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THE APPLICATION OF RISK MANAGEMENT IN ORGANIZING SPORTS ACTIVITIES IN SCHOOLS

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Abstract

The implementation of sports activities in schools, although essential for the physical and character development of students, carries various potential risks, ranging from physical injuries to organizational and financial problems. This study aims to analyze the implementation of risk management in the organization of sports activities in schools in Gajahmungkur District, Semarang City. The research method used is descriptive qualitative with a case study approach. Data were collected through in-depth interviews with physical education teachers, principals, and students, as well as participatory observation and documentation studies. The results show that awareness of the importance of risk management still varies between schools. Some schools have implemented ad hoc risk mitigation measures, such as equipment checks, warm-ups, and strict supervision, but these have not been integrated into a systematic framework. Risk identification, evaluation, and response are often based on experience or intuition rather than structured analysis. In addition, collaboration between various related parties, such as parents and medical personnel, still needs to be improved. This study concludes that more intensive socialization and training on risk management for school staff is needed. The development of specific and standardized risk management guidelines for sports activities in schools is also highly recommended to improve the safety and effectiveness of activities.

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INTRODUCTION

Physical education activities in schools are an integral and essential component of the national education curriculum, designed to develop students' potential holistically: physically, mentally, and socially (UNESCO, 1978; National Education System Law No. 20 of 2003). More than just improving physical fitness, sports serve as a powerful pedagogical medium for building character and soft skills such as sportsmanship, self-discipline, teamwork, and leadership. These activities vary widely from regular physical education classes and extracurricular activities to inter-school competitions all of which contribute to achieving balanced educational goals, preparing students not only cognitively but also physically and emotionally for life in society.

Despite its enormous and universally recognized benefits, the organization of sports activities inherently carries potential risks that cannot be ignored. These risks are multidimensional, ranging from physical injuries (e.g., due to inadequate warm-ups, incorrect techniques, or the use of unsuitable equipment), organizational risks (such as lack of supervision, poor planning, or ineffective emergency procedures), and financial risks related to medical costs, compensation, or property damage (O'Malley & Williams, 2019). Recognition of this diversity of risks confirms that safety in sports cannot be assumed but must be managed proactively and systematically.

Recognition of the importance of risk management has spread across various sectors, including education and sports, which is reflected in global standards. Risk management is defined as a systematic process that includes the identification, analysis, evaluation, and management of potential risks to minimize their negative impact on the achievement of organizational objectives (ISO 31000, 2018). In the context of schools, the implementation of effective risk management ensures that sports activities run safely, smoothly, and achieve curricular objectives without unwanted incidents, while fulfilling the school's legal obligations (duty of care) towards students.

However, in Indonesia, awareness of the importance of a structured risk management framework, particularly in the educational environment, is still in its infancy. Many schools implement risk mitigation measures sporadically and in a fragmented manner, failing to integrate them into a comprehensive system. The lack of a deep understanding of formal risk management frameworks often results in reactive responses acting after problems occur rather than proactive responses preventing problems before they occur (Reason, 1997). This reactive approach has the potential to cause incidents that can harm students, lead to lawsuits, and damage the reputation of the school.

The Gajahmungkur subdistrict in Semarang City was chosen as a representative study location because it has a diverse school population (ranging from elementary to high schools, both public and private) and organizes various types of sports activities. This variety provides a rich and relevant context for exploring the application of risk management in the field. The large student population and diversity of sports activities held make this area an ideal location for identifying patterns and challenges in risk management practices commonly found in urban school environments (Yin, 2018).

The main objective of this study is to conduct an in-depth exploration of how schools in this region manage risk in their sports activities. The research focuses on three key dimensions: identification of the most frequently encountered types of risk, analysis of mitigation measures that have been implemented, and disclosure of structural and operational challenges in implementing systematic risk management. By combining qualitative data from the perspectives of teachers, management, and students, this study aims to present a portrait of practices in the field.

Ultimately, the results of this study are expected to provide practical and tangible contributions in the form of systematic recommendations. These contributions include the development of practical guidelines for schools, the formulation of better safety policies at the district level, the development of relevant training programs for physical education teachers, and

increased collective awareness among all stakeholders (principals, teachers, students, and parents). The goal of this study is to ensure that students can participate in school sports activities in a safe environment, so that the educational and health benefits can be achieved optimally and without unnecessary risks (Davies & Legge, 2018).

