

## SYSTEMATIC REVIEW

# A Systematic Review of Risk Factors and Safety Gaps in Religious Boarding Schools in Southeast Asia

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## ABSTRACT

**Introduction:** Safety management in religious boarding schools is a growing concern due to persistent risks related to infrastructure, emergency response, and hygiene practices. Despite their increasing presence, many of these institutions lack structured safety systems, leaving students susceptible to preventable hazards. This study aimed to provide descriptive analysis involving specific safety concerns within religious boarding schools. **Methodology:** This systematic review was conducted using the PRISMA guideline. Studies were identified by searching Scopus, Web of Science, PubMed, and Google Scholar from inception to June 2025. **Results:** A total of 349 records were retrieved, and 19 studies were included in the final version of the study. Three major themes and several sub-themes were identified: (1) Physical and Infrastructure Safety (building integrity, overcrowding, poor maintenance), (2) Emergency Preparedness and Fire Safety (lack of fire safety tools, evacuation plans, emergency drills), and (3) Health, Hygiene and Disease Control (sanitation, waste disposal, personal hygiene practices). Organizational-level management was found to be the most influential factor in shaping safety outcomes. The review highlights serious gaps in safety implementation, often due to poor institutional oversight, insufficient training, and limited policy enforcement. While external support is important, school management plays a central role in driving sustainable safety practices. **Conclusion:** To ensure a safe environment in religious boarding schools, stronger institutional commitment, structured OSH policies, and multi-stakeholder collaboration are crucial. This review highlights the need for future research on implementation models and targeted interventions to address these safety gaps.

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## INTRODUCTION

School safety has emerged as a key global issue in educational institutions strive to provide secure effective and supportive learning environment for students but also physically and psychologically. In Southeast Asian, Madrasah, Tahfiz or Pesantren are among the oldest informal Islamic educational institutions serving as centres for learning the Qur'an, Sunnah, and core religious practices. Madrasahs have been fundamental in fostering social mobility by providing a balance of

religious and general education, equipping students with modern competencies together with Islamic values. This dual focus enables students to contribute positively to society and cross both spiritual and mature challenges (1). The curriculum in madrasahs and pesantren often integrates traditional Islamic teachings with contemporary educational needs. This integration is crucial for preparing students to meet modern societal demands while preserving Islamic identity (2). Madrasahs and pesantren contribute significantly to religious identity, social values, and community integration. They serve as centres for learning and practicing Islamic teachings, fostering a sense of community and shared values among students (3). The emergence of modern Religious Boarding Schools, particularly Islamic boarding schools or pesantren, reflects a blend

of traditional Islamic teachings with contemporary educational approaches. This transformation aims to meet the evolving needs of society while maintaining the core values of Islamic education. However, the safety and well-being of students in these institutions have become a growing concern, with past incidents highlighting risks related to infrastructure, emergency preparedness, and hygiene (4).

Despite increasing intention to school safety globally, religious boarding school in Southeast Asia remain understudies, particularly regarding specific risk factor and institutional safety practices. Previous studies are localized, descriptive or country specific, providing limited view into regional patterns or systematic safety gaps. Besides, existing research rarely integrates physical infrastructures, emergency preparedness and health management into a single framework, creating important knowledge gaps. This review addresses these gaps by systematically evidence on safety practices in faith based boarding school. It's an originality lies in focusing on these institutions as continuous living learning environments. Globally, incidents in religious and boarding schools' settings have underscored persistent safety challenges such dormitory fire, inadequate facilities and student maltreatment. These incidents have also been reported from other countries including Kenya, South Korea, China, Saudi Arabia, India and Russia, where more than a hundred students have died or become injured, despite the fact that educational buildings should be safe

places for them as they spend their daily time at school (5,6,7). The incidents have been causing injuries and damage property and educational structures. Past study stated that in attempt to reduce risk factor and disaster in schools, the management have ensuring availability of regularly serviced, inspected and tested all safety facilities and ensure reliable electrical wiring systems in school buildings and presence of emergency doors. Fire and Rescue Department Malaysia in 2020 recorded 216 fire incidents in private Islamic schools between 2015 to 2019 including fatal cases in 1985, 1998, 2013, and 2017. These tragedies have raised public concern about administrator's safety awareness and preventive measures (8). The reported fire and safety incidents are summarized in **Table I**.

