



Contents lists available at ScienceDirect

Safety and Health at Work

journal homepage: www.e-shaw.org

Review Article

Current Status and the Future of Occupational Safety and Health Legislation in Low- and Middle-Income Countries

France Ncube*, Artwell Kanda

Department of Environmental Science, Bindura University of Science Education, Private Bag 1020, Bindura, Zimbabwe

ARTICLE INFO

Article history:

Received 5 May 2017

Received in revised form

4 January 2018

Accepted 28 January 2018

Available online 21 February 2018

Keywords:

Harmonization

Legislation

Low- and middle-income country

Occupational safety and health

Reform

ABSTRACT

This article addresses three key issues. First, the commonalities, differences, strengths, and limitations of existing occupational safety and health (OSH) legislation of low- and middle-income countries were determined. Second, required revisions were identified and discussed to strengthen the laws in accordance with the best international practice. Finally, proposals for additional OSH laws and interventions were suggested. A literature search of OSH laws of 10 selected low- and middle-income countries was carried out. The laws were subjected to uniform review criteria. Although the agricultural sector employs more than 70% of the population, most of the reviewed countries lack OSH legislation on the sector. Existing OSH laws are gender insensitive, fragmented among various government departments, insufficient, outdated, and nondeterrent to perpetrators and lack incentives for compliance. Conclusively, the legal frameworks require reformation and harmonization for the collective benefit to employees, employers, and regulatory authorities. New OSH legislation for the agricultural sector is required.

© 2018 Occupational Safety and Health Research Institute, Published by Elsevier Korea LLC. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

The provision of Occupational safety and health (OSH) services to workers has long been a global concern. The International Labor Organization (ILO) Convention No. 161 of 1985 [1] and the World Health Organization (WHO)'s 2008–2017 Global Plan for Action [2] both demonstrate the value that the international community has to safety issues. Unfortunately, developing countries are lagging far behind in comparison with their industrialized counterparts, with regard to the provision of OSH services to workers [3–6]. According to LaDou [6], 20–50% of workers in developed countries have access to adequate OSH services, whereas in developing countries, it is only 5–10%. Even worse, in some countries, for example, Tanzania, less than 5% of the workforce has access to OSH services [3]. More importantly, the lack of adequate OSH services contributes to high work-related injuries [3,4,7]. Because OSH legislation is a vital component of injury prevention programs, compensation, and litigation functions, an examination of such legislation for developing low- and middle-income countries may help to identify their current limitations, strengths, and priority areas for continual improvement. Consequently, a review of existing OSH legislation is required.

To date, original articles, short communications, commentaries, and reviews on OSH legislation in low- and middle-income countries are limited. Nonetheless, a recent article by Moyo et al [8] raised several critical issues on OSH legislation in Southern Africa using case studies of South Africa, Zimbabwe, Botswana, and Zambia. For example, although this article is rich with details of fragmentation of OSH laws among government departments, it addressed neither how such fragmentation affects enforcement nor how such fragmentation can be resolved. In the present study, this issue was revisited with deliberate attempts to fill this gap.

The lack of gender sensitivity in OSH laws has not been addressed in previous studies. In our opinion, this issue deserves a closer scrutiny. Therefore, we provide evidence of lack of gender sensitivity in existing OSH laws, its historical origins, and how it can be corrected. We conclude this issue by detailing the ILO's standpoint on gender sensitivity in the context of OSH. Moreover, the inadequacy of current OSH laws in the context of the agricultural sector has not received sufficient attention in the available literature. For three reasons, this issue shall receive more scrutiny in our present article: (1) in most low- and middle-income countries, agriculture employs more than 70% of the entire labor force, yet it is not fully covered by existing OSH laws, (2) there is compelling

* Corresponding author.

E-mail address: france.ncube257@gmail.com (F. Ncube).

evidence that the greatest number of injuries occurs in the agricultural sector [9,10] although a large number is also recorded in the construction industry [11], and (3) workers are exposed to pesticides from agricultural products [10].

To the best of our knowledge, no documented study on OSH laws has used predesigned review criteria for analyzing these laws. Currently, there are no universally agreed upon international OSH criteria for evaluating the adequacy of OSH legislation. We developed ten-point review criteria and uniformly applied it to OSH legislation of the selected countries (Table 1). The crux of the review criteria was to ultimately influence future OSH policy directions in such countries by unearthing key areas requiring correction.