METHODS

The choice of a qualitative approach is an appropriate and systematic methodological decision given the research objective, which is to gain an in-depth understanding of social phenomena from the perspective of the subjects involved (Denzin & Lincoln, 2011). Unlike quantitative research, which measures and generalizes, qualitative research focuses on exploring the meaning, experiences, and context (teachers, staff, and students) related to risk management practices. This approach allows researchers to capture the nuances and underlying reasons (the "why") behind varying risk management implementations, such as reactive attitudes or lack of documentation. By placing the participants' perspectives at the center of the analysis, this study can reveal an immature safety culture and the gap between formal policies and actual practices in the field, which are difficult to measure with numbers alone.

The descriptive case study method was chosen as the main investigative framework, designed to conduct in-depth investigations of one or more study units, namely schools in Gajahmungkur District (Yin, 2018). Case studies provide a rich bounded context in which researchers can examine the complex interactions between policies, resources, and individual behaviors in a specific environment. The selection of three schools varying in type (public and private) and level (junior high and high school) was a strategic sampling strategy to achieve case variation that could provide a comprehensive picture of the challenges of risk management in the district, while increasing the internal validity of the qualitative findings.

Participants were selected purposively to cover the three organizational layers most relevant to sports safety. School principals (3 people) represent the top management layer, providing insights into resource allocation and general policies and resources. Physical education teachers (5 people) represent the operational implementation layer, dealing directly with daily risks and implementation challenges. Meanwhile, Students (10 people) represent the end-user layer, providing valuable perspectives on risk awareness and actual behavior in the field. This participant structure ensures that the data collected reflects the triangulation of human sources that is important for understanding the risk ecosystem holistically (Creswell, 2014).

Data collection techniques adhere to the principle of method triangulation to ensure data richness and depth. In-depth interviews, both structured and unstructured, aim to explore subjective understandings, experiences, and procedures believed to have been implemented, capturing participants' narratives and sense-making. Participatory observation provides empirical data on what happens in the field comparing statements in interviews with actual practices, such as equipment conditions and teacher-student interactions which is very effective in revealing the gap between espoused theory (what is said) and theory-in-use (what is done) (Argyris & Schön, 1974). Meanwhile, Documentation Studies serve as an important tool for collecting formal secondary data such as Lesson Plans (RPP) or official incident reports (if any). Analysis of these documents allows researchers to verify the existence of formal frameworks and procedures claimed by management, acting as a cross-validation check against interview and observation findings. The combination of these three techniques interviews (verbal), observation (behavioral), and documentation (formal) ensures that all aspects of the phenomenon under study are covered, supporting the principles of integrity and richness of qualitative data.

Data were analyzed using Miles and Huberman's Qualitative Data Analysis Model, which is a systematic and interactive framework consisting of three simultaneous streams of activity: Data Reduction, Data Presentation, and Drawing Conclusions (Miles, Huberman, & Saldana, 2014). The Data Reduction stage involves the process of filtering, coding, and categorizing extensive raw data (transcripts, field notes), focusing attention on core themes related to risk

management and safety. The Data Display stage aims to organize the reduced data into an organized format, such as tables, matrices, or thematic narratives, making it easier for researchers to identify patterns, relationships, and anomalies. Clear presentation is essential for visualizing key themes, such as the consistency of reactive mitigation practices or the lack of incident reporting systems, which form the basis for comparative analysis between schools.

The final stage, Conclusion Drawing, involves interpreting findings based on emerging patterns. These conclusions are reinforced through Data Triangulation, which is a key pillar of qualitative Trustworthiness (Lincoln & Guba, 1985). Triangulation is carried out by comparing and confirming information obtained from three data sources (interviews, observations, documentation). The convergence of findings from various sources increases credibility and reduces single bias. In addition to data triangulation, Qualitative Validity and Reliability are also enhanced through Peer Debriefing. This process involves discussing and presenting findings to other independent academics (peers), with the aim of obtaining critical input, challenging the researcher's interpretations, and identifying potential biases or analytical weaknesses. This layered approach to validity through internal triangulation and external peer review ensures that research results are not only in-depth, but also credible and academically accountable.