The challenge of establishing effective safety management systems in religious boarding schools is complex, involving infrastructural inadequacies, lack of comprehensive safety frameworks, and insufficient proactive measures. These institutions often operate in environments that are not consistently compliant with modern safety standards, relying on fragmented, post-incident responses rather than structured systems aligned with standard benchmarks. Islamic boarding schools, face the challenge of integrating modern safety standards with traditional educational practices. The curriculum and educational standards often lag behind modern requirements, making it difficult to implement effective safety measures (17). They also face challenges

**Table I: Summary of Reported Fire and Safety Incidents in Religious or Boarding Schools Worldwide**

| Country      | Year / Incident                            | Level of Education | No. of Students Affected            | Key Safety Issues Identified            | References                                                                                 |
|--------------|--------------------------------------------|--------------------|-------------------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------|
| Malaysia     | 2017 – Darul Quran Ittifaqiyah Fire        | Secondary (Tahfiz) | 25 deaths (23 students, 2 teachers) | No fire alarms or escape routes         | Noor et al. (2022) (8)                                                                     |
| Indonesia    | 2021 – Islamic Boarding School Fire, Medan | Secondary          | 6 deaths                            | Faulty wiring, overcrowding             | Salami et al. (2022) (9); Seyedin et al. (2020) (6); Nyagawa et al. (2023) (7)             |
| Thailand     | 2016 – Chiang Rai Girls' Dormitory Fire    | Primary            | 17 deaths                           | Wooden structure, no detectors          | Hassanain et al. (2022) (10); Rahrdo and Prihanton, (2020) (11)                            |
| Kenya        | 2017 – Moi Girls' High School Fire         | Secondary          | 9 deaths                            | Locked exits, slow emergency response   | Nyagawa et al. (2023) (7); Ilori & Sawa, (2023) (12)                                       |
| Saudi Arabia | 2002 – Mecca Girls' School Fire            | Secondary          | 15 deaths                           | Restricted evacuation, poor enforcement | Hassanain et al. (2022) (10); Seyedin et al. (2020) (6)                                    |
| China        | 2018 – Henan Kindergarten Fire             | Preschool          | 11 injuries                         | Faulty gas connection                   | Hassanain et al. (2022) (10); Rahrdo and Prihanton, (2020) (11)                            |
| South Korea  | 2020 – Jecheon Sports Center Fire          | Mixed              | 29 deaths                           | Inadequate inspections, exit blockage   | Hassanain et al. (2022) (10); Salami et al. (2022) (9)                                     |
| India        | 2019 – Surat Tuition Centre Fire           | Secondary          | 22 deaths                           | Illegal wiring, lack of exits           | Heidari et al. (2020) (5); Ahmad. M., (2021) (13); Hassanain et al. (2022) (10)            |
| Russia       | 2022 – Dagestan Dormitory Fire             | Boarding           | 8 deaths                            | Electrical short circuit                | Mubita et al. (2023) (14); Onyekwere et al. (2024) (15); Rahrdo and Prihanton, (2020) (11) |
| Liberia      | 2019 – Quranic School Fire, Paynesville    | Primary            | 28 deaths                           | No fire exits, poor supervision         | Ilori & Sawa, (2023) (12); Ahmad et al. (2024) (16)                                        |

in improving human resources and facilities, which are critical for ensuring student safety and health. The management of these schools often struggles with issues related to facilities, spatial planning, and the quality of teacher resources (18). The lack of emergency response systems in some schools, as observed in the Islamic Boarding School, highlights the need for education and infrastructure improvements, such as evacuation routes and assembly points, to prepare for emergencies like earthquakes and fires (19).