2. Materials and methods

A literature search of OSH laws of some selected low- and middle-income countries was carried out. We enrolled countries where we were able to obtain their OSH laws from applicable sources such as government printers and the Internet. Most national laws were readily available online for free download. In the Internet search, we used PubMed and a free search tool with combinations of the terms: Developing country, Factories, Act, Compensation, Scheme, OSH laws, mining, pneumoconiosis, Public Health Act, Occupational Safety and Health, regulation, and Agriculture. Efforts were made to get the current versions of the OSH laws from government printers of the reviewed countries. We enrolled countries where we were able to obtain at least three OSH laws. These were Botswana, Ghana, India, Kenya, Malawi, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe. The laws were subjected to uniform review criteria which constituted elements of legislative content such as scope, occupational health surveillance, worker compensation, gender sensitivity, and administrative nature, for example, structure, fragmentation, enforcement, contradictions, operationalization, and continuous improvement (Table 1).

Table 1
Review criteria for OSH laws of selected low- and middle-income countries

Criterion	Description of criterion
Scope of coverage	Are there Acts that adequately cover OSH issues in the mainstay of the national economy, e.g., agriculture, mining, and manufacturing industries? Do the laws provide funding mechanisms for OSH services? Do the OSH laws detail the responsibilities of employers and employees in safety promotion? Are there legal requirements for the establishment of a safety and health committee?
Occupational health surveillance	Are there specified surveillance requirements of the worker and the work environment? Are there provisions on exposure limits for occupational hazards such as dust, vibrations, noise and workplace audits, hazard operability studies, and risk assessment?
Compensation	Is there commitment of legislation to worker compensation for injury?
Gender sensitivity	How do OSH laws address issues of gender, historical imbalances, and regional and international conventions that abolished all forms of humankind discrimination?
Structure	Is the basic layout of OSH laws user-friendly: organized into sections, subsections, paragraphs, and sub-paragraphs? Are key terms including those in the Act's title defined?
Fragmentation	Is there duplication of roles between the lead government agency and others in execution of OSH laws? If yes, what are the implications and possible solutions?
Regulation and enforcement	Are the fines/penalties deterrent enough at organizational level or their value is prohibitive only to individuals? Are there legal provisions within the OSH laws for the use of the collected fines/penalties in OSH promotion activities such as training or the fines join the mainstream of state funds? Do the OSH laws provide for the establishment of industrial courts? Do the OSH laws have mechanisms such as incentives to support those who comply with (e.g., reduction of tax band) or focus on law breakers?
Contradictions	In what ways do the national OSH laws contradict with other relevant statutes at national, regional, and international levels?
Operationalization	Do adequate statutory instruments (SIs) exist for addressing omissions and provisions of existing OSH laws? Do the laws oblige employers to provide specialist OSH services to workers?
Continuous improvement	Is there room for revisions to strengthen, reform, and harmonize existing OSH laws?

OSH, Occupational safety and health.

3. Results

3.1. Legislative content

The present study unearthed several deficits on the content of the analyzed OSH laws (Table 2). Fundamentally, the laws grossly lack, among many other issues, coverage of agricultural workers, the right of workers to refuse to work in unsafe work stations, provisions for OSH services—funding mechanisms, requirements on documentary evidence of functionality of safety committees, and gender sensitivity. Still, other preventive measures, such as mandatory organizational OSH systems and chemical safety emphasis, are largely yet to be incorporated in the laws. Taken together, the vast shortcomings in the content of the OSH laws require the urgent attention of policy makers if the United Nations Social Development Goal number 8 on decent work and article 5 of the ILO convention 161 on Occupational Health Services are to be achieved by low- and middle-income countries.

3.2. Administrative concerns

Reviewed OSH laws had various administrative limitations that may adversely impinge on their effective implementation by responsible regulatory authorities. Some limitations pertain to their structure, fragmentation, enforcement, and contradictions (Table 3).

4. Discussion

4.1. Legislative concerns

Depressingly, despite employing a huge workforce and experiencing such high injury frequency rates [9,10], we found very few Acts addressing OSH concerns of agricultural workers (Table 2), and the few concerned Acts narrowly considered mainly chemical hazards; therefore, they too need to be configured to detail other

