RESEARCH ARTICLE:

Schools and Occupational Health and Safety: Perspectives for Developing Countries

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Abstract

Occupational health and safety (OHS) services are important for the sustainable development of countries. Education in OHS is needed, specifically in developing countries and schools. Knowledge and awareness about OHS are sparse in low- and middle-income countries. The identification of potential risks and hazards, and their control measures, provide the foundation for a successful safety programme. This paper assesses OHS in schools, in developing countries, and an OHS management framework for schools is established. The methodological steps were to conduct a literature search, identify relevant studies, extract evidence from publications, and synthesise the evidence. The findings provided a basis for the proposed OHS management framework for schools. It was found that OHS are neglected in schools in developing countries, due to insufficient legislation, regulation, and policies. The study recommends that schools and governments work cooperatively to improve OHS. The school management should ensure that a safety culture exists, and health and safety awareness is raised. Schools should also introduce, maintain and develop their OHS activities and built these into their strategic plans, objectives, and policies.

Keywords: *occupational health and safety; schools; developing countries; safety framework; school management; education and training; safety culture; awareness*

Introduction

OHS practices are vital for a country's sustainable development, as such practices can aid in reducing occupational accidents and diseases, which place an economic burden on individuals, enterprises, and the nation (National Occupational Health and Safety Policy, 2009; LaDou *et al*., 2018). Ahasan and Partanen (2000) argue that the rapid growth of industrialisation and market opportunities necessitate the implementation of OHS for labour welfare. Globalisation and industrialisation expose people to increasing occupational hazards. The global workforce's health status and exposure to occupational risks represent large gaps between and within countries (Ahmed and Newson-Smith 2010; Kavouras *et al*., 2022). According to the International Labour Organisation (ILO) (2019; 2023), approximately 340 million workers worldwide succumb to occupational-related accidents and 160 million occupational-related diseases. About 65% of global work-related mortality occurs in Asia, followed by Africa (11.8%), Europe (11.7%), America (10.9%), and Oceania (0.6%). Regional differences in the rates of fatal occupational accidents per 100 000 workers can be seen, with those in Africa and Asia being much higher than those in Europe (Hämäläinen *et al*., 2017). These numbers are difficult to calculate accurately in South Africa, due to the large informal workforce sector, where accidents are not reported (Federated Employers Mutual Assurance Company (FEM), 2023). The multi-faceted national, social, political, demographic, and occupational differences between countries and regions translate to differences in work-related deaths and diseases (ILO, 2019). In comparison with global trends, Africa has the highest relative share of work-related communicable diseases (33%) and occupational accidents (20%) (Takala *et al*., 2017). OHS legislation and regulations cover only about 10% of the population in developing countries (Lucchini and London, 2014; Sylvester and Benjamin, 2020), while people in developing countries are exposed to more than 80% of global occupational hazards (Renton *et al.,* 2012). These

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hazards are associated with risks likely to cause injuries, fatalities, and diseases to workers (Khan, 2013; Sylvester and Benjamin, 2020). Developing countries generally lack effective OHS environments and depend on developed countries for support (Legotlo, 2014; Mohammed, 2020; Sylvester and Benjamin, 2020).