Safety and health management in schools are essential for creating a conducive learning environment. Benefits include improved academic performance and better mental and physical health outcomes for students. Effective management requires collaboration among all school community members, including students, staff, and parents (14). A comprehensive risk management approach involves identifying, evaluating, and mitigating risks that may affect educational institutions. This includes addressing natural, financial, psychosocial, and health-related risks (20). Understanding the risks within religious boarding schools is crucial for developing strategies that ensure the safety and well-being of students and staff. This study is significant as it addresses the lack of systematic evidence on safety and risk factors in religious boarding schools where students are under continuous school supervision. This study aims to review existing literature to explore the specific safety concerns within religious boarding schools and propose effective management approaches. This study provides an actionable view for policymakers, school administrators, authorities, and researchers for supporting targeted interventions and improved safety governance.

## MATERIALS AND METHODS

This systematic review was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guideline (21). The main research question was: 1. What are the current safety practices implemented in Islamic Boarding Schools in Southeast Asia? Literature research was conducted across four leading index databases such as Web of Science, Scopus, PubMed, and Google Scholar from inception to June 2025. The search terms for published literature included 'safety management', 'school safety', 'emergency preparedness', 'hygiene control', 'religious boarding school', 'madrasah', 'pesantren', 'tahfiz'. Search terms were selected based on the study focus, using Boolean operators 'OR' and 'AND' to refine database results. Only studies that related occupational safety and health in Religious and Islamic Boarding School were considered for this review. Reference list of key studies was also screened manually to ensure comprehensive coverage. This review followed established methodological guidance, including the PRISMA 2020 statement and the Cochrane Handbook for Systematic Reviews of Interventions (22), to ensure

transparency and reproducibility in study selection and data synthesis.

The reviewers independently assessed the suitability of records in a blinded, standardised manner. A structured method was used to identify, select, evaluate, and synthesize studies for systematic reviews. The articles were screened based on several inclusion and exclusion criteria determined by the researchers. Studies were included when reporting safety practices, incidents, or health management in religious or boarding schools being empirical, peer-reviewed and published in English and Bahasa Melayu, and conducted with southeast Asia as well as other global contexts. Studies were excluded if constituting reviews, editorials, or presenting duplicates or lacking methodological clarity (23). The purpose of the screening phase is to remove duplicate articles. Eligibility criteria were developed according to the study area that covers disciplines. At this stage, each article's title, abstract, and main body were carefully analyzed to determine whether they met the eligibility criteria and were appropriate to achieve the aim of the current study. A total of 19 articles were reviewed, evaluated, and analysed rigorously throughout this systematic review to extract data that meet the objective and clarify the research question.

## RESULTS

### Literature Search

A total of 349 records were initially identified. After removing 10 duplicates, 212 records proceeded to abstract screening, where 170 were excluded due to irrelevance. Then, 42 full-text articles were assessed for eligibility. Of these, 15 were excluded for not aligning with the study's objectives and lacked specific data. Finally, 19 studies met the inclusion criteria and were included in the final review as per **Table II**. The PRISMA flow diagram, including reasons for exclusion, is presented in **Figure 1**.

