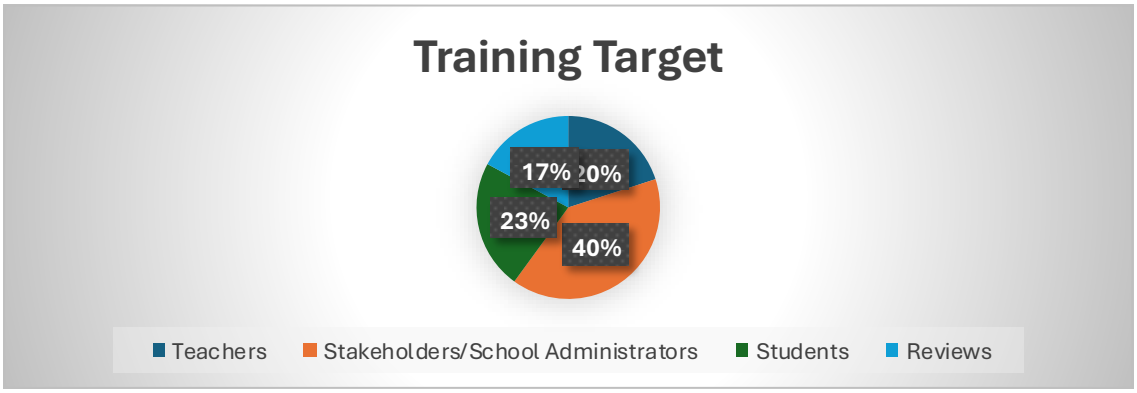

Figure 2: Targeted Stakeholders for crisis and emergency training programs

Figure 2 shows the paucity of emergency and crisis management training programs specifically designed for science teachers. Although only a few studies (8 articles, 23%) targeted teachers, these still lack a well-designed framework for science educators. Most programs (14 articles, 40%) targeted pre-service teachers, school administrators, or education stakeholders, without addressing the specific needs of teachers. There is a significant gap in integrating crisis management into science curricula, linking it to laboratory safety, hazardous materials management, or workplace risk management.

Research Question Three: What gaps exist in the current literature regarding context-specific training modules, such as terrorism, banditry, kidnapping and other school-targeted violence?

The review indicated an absence of strong cross-sector collaboration models that link education stakeholders with security agencies and community defence groups in high-risk areas as presented in figure 3.

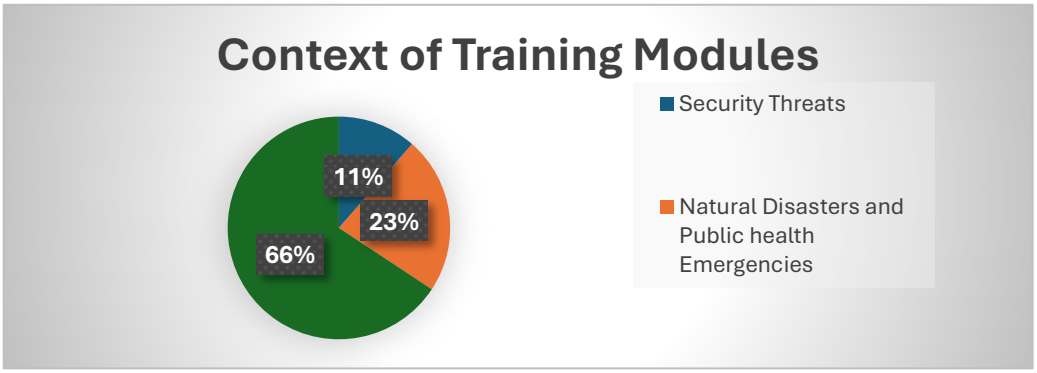

Figure 3: Regarding Context-specific Training Modules

From figure 3, it is clear that there are few local conflict management systems that address the real realities of conflict, such as the type affecting the study area. Existing school emergency plans show little integration of security threats, such as terrorism, armed attacks, and kidnappings, with only 4 articles (11%) addressing these concerns. In contrast, more research and interventions focus on natural disasters and public health emergencies, with 8 articles (23%) addressing these areas. While the remaining 23 articles (66%) address the problem in general without focusing on either type. Furthermore, there is little robust evidence on the effectiveness of conflict training in long-term insecurity. The review highlights the lack of effective models of cross-sector collaboration that bring together education stakeholders with security agencies and civil protection organizations in high-risk areas. Furthermore, social support systems are often not fully integrated into training programs, leaving significant gaps in addressing the vulnerabilities associated with repeated violent incidents.