Table 2
Legislative content of OSH laws

Criterion	Main issues assessed on the criterion	Main findings on OSH laws	
		Present	Absent
Scope	OSH provisions on agricultural hazards	[12,13,35,36,38,43,44]	[14–34,37,39–42,45–49]
	Coverage of informal sector & self-employed	[35,36,38–40,42–44]	[12,14–17,19–22,37,41,45–54]
	Right to refuse to work in unsafe work	[35,41,43]	[12–34,36–40,42,44–49].
	OSH services funding mechanisms	None	All laws
	Safety committees and representatives	[12,21,35,36,38,40,41,44].	[13,15–20,22–34,37,39,42,43,45–49]
	Mandatory training of safety committees	[36,41]	[13–17,20,26–35,38–40,42–48]
	Frequency of Safety, Health and Environment committee meetings & reports	[12,40]	[13–39,41–49]
	Safety and health audits and their frequency	[12,36]	[13,35,38–40,42–49]
	Mandatory organizational OSH policies	[12,21,35,36,38,40,41,44]	[13–20,22,26–34,39,42,43,45–49]
	Chemical safety in workplaces	[12,13,21,35,36,38,40,43–45,48]	[14–20,22,26–34,39,42,46,49]
	Employers' general duties in workplaces	[12,21,35,36,38,40,41,43,44,50]	[13–20,22,24–34,39,42,45–49]
	Employees' general duties in workplaces	[15,21,35,36,38,41,43,44]	[13–20,24–34,39,42,45–49]
	Mandatory OSH systems e.g., Occupational Health and Safety Assessment Series 18001	None	Absent in all laws
	Occupational surveillance	Exposure limits for dust, vibrations, light, and heat	None
Worker surveillance		[12,20,21,35,36,38,41,44,46]	[13–19,39,42,43,45,47–49]
Workplace surveillance		[12,22,35,36,38,40,41,44]	[13,15–21,39,42,43,45–47,49]
At least three OSH expert categories		None	All laws
Compensation	Existence of injury compensation laws	[50–56]	Nothing found for India
	Minimum claims	None	Absent in all laws
Gender sensitivity	Gender-biased terminology in OSH laws	[12–16,19–26,28,30,32,34,36–40,42,45–47,49–56,58–62]	[13,17,18,27,29,33,35,41,43,44,48]

OSH, Occupational safety and health.

hazards, such as, dust, vibrations, and noise from, for instance, powered farming equipment such as tractors, mowers, and chain and hand saws and mowers. In addition, given the vulnerabilities of the farm worker against (1) the superiority of the farm owner and (2) the localization of farm activities without legal provisions for inspectorate services, any forms of regulation, compensation, and medical surveillance, we strongly feel that the agricultural worker

has been sidelined in the context of OSH services provision. Therefore, work-related risks from old and new production equipment, work practices, and activities may go unrecognized, unabated, unmonitored, and undocumented. Such shortcomings present a clear priority for future development. On the basis of such omissions, it can thus be concluded that the precolonial, the colonial and postcolonial governments in most low- and middle-income countries have done very little to address the OSH burdens of the farm worker.

Depriving agricultural workers of OSH services is against the spirit and letter of ILO's convention No. 184 of 2001, article 19 and 21 (1). Article 19 provides for the improvement of OSH issues in the agricultural sector through formulation, implementation, and review of national OSH policies and legislation for accident and injury prevention. Article 21 (1) emphasizes that workers in the agricultural sector must be covered by an insurance or social security scheme against fatal and nonfatal occupational injuries to the level equal to other sectors. Inasmuch as there are OSH Acts for the mining and manufacturing industries, the present study confronts this shortcoming by calling for the enactment of the Agricultural Safety and Health Acts. Such Acts, doubtlessly, will be a vital tool for championing OSH issues in the sector. Beyond the formulation and implementation of such OSH laws, there is need for policy makers to support further research in agricultural practices so as to identify priority OSH issues deserving attention. A recent review covering epidemiological studies on occupational health risks to waste workers and informal recyclers cited methodological limitations of the existing body of research with regard to proving causality issues [63]. Consequently, we recommend that policy makers need to invest more in rigorous research efforts that can yield sound insights toward strengthening OSH policies and legislation.

On the other hand, although the mining and manufacturing industries of low- and middle-income countries are richly covered by specific sectorial national OSH legislation [14–22,35–38,40,41,44–56,58–62], such laws have tended to ignore various critical issues. The ILO convention 170 contains the right of employees to refuse to work in unsafe and unhealthy conditions, but this right was generally not enshrined in most Acts (Table 2). We

Table 3
Administrative concerns on OSH laws

Criterion	Main findings
Structure	- Constituted contents page, operational definition of terms, sections, subsections, paragraphs, and sub-paragraphs. - Some defined key terms in the Act's title [12–14,16,17,19–22,34,37,40,41,44,46–52], but some did not [15,18,26–33,35,36,38,39,42,43,45,53,54].
Fragmentation	- Some are mainly administered by the Health Ministry [14–16,23–34] and Ministry of Mines [15,17,18,41,47–49], and others by the Ministry of Labor [14,16,19–22,35–37,39,40,42–46,50–62].
Enforcement and regulation	- Heavy emphasis on fines and penalties, but no specified incentives to those who comply. - The small value of the fines which varied from country to country. - The OSH laws are not self-sustaining as fines for breaking them joined the other state funds and uses.
Contradictions	- Some OSH laws were not gender sensitive (Table 2) and contradicted employment laws and country constitutions that preached antidiscrimination [39,43,57,72–74]. - Still, some OSH laws compete for supremacy over one another, for example, Zimbabwe's laws [20,26,47] contained the statement that "where the Act shall contradict with any other Act, this Act shall prevail".
Operationalization	- The laws had statutory instruments addressing omissions and/or provisions of the mother Act.