### Study Characteristics

All of 19 selected studies, 10 studies focused on physical and infrastructure safety in religious boarding schools, examining facility management, security standards, and infrastructure quality across various countries (35,36,37,38,39). Study designs varied including cross-sectional design, qualitative studies, case studies and literature review. Sample sizes range from single schools to multiple institutions involving hundreds of students and staff reflecting diverse contexts and school type. Studies have discussed safety standards and highlighted the importance of effective infrastructure management in Islamic schools (29,31). Another studies, (32,33,34) linked working environment and managerial skills to institutional safety, highlighting facility management's role in improving educational quality. Four studies were classified under the emergency preparedness and fire safety theme. These studies focused on fire

**Table II: Summary of Included Studies**

| No. | Author(s)                              | Title/Focus Area                                                                                                                                          | Theme                              |                                      |                                     |
|-----|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--------------------------------------|-------------------------------------|
|     |                                        |                                                                                                                                                           | Physical and Infrastructure Safety | Emergency Preparedness & Fire Safety | Health, Hygiene and Disease Control |
| 1   | Khusumadewi A & Pramesti M (2023) (24) | Development of Psychological Well-Being Scale for Students in Islamic Boarding Schools                                                                    |                                    |                                      | /                                   |
| 2   | Duhung et al. (2024) (25)              | Implementing Fire Emergency Response and Health Behaviour Modules to Elevate Islamic Student Knowledge in Boarding Schools, Indonesia                     |                                    | /                                    | /                                   |
| 3   | Karon et al. (2017) (26)               | Improving water, sanitation, and hygiene in schools in Indonesia: A cross-sectional assessment on sustaining infrastructural and behavioral interventions | /                                  |                                      | /                                   |
| 4   | Hastasari et al. (2022) (27)           | Students' communication patterns of islamic boarding schools: the case of Students in Muallimin Muhammadiyah Yogyakarta                                   |                                    |                                      | /                                   |
| 5   | Hanafi et al. (2021) (28)              | The new identity of Indonesian Islamic boarding schools in the "new normal": the education leadership response to COVID-19                                | /                                  |                                      | /                                   |
| 6   | Laksana et al. (2025) (29)             | Implementation of Security Standards for Facilities and Infrastructure at Integrated Islamic Junior High School LHI Yogyakarta                            | /                                  |                                      |                                     |
| 7   | Ratriwardhani et al (2024) (30)        | Education On The Emergency Response System As An Effort To Handle Fire Disasters In Islamic Boarding Schools                                              | /                                  | /                                    |                                     |
| 8   | Detsari et al. (2023) (31)             | The Implementation of School-Based Management in Supporting Standard of School Infrastructure and Facilities in Islamic Private School                    | /                                  |                                      |                                     |
| 9   | Rizky et al (2022) (32)                | Management of Educational Facilities and Infrastructure in Islamic Junior High School                                                                     | /                                  |                                      |                                     |
| 10  | Rohmaniyyah et al (2025) (33)          | Management Of Facilities And Infrastructure In Education Quality Development_ A Case Study At Al-Munawwir Islamic Boarding School                         | /                                  |                                      |                                     |
| 11  | Meutia et al (2024) (34)               | A Critical Review Of Standards Of Facilities And Infrastructure In Islamic Context: Theory And Practice                                                   | /                                  |                                      |                                     |
| 12  | Nasution et al (2021) (35)             | Planning of Facilities and Infrastructure in Islamic Education                                                                                            | /                                  |                                      |                                     |
| 13  | Ahmad M.(2021) (36)                    | Management Of Facilities And Infrastructure In Schools                                                                                                    | /                                  |                                      |                                     |
| 14  | Nurhuda et al (2023) (37)              | The Concept of Facilities and Infrastructure Management in Schools: A Literature Review                                                                   | /                                  |                                      |                                     |
| 15  | Sadikin et al (2023) (38)              | The Analysis of Relationship between Job Satisfaction and Working Environment of Teachers in Islamic Private School                                       | /                                  |                                      |                                     |
| 16  | Anshori et al (2022) (39)              | Management of Facilities and Infrastructure in Improving The Quality of Islamic Education                                                                 | /                                  |                                      |                                     |
| 17  | Iffendi M (2021) (40)                  | Disaster Emergency Response Management to Anticipate the Spread of Covid-19 at the Islamic Boarding School                                                |                                    | /                                    |                                     |
| 18  | Farhany et al (2023) (41)              | An overview of clean and healthy living behavior practices in the Islamic boarding school (pondok pesantren) environment                                  |                                    | /                                    |                                     |
| 19  | Diannita et al (2025) (42)             | Mapping Of Fire Extinguisher A Case Study In Islamic Boarding School Gontor 2 Ponorogo                                                                    |                                    | /                                    |                                     |