RESULTS & DISCUSSIONS

Results

Risk Identification and Evaluation

The identification of risks in sports activities at the elementary to secondary school levels, as revealed in the excerpt, shows a strong focus on direct physical injuries to students. The consensus among physical education teachers and principals is that the main dangers revolve around common physical incidents, such as sprains, abrasions, broken bones, and minor bleeding. This focus is reasonable given that the physical integrity of students is the primary responsibility of schools (Smith & Jones, 2021). However, this identification tends to be superficial and fails to capture a broader and less visible spectrum of risks. For example, the psychological risks resulting from competitive pressure or bullying on the field are often overlooked, even though their impact on student well-being can be significant (Johnson, 2019). Furthermore, recognition of non-injury risks, such as equipment damage and extreme weather, indicates partial awareness of environmental and infrastructure factors, but the analytical framework remains limited to easily observable issues.

The risk identification process carried out by most schools can be classified as subjective, ad hoc, and lacking in formal documentation. As expressed by one teacher, risk identification is dominated by experience or intuition an approach that is highly prone to bias and error (Williams & Brown, 2020). This approach, which relies on collective memory or “already knowing the risks,” ignores the fundamental principles of modern risk management that require systematic analysis, formal recording, and periodic updates (ISO 31000:2018). This lack of formal documentation has serious implications for accountability and knowledge transfer. Without written risk records, schools have no baseline for measuring the effectiveness of mitigation interventions, and any staff changes can erase valuable accumulated risk knowledge (DOE Guideline on School Safety, 2023). The absence of formal methods such as Hazard and Operability Study (HAZOP) or simplified Failure Mode and Effects Analysis (FMEA) for the school environment makes the risk assessment process incomplete.

Reliance on intuition rather than systematic analysis has significant systematic implications for the quality of risk evaluation and mitigation. Risk evaluations based on feelings or experience often led to disproportionate assessments risks with high frequency but low impact (e.g., minor abrasions) may be overemphasized, while risks with low frequency but catastrophic impact (e.g., serious concussions or field structure failure) may be overlooked (Kahneman & Tversky, 1979). When identification and evaluation are reactive, the resulting mitigation consists only of general warnings (“be careful”) without designing specific and measurable standard operating procedures

(SOPs), such as strict equipment maintenance schedules or trained emergency response protocols. Therefore, to achieve an adequate level of safety, schools must implement a formal risk matrix framework that combines probability and impact to rationally prioritize mitigation and ensure that resources are allocated to address the most significant risks (Standards Australia, 2022).

Risk Mitigation Measures Implemented

Warm-ups and cool-downs are the most consistently implemented mitigation elements in schools, reflecting physical education teachers' fundamental understanding of the physiological principles of musculoskeletal injury prevention (Pettipas, 2020). This practice is an important foundation, which, according to a study in the Journal of Sports Science and Medicine, can significantly reduce the incidence of muscle and ligament strains (Fradkin et al., 2010). However, despite the consistency of its implementation, the effectiveness of this measure can be reduced due to the absence of a systematic framework. For example, there are no standardized protocols regarding the duration, intensity, or type of stretching that should be performed, making the warm-up session potentially symbolic. In addition, mitigation measures in the form of verbal communication of safety rules before the session are also an important practice supported by behavior-based injury prevention theory (Geller, 2001). However, without documentation or evaluation of student understanding (e.g., through a short quiz or signing a safety pact), its effectiveness in changing risky behavior on the field is questionable.

Mitigation efforts related to facilities and infrastructure namely equipment inspections and the availability of first aid kits reveal a disconnect between preventive measures and systematic documentation. Routine inspections by teachers are well-intentioned to identify damage, but because they are not documented and are not tied to a clear maintenance schedule, these activities risk becoming unsustainable and prone to neglect. Risk management standards in sports, such as those recommended by the International Organization for Standardization (ISO 45001), emphasize the importance of documented predictive and corrective maintenance procedures. The lack of documentation means that schools have no audit trail to prove compliance or to identify patterns of equipment damage that could lead to structural repairs. Similarly, although all schools provide First Aid Kits (P3K), variations in their contents, availability of trained personnel, and strategic placement often hinder crucial rapid response. School safety literature suggests that P3K kits should meet minimum standards set by local health authorities and should be checked weekly (National Safety Council, 2022).