OSH, Occupational safety and health.

feel this right deserves to be explicitly stated in the OSH laws. Crucially, most labor and employment Acts (Table 2) need to be broadened to detail the general obligations of employers and employees on OSH issues.

The funding mechanisms for OSH services were not embedded in the OSH laws. If this omission is not corrected, some employers may underfund their organizational OSH services. Still, OSH Acts did not harness the international best practices on accident and injury prevention such as the Occupational Health and Safety Assessment Series (OSHAS) 18001 and often, OSH policies. There is urgent need to legally compel employers to establish such requirements.

Depressingly, the OSH laws missed emphasis on setting national standards on hazards such as dust and vibrations. Exposure limits, for example, threshold limit values and time-weighted averages, are not prescribed, yet they should form the core yardstick of an occupational health surveillance program. Furthermore, hazard profiling, audits, and risk assessments are rarely contained in the laws and there is no legal requirement for employers to submit such reports to regulatory authorities. Still, some laws designed to deal with dusty occupations [20,46], completely negated workplace risk assessments, and preventive OSH measures. Rather, they merely put strong emphasis on worker medical examinations and provision of protective clothing. Yet, these are the lowest priority options in the hierarchy of control of occupational hazards. We recommend widening their scope to harness higher priority preventive measures in the hierarchy, such as elimination, substitution, and engineering, which can make the work environment fit for safe work.

Most OSH laws still lack provisions for setting up workplace safety and health committees (Table 2). Where provided, there were rarely legal requirements on how often they should hold meetings and provide documentary proof such as reports and minutes. Therefore, such committees may exist in theory but practically be dysfunctional. We suggest the incorporation of provisions on minimum frequency of committee meetings and submission of documentary proof to the employer and regulatory authorities. The laws richly stressed it for workers but were deafeningly silent on specialized training for capacitating safety committees.

Although public health encompasses OSH issues in practice, these were not adequately handled in the public health Acts. For example, the duties of employers and employees in work environments were not provided. We propose that such duties be clearly defined in the public health Acts as they are the mother Acts governing all health-related issues. The functions of the health ministries did not contain OSH issues. We suggest inclusion of an additional function in the public health Acts on promoting prevention of injuries and diseases in work environments.

On the positive side, we found that most low- and middle-income countries have an established compensation legal framework (Table 2) in compliance with ILO's Convention No. 121 of 1964 on Employment Injury Benefits [64]. However, numerous legislative obstacles exist in the laws which may ultimately disadvantage many deserving workers. First, the laws do not provide a minimum standard for claims, and some do not cover informal workers and the self-employed. Still, the level of compensation promised by the compensation laws does not consider the severity of risk encountered by workers, and the unwillingness to compensate is apparent and frightening. For instance, Tanzania formulated its Workers Compensation Act in 2008, but its implementation date was deliberately pushed far ahead to July 2015. This country is still not bound in any way by ILO's compensation convention no 21 as it is not a member. In Malawi, it appears that the fund has not been set

up. Employers pay to the Commissioner's office after an injury has occurred [71]. This may suggest that an injured worker deserving compensation could encounter delays in receiving such claims. This defeats the rationale of the fund. Therefore, delays in enforcement of new laws require urgent attention not to delay justice.

The compensation claim procedures in low- and middle-income countries are extremely long and bureaucratic. This may demotivate or exclude many deserving workers. For example, existing laws engage in fault-finding games by insisting that the injury must not be due to workers' negligence [21,50–54,56]. However, the Uganda Compensation Act [55] must be commended for insisting that compensation must be paid regardless of "whether or not the incapacity or death of the worker was due to the recklessness or negligence of the worker or otherwise." We feel that it is unlikely that a normal worker can deliberately commit a fatal injury just for a claim. Therefore, the condition on noncompensation for injuries related to negligence appears unnecessary. Most compensation laws insist that reporting of an injury must not be delayed. The claim must be made within 17 days from the injury date in Botswana and within 14 days in Zimbabwe. However, the Work Injury Benefits Acts of Kenya [50] must be commended for accepting claims made within 12 months after injury or death. The injury-reporting time must be extended to at least a month to accommodate genuine delays associated with factors such as injury trauma and financial handicaps. Conclusively, we propose setting of a minimum standard on compensation claims rather than to leave the issue to the voluntary whims of responsible authorities.