prevention strategies, emergency response systems, and disaster management preparedness in religious boarding schools (25,26,30,43,44). These studies focused on Integrated fire response and health modules to boost student preparedness, with interventions to strengthen institutional fire safety. Five studies were categorized under the theme of health, hygiene, and disease control, reflecting the importance of maintaining sanitary conditions, promoting healthy behaviours, and managing psychosocial well-being in boarding

school environments (26). Sub theme that emphasised practices and clean-living behaviours among students in school, and highlighting the importance of sustainable infrastructure and long-term health-promoting habits within the school environment (27,28, 45).

#### **Physical and Infrastructure Safety**

Many religious boarding schools operate in aging buildings with poor structural integrity and lack regular maintenance. Overcrowded dormitories and

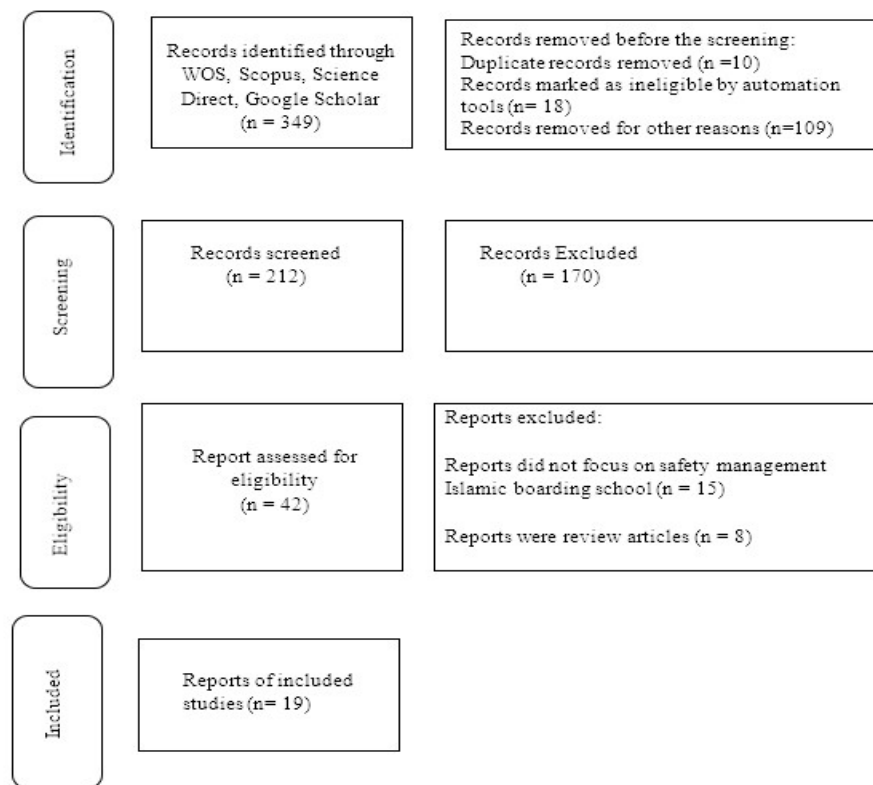


Fig. 1: Selection flow diagram (Adapted from PRISMA selection flow diagram)

classrooms, broken furniture, and unsafe electrical systems are common, often due to weak safety oversight and the absence of preventive maintenance plans. Perimeter security is also lacking, with minimal fencing or surveillance, increasing exposure to external risks. Environmental hazards such as open drains and uneven walkways further endanger students. These reflect the lack of structured OSH policies, trained personnel, and systematic safety management. This leads to the development of four sub-themes building structural integrity, space inequity, hazard-infested learning environments, and infrastructure maintenance systems (8,9,17,18).