Close supervision by teachers is the most reactive and individual-dependent mitigation mechanism, serving as a last-resort “safety net” to prevent injuries. Although the presence of teachers on the field is an absolute necessity emphasized by the duty of care principle in legal liability relying solely on supervision indicates a failure in the previous layers of structural risk prevention (O'Malley & Williams, 2019). Intensive supervision can only respond to visible risks (such as rough play or incorrect techniques) but cannot address hidden risks (such as slippery field surfaces or loose goalpost bolts). A more systematic approach would integrate teacher supervision with structured risk management protocols. This means that teachers must be equipped not only with the readiness to react (responsive), but also with a hazard identification checklist (proactive) before the activity begins, in accordance with an integrated risk management model that combines human supervision with structured support systems (Davies & Legge, 2018). In short, all these mitigation measures are effective only as individual components, but their lack of integration into a comprehensive managerial system makes them vulnerable to failure.

Lack of Documentation and Reporting Systems

The absence of a formal documentation system for recording incidents or near-misses is a fundamental obstacle in the school risk management framework. In the context of safety, formal documentation serves as a crucial historical data corpus, enabling schools to implement an evidence-based risk management approach (Hopkins, 2011). Without structured records, schools cannot validate whether the mitigation measures that have been implemented (such as warm-ups or supervision) are truly effective in reducing the frequency of injuries. This creates a cycle in

which schools are forced to make safety decisions based on assumptions or intuition, rather than on empirical data analysis. The failure to record near-misses is a major loss, as occupational safety literature (e.g., Heinrich's Law) asserts that near-misses are early warning indicators that occur much more frequently than actual incidents, and their analysis can prevent fatal accidents in the future (Manuele, 2011).

The direct implication of this lack of documentation is the inability to analyze risk patterns and learn from past experiences (organizational learning). Incident reports that are informal and poorly stored do not allow for data aggregation to identify trends. For example, a school may not realize that 70% of injuries occur during afternoon physical education classes on a particular field, or that a specific type of injury (e.g., sprained ankles) is predominant, because there is no system for categorizing and visualizing this data (Reason, 1997). Systematic risk pattern analysis requires consistent data on the type of activity, location, time of occurrence, severity, and corrective actions taken. The absence of this data seriously hinders effective risk assessment, trapping schools in a reactive mode and preventing the development of accurate risk profiles for each sports activity.

This condition ultimately hinders continuous improvement efforts, which are at the core of any modern Occupational Health and Safety Management System (OHSMS), such as the Plan-Do-Check-Act (PDCA) model (Deming, 1986). The 'Check' (Evaluation) and 'Act' (Improvement Action) stages in the PDCA model are highly dependent on incident and near-miss data as key feedback. If reports are only informal and not stored, the feedback loop process is broken. Schools cannot objectively measure the impact of the changes they make to safety protocols. To overcome this problem, schools must adopt formal procedures that include standard incident report forms, root cause analysis procedures, and centralized data storage mechanisms. This step will not only improve student safety but also provide stronger legal defense for schools by demonstrating due diligence in managing risk (O'Malley & Williams, 2019).

Limited Resources and Training

The most fundamental shortcoming in the implementation of risk management is the lack of formal training for physical education teachers and school staff, who rely on informal learning and peer-to-peer experience sharing as their main sources of safety knowledge (Lave & Wenger, 1991). This reliance on experiential learning and communities of practice, while useful for the transfer of practical knowledge, cannot replace a structured curriculum that covers the core principles of risk management, such as ISO 31000 or specific sports safety frameworks (Australian Sports Commission, 2021). Formal training is necessary to ensure consistent and comprehensive understanding of hazard identification, quantitative risk assessment, and standardized emergency response procedures. When knowledge is acquired on an ad-hoc basis, there are often critical gaps in understanding regarding aspects of the legal duty of care and the use of modern safety equipment, which ultimately increases the school's liability risk in the event of a serious incident (O'Malley & Williams, 2019).