More disheartening, the bulk of the reviewed OSH laws were not gender sensitive. The terms he, him, and himself were used to refer to a worker as if female workers were not covered by these Acts [14,15,19–22,30,31,34,38,45–52]. The same terms were used in reference to inspectors, engineers, competent persons, medical officers of health, magistrates, and government analysts, [19,23–26,33,38]. Terms such as chairman rather than chairperson were used to refer to heads of certain boards [15,20,22,26,31,38,39,45,47,51]. Such an approach appears to wrongly convey a message that women were still not eligible for such responsibilities. Moreover, complainants, owners, and occupiers of buildings, contractors, clients, patients, parents, and adults were treated using the same gender-biased terminology, as if one needed to be a male person to qualify to be in those categories [12,19,20,22,26,28,33,38,45,47–49,56]. In most Acts, even ministers (legislators), secretaries of the Act's enforcing ministries, and commissioners were also referred to as he or him. Certainly, if legislators fail to detect such anomalies, it raises extreme doubts on the level of scrutiny accorded to the law formulation process. Some titles of the Acts appeared more biased to males. For example, the Ghana Workmen's Compensation Law of 1987 [56] may need a unisex title such as Workers Compensation Law. OSH laws, particularly for Uganda, were found to be gender sensitive in terms of our criterion (Table 2). They used the terms chairperson rather than chairman and himself/herself and him/her, instead of just he/himself.

The lack of gender sensitivity in OSH laws could probably be attributed to (1) historical fields such mining and manufacturing that were dominated by males and (2) government administrative office positions such as inspector and minister that have been traditionally no-go areas for women. Yet today, no one is likely to argue that these fields now employ an appreciable proportion of women. We, therefore, propose that such segregatory terms be replaced with gender-sensitive terms such as employee, employer, worker, and chairperson where applicable. This is in line with international conventions [65–68] and regional charters [69,70] that

abolished all forms of discrimination against humankind. Indeed, OSH laws of low- and middle-income countries seem to be static in a dynamic world. The OSH laws require urgent reform so as to reflect modern societal values and humanity, particularly with regards to gender sensitivity issues.

4.2. Administrative issues

The OSH laws followed a structured and user-friendly format (Table 3). Such a well-organized approach makes them user-friendly particularly with regard to enforcement and litigation functions. However, some laws did not define some key terms in the Act's title, thus making the laws less clear. Although the factories Acts defined what constitute a factory, the definitions were often narrowly confined to factories employing more than five workers. We propose that key terms in Acts be defined to reflect the focus of the Act and the factories Acts be widened to cover other excluded factories.

Furthermore, OSH legislation is fragmented among various government departments (Table 3). Moyo et al [8] observed this shortcoming and came to similar conclusions with regard to selected countries of southern Africa. Such fragmentation may result in duplication of roles, overlaps, and contradictions among the laws, lack of coordination, and waste of scarce resources among administering departments. For example, in the public health Acts and the factories Acts, inspectors have the same right to enter any premises or vessel for the purposes of inspection, and this includes factories. Clearly, this represents duplication of roles. Therefore, the OSH laws require harmonization, possibly under a single regulatory authority, for effective coordination, consistency, and uniformity.

The non-gender-sensitive laws contradicted employment laws and country constitutions (Table 3), which preach antidiscrimination. This represents a grave contradiction where legislators use gender-insensitive terminologies in OSH laws but urge citizens to be gender sensitive and shun all forms of discrimination in other laws. Therefore, we urge our legislators to revisit and reform the OSH laws and rectify the contradictions.

There are contradictions in certain legislation of some reviewed countries which demonstrates a quest for supremacy of OSH laws over one another. For example, Zimbabwe's Acts [20,26,47] contain the statement, "where the Act shall contradict with any other Act, this Act shall prevail". This raises sobering concerns as to which Act is really superior to the other as the documents do not show to which Acts they are superior. We suggest that this anomaly be addressed such that the Acts portray themselves as complementary and adjunct to one another. Although Zimbabwe is a signatory to ILO conventions that set the international noise exposure threshold at 85 dB, its Mining Management statutory instrument 109 section 92 states that noise exposure level should not exceed 90 dB. We feel that when national laws set limits above international threshold without sound scientific basis, it presents a contradiction. On the positive side, we observed that employment laws in low- and middle-income countries [39,42,43,57] upheld ILO convention No. 138 of 1978 and 182 of 1999 that illegalized child labor.

Existing OSH legislation in low- and middle-income countries places heavy emphasis on fines and penalties for its contravention. None of them had provisions for specified incentives to those who comply. For example, possible incentives may entail reduction of tax bands for compliant organizations and the introduction of awards for excellence in safety provision. The small fines which vary from country to country appear slightly deterrent only to individuals but not to medium and large organizations which can easily budget for the penalties. Costly and deterrent fines may be required to deter present and future perpetrators of unsafe and undesirable OSH practices. Fines for breaking OSH laws in most

low- and middle-income countries are combined with other state funds without any specific requirement that exists for their use in OSH issues. Resultantly, these laws are not self-sustaining. This scenario may complicate issues, particularly for resource-constrained low-income countries. Possible improvements may entail amending the OSH laws to specify how funds gathered in their enforcement are to be used. Furthermore, most OSH laws had statutory instruments that comprehensively addressed the provisions of the mother Acts. For example, several key provisions of Zimbabwe's Factories and Works Act [14] are detailed through statutory instruments [58–62].