The knowledge and awareness about factors involving OHS are often sparse in low- and middle-income countries (Lucchini and London, 2014; Lucchini and Landrigan, 2015; Abdalla *et al*., 2017). OHS are often neglected in developing countries, due to various factors, including competing social, economic, and political challenges (Khan, 2013). The efficacy of OHS administration in developing countries is also less than those of developed countries. Developing countries also tend to have less extensive, comprehensive and complex legal and institutional frameworks for OHS administration than developed countries (Kheni *et al*., 2008, Myeni and Ngcobo, 2020: 3) and do not take safety seriously or have insufficient legislation to minimise OHS (Khan, 2013). These countries are also known for their unpredictable and volatile institutional environments with uncodified or unregulated laws, depending on political power (Bruton and Ahlström, 2003; Ahlström and Bruton, 2006). Developing countries do not have the same capacities to manage OHS issues, and neither do their national governments have the capacity to enforce OHS regulations (ILO, 2019). Furthermore, many developing countries cannot translate new research into sound government policies in relation to OHS, due to weak government institutions and the lack of a strong scientific community (Lentz-Marino, 2014). More research on innovative OHS management techniques should be conducted in developing countries (Kheni and Braimah, 2014). A healthy and safe environment is required for teaching and learning to take place as it supports the quality of education (Netshitahame and Van Vollenhoven, 2002; Lacoe, 2020; Purwana, 2022). Education in OHS is needed to establish such an environment, specifically in developing economies and schools (Ma and Yuan, 2009; Takala *et al*., 2014). Schools should be safe for learners and employees to facilitate effective teaching and learning (Prinsloo, 2005; Themane and Osher, 2014; Darling-Hammond *et al*., 2020). Issues in terms of safety in a school, whether within or outside, is problematic (Ahmad and Hussain, 2021). A lack of interest is an essential factor that contributes to the failure of OHS promotion plans (Nasab *et al*., 2009). Planned education on OHS is necessary to change the attitude of learners from risky to safe behaviour (Mearns *et al*., 2000; Cox *et al*., 2004). Schools need to be "risk led", not "law led" (Royal Society for the Prevention of Accidents (ROSPA), 2012). The mere introduction of OHS legislation is ineffective in reducing injuries; additional strategies are needed to increase OHS in schools (Ricci *et al*., 2016).

Limited research exists on the views of school principals toward improving OHS practices in schools as well as the expectations of senior management and school administrations (Yilmaz, 2022). There is also limited evidence of the effectiveness of OHS information and resources, specifically for high school learners (Pisaniello *et al*., 2013). The lack of focus on OHS within a school could result in hazards and risks not being recognised; thus, resulting in undesired behaviour (Themane and Osher, 2014). Young people are vulnerable thus requiring special knowledge and skills related to crisis prevention, preparedness, and intervention (Roth and Erbacher, 2022). However, according to Van Dijk (2015), education and training alone cannot be relied upon to solve all OHS problems. An integrated approach is required to address the effectiveness of school safety, as teaching and learning is ineffective when educators and learners feel unsafe (Mabasa, 2013). OHS is vital to ensure that both learners and staff can function in an environment that is protected, maintained, and promoted (Osayande and Aideyan, 2015). The authors identified gaps in OHS research, especially pertaining to OHS in schools. Therefore, the objective of this article is to assess OHS in schools in developing countries and establish an OHS framework for schools. Such a framework will promote the effective management of OHS and enhance schools' OHS culture. The literature supports the view that schools should provide a distinct and practical framework for educators and learners for a holistic school approach to OHS training and where health and safety procedures are communicated (Makota and Leoschut, 2017; Department of Basic Education, 2018). The article will assist school management and education departments in creating a safer school environment. The literature review follows and provides context to OHS in developing countries, training and education, and OHS management. It is followed by the methodology, discussion of the findings, and conclusions.

Literature Review

The multidisciplinary field of OHS is aimed at anticipating, recognising, evaluating, and controlling both hazards and risks that are found in (or result from) the workplace and could have a negative impact on the health and wellbeing of workers, society and the environment (Ahasan and Partanen, 2000; ILO, 2001; ILO, 2014). Modern OHS practices incorporate both psychological and social well-being and is aimed at allowing workers to have socially and economically productive lives (ILO, 2001). Around 2.3 million people worldwide succumb to work-

related accidents or diseases annually, which is over 6 000 deaths daily (World Statistic, 2019; 2023). In addition, the underreporting of occupational accidents and illnesses, including fatal accidents, reduces the actual figures (World Statistic, 2019). According to Borys *et al*. (2009), safety rules and regulations are based on greater control of workers' behaviour, which is believed to lead to a safer workplace, including the potential to avoid prosecution in the case of incidents or accidents in the workplace. A considerable and complex task remains for employers, governments, workers, and other stakeholders in ensuring the safety and health of workers for present and future generations (ILO, 2019).