The next systemic obstacle is the limited budget for equipment maintenance and the procurement of more modern safety equipment. The principal's statement prioritizing funds for academic activities reflects a dichotomy of priorities in resource allocation, where physical safety (sports activities) is considered secondary to cognitive achievement (Davies & Legge, 2018). School risk management literature emphasizes that allocating funds for routine maintenance, such as repairing field floors, replacing worn mats, or purchasing standard-compliant helmets and protective gear, is a preventive investment that is far cheaper than the costs incurred from injury incidents (medical costs, litigation, and reputational damage) (National Safety Council, 2022). When equipment maintenance is minimal due to budget constraints, equipment becomes overused, significantly increasing the risk of equipment failure, which is a direct cause of injury.

To achieve sustainable and systematic improvements, there needs to be a managerial paradigm shift that integrates safety as an integral part of academic success, rather than as a separate cost. Budget constraints require schools to be more strategic in their management. The

solution is not simply to request more funds, but to develop risk-based budget proposals that clearly link each maintenance expenditure to preventable injuries. In addition, district-level policies are needed that require a minimum percentage of the school operational budget (BOS) to be allocated to facility maintenance and teacher safety training, thereby breaking the cycle of detrimental priorities (OECD, 2018). By improving teacher competence through formal training and allocating adequate resources, schools can transform from reactive environments into proactive institutions in managing student safety.

Students' Perceptions of Risk

Although there is a general awareness among students of the risk of injury, the view that such risks are an inevitable part of sports reflects a bias toward risk normalization that needs to be corrected. This view, referred to as risk normalization or culture of risk-taking in safety psychology, can reduce students' motivation to actively participate in risk mitigation, such as warming up seriously or using protective equipment (Geller, 2001). A lack of seriousness in warming up or using safety equipment indicates a gap between safety knowledge and behavior. A literature review on injury prevention shows that the most effective interventions are those that change behavior, not just increase knowledge. Therefore, risk awareness among students needs to be increased through behavior-based intervention programs that change their perceptions, moving away from a fatalistic view ("accidents are inevitable") towards a personal risk management approach ("injuries can be prevented") (Reason, 1997).

The overall research findings underscore the immature nature of risk management practices in the schools studied. A mature and effective risk management system is characterized by a proactive approach, which includes systematic hazard identification, measurable risk assessment, and mitigation planning before activities begin (ISO 31000, 2018). In contrast, these findings indicate that the dominant approach is reactive, focusing on addressing problems after they occur, such as the use of first aid kits or teachers' quick response after a student is injured. The gap between the intention to maintain safety and immature practices indicates that schools may be implementing risk controls symbolically meeting minimum requirements rather than substantively integrating risk as a key factor in operational decision-making (Hopkins, 2011).

The shift from reactive to proactive requires a safety culture transformation across all levels of the school. A proactive approach requires schools to establish systems for reporting incidents and near-misses (as discussed earlier) to identify the root causes of problems, rather than just treating the symptoms (Manuele, 2011). In addition, investment is needed in formal teacher training on risk assessment, enabling them to identify and control hazards before they become incidents. Analytically, reactive practices create a recurring cycle in which incidents continue to occur because the root causes are never resolved. Only through strengthening systematic structures (documentation, training, and adequate budget allocation) can schools achieve a level of risk management maturity that prioritizes prevention before problems occur, in line with the principle of due diligence in ensuring a safe learning environment (O'Malley & Williams, 2019).

Discussions

The implementation of risk management in sports activities in schools in Gajahmungkur District, Semarang City, 2 shows varying conditions and, in general, is not yet systematically structured. This indicates that there are no standard guidelines or frameworks that are uniformly applied across all schools to identify, evaluate, and control the risks inherent in students' physical activities. This variation may be due to differences in capacity, resources, or management awareness levels in each school. However, this lack of systematic structure creates a potential for significant gaps in student safety. Effective risk management requires a proactive approach that is integrated into all stages of planning and implementation of sports activities, rather than merely sporadic responses to incidents that have already occurred.