### Emergency Preparedness and Fire Safety

Emergency preparedness and fire safety measures in religious boarding schools remain underdeveloped in many contexts. Studies highlight the lack of formal emergency response plans, limited fire drills, and insufficient fire safety equipment such as alarms and extinguishers. Evacuation procedures are often unclear, with minimal training provided to staff or students. Sub-themes such fire safety tool, evacuation routes and signage, emergency response training, emergency planning and documentation, institutional awareness compliance (5,6,19).

### Health, Hygiene and Disease Control

Maintaining health and hygiene in religious boarding schools remains a persistent challenge. Many institutions lack adequate sanitation facilities, clean water supply, and proper waste management systems. Basic hygiene

practices, such as handwashing and routine cleaning, are often neglected due to limited resources and awareness. These conditions increase the risk of communicable disease outbreaks.

The selected three themes also derived based on alignment with the Occupational Safety and Health (Amendment) Act 2022 and ISO 45001: 2018 Occupational Health and Safety Management System. These extends the duty of care beyond traditional workplaces to include educational and training institutions, emphasizing safe infrastructure, emergency readiness and health protections of students and staffs. It highlights the need for hazard identification and risk management as part of holistic safety and health framework. These three themes reflect the core dimension of safety governance applicable to boarding school as living learning environment, where physical infrastructure, emergency systems, and hygiene practices directly influence students' wellbeing and risk exposure.

## DISCUSSION

### Physical and Infrastructure Safety

This review of religious boarding schools highlights significant concerns regarding their physical conditions, which pose daily risks to occupants. Physical and structural deficiencies remain a critical safety gap across religious and Islamic boarding school in Southeast Asia. These issues are primarily due to aging or poorly constructed facilities, overcrowding, and inadequate maintenance systems. Many educational facilities,

including religious boarding schools, operate in aging buildings that are not compliant with safety standards. This is evident in the findings from Nyeri and Nairobi Counties in Kenya, where dormitories were found to be congested, poorly ventilated, and lacking essential safety equipment like fire extinguishers (43). Several studies reported that many dormitories were built using non-fire-resistant materials and lack of proper maintenance. Diannita (2025) found that dormitory blocks were crowded and poorly ventilated, contributing to higher chances of fire and health risk (42). Similarly, Hassanain (2022) emphasized that non-compliance with building codes and insufficient safety inspection in Saudi private school increased vulnerability to fire incidents (10). The presence of defects such as plumbing issues, dampness, and electrical problems in educational buildings has been linked to health risks for students and staff, emphasizing the need for effective maintenance policies (44). Sanitation facilities in some Islamic boarding schools also do not meet health requirements, further indicating the need for routine supervision, repair, and cleaning to ensure a safe environment (15). The absence of regular maintenance and inspection systems contributes to the deterioration of safety standards in educational facilities. In the United States, deferred maintenance of school facilities was estimated at \$254.6 billion, highlighting the need for increased investment in facility maintenance (45). In Malaysia, fire incidents reported between 2015 and 2019 because many of which were linked to poor electrical wiring and illegal building extension (46). These findings highlight the urgent need for strict enforcement of infrastructure standard especially in unregistered private religious schools. This issue is compounded by the broader gap in the implementation of Occupational Safety and Health (OSH) policies and the absence of dedicated safety personnel and institutional frameworks. Effective management of facilities and infrastructure requires a strategic approach, involving planning, procurement, maintenance, and evaluation. Schools need to adopt a management model that emphasizes clarity, responsibility, and efficiency (47).