OHS plays an important role in schools with the primary duty to safeguard staff and learners (ROSPA, 2012). According to Kandemir and Argon (2020), the concepts of health and safety are an integral part of an education system, with most of the population having a direct (or indirect) relationship with the education sector. There is, however, a need for consensus about what constitutes OHS in schools (Mayer and Furlong, 2010). School health and safety stakeholders consult statistics and data on the prevalence of incidents and accidents. "Prevalence" refers to the number (rate) of incidents of a condition of interest (event/disease) that is present in a specific population at a given time. "Incidence" indicates the rate of new possibilities emerging within a specified timeframe (Mayer and Furlong, 2010). The school, being a formal pedagogical setting, should convey accurate, beneficial information to help correct misconceptions about OHS practices (Osayande and Aideyan, 2015; Guerriero, n.d.). Through adequate safety education, schools should be able to, firstly, ensure the development, implementation, and monitoring of effective safety programmes; secondly, identify potential and current health and safety hazards, and recommend an approach for assessment and control (Ladue, 2006); thirdly, locate, evaluate, interpret and provide health and safety information appropriate to the school; fourthly, collect, analyse, interpret and use data, with proper attention to ethical, legal and confidentiality requirements; and, finally, apply relevant legislation, standards, and codes of practices in the school activities (Asogwa, 2007). OHS education should aim to improve the quality of the school learning environment (Purwana, 2022).

Sub-Saharan Africa's fatality rate is estimated at 21 workers out of 100 000, with an accident rate of approximately 16 000. In Latin America and the Caribbean, about 30 000 fatalities occur yearly (Alli, 2008). The economic costs of injuries and deaths are substantial (Khan, 2013). OHS concerns in Ukraine (Eastern Europe), Honduras (Central America) and in some parts of Southern Africa (ILO, 2013). Marumo (2016) states that many African countries' regulatory and enforcement institutions are not equipped to deal with OHS issues, due to a lack of resources and historical administrative challenges. Reasons for poor OHS performance in developing countries include aspects such as bureaucracy, time pressures, ineffective institutional structures for implementing OHS laws, and worker ignorance that they should be provided with a safe work environment that is not harmful to their health or wellbeing (Koehn *et al*., 1995). The health and safety of workers remains a fundamental human right (Şenkal *et al.,* 2021) and occupational surveillance needs to be strengthened, specifically in developing countries (Gupta and Mahajan, 2003). The health and safety of workers of all ages, including the youth, should be considered to minimise the detrimental effect on society (ILO, 2018). Challenges in the educational systems of developing countries include the inefficient use of educational resources, such as teaching staff, poorly maintained facilities, and a shortage of school facilities and classrooms (Legotlo, 2014; Mohammed, 2020). Poor data-keeping also poses a challenge, due to difficulty in measuring the effect of hazards, resulting in poor analysis and decision-making (Khan, 2013; Foote, 2023). Developing countries need better enforcement, health and safety data, reporting systems, and reporting of occupational incidents (Marumo, 2016; Kyung *et al*., 2023). According to Khan (2013), OHS problems in developing countries include perception (lack of a safety culture), data management (insufficient data related to the effects of hazards and improvement measures), legislation that is properly enforced, and corruption (which is not conducive to the development of a safety culture).

Brazil, for instance, has no significant educational policies for schools as the most recent educational legislation was passed in 1996 and no specific reference was made to school safety (Marteleto *et al*., 2016). Furthermore, the (public) education system is underfunded and overwhelmed by structural problems and overcrowding (Expat Arrivals, 2019). The country's authorities should integrate OHS in social and economic development endeavours. Policy reform of health systems should be undertaken, including the integration of workplace health and safety measures, such as in Brazil, under the National Health System programmes (Repullo and Gomes, 2005; IOL, 2023). In Trinidad (West Indies), OHS information (including the provision of training) is not available. The attitudes and perceptions of people towards OHS are not known either. It is suggested that Trinidad should promote a preventive OHS culture, ensure the effective management of OHS, and emphasise and encourage the benefits associated with OHS protection. These measures could include ensuring compliance with regulations,