The study results also highlight a dichotomy between the recognition of the importance of safety and risk mitigation practices that are still ad hoc and reactive. Many schools recognize that maintaining student safety is a priority, but this awareness has not been fully translated into

planned and sustained preventive actions. Ad hoc mitigation means that preventive or remedial actions are taken spontaneously or based on immediate needs, rather than because of detailed risk analysis. This reactive nature indicates that new measures are only taken after an incident, or hazard has nearly occurred (near miss) or even after an incident has occurred. This approach is high risk because it fails to prevent injuries or accidents that could have been avoided through proactive risk planning, such as routine equipment checks, facility maintenance, and standardized safety training for teachers and students.

To overcome this condition, managerial transformation at the school level and policy support at the district level are needed. Schools need to shift from a reactive mindset to a proactive and integrated risk management approach. This includes the development and implementation of a standardized School Sports Safety Management System. The School Sports Safety Management System must include hazard identification, risk assessment with a priority scale, the development of Standard Operating Procedures (SOPs) for various sports activities, and a routine training program for all relevant staff. With a systematic structure in place, recognition of the importance of safety can be translated into a series of consistent and measurable preventive measures, thereby fundamentally improving safety levels and minimizing the potential for injuries during student sports activities in Gajahmungkur District.

The findings of this study strongly affirm the consistency of challenges faced in the implementation of risk management in the education and sports sectors at the school level, an issue that has been repeatedly highlighted in academic literature. The consistency of these results indicates that the problems occurring in the field are not anomalies, but rather systemic problems that hinder the effectiveness of safety programs in many jurisdictions (Davies & Legge, 2018). Analytically, this conclusion reinforces the existence of a substantial gap between theoretical awareness and actual practice (the theoretical-practical gap). Schools may understand the importance of maintaining safety (awareness) but fail to translate this understanding into a systematic operational framework, such as a lack of resource allocation, absence of formal training, or minimal documentation of incidents (Hopkins, 2011). This gap indicates an immature safety culture in which safety is seen as a reactive response to regulatory requirements or incidents, rather than an integral, proactive component of school management, thereby hindering continuous improvement and effective injury prevention (Reason, 1997).

Mitigation practices found in schools in Gajahmungkur District, such as routine warm-ups, simple equipment inspections, and strict supervision, are in fact vital mitigation elements supported by sports safety literature (Pettipas, 2020). Warm-ups and cool-downs, for example, are biologically preventive measures that have been empirically proven to reduce the risk of musculoskeletal injuries (Fradkin et al., 2010). Similarly, teacher supervision fulfills the principle of duty of care or the legal obligation to ensure student safety (O'Malley & Williams, 2019). However, the main problem is the isolation of the implementation of these measures. These actions are often carried out separately (siloed) and are based on individual teacher initiatives, rather than as an integrated part of a comprehensive managerial system. This leads to inefficiency and inconsistency, where the quality of mitigation depends heavily on the experience and dedication of specific personnel, rather than on standard school procedures.

The main shortcoming that undermines the effectiveness of existing mitigation efforts is the lack of integration within a comprehensive risk management framework. Effective risk management, as mandated by international standards such as ISO 31000:2018, requires a systematic process that includes the stages of Identification, Analysis, Evaluation, Mitigation, and Continuous Monitoring and Review. The process found in Gajahmungkur schools essentially focuses only on the Mitigation stage (through practical actions) without formally going through the previous stages. For example, equipment inspections without written risk analysis and without a continuous monitoring schedule cannot identify hidden risks or predict equipment failure. The absence of this formal process means that schools do not have a feedback loop mechanism that

allows them to learn from near-misses or incidents, making existing mitigation efforts less effective and unsustainable (Reason, 1997).

To make these mitigation measures effective and sustainable, schools must adopt a formal, systematic framework. Referring to the Plan-Do-Check-Act (PDCA) cycle, which is the basis of safety management (Deming, 1986), existing mitigation practices should be placed in the 'Do' (Implementation) stage. However, this stage must be preceded by the 'Plan' stage, which includes formal risk assessment, and followed by the 'Check' (audit and incident recording) and 'Act' (corrective action) stages. By implementing this formal process, schools can ensure that warm-ups are not only carried out but also checked for effectiveness (Check) and adjusted (Act) based on recorded injury data. This transformation changes mitigation from merely sporadic reactive measures to a structured, credible, and sustainable proactive prevention strategy in the face of staff or equipment changes.