5. Conclusion

The shortcomings and opportunities for reformation of OSH laws in low- and middle-income countries have been presented in this article. The expectations of the ILO and WHO on OSH laws are largely yet to be codified into their national laws. The countries appear to be using outdated, fragmented, and nondeterrent legislation which needs to be gender sensitive and strengthened in tandem with international best practices of OSH. Further research needs to consider other elements not addressed in this article, which should be included in the OSH legislation.

There are some limitations in the present study. First, the eligibility criteria used required that enrolled countries have at least three OSH laws available online or obtainable from other sources such as government printers. We were unable to get OSH legislation of some countries. Because the unenrolled countries may have OSH laws entirely different in terms of strengths and shortcomings when compared with those of reviewed nations, our study results may not apply to such countries. More transparency and easier access to public documents may richly benefit further work on improving policies and harmonizing what is today a complicated puzzle. Second, a lot has not been answered by the previous literature and the present study. For example, significant uncertainty still remains concerning what is not working and needs to be improved in international health with regards to occupational exposure and safety. Therefore, further work is extremely needed to generate such knowledge and supportive evidence.

Furthermore, although the ILO and WHO are the acknowledged international parents of OSH, recent literature richly demonstrates possible and actionable measures that member states can adopt to effect desirable improvements. For example, threats to these intergovernmental organizations to exit membership have possible serious financial repercussions such as loss of subscriptions, which may stifle their functions [75]. Dhatt et al [76] recently bemoan that the WHO leadership is predominantly male dominated and stressed the need for redressing its gender inequalities. The lack of gender parity in international organizations makes them less suitable for meaningfully leading member states in efforts toward rectifying the gender shortcomings identified in OSH laws of low- and middle-income countries. Although activities in various organizations may have negative consequences on the environment, the present article did not examine environmental laws in the reviewed countries because we felt this is a broad and crucial area deserving a separate study.

Nonetheless, despite these limitations, the present study has two major strengths. First, to the best of our knowledge, it is the first broad-based review covering OSH legislation in various regions of Africa and Asia. Such a wide scope of focus may enrich the existing body of knowledge on the current status and needs of OSH legislation. Second, the article used predesigned ten-point criteria so as to produce a fair discussion of the OSH legislation in the selected countries. The review criteria deliberately included legislative and administrative elements promoted by ILO conventions

that most of these countries are a signatory. This inclusion enables us to reflect on the extent to which the countries have addressed their international commitments in their national legal framework.

Conflicts of interest

All authors have no conflicts of interest to declare.

Acknowledgments

The study was self-funded.