disseminating information about hazards and risks, developing appropriate educational programmes and materials, and providing OHS training concerning hazards and risks. Furthermore, it is suggested that subsidies for ergonomically designed tools and personal protective equipment (PPE) could be provided (Baksh *et al.*, 2015). Pakistan's OHS challenges include illiteracy, a lack of basic infrastructure, an insufficient number of qualified human resources in OHS, and a lack of research regarding OHS. Strategies to ensure effective OHS should include an increased awareness of health and safety hazards, monitoring of high-risk groups, legislation, ethical issues, safety regulations, policies, employee safety training, safety culture and OHS spending (Ahmad *et al.*, 2012; Russell, 2023).

In the absence of stable and safe school infrastructure, effective school management and education related to school safety, for educators and learners, is at risk in China (Yongqi, 2017). Safety drills are, however, instituted in schools, to counter the dangers posed by earthquakes and fires. China also experiences challenges with school safety and security since its school safety policies is focused more on security in terms of acts of terrorism (Vavilova and Matveev, 2012). Vital school facilities, modern technology, increased basic hygienic conditions, and access to schools are suggested to enhance OHS in schools (Van Jaarsveld, 2021). OHS issues plague many schools in South Africa (Equal Education, 2018). Some schools have limited infrastructure (Makinana, 2013; Nkosi, 2013), a shortage of classroom space and an inadequate allocation of resources (Legotlo, 2014; Bayar, 2016). Reygan (2016) states there is a risk that educational resources are developed but not distributed, or not effectively distributed, and not properly followed up and successfully implemented. South Africa is a policy-rich country, with some of the most inclusive legislation in the world; however, implementation is often poor (Equal Education, 2018). There is an inability or unwillingness to effectively implement educational policy, particularly where it relates to violence and inequality. School violence has a negative effect on learners, as the experience of and exposure to violence from a young age increases the risk of engaging in anti-social and unsafe behaviour later in life (Lester *et al.*, 2017; Daniel, 2018). Impactful OHS interventions require consideration of various health and safety concerns across different schools and communities (Equal Education, 2018). The rising trend of occupational accidents is imminent if appropriate safety measures are not adopted (Adebola, 2014). From research conducted in Malawi, the following OHS guidelines for developing countries are proposed (Table 1):

Table 1: Occupational health and safety guidelines

• Scale up OHS training in educational and vocational training institutions.
• Review current systems of recording and reporting of occupational injuries.
• Conduct OHS advocacy and awareness campaigns.
• Formulate inspection and incident investigation guidelines.
• Build capacity, including the training of inspectors.
• Formulate specific regulations for high-risk areas and sectors.
• Review and harmonise OHS legislation.
• Create a national committee on OHS.

Source: International Labour Organisation (2013)

Malawian research encouraged parliament to include OHS in political and national agendas and national development plans to secure additional resources and enhance institutional capacity for OHS. Malawi is implementing a coherent national system, in line with international standards and practices, for collecting and recording data concerning OHS accidents. It will support the planning of effective preventive programmes and understanding of trends and challenges regarding OHS (ILO, 2013). The health and safety of workers (and learners) is recognised as a fundamental human right; hence, possible measures, including legislative and occupational surveillance, need to be strengthened, especially in developing countries (Ahmad *et al.*, 2012).