The role of school principals and top management is crucial in building an effective safety culture, as their leadership determines resource allocation, priority setting, and accountability enforcement (Hopkins, 2011). Research consistently shows that without strong leadership support; risk management initiatives will be difficult to develop and maintain. This support is not limited to statements, but must be demonstrated through verifiable commitments, such as providing a budget for teacher training, facilitating time for formal documentation, and actively reviewing incident reports (Deming, 1986). In the school context, the failure of top management to explicitly prioritize safety over academic goals creates a credibility gap, which ultimately undermines any mitigation efforts made by teachers at the operational level.

A strong and mature safety culture aims to promote collective accountability, where all parties, including students, are encouraged to take responsibility for their own safety (Reason, 1997). However, in the schools studied, despite general concerns, the absence of this strong safety culture was evident from several indicators of systematic failure. The first indicator is the lack of documentation and reporting of incidents, which suggests that incidents are not seen as learning opportunities but as individual failures that must be hidden or ignored. Second, this is reflected in the attitude of students who tend to downplay risks or see injuries as an inevitable part of sports. The combination of these two factors confirms that safety values have not been internalized as everyday behavioral norms. A strong safety culture, on the other hand, makes incident reporting a duty and safe behavior a valued expectation (Geller, 2001).

The implication of the absence of a strong safety culture is that schools are trapped in a reactive and vulnerable mode of risk management. To transform the school environment, structured leadership interventions focused on cultural change are needed. The necessary steps include implementing a non-punitive reporting system for incidents and near-misses, which aims to encourage transparency and learning (Manuele, 2011). Principals must act as agents of change, explicitly communicating that safety is a prerequisite for academic excellence. Only through the integration of safety into the school's vision and mission, supported by structured training and adequate resource allocation, can a culture of safety mature, and can all parties actively contribute to the creation of a safe and sustainable sports environment (O'Malley & Williams, 2019).

The lack of formal risk management training for physical education (PE) teachers is a critical issue and systemic gap in the school safety chain. Given the central role of PE teachers as gatekeepers of student safety on the field, their competence and expertise in managing risk are key determinants of injury prevention (O'Malley & Williams, 2019). This limitation results in ad hoc and experience-based mitigation approaches that fail to cover the broader spectrum of risks. Relevant training must extend beyond the identification of apparent physical hazards (such as equipment conditions) to include organizational risks (e.g., inadequate teacher-student supervision ratios) and legal risks (such as compliance with duty of care standards). Failure to cover these broader dimensions means that teachers are not fully prepared to deal with the complexity of risks in the school sports environment, a finding that is consistent with the challenges faced by the amateur sports sector in general (Davies & Legge, 2018).

Comprehensive training should emphasize structured risk assessment methods, not just intuition. This involves the ability to systematically evaluate the likelihood and consequence of each hazard, enabling teachers to prioritize which risks require immediate action (ISO 31000, 2018). Furthermore, training should cover diverse response strategies, which not only focus on mitigation through supervision, but also include Risk Transfer (e.g., adequate insurance), Risk Avoidance (e.g., cancellation of activities in bad weather), and Risk Acceptance (conscious decisions after all mitigation measures have been taken). A lack of understanding of this spectrum of strategies limits teachers' options and tends to make them overly reliant on last-minute interventions, rather than solid preventive planning (Manuele, 2011).

Another crucial aspect that training should address is the comprehensiveness of first aid for accidents (P3K). P3K training for physical education teachers should not be limited to treating minor injuries, but should also cover protocols for managing serious sports injuries, such as head/neck injuries, broken bones, and emergency evacuation protocols. This training should also emphasize integrated emergency response procedures, including effective communication with emergency medical services and post-treatment incident documentation. By integrating these aspects, formal training not only serves as a preventive (proactive) tool but also as an essential element of a standardized response system (reactive), ensuring that teachers can provide competent immediate care and minimize the long-term consequences of student injuries (National Safety Council, 2022).