Discussion

The study shows that a variety of models of thinking and practice have been explored worldwide, ranging from structured theoretical frameworks to practical implementation strategies. Notably, Liou' s (2015) Dynamic Crisis Lifecycle Model provides a response framework that incorporates the theory of conflict and complexity, providing flexibility at all stages of crisis prevention, preparation, response, and recovery. Similarly, Lazaris (2025) emphasizes appropriate approaches that involve different stakeholders, while Kelley (2015) emphasizes the importance of Crisis Response Teams with defined principles. Other approaches, such as vulnerability advisory leadership (Wilson, 2021), agile leadership (Çobanoğlu & Demir, 2022), and assertive

leadership (Alkhawlani et al., 2016), highlight the importance of leadership characteristics and organizational culture in determining the effectiveness of crisis response. Additionally, conflict response protocols (Courson, 2020; Rider, 2015) and specific disaster preparedness frameworks (Shah et al., 2018; Saleri, 2024) indicate how to manage conflict in specific risk contexts.

Nonetheless, the extent to which these products are designed for science teachers in secondary schools is limited. The literature reviewed often takes a generic approach, targeting all teachers, school principals, or key stakeholders in education without incorporating the specific needs of science educators. This gap is significant, given the safety concerns of science teaching, such as laboratory chemical hazards, equipment safety, and hazards during field trips. While studies from countries such as Nigeria (Aliyu, 2021; Oreoluwa & Toyin, 2021) and Kenya (Saleri, 2024) have addressed the context of secondary schools, they have failed to include consideration of specific aspects that could enhance relevance and utility for science educators.

A key finding is the lack of effective training for schools on conflict management, particularly for schools in areas affected by insecurity, including terrorism, armed robbery, and school violence. Existing research has focused on natural disasters, epidemics, and general security, with little evidence addressing the ongoing threat of violence in educational settings. This gap is particularly evident in high-risk areas such as Northern Nigeria, where attacks on schools highlight the need for integrated security principles, partnerships with security agencies, and trauma-informed recovery strategies. In addition, there is a paucity of literature on collaboration between education stakeholders, security agencies, and civil society organizations in the design and delivery of conflict management training.

Generally, the study shows that while there is a strong body of research and practice for training for people affected by conflict and emergencies in schools, there is significant work to be done to tailor these models to the specific contexts and needs of the contexts. For areas experiencing insecurity, this includes not only integrating violence-related risk management into training, but also building resilience through community partnerships and sustainable social support systems.

Conclusion

This review found that while there are many models and approaches to crisis and emergency management around the world, from transformative life models to vulnerability-aware leadership and risk-specific principles, these approaches are often generic and rarely tailored to the needs of science teachers in secondary schools. In addition, there is a lack of well-designed training materials specifically for schools in insecure settings that are prone to terrorism, armed robbery, and violence. Existing recommendations emphasize contextual understanding, collaboration, appropriate lessons, and social support, but their application to contexts that are both sensitive and at-risk remains limited. Addressing these gaps will require the design and implementation of specific, local training materials that reflect the realities of science and environments that are vulnerable to security challenges.

Recommendations

The following recommendations were made based on the findings:

i. Existing global frameworks, such as the Crisis Lifecycle Framework and Crisis Response Teams, should be adapted to local school settings to ensure flexibility and preparedness for multiple hazards.

ii. Specific crisis management guidelines should be developed for science teachers, including laboratory safety, hazardous chemicals management, and emergency procedures for fieldwork.

iii. Local crisis training programs should be developed to address the threat of violence, developed in collaboration with law enforcement agencies, community protection organizations, and mental health services.

iv. Training should involve all school staff, be conducted regularly with real-world training, incorporate social support, and engage with the community to ensure sustainability.

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