Methodology

The methodological steps followed comprised a literature search, identifying relevant studies, extracting data from publications, and synthesising the evidence. The electronic literature search identified articles on occupational safety, health and the environment; safety and health of young workers; occupational safety practices; safety culture; OHS in schools; health and safety in schools in developing countries; teaching, education, training and safety; and school health and safety management. The authors examined the titles, abstracts, and full publications, respectively, and they were independently reviewed. The documents consulted included reports of international organisations; policy documents; publications from government departments, ministries, and institutes; OHS guides, and briefs from labour offices and organisations; conferences papers; and chapters in books. The review

did not consider OHS acts, labour issues, secondary prevention, industrial hygiene, health promotion, ergonomics, health psychology, stress management, physical fitness, ill health, school adventurous activities, social justice, and migrant workers and scholars. The authors selected 116 texts for the article. The need for more recent scientific research on OHS in schools in developing countries was identified. Most OHS literature focuses on developed countries, diseases, and health and safety in specific sectors (i.e., construction, manufacturing). No comparative studies on OHS in schools between developing countries or on the effectiveness of OHS education and training in developing countries were found. The University of South Africa, College of Economic and Management Sciences' Research Ethics Review Committee granted permission to conduct the study. The significance of this article lies in the evaluation, understanding, explanation and application of relevant material to enhance a safe school environment in developing countries and establishing an OHS management framework for schools.

Occupational Health and Safety in Training and Education

OHS training refers to planned efforts to facilitate learning of health- and safety-specific competencies (Noe, 2005). Such training consists of safe practices, hazard recognition and control measures, the correct use and maintenance of personal protective equipment, as well as emergency procedures and preventive actions, among others (Cohen *et al*., 1998). According to Buijs (2009), education and health share common interests, and combining these might assist in schools becoming safer and healthier environments where learning, teaching, and working can be enjoyed. School principals and management teams are tasked with overseeing the running of schools and are responsible for ensuring that health and safety risks are managed effectively (Open Government Licence, 2018). Close collaboration between the education sector and the educational quality system is necessary. Learners, staff, and parents should foster a sense of ownership through participation and meaningful engagement, which is a prerequisite for the effectiveness of health-promoting activities in schools (Buijs, 2009). Collaboration with the education sector and school policies related to OHS should be prioritised (Pisaniello *et al*., 2013).

Integrating health and safety in vocational training programmes help to build safer and healthier future generations of learners and workers (ILO, 2019). Training and education in OHS, at every level, is an effective method to build health and safety awareness, knowledge and skills among learners, workers and employers (Olcay *et al*., 2021). Schools should focus on their most significant risks, prioritise their efforts to mitigate these risks and tailor their health and safety measures to effectively address their unique OHS needs. Risk should be integrated into the school curriculum, as schools have the primary duty to safeguard staff and learners in their care and to create risk awareness (ROSPA, 2012). Risk management principles and "OHS thinking" should be an intrinsic part of the decision-making process in schools, not an "add-on" (Schulte, Stephenson, Okun, Palassis, and Biddile, 2005; Cunningham *et al*., 2020). According to Van Dijk and Caraballo-Arias (2015), access to online OHS information and tools initiates opportunities for developing economies. Online learning and blended educational forms increase the coverage, quality and efficiency of OHS education (Van Dijk and Caraballo-Arias, 2015). OHS training should be included in vocational training and be applied to the learning method and course content (Schulte *et al*., 2005; Holte and Kjestveit, 2012). Increased use of visual (audio) media to communicate OHS issues in multicultural contexts, specifically in developing countries, is vital (Bust *et al*., 2008). Research supports school-based educational programmes towards increasing knowledge about safety (Lerman *et al.,* 1998; Linker *et al*., 2005), but knowledge might not translate to safe behaviour and injury reduction (Pisaniello *et al*., 2013).

OHS in schools in developing countries were investigated and an OHS management framework established. Education in OHS is needed in schools, as teaching and learning cannot occur in an unsafe environment. Furthermore, literature emphasised the importance of strategic goals and plans to develop, implement, and monitor the effective implementation of school OHS. Developing countries experience challenges in successfully implementing OHS in schools, which include limited health and safety measures for schools; poor safety culture; lack of OHS data; lack of qualified and skilled human resources; inadequate safety regulations and resources; poor reporting systems and compliance with OHS legislation; limited awareness of hazards and risks; and limited monitoring and evaluation of safety systems and consultation with school stakeholders. The literature supported that school-based educational programmes on OHS should be implemented. Blended and online learning increases the coverage, efficiency, and quality of health and safety education, specifically in developing economies. Such training and education increase learners' skills, knowledge, and safety awareness in schools. Furthermore, learners' attitudes and characteristics, lack of support from the school management and the failure to prioritise hazards and risks, hampers school safety. School management is responsible for successfully implementing an OHS management system and the required monitoring mechanisms.