### **Emergency Preparedness and Fire Safety**

Emergency preparedness in schools is a critical issue, with significant gaps in fire safety tools, evacuation routes, emergency response training, and compliance with safety standards. The level of emergency preparedness across faith-based school remains low, with limited training and inadequate emergency systems. Many schools lack essential fire safety equipment such as extinguishers and alarms, or these tools are not properly maintained. The absence of clear guidelines and mandatory specifications for school preparedness plans further exacerbates this issue, leaving schools to manage on their own without adequate support or direction. Compliance with safety standards is weak, with many schools failing to implement mandated safety measures. Past study (24) reported that after school a school-based

fire preparedness program in Thailand, students fire response knowledge significantly improved, proving that structured training can be casualties. However, most schools in Indonesia and Malaysia still lack of systematic drills and early warning mechanism (48). The study found over 70% of schools had non-functional fire extinguishers and no emergency response plan in Nigeria (49). In the United States, the lack of mandatory specifications for school preparedness plans results in inconsistent implementation of safety protocols across different states (43). The absence of formal emergency plans is a significant barrier to effective emergency preparedness. The development of comprehensive fire emergency plans and increased investment in fire safety education are proposed strategies to bolster emergency response readiness in schools (44). In religious and cultural settings, such as Islamic boarding schools, there is often a lack of structured emergency response systems. Educating students and staff on emergency response and installing necessary safety infrastructure can significantly enhance preparedness (19). Awareness and training are crucial for effective fire safety management. Studies show that a significant portion of students and staff lack knowledge of fire safety protocols, which highlights the need for structured training programs (15). The findings from the provided papers underline the urgent need for structured and enforceable emergency preparedness systems in religious school settings, particularly concerning fire safety. The current state of fire safety measures in these environments is often inadequate, with significant gaps in both infrastructure and awareness. Collectively, these studies found that emergency preparedness remains reactive rather than preventive.

### **Health, Hygiene and Disease Control**

Religious boarding schools face significant challenges in maintaining adequate health and hygiene standards, primarily due to insufficient sanitation facilities, poor personal hygiene practices, and inadequate waste management. Health and hygiene management are often secondary to academic and spiritual program. Many Islamic boarding schools lack proper sanitation facilities, which do not meet health requirements. For instance, a study at the Ainul Yaqin Islamic Education Foundation found that while clean water supply facilities met requirements, waste management and wastewater disposal facilities did not, leading to an overall inadequate sanitation score (45). Studies in Indonesia showed poor waste disposal, limited access to clean water and minimal health promotion activities. The absence of adequate sanitation facilities is a common issue across many regions, as highlighted by a study in Indonesia, which found that most boarding schools do not meet health standards, resulting in health issues like scabies and diarrhoea among students (47). Poor personal hygiene is prevalent among students in boarding schools, contributing to the spread of diseases such as scabies. A study in Yogyakarta reported a

62.6% prevalence of scabies among students, linked to inadequate personal hygiene practices (50). Improper waste disposal is a significant issue in boarding schools, with many institutions lacking effective waste management systems. For example, the Salafiyah Sa'idiyah Islamic boarding school faced challenges with scattered trash and poorly maintained facilities, highlighting the need for better waste segregation and management practices (51). Islamic boarding schools are particularly vulnerable to infectious diseases due to factors such as crowded dormitories and shared facilities. A study found that a significant percentage of students had a history of infectious diseases, highlighting the need for effective prevention and control programs (52-53). A study (52) emphasized that poor air quality and inadequate sanitation in boarding school environment can lead to respiratory and skin infection among students. During Covid-19 pandemic, Indonesia study (42) observed that many Southeast Asia religious schools lacked clear infection control protocol and isolation facilities, increasing the risk of outbreaks. These findings highlight the importance of integrating environmental health standard into school safety framework, ensuring that safety encompass both physical and psychosocial dimensions. This study found the unique contribution of systematically reviewing risk factors and safety gaps specifically in faith based boarding school., providing guidance for policymaker and administrators to improve students' safety and wellbeing. The implementation of health prevention measures such as screenings and disease monitoring in religious boarding schools, like pesantren, is crucial for ensuring student wellbeing and effective institutional health management. Collaboration with health professionals, government support, and community involvement are crucial for overcoming these barriers and ensuring the success of health initiatives in these settings.