References

- [1] International Labour Organization. Convention concerning occupational health services. Geneva (Switzerland): ILO; 1985. Convention No.: 161.
- [2] World Health Organization. Global plan of action on workers' health 2008–2017. Geneva (Switzerland): WHO; 2008.
- [3] Mrema EJ, Ngowi AV, Mamuya SHD. Status of occupational health and safety and related challenges in expanding economy of Tanzania. *Ann Glob Health* 2015;81:538–47.
- [4] Nordberg E. Injuries as a public health problem in sub-Saharan Africa: epidemiology and prospects for control. *East Afr Med J* 2000;77:S1–43.
- [5] Loewenson E. Assessment of the health impact of occupational risk in Africa: current situation and methodological issues. *Epidemiology* 1999;10:632–9.
- [6] LaDou J. International occupational health. *Int J Environ Health* 2003;206:303–13.
- [7] International Labour Organization. Improving safety and health at work through the decent work agenda. ILO. Available from: <http://www.ilo.org/safework/projects/WCMS149466/langeen/index.htm>.
- [8] Moyo D, Zungu M, Kgalamono S, Mwila CD. Review of occupational health and safety organisation in expanding economies. *Ann Glob Health* 2015;81:495–502.
- [9] International Labour Organization. Manual 6: how to ratify & use ILO Convention No 184 on safety and health in agriculture. *Employment Injury Benefits*. ILO. Available from: http://www.iufdocuments.org/www/documents/How_to_use_IJC184.pdf.
- [10] Lucchini RG, London L. Global occupational health: current challenges and the need for action. *Ann Glob Health* 2014;80:851–6.
- [11] Jacobs DE, Forst L. Occupational safety, health and healthy housing: a review of opportunities and challenges. *J Public Health Manage Prot* 2017;23:e36–45.
- [12] The United Republic of Tanzania. The occupational health and safety act. Da es Salaam (Tanzania): Government Printers; 2003. 83 p. Act No.: 5.
- [13] Government of Botswana. Agrochemicals Act. Gaborone (Botswana): Government Printers; 1999. 12 p. Act No.: 18.
- [14] Government of Zimbabwe. Factories and Works Act. Harare (Zimbabwe): Government Printers; 1948. 20 p. Act No.: 20.
- [15] Government of Botswana. Mines, quarries, works and machinery regulations. Gaborone (Botswana): Government Printers; 1978. 197 p. Statutory Instrument No.: 127.
- [16] Government of Botswana. Factories Act. Gaborone (Botswana): Government Printers; 1973. 35 p. Statutory Instrument No.: 31.
- [17] Government of Uganda. The Mining Act. Kampala (Uganda): Government Printers; 2003. 61 p. Act No.: 9.
- [18] Government of Ghana. Minerals and Mining Act. Accra (Ghana): Government Printers; 2006. 59 p. Act No.: 703.
- [19] Government of Ghana. The Factories, Offices, & Shops Act. Accra (Ghana): Government Printers; 1970. 39 p. Act No.: 328.
- [20] Government of Zimbabwe. Pneumoconiosis Act. Harare (Zimbabwe): Government Printers; 1971. 20 p. Act No.: 13.
- [21] Government of Zimbabwe. Accident prevention and worker's compensation scheme. Harare (Zimbabwe): Government Printers; 1971. 50 p. Statutory Instrument No.: 68.
- [22] The Republic of Kenya. The Factories Act. Nairobi (Kenya): Government Printers; 1951. 76 p. Act No.: 38.
- [23] Government of India. Food safety and standards (Prohibition and restrictions on sales) regulations. New Delhi (India): Food Safety and Standards Authority; 2011. 7 p. Regulation No.: 2-15015/30/2010.
- [24] Government of India. The Prevention of Food Adulteration Act. New Delhi (India): Food Safety and Standards Authority; 1954. 261 p.
- [25] Government of India. Bio-medical Waste (management and handling) rules. New Delhi (India): Government Printers; 1998. 12 p. Regulation No.: S.O. 630 (E).
- [26] Government of Zimbabwe. Public Health Act. Harare (Zimbabwe): Government Printers; 1924. 44 p. Act No.: 19.
- [27] Government of Uganda. The Public Health Act. Kampala (Uganda): Government Printers; 1935. 58 p.
- [28] Government of Malawi. Public Health Act. Lilongwe (Malawi): Government Printers; 1968. 65 p. Act No.: 1.
- [29] Government of Ghana. Public Health Act. Accra (Ghana): Government Printers; 2012. 194 p. Act No.: 851.
- [30] Republic of Zambia. Public Health Act. Lusaka (Zambia): Government Printers; 1930. 265 p. Act No.: 12.
- [31] Republic of South Africa. National Health Act. Pretoria (South Africa): Government Printers; 2003. 42 p. Act No.: 61.
- [32] Government of Botswana. Public Health Act. Gaborone (Botswana): Government Printers; 1971. 62 p. Act No.: 44.
- [33] The Republic of Kenya. Public Health Act. Nairobi (Kenya): Government Printers; 2012. 249 p. Act No.: 12.
- [34] The United Republic of Tanzania. Public Health Act. Da es Salaam (Tanzania): Government Printers; 2009. 105 p. Act No.: 1008.
- [35] Government of Uganda. Occupational Safety and Health Act. Kampala (Uganda): Government Printers; 2006. 86 p. Act No.: 9.
- [36] The Republic of Kenya. The Occupational Safety and Health Act. Nairobi (Kenya): Government Printers; 2007. 128 p. Act No.: 15.
- [37] Republic of South Africa. Occupational Diseases in Mines and Works Act. Pretoria (South Africa): Government Printers; 2002. 3 p. Act No.: 60.
- [38] Government of Malawi. Occupational Safety, Health and Welfare Act. Lilongwe (Malawi): Government Printers; 1997. 51 p. Act No.: 21.
- [39] The Republic of Kenya. Employment Act. Nairobi (Kenya): Government Printers; 2007. 31 p. Act No.: 1.
- [40] Republic of South Africa. Occupational Health and Safety Act. Pretoria (South Africa): Government Printers; 1993. 27 p. Act No.: 85.
- [41] Republic of South Africa. Mine Health and Safety Act. Pretoria (South Africa): Government Printers; 1996. 73 p. Act No.: 29.
- [42] Government of Malawi. Employment Act. Lilongwe (Malawi): Government Printers; 2000. 36 p. Act No.: 6.
- [43] Government of Ghana. Labour Act. Accra (Ghana): Government Printers; 2003. 69 p. Act No.: 651.
- [44] Republic of Zambia. The Occupational Health and Safety Act. Lusaka (Zambia): Government Printers; 2010. 73 p. Act No.: 36.
- [45] Government of the Republic of Zambia. The Factories Act. Lusaka (Zambia): Government Printers; 1966. 157 p. Act No.: 2.
- [46] Government of the Republic of Zambia. The Pneumoconiosis Act. Lusaka (Zambia): Government Printers; 1950. 89 p. Act No.: 27.
- [47] Government of Zimbabwe. Mines and Minerals Act. Harare (Zimbabwe): Government Printers; 1961. 170 p. Act No.: 38.
- [48] Government of the Republic of Zambia. The mines and minerals development (prospecting, mining and milling of uranium ores and other radioactive mineral ores) regulations. Lusaka (Zambia): Government Printers; 2008. 30 p. Statutory Instrument No.: 85.
- [49] The United Republic of Tanzania. The Mining Act. Da es Salaam (Tanzania): Government Printers; 1998. 205 p. Act No.: 15.
- [50] The Republic of Kenya. The Work Injury Benefits Act. Nairobi (Kenya): Government Printers; 2007. 128 p.
- [51] Government of Malawi. Workers Compensation Act. Lilongwe (Malawi): Government Printers; 2000. 59 p. Act No.: 999.
- [52] Republic of South Africa. Compensation for Occupational Injuries and Diseases Act. Pretoria (South Africa): Government Printers; 1993. 50 p. Act No.: 130.
- [53] Government of Botswana. Workers compensation (forms) regulations. Gaborone (Botswana): Government Printers; 2001. 29 p. Statutory Instrument No.: 70.
- [54] The United Republic of Tanzania. Workers Compensation Act. Da es Salaam (Tanzania): Government Printers; 2008. 55 p. Act No.: 20.
- [55] Government of Uganda. Workers Compensation Act. Kampala (Uganda): Government Printers; 2000. 35 p. Act No.: 8.
- [56] Government of Ghana. Workmen's Compensation Act. Accra (Ghana): Government Printers; 1987. 28 p. Act No.: 187.
- [57] The United Republic of Tanzania. Employment and Labour Relations Act. Da es Salaam (Tanzania): Government Printers; 2004. 84 p. Act No.: 6.
- [58] Government of Zimbabwe. Factories and works (building, structural and excavation work) regulations. Harare (Zimbabwe): Government Printers; 1976. 9 p. Regulations No.: 264.
- [59] Government of Zimbabwe. Factories and works (electrical) regulations. Harare (Zimbabwe): Government Printers; 1976. 5 p. Regulations No.: 304.
- [60] Government of Zimbabwe. Factories and works (machinery) regulations. Harare (Zimbabwe): Government Printers; 1976. 17 p. Regulations No.: 302.
- [61] Government of Zimbabwe. Factories and works (pressure-vessel) regulations. Harare (Zimbabwe): Government Printers; 1976. 7 p. Regulations No.: 303.
- [62] Government of Zimbabwe. Factories and works (boiler) regulations. Harare (Zimbabwe): Government Printers; 1976. 14 p. Regulations No.: 279.
- [63] Ncube F, Ncube EJ, Vuyi K. A systematic critical review of epidemiological studies on public health concerns of municipal solid waste handling. *Perspect Public Health* 2017;137:102–8.
- [64] International Labour Organization. Employment injury benefits. (Switzerland) Geneva: ILO; 1964. Convention No.: 121.
- [65] International Labour Organization. Discrimination: employment and occupation. (Switzerland) Geneva: ILO; 1958. Convention No.: 111.
- [66] United Nations. Convention on the elimination of all forms of discrimination against women. (Switzerland) Geneva: UN; 1979.
- [67] United Nations. Universal declaration of human rights. Geneva (Switzerland): UN; 1948. Report No.: 217.
- [68] International Labour Organization. Decent work. Geneva (Switzerland): ILO; 1999.