The findings of our review provided the basis for the framework (Table 2) on OHS management in schools. The framework provides practical information for the future implementation of an OHS management system and could be used as a tool to execute and strengthen school operations and activities through improved safety processes. The effective execution and implementation of such a framework will, however, depend on the active support and leadership of school management.

Table 2: Occupational health and safety management framework for schools

	Item	Suggestions for Implementation
1	Legislation, policies, and procedures	Review OHS legislation, policies and procedures, and retain consultants and external stakeholders, if help is needed (ROSPA, 2012). Safety is the inherent responsibility of the government, education departments and school management (Rielander, 2023).
2	Strategic plans to ensure safety management	Parental and community support, as well as legislative support is required. School strategic plans will only succeed with adequate resources, support and engagement (Morrison-Porter, 2021). Adopt processes, strategic management plans and safety systems that are best suited for the school. It will guide school safety teams/committees to ensure a standardised safety approach (Health, Safety and Environment, 2020). With realistic objectives, OHS strategic plans provide effective and continuous solutions through risk reduction in schools (Suarez *et al.*, 2016; Ahmad and Hussain, 2021). All managers and staff should have OHS targets and objectives (Ahmad and Hussain, 2021).
3	Education and training	OHS education and training provide knowledge and skills about occupational hazards and possible ways to prevent and control it (Osayande and Aideyan, 2015). Obtain feedback on OHS performance in the school, while the school management should supervise the scheduling of corrective measures (Billorou and Sandoya, 2019). Teach OHS as part of a comprehensive social and health school curriculum and conduct a safety training needs analysis (ROSPA, 2012).
4	Safety compliance	Monitor safety compliance with preventive measures and OHS regulations and control the application of safe school techniques and tools to ensure safe conditions. Supervise safety conditions in the school environment; inspect facilities, machinery, and equipment; take corrective measures and report these to the school management (Billorou and Sandoya, 2019). Emergency exit requirements, emergency evacuation training requirements, fire extinguishers, fire-reporting and fire prevention plans, first-aid and rescue procedures, and first-aid kits, are all aspects of an emergency action plan (Amherst College, 2021).
5	Promote school safety improvement	Suggest improved OHS practices in schools and promote exchanges, collective reflections, and proactive attitudes regarding OHS. Disseminate up-to-date information and provide instructions, manuals and videos on health and safety in schools (Billorou and Sandoya, 2019).
6	Resources	Articulate resource elements under specific/critical key performance areas and action elements to ensure its success. Action elements include safety maintenance and inspections, monitoring and reviewing, and a safety trend analysis (Oschman, 2019).
7	Safety culture	School management should apply a safety culture of collective leadership, as it creates a positive, supportive and safe environment (Xaba, 2014). School management should be relationship-orientated through teamwork and culture-forming and task- and process-orientated to ensure participation by all stakeholders (Grant and Otter, 2017). Create a positive OHS culture; for example, keep track of how many incidents occurred in the school and where problems originated. The principal's active and visible leadership promotes a positive OHS culture (Ahmad and Hussain, 2021). Integrate courses in educational curriculums to possess a health and safety culture (Gong, 2019; Olcay *et al.*, 2021).
8	School safety awareness	Encourage the adoption of and reinforce a whole school OHS approach into the wider community. Involve learners in OHS issues and decisions. Address the psycho-social aspects of health and safety (i.e., resilience, self-esteem, confidence, self-sufficiency), and adopt a positive approach to health and safety, which rewards safe behaviour within the school environment (ROSPA, 2012). Everyone in the school should be aware of what needs to be done to improve safety systems and reduce risk in terms of implementation and operation; and plans should be in place in the event of an emergency (Ahmad and Hussain, 2021).
9	Relationship management and engagement	School principals are at the centre of the responsibilities regarding OHS problems that occur in schools, and efforts to realise these expectations can promote OHS in schools (Yilmaz, 2022). The engagement of educators and relationship management in a school are essential to ensure educator motivation and a healthy school environment. Poor communication is a barrier when OHS relationships and partnerships are built and when teamwork is encouraged (Riberio, 2020).