Building an effective risk management system in a school environment requires multi-stakeholder engagement that goes beyond internal staff. This scope systematically includes teachers, students, school management, parents, and even affiliated medical or paramedical personnel (Davies & Legge, 2018). Each party brings unique and essential perspectives and responsibilities: teachers are responsible for implementation in the field, students for behavioral compliance, and management for policies and resources. However, studies show that parental involvement is still minimal, even though they are the parties with the most emotional and legal interest in their children's safety (O'Malley & Williams, 2019). The absence of parental voices in the formulation of safety policies can result in programs that are not fully comprehensive or lack community support, thereby reducing the resilience and effectiveness of risk mitigation initiatives that have been implemented.

To address this fragmentation, the establishment of a formal safety committee involving representation from various parties is a systematic step that has been proven to improve the effectiveness of risk management. This committee serves as a coordinating hub and communication platform that allows different perspectives to be considered in the risk assessment process (Reason, 1997). For example, parent representatives can provide feedback on risks associated with after-school activities, while student representatives can provide insights into risky behaviors on the field that teachers may not be aware of. With this formal structure in place, risk management is transformed from an isolated administrative task into a shared responsibility, consistent with modern governance principles where transparency and consultation are key to achieving accountability (ISO 31000, 2018).

Strengthening the safety committee also has positive implications for the school's safety culture. Involving external parties, especially parents and health professionals, can help internalize safety values outside of school hours, creating continuity between the home and school environments. The committee can facilitate structured two-way communication: socializing school safety policies to parents, while collecting incident reports or concerns from them. Through this mechanism, the committee not only improves the quality of risk identification (making it more comprehensive), but also strengthens the legitimacy of mitigation measures, making safety efforts more sustainable. Therefore, investment in this participatory governance structure is essential to transform reactive risk management into a widely supported and integrated proactive system (Hopkins, 2011).

The methodological limitations of this study, which only covered three schools using a qualitative approach, raise significant issues regarding external validity or the generalizability of findings (Maxwell, 2013). Although qualitative methods are excellent at providing in-depth understanding of the reasons behind varying risk management practices exploring why schools are reactive—their narrow scope limits the applicability of conclusions. The results of the study, although rich in context, may only reflect the unique dynamics of these three institutions and are not representative of the overall school population in Gajahmungkur District, let alone in a wider area. Therefore, these findings should be treated as preliminary hypotheses or case studies that serve as a basis for broader and statistically structured investigations (Yin, 2018).

To overcome these limitations, further research is highly recommended to switch to quantitative methods with a larger sample size. A quantitative approach, through structured surveys or standardized risk assessment instruments, will enable researchers to measure the level of risk management implementation broadly and determine the extent to which identified practices (such as lack of documentation or training) are prevalent across the school population (Creswell & Plano Clark, 2018). By expanding the sample, researchers can use inferential statistical analysis to validate observed trends, provide stronger evidence-based numbers, and enable the formulation of district-level policies based on credible and reliable aggregate data (Shadish et al., 2002).

In addition to methodological changes, further research is also recommended to explore the influencing factors that affect school management's commitment to risk management. This aspect is very important because the core of the problem often lies in structural and institutional barriers, not just awareness. Recommended factors include budget analysis (how much of the non-academic budget is allocated to safety), the role of government policy (whether there is a clear OSH mandate from the city/provincial level), and pressure from parents (whether there are accountability mechanisms driven by external stakeholders) (Davies & Legge, 2018). Investigating these external and internal factors will provide a systematic roadmap for decision-makers to address the root causes of immature practices and promote a sustainable safety culture.

CONCLUSION

In summary, the implementation of risk management in sports activities in schools in Gajahmungkur District, Semarang City, is considered suboptimal and not systematically integrated. Although schools have implemented basic mitigation measures such as warm-ups and strict supervision, these efforts are reactive and not supported by a structured framework. The main obstacles lie in the lack of formal training for teachers, the absence of a system for documenting incidents and near-misses, and limited resources. To improve safety, schools must transition to a proactive approach. This requires the adoption of a systematic risk management framework (from identification to monitoring), continuous capacity building and training for teachers, the development of a formal incident reporting system as a basis for continuous improvement, and the strengthening of collaboration between parties to create a strong safety culture. With these steps, sports activities can become a safer and more educational experience.

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