- [69] African Commission on Human and Peoples' Rights. Protocol to the African charter on human and peoples' rights on the rights of women in Africa. Maputo (Mozambique): ACHPR; 2000. Report No.: CAB/LEG/66.6.
- [70] African Commission on Human and Peoples' Rights. African charter on human and peoples' rights. Banjul (Gambia): ACHPR; 1981. 18 p. Report No. : CAB/LEG/67/.3.
- [71] Mbewe B. Malawi country profile on occupational safety and health; 2009. Available from: http://www.ilo.org/safework/countries/africa/malawi/WCMS_187633/lang-en/index.htm.
- [72] Government of Zimbabwe. Constitution of Zimbabwe. Harare (Zimbabwe): Government Printers; 2013. 151 p. Act No.: 20.
- [73] The Republic of Kenya. The constitution of Kenya. Nairobi (Kenya): Government Printers; 2010. 199 p.
- [74] The United Republic of Tanzania. The constitution of the United Republic of Tanzania. Da es Salaam (Tanzania): Government Printers; 1977. 91 p. Amendment No.: 14.
- [75] The New York Times. W.H.O.'s identity crisis; 2017. Available from: https://www.nytimes.com/2017/05/29/opinion/who-world-health-organization.html?_r=0.
- [76] Dhatt R, Kickbusch I, Thompson K. Act now: a call to action for gender equality in global health. Lancet 2017;389:602.