10	School stakeholder satisfaction	It refers to systems that measure stakeholders' perceptions of how the school's health and safety management is functioning. Stakeholders include learners, educators, staff, and parents, who have a vested interest in the learning processes and the safety of scholars (Spacey, 2018). The school management should "stay in the know'" and be aware of school stakeholder trends, challenges and priorities (Grochocki, 2021). Learners, administrators, teachers, parents and other stakeholders should share ideas, communicate openly and take on the necessary responsibilities and training, to ensure OHS in schools (Yilmaz, 2022).
11	Safety hazards and risks	Identify school safety hazards and risks and incorporate these into the safety culture of the school. Timeframes, resources and safety risk management drive safe school strategic processes (Bushby, 2018). Conduct risk identification, advance accident prevention measures, use safe equipment, and adhere to safety procedures (Purwana, 2022).
12	Safety risk assessment, reviews, and measures	Staff should know when to conduct safety risk assessments, how to conduct them effectively, who to involve, and who should be informed of the outcomes. Staff should also have the competencies, knowledge and skills to effectively perform risk reviews and assessments (Makin and Winder, 2008). Communicate the necessary information on measures, procedures, and roles regarding OHS to the relevant stakeholders, and explain specific information on identifying, controlling, and preventing OHS accidents and incidents in schools (Billorou and Sandoya, 2019).
13	Monitoring and control	Audits identify safety action measures and ensure compliance and continuous improvement. Findings from school safety audits guide the school management to establish and revise policies, processes, and the safety culture of the school. It also determines if the school complies with continuous OHS improvement processes and plans (Stadnicka and Antosz, 2015). The efficiency of an OHS management system is revealed through active self-monitoring of both software and hardware (procedures, systems, people and individual performance and behaviour) that are considered. If control fails, reactive monitoring should investigate the occurrences and accidents that may have resulted in loss or harm, to determine why they failed (Ahmad and Hussain, 2021).

Implementation of OHS in Schools

Various authors support the notion that an OHS framework should be implemented in schools, as it would enhance OHS endeavours and ensure safety in schools (Birken *et al*., 2017; Moir, 2018) Such a framework will assist schools in further improving OHS features in the school, to minimise unwanted events from occurring. It can be implemented in schools as an effort to minimise accidents and provide more thoughtful ideas and seek cooperation with various parties (Ahmad and Hussain, 2021). This framework includes a balance between strategic and implementation elements and provides for contingency arrangements and follow-up items that involve measurement and monitoring. Continuous development, improvement, and engagement will ensure the long-term benefits of such a framework, to overcome OHS challenges, hazards, and risks in schools.

Governments and schools should cooperate, and create partnerships to comply with legislation, regulation, and policies towards improving OHS in schools. Sufficient resources and capacity are needed to ensure that OHS are successfully implemented in schools. It should also provide adequate health and safety training for educators, and how to convey this knowledge to learners. OHS practices in schools should commence with the creation of governing bodies and teams for OHS services at the beginning of each academic year (Yilmaz, 2022). The importance of sufficient resources (i.e., equipment, infrastructure, skilled manpower and training) for the successful execution of OHS strategic plans in schools have been highlighted. OHS resources should be up-to-date, understandable, and appropriate for the specific age group, and suitable for all literacy levels. OHS policies, formulated by schools, should be reviewed annually, be learner-centred, promote the participation of all learners and staff, and address OHS issues and plans. Prevention and intervention strategic plans should also be identified. Roth and Erbacher (2022) emphasise that a school health and safety team or committee should attend to the health and safety roles and responsibilities of the school management, educators, learners, and parents. School management needs to monitor and evaluate OHS through an effective safety system as they are responsible for ensuring that a safety culture exists, safety awareness is raised, and clear health and safety objectives are set. Such a management process should ensure that learners and staff operate within the boundaries of such a system. Furthermore, schools should identify and have access to up-to-date information on their compliance obligations for use in assessments, reviews, and audits aimed at continuous improvement and success of their OHS management system. Ultimately, the school's senior management should guide audits within the scope of OHS in the school (Yilmaz, 2022).