The findings of this review discovered that most included studies were descriptive in nature, focusing primarily on safety awareness, infrastructure deficiencies, and emergency preparedness without implementing or evaluating specific interventions. Similar to previous research in Southeast Asia, fire safety and building management challenges remain major issues due to aging infrastructure and inadequate inspection systems (48). Studies assessing water, sanitation, and hygiene (WASH) infrastructure also show that many schools, particularly in Indonesia, lack basic facilities and maintenance, increasing the risk of disease outbreaks (54). Although these descriptive studies identify critical gaps, few have tested structured occupational safety and health (OSH) interventions or longitudinal improvements in school safety indicators. Moreover, outcome measures across studies were inconsistent with, with some relying on checklist based on assessments or self-reported data rather than standardized, validated safety indicators, making cross study comparisons difficult.

When integrated with global frameworks, the evidence shows alignment with the World Health Organisation in 2021 safe schools' framework and the Comprehensive School Safety Framework as published 2022, which emphasises safe learning environments, health services and disaster preparedness within the education sectors. Similarly, the ISO 45001 Occupational Safety and Health Management System underscore a structured, risk-based approach that could guide safety implementation in boarding schools. Applying these frameworks can this review highlights a significant gap, the scarcity of interventions studies that test and evaluate OSH-based programs, engineering improvements or behavioural interventions in religious boarding schools. Future research should therefore adopt longitudinal and interventional designs to assess the real-world impact of these safety measures.

## LIMITATION

Several limitations of this review should be acknowledged. The limited number of available studies may affect the generalizability and representativeness of the findings across different Islamic boarding school settings. While the inclusion of studies from various regions and methodologies offers a broader perspective on safety management practices, it may also result in variability in reported risks and implementation outcomes. The heterogeneity of study designs and outcomes also prevented a meta-analysis, and results were synthesized narratively. The search strategy was restricted to English and Bahasa Melayu, which may excluded relevant studies or institutional reports in other languages, particularly from Indonesia and other Southeast Asian countries. Nevertheless, this review is one of the few attempts to comprehensively examine the key issues, contributing factors, and safety challenges specific to Islamic boarding school. Nonetheless, the review provides a valuable synthesis of existing knowledge and identifies crucial gaps for future research.

## CONCLUSION

The systematic review on safety management practices in religious boarding schools highlights the fundamental need for structured and inclusive safety efforts within the education sector. Three main themes and several sub-themes were identified, representing the core components required for effective safety implementation. These efforts involve multiple levels of responsibility, including government agencies, school management, and individuals. The thematic findings suggest that institutional management plays the most significant role, while policy oversight and individual awareness also contribute to the overall safety ecosystem. To achieve comprehensive safety in religious boarding schools, strong collaboration and accountability across all levels are essential. However, the review concludes that the school or organizational level must intensify its

commitment, as it stands as the central driver in ensuring a safe, secure, and supportive school environment.

This impact of this review lies in providing a comprehensive evidence base to guide the development of a Safety Assessment Model (SAM) for traditional Islamic boarding schools, bridging the gap between theory and practice. The findings have significant implications for policymakers, school administrators and health authorities. Future studies should prioritize intervention-based designs and employ standardized outcome measures to allow meta-analysis and longitudinal evaluation. Strengthening safety frameworks at multiple levels policy, institutional, and operational will be vital to ensure safer learning environments and healthier living conditions for students in religious boarding schools.

# DECLARATION OF COMPETING INTEREST

This manuscript has not been submitted to, nor is under review at, another journal or other publishing venue. The authors have no affiliation with any organisation with a direct or indirect financial interest in the subject matter discussed in the manuscript.

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