Review

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Systematic review of qualitative literature on occupational health and safety legislation and regulatory enforcement planning and implementation

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Objective The ability of occupational health and safety (OHS) legislation and regulatory enforcement to prevent workplace injuries and illnesses is contingent on political, economic, and organizational conditions. This systematic review of qualitative research articles considers how OHS legislation and regulatory enforcement are planned and implemented.

Methods A comprehensive search of peer-reviewed, English-language articles published between 1990 and 2013 yielded 11 947 articles. We identified 34 qualitative articles as relevant, 18 of which passed our quality assessment and proceeded to meta-ethnographic synthesis.

Results The synthesis yielded four main themes: OHS regulation formation, regulation challenges, inspector organization, and worker representation in OHS. It illuminates how OHS legislation can be based on normative suppositions about worker and employer behavior and shaped by economic and political resources of parties. It also shows how implementation of OHS legislation is affected by "general duty" law, agency coordination, resourcing of inspectorates, and ability of workers to participate in the system.

Conclusions The review identifies methodological gaps and promising areas for further research in "grey" zones of legislation implementation.

Key terms inspector; meta-ethnography; OHS; OHS policy; OHS politics; policy; policy implementation; qualitative methodology; regulation; Robens' report; worker representation.

The ability of occupational health and safety (OHS) legislation and regulatory enforcement systems to prevent workplace injuries and illnesses is contingent on a series of arrangements. The conditions that give rise to injuries must be clearly reflected in regulatory standards, which must be communicated to workplace parties, and enforcement strategies must be implemented to identify and address non-compliance (1, 2). Across these arrangements, contextual conditions shape OHS regulatory and enforcement processes, including the changing nature of work and risks and how workplace parties engage with OHS design and implementation (2, 3)

Research studies on OHS legislation and enforcement have mainly drawn on quantitative methods and addressed the effectiveness, patterns, and cost of various enforcement strategies. Studies have considered what inspection strategies are associated with regulation compliance and reduced work injury rates, the relative effectiveness of enforcement (eg, inspections, penalties) versus consultation and advice (4–9), and inspection

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sequence and frequency (10). Studies have also examined inspection patterns across economic conditions, business size and risk (11, 12) and whether OHS inspections have a negative effect on firm productivity (8).

This article presents a systematic review of peer-reviewed, qualitative literature on how OHS legislation and regulatory enforcement is planned and implemented. In contrast to quantitative research designs, which are primarily concerned with establishing measurable relationships, qualitative research designs are oriented to discerning complex chains of interactions, explaining the nature of relationships between events, and interpreting events in relation to their social, legal, economic, and other contexts (13). A challenge for all OHS reviews is that they are based on studies from different industries and regulatory regimes. In this review, we identified shared, broader contextual features that these variations speak to, including widespread political and economic trends that have occurred over the last 20 years. As such, we identify an underlying reality for OHS planning and implementation (14). To our knowledge, no review of qualitative literature has yet been carried out on planning and implementation of OHS regulation.

Methods

The systematic review was conducted using a meta-ethnographic approach, which begins with a research question, assembles relevant studies, and translates findings into each other to generate overarching concepts and themes. The goal of a meta-ethnography is to generate findings that are more than the sum of the parts through a process of clarification of patterns in data (15). The systematic review process followed a standard procedure of literature search, data extraction, quality assessment, data extraction, and synthesis.

The research team was composed of researchers based in Canada, Australia, and Sweden. A 10-member Advisory Committee guided the review team. It included academics with backgrounds in epidemiology, business, and law and OHS practitioners from the Ontario labor ministry and inspectorate, a labor union, an injured worker organization, and an employer representative. The committee was consulted at the start of the study about search terms, definitions, and the research questions. At the end of the study they provided feedback about cohesion and relevance of synthesis findings.

Literature search and inclusion decisions

The literature search included qualitative, quantitative and mixed-methods articles that focused analytically on directives related to OHS legislation or regulation made by a government authority and that were published from 1990 onwards in peer-reviewed journals. Regulation included legal design and program implementation and activities that focus on enforcement (eg, prosecutions, inspections) or on government-directed voluntary activities (eg, voluntary guidelines, consultations). The search was conducted in partnership with a quantitative systematic review team conducting a review of OHS regulatory effectiveness.

We searched 11 databases: Medline, EMBASE, PsycINFO, ABI Inform, Health & Safety Sci Abstracts, ASSIA, EconLit, Sociological Abstracts, Wilson Social Service Abstracts, Index to Legal Periodicals, and SafeWork Australia /RegNet Sources.

We focused on empirical studies, thus excluding theoretical articles, literature reviews, opinion pieces, and commentaries. We defined qualitative studies as those using qualitative data (eg, interviews, focus groups, documents) and employing a qualitative data analysis approach (eg, narrative, thematic, ethnographic analysis).

Search terms were guided by existing terms used in relevant papers (see Appendix table A, http://www.sjweh.fi/data_repository.php). The search strategy followed a modified PICO format, in which articles containing at least one term from each of four categories (regulatory focus, setting, policy levers, and context) were captured. Content experts from six countries were consulted to uncover additional articles. A hand-search of the unindexed journal, *Policy and Practice in Health and Safety*, was also conducted.

To establish whether the study met inclusion criteria, titles and abstracts of the articles were reviewed. Where there was insufficient information, full text articles were retrieved and assessed. The search of qualitative, quantitative, mixed methods and review articles yielded 11 947 articles published between 1990 and 2013 (figure 1). This included all the articles obtained after databases were merged, duplicate articles were removed, and additional articles provided by content experts had been identified. Of these, 9587 articles did not meet our inclusion criteria. Full paper screening proceeded for 2360 articles, yielding 257 articles that were sorted as qualitative or mixed methods and reviewed and assessed by our qualitative team.

At this point, the joint quantitative and qualitative team partnership was completed, and the qualitative team conducted an additional screening of articles categorized as "qualitative". Verification of method, focus and inclusion criteria led to the exclusion of incorrectly sorted studies. Also, additional inclusion criteria were added: requirements for a description of data sample, collection, and analysis. These led to the exclusion of 222 articles, leaving 34 to proceed to quality assessment. Table B (appendix, http://www.sjweh.fi/data_repository.php) shows which databases produced the 34 included articles.

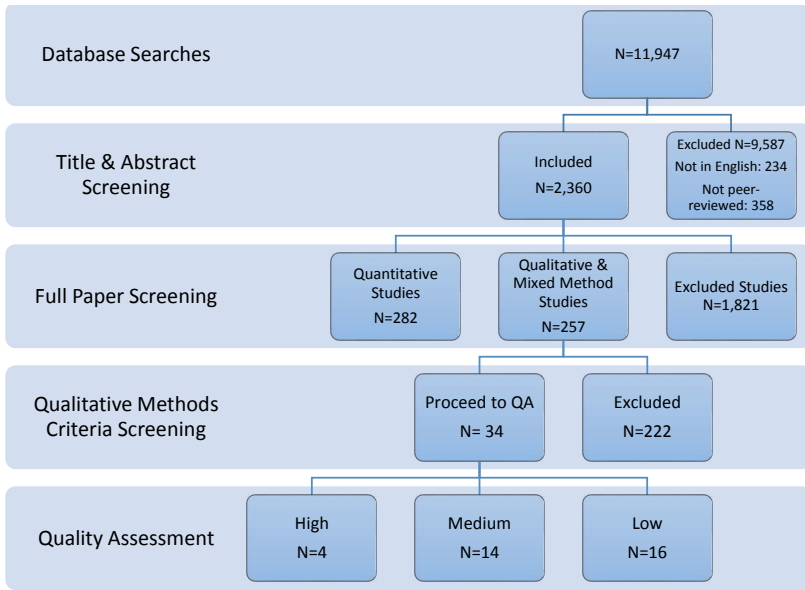

Figure 1. Flowchart of Studies

Quality assessment

Varied pairs of reviewers independently evaluated each article and met to review quality ratings and resolve differences. The pairs consisted of the first six authors, who have specialized expertise in OHS and qualitative research methods. To enhance review quality, reviewers were systematically paired on an article-by-article basis to ensure each reviewer worked with multiple partners.

The quality of studies was assessed using 17 criteria adapted from Spencer et al (16) related to design and objective, analysis, reporting, other quality, and findings (see table 1).

Studies were ranked as being of high, medium, or low quality. High quality studies provided explanatory detail about issues such as the relationships between events and their context and explored underlying mechanisms. Medium quality studies provided rich description and identified new variables or concepts, thereby broadening understanding of phenomena. Low quality studies were unconvincing, had weak sampling strategies or inadequate analysis.

Of the 34 studies proceeding to quality assessment and partial data extraction, 4 were high, 14 medium, and 16 low quality. The 18 assessed as medium or high quality proceeded to full data extraction and evidence synthesis.

Data extraction

Data were extracted on OHS regulatory characteristics, method, theoretical perspective, analytic process, findings, and how/why the findings were relevant to OHS regulations. Reviewers also extracted detail on the study purpose and key study findings. As with earlier steps, varied pairs of reviewers (the first six authors) independently extracted data and met to reach a consensus about details included. Table 2 provides details of the 18 studies included in the synthesis.

Synthesis approach

Findings were systematically reviewed and integrated using the general principals of meta-ethnography (17). Drawing on data extractions, data were organized by recurring concepts, which contributed to themes. To provide sufficient substance to a theme, concepts from a minimum of three articles were required (18).

A process of constant comparison and negative case analysis guided the synthesis. Constant comparison assembles issues and groups them under a common concept. It involves the reciprocal translation of similar or analogous findings. For example, authors may use dissimilar vocabularies but may be addressing the same general concept. Negative case analysis focuses on studies that appear to contradict other findings. The reviewer attempts to account for or reconcile this conflict. For instance, Sorensen et al (19) proposed that OHS self-regulation in Denmark improved workplace safety, but other studies based in the UK and USA described this approach as weakening worker protection. The negative case analysis directed attention to the presence in Denmark of cooperative labor and employer local agreements on OHS, which provided an extra dimension to how "self-regulation" is enacted. The final synthesis is organized in four main themes which were determined through assembling concepts across the articles (table 3). The first six authors, who

Table 1. Quality assessment criteria.

Methods—Design and Objectives	How defensible is the research design?
	How well defended is the sample design/target selection of cases/documents?
	Sample composition/case inclusion - how well is the eventual coverage described?
	How well was the data collection carried out?
Methods—Analysis	How well has the approach to and formulation of the analysis been conveyed?
	Contexts of data sources - how well are they retained and portrayed?
	How well has diversity of perspective and content been explored in analysis?
	How well has detail, depth and complexity (i.e. richness) of the data been conveyed?
Reporting	How clear are the links between data, interpretation and conclusions - i.e. how well can the routes to any conclusions be seen?
	How clear and coherent is the reporting?
Other quality indicators	Reflexivity and Neutrality --How clear are the assumptions/theoretical perspectives/values that shaped the form and output of the study?
	Ethics-What evidence is there of attention to ethical issues?
	Auditability- How adequately has the research process been documented?
Findings	How credible are the findings?
	How has knowledge/understanding of OHS regulatory levers been extended by the research?
	How well does the study address its original aims and purpose?
	Scope for drawing wider inference about OHS regulatory levers- how well is this explained?

were engaged in all search, data extraction, and quality assessment components of the study, identified concepts. A core group (EM, LR, and SS) independently read all data extraction documents, proposed concepts, and organized themes. Other team members reviewed the proposed themes and a consensus was agreed for organization of the data.

Synthesis findings

Two overall synthesis findings were produced. First, the synthesis illuminates the "underbelly" of OHS legislation formation, including how OHS legislation can be based on normative presumptions about worker and employer behavior and shaped by differential economic and political resources of parties. Second, the synthesis shows ways that implementation of OHS legislation is shaped by a range of conditions including "general duty" approaches to legislation, adequacy of coordination of authorities, resourcing of inspectorates, and ability of workers to participate in the system. Findings are presented by concepts organized in four main themes: (i) OHS regulation formation, (ii) regulation challenges, (iii) inspector organization, and (iv) worker representation.

OHS regulation formation. How OHS regulations are formed, including what logic and conditions underpin law and policy design, is the focus of this first theme.

Influence of Robens' assumptions. The Robens' Report, published in the United Kingdom (and building on Nordic approaches developed in the 1960s), altered the landscape of OHS policy design because it criticized a prescriptive approach to OHS regulation and emphasized that the primary role of law should be to encourage workplace self-regulation (20). It recommended that OHS inspectors adopt an advice-giving role and that rigorous enforcement of legal sanctions be saved for those who persistently refuse to comply with regulations. It assumed a shared, natural *identity of interest* between employers and workers, which made workplace self-regulation possible and suggested that a general raising of the consciousness of management and workers should be sufficient to improve health and safety standards. The philosophy and design of OHS policy across jurisdictions, as shaped by principles laid out in the Robens' Report (21), underpinned the focus of articles forming this concept.

Genn (22) addressed the question of whether employers and workers form an OHS identity of interest, examining responses to health and safety regulation among employers in the UK. She found that although a concurrence of interest sometimes occurred, it tended to be where OHS risks were serious and well known and an incident would cause severe economic damage to the company (eg, oil refineries, chemical works, lead smelting). Overall, the study found that an identity of interest could not be assumed between management and workers. Many employers were motivated to achieve good standards because of regulatory requirements or cost-benefit calculations, rather than safety interests. An employer and worker identity of interest was also absent in Grabe's (23) study of consultation processes regarding OHS regulatory formation in the UK and Germany. She found that employers emphasized cost, competition and job loss, while unions prioritized work accident statistics and avoidance of harm to workers. Hart's (24) study of Norwegian oil rigs found similar competing OHS safety values between employers and workers.

A Robens' principle is that workplace parties can be spurred to create and maintain safe workplaces through general awareness of OHS laws and specific workplace sanctions. Several studies challenged these notions of *general* and *specific deterrence*, finding that these fail to adequately incorporate larger social factors in OHS behavior. A study by McCallum et al (25) of the views of Australian judicial officers about whether OHS prosecutions prevent those convicted of OHS offences from reoffending (specific deterrence) or whether convictions have a broader effect of deterring non-prosecuted

Table 2. Study descriptions and quality ratings. [OHS=occupational health & safety; M=medium; H=high]

Author & year	Focus	Method and sample	Jurisdiction and sector	Rating
Bluff et al 2102 (32)	OHS Responsibilities of upstream duty holders	Participant observation and interviews with OHS inspectors; document analysis of OHS publications, cases and prosecutions	Australia, any sector	M
Dacanay & Walters 2011 (31)	Philippine workers in international maritime shipping	Interviews and focus groups with government agency officials, mangers of staffing companies, seafaring industry officials, seafarers. Document analysis of Comprehensive Case Management Program, case law, jurisprudence, health and safety accident records kept by the regulatory authorities.	Philippines, marine shipping	M
Egilman et al 2007(27)	Popcorn worker lung and under-regulation	Document analysis of internal correspondence, reports, programs, presentations, depositions of industry representatives and physicians, medical records of workers who died due to exposure, supplemental information from the internet.	USA, food industry	M
Genn 1993 (22)	Business responses to the regulation of health and safety in England	Interviews with managers from industrial and agricultural sites in different locations in England and Wales.	UK, any sector	M
Gräbe 1991 (23)	Comparison of OHS policy making and implementation in UK and Germany	Interviews in Great Britain and Germany with employers' federations, trade unions safety experts, insurance organizations, OHS organizations and institutions, industrial safety and standard inspectorates. Also workplace managers, safety representatives, trade unions officials, occupational physicians and nurses, and employees.	UK and Germany, any sector	M
Gunningham 2012 (28)	Regulatory competence and Australia's mines inspectorate	Interviews with OHS regulators, researchers, industry representatives, unions and OHS consultants.	Australia, mining	M
Harris et al 2012 (37)	Role typology for health and safety representatives	Interviews with senior managers, union convenors, OHS managers, line managers and workers.	New Zealand, metal manufacturing	H
Hart 2002 (24)	Worker involvement OHS	Interviews with safety delegates, management and union representatives on the working environment committees, union representatives at offshore oil platforms, Norwegian Petroleum Directorate representatives. Analysis of documents from the oil company, unions and the Working Environment Act.	Norway, offshore oil rigs	M
Jeppesen & Boggild 1998 (38)	Health and safety worker-management cooperation committees	Interviews across hospitals with representatives from cooperation committees, health and safety committees, local unions, and employees.	Denmark, healthcare	M
Johnstone et al 2011 (34)	Psychological risk at work	Interviews and participant observation of inspectors, inspectorate managers and workers. Document analysis of policy and inspectorate internal records.	Australia, any sector	M
Lippel et al 2011 (35)	Risks for temporary agency workers	Interviews and focus groups with workers, site and agency employers and managers, OHS and workers' compensation experts. Legal analysis of legislation and its application.	Ontario and Quebec, temporary employment	M
Lippel et al 2011 (33)	Protection of worker mental health	Legal analysis of Quebec OHS Legislation and case law. Interviews with union delegates.	Quebec, any sector	M
McCallum et al 2012 (25)	Role of judiciary in OHS prosecutions	Interviews with members of the New South Wales and Victorian judiciary.	Australia, any sector	H
Quinlan 2007 (26)	Mental health and organisational downsizing	Interviews and focus groups with OHS regulatory staff, inspectors, senior employer/industry and union representatives. Document analysis of OHS statues, government agency documents, industrial tribunal and court proceedings.	Australia, any sector	M
Quinlan et al 2009 (36)	Precarious work arrangements an OHS	Interviews and participant observation with current and former OHS agency staff, senior managers and worksites. Analysis of agency documents.	Australia, any sector	M
Sørensen et al 2009 (19)	Local workplace OPHS agreements	Interviews with private and public sector employer associations and unions, private companies with local agreements about H&S organization. Also interviews with municipalities including managers, shop stewards, safety officers and representatives.	Denmark, any sector	H
Vierendeels et al 2011 (29)	Modeling the major accident prevention legislation change process within Europe	Policy analysis relating to past major accident cases. Case study of Directive 2003/105/EG. Document analysis of official accident reports, committee minutes and working reports, and Seveso Amendments. Interviews with people involved with changing regulations.	European Union, any sector	M
Walters 1991 (30)	Ontario labor relations board rulings on work refusals	Document analysis of Ontario Labor Relations Board decisions on reprisals by employers for work refusal.	Ontario, any sector	H

companies from breaching OHS legislation in the future (general deterrence) found that judges were skeptical about each. Both general and specific deterrence required conditions that were not always present. In practice, long delays in process disassociated the crime from the punishment, thereby reducing impact on avoidance behavior. Also, although general deterrence relies on community awareness of the possibility of sanctions and their severity, information about OHS punishments was not necessarily communicated to communities.

General and specific deterrence principles were raised in two other articles. Quinlan (26) found little general deterrence activity in relation to organizational downsizing in Australia. The OHS agencies did not inform employers about detrimental physical and mental effects on workers of downsizing or related prevention responsibilities. Quinlan argues that this lack of information perpetuated a view among employers that downsizing posed no legal OHS obligations. In their study of an occupational disease outbreak in the US, Egilman et al (27) observed similar lack of public information about hazards, which might encourage workplace parties to address OHS problems. They found that, despite litigation being one of the most importance means for determining how and why occupational health disasters occur, there were few processes for making this information publicly available to protect public and occupational health.

Workplace self-regulation is a third aspect of a Robens' approach to OHS. It involves the assumption of employer awareness of obligations, consciousness of dangers, knowledge about means of improving standards, and a clear definition of OHS responsibilities within companies (22, 28). The suitability of self-regulation for workplace health and safety was discussed in four articles. Gunningham (28) found these knowledge conditions lacking in the Australian mining sector, as did Genn (22) in her study of UK businesses. Egilman et al (27) proposed that an American food sector actively sought self-regulation, not because of common employer and worker interests, but in order to evade regulatory oversight, which in this case allowed employers to continue using toxic material and avoid liability for the consequences. In contrast, Sorensen et al (19) described a move toward increased workplace self-regulation in Denmark as enhancing worker health. However, an important contextual difference was that the self-regulation was combined with cooperative labor and employer local agreements on OHS.

A Robens' approach would suggest that OHS inspectors should focus on playing an advice-giving role. This advisory role was addressed in several articles, where each questioned its applicability. Grabe (23) described an education and persuasion approach used by OHS inspectors in the UK and Germany that involved a process of first providing advice to employers, then following up with enforcement if the advice is not followed. She notes that this approach was not supported by labor, who in both jurisdictions, preferred to see inspectors

Table 3. Finding themes

	Regulation formation		Regulation challenges			Inspector organisation			Worker representation	
	Robens' approach	Politics of regulation formation	Psychosocial & mental health	Organizational restructuring	Complex contracts	Interpretive leeway	Inspectorate staffing	Inspector training	Worker consultation	Nature of involvement
Bluff et al 2012					x		x			
Dacanay & Walters 2011		x			x		x			
Egilman et al 2007	x	x								
Genn 1993	x									
Grabe 1991	x	x				x			x	
Gunningham 2012	x					x	x	x	x	
Harris et al 2012										x
Hart 2002	x			x						x
Jeppesen & Boggild 1998										x
Johnstone et al 2011			x				x	x		
Lippel at al 2011					x				x	
Lippel et al			x							
McCallum et al 2012	x									
Quinlan 2007	x		x	x		x		x		
Sorensen et al 2009	x			x						x
Vierendeels et al 2011		x								
Walters 1991		x								

make more use of their legal powers. Genn (22) suggested that the relatively soft approach of inspector advice-giving may not be well suited to small businesses or workplaces with no obvious major hazard. Her study found UK employers were mostly concerned with budgets and production concerns and unlikely to seek advice from inspectors who might request costly changes. Finally, when employers are aware that inspectors have discretion to either give advice or apply fines, this creates leeway for resistance to penalties. Gunningham's (28) study of Australian OHS inspectors found that they required considerable self-confidence and negotiation skills in order to move from advice to an enforcement position in workplaces; attributes that inspectors did not always possess.

The politics of OHS regulation formation. A key challenge identified in articles was that of finding common ground about OHS regulatory needs among multiple parties with divergent interests. Articles in this concept considered coordination of regulation and the impact on legislation formation of different stakeholders, including the general public, employers, and unions.

Although OHS policy formation is usually driven by standard processes involving research, and expert knowledge, other non-systematic processes are also at play in legislative formation and change. Vierendeels et al (29) conducted an examination of major accident prevention legislation change process within the European Union between 1982 and 2003 and identified two major driving forces for legislative change. In addition to the "standard procedure" as described above, there was "shock-effect-induced procedure" where legislative change was irregular and followed major accidents. The type of victim influenced this shock effect, with civilian deaths following a major accident having a particularly strong impact on OHS legislation formation.

Studies highlighted how OHS regulations are influenced by interest groups that actively participate in the formation of what is considered as terrain for OHS regulation. Grabe's (23) study of OHS regulation in the UK and Germany considered the quality of consultation between regulatory agencies and interest groups. Although trade unions and employers' federations had forums to jointly consider ideas and proposed regulations, the different parties had systematically uneven access to the resources required to participate fully in this process. Employers had a structural advantage over labor through greater access to expertise and economic support. They were represented by specialists and academics, while trade unions valued working experience over technical scientific expertise and sent senior union officials to OHS working groups.

The nature of OHS evidence and regulation formation was also addressed in Egliman et al's (27) study of flavor and extract manufacturers in the US popcorn butter industry. They describe how employer interest groups influenced what was considered as territory for OHS regulation. The relative prominence of employer interests in determining the scope of OHS regulation was also observed in a study of labor relations board decisions in Ontario, Canada, which found that decisions regarding work refusals due to unsafe work conditions systematically prioritized employer and production concerns (30).

Just as strong employers can shape OHS regulation, so can weakened unions contribute to under- and deregulation. Two articles linked weakened OHS legislation coverage to unions constrained by economic conditions. Grabe (23) noted that, where high unemployment exists, employers on health and safety committees can easily be critical of unions and make persuasive arguments about cost effectiveness. Dacanay & Walters (31) detailed how a deregulation of OHS legislation occurred in the context of Filipino state and regulator concerns about loss of maritime industry market share. The union members, facing high unemployment, withdrew from their protective OHS stance and accepted a commercially oriented focus.

Several articles addressed the challenge of coordinating regulatory systems for effective OHS practice. Coordination between OHS and other authorities across state and national borders was addressed in Bluff et al's (32) Australian study of upstream duty holders and Grabe's (23) study of OHS enforcement in the UK and Germany. Grabe found cooperation to be lacking in Germany because of different priorities between controlling authorities responsible for enforcement and inspectors. The Employers Liability Association inspectors concentrated on safety problems and equipment, while the Industrial Safety Standards inspectors examined environmental working conditions. In the American context, Egilman et al (27) documented how weaknesses in the coordination, organization, and mandate of regulatory bodies led four different occupational and environmental regulatory systems to each fail to detect and prevent an occupational disease outbreak. Poor regulatory coverage is also addressed in Dacanay and Walter's (31) study of Filipino seafarers. The seafarer's access to OHS protection was limited to the general state administrative regulations for Philippine exported labor. Seafarers fell through regulatory cracks because they fell outside the coverage of the Labour Code's protective and preventive measures on OHS.

In sum, this theme provides insights into practical and political processes of OHS regulatory formation. Robens-type concepts of self-regulation, identity of interest, deterrence, and inspector advice-giving role are not always well suited to current workplace realities and can be poorly applied, yielding questionable results. As well, OHS regulations and processes can be shaped by public

opinion and relative employer or labor influence or slip through the cracks between regulatory authorities.

Regulation challenges. Some health and sector issues have posed particular challenges for interpretation and enforcement of OHS law and policy. These regulation challenges are considered in this theme.

Psychosocial and mental health. Lippel et al (33) identified how the Quebec workers' compensation administrative tribunal discouraged mental health