OHS education should be introduced at the secondary school level, and should inculcate the desired attitude, knowledge, and skills towards OHS (Osayande and Aideyan, 2015). Interactive and practical training are essential components of effective OHS education. Engaging methods and online resources should be available to educators and learners as they increase safety knowledge. Safety professionals, consultants, and health educators could also conduct information sessions, forums, or seminars at schools, as it boosts learners' motivation to be safety conscious. Education raises awareness about preventive OHS activities (Bilir, 2016). Learner clubs at schools and social activity content can also be helpful for the formation of an OHS culture. Anonymous reporting systems encourage learners to report potential OHS issues. Regular school preparedness drills should be conducted and information on possible hazards and risks shared. Promoting dialogue should be encouraged through participation, cooperation and collaboration, at all school levels and with school stakeholders. Consultation with stakeholders should occur, and agreements and partnerships with community health agencies, hospitals, law enforcement agencies, and the local police should be formed and maintained. Schools should set their expectations for OHS performance at a reasonable level (Roth and Erbacher, 2022).

Recent scientific literature on OHS in schools in developing countries needs to be conducted and reporting on OHS accidents and incidents in schools should be enhanced (Fagan and Hodgson, 2017). Future research could determine the functioning and success of OHS committees at schools, the implementation of strategic plans for OHS at schools, the significant OHS hazards and risks in schools in developing countries, the integration of related risk assessment activities, and the monitoring and control processes involved with OHS at schools. Enhanced understanding on how school OHS education and training can be made inclusive and more effective, and how it can influence the behaviour of learners more positively should be investigated (Salminen and Palukka, 2007). The views of principals, senior management, learners, teachers, and parents should be explored to ensure a safer and healthier school environment (Yilmaz, 2022). Follow-up research may also be conducted to determine the success of implementing the proposed OHS management framework for schools.

Conclusion

This article aimed to assess OHS in schools in developing countries and establish an OHS management framework for schools. Schools should provide an effective framework for learners, educators, and the wider school community, to ensure that OHS procedures are communicated to all. The importance of OHS in schools in developing countries, deserves attention, as issues have not been properly addressed in recent scientific literature. Safe schools are psychologically and physically safe, and allow learners, educators and all the support staff to function in a healthy and safe environment. It is recommended that governments and schools work cooperatively, and create alliances and partnerships to comply with legislation, regulation, and policies towards improving OHS in schools. Osayande and Aideyan (2015) support the view that OHS education should be introduced at the secondary school level, and it should inculcate the desired attitude, knowledge, and skills towards health and safety measures. It should be combined with sufficient resources and capacity, to ensure that health and safety are successfully implemented. OHS practices in schools should begin with the creation of the school governing bodies and teams for OHS services at the beginning of each academic year (Yilmaz, 2022). Prevention and intervention strategic plans should also be identified to attend to the monitoring and evaluation of OHS through an effective safety management system. Furthermore, schools should identify and have access to up-to-date information on their compliance obligations to ensure the continuous improvement and success of their OHS management system. Ultimately, the health and safety of school workers and learners remain a fundamental human right. All possible OHS measures, including occupational and legislative surveillance, should therefore be strengthened and protected. A limitation of the study was that recent scientific literature on OHS in schools in developing countries needed to be more extensive in schools in developing countries (Fagan and Hodgson, 2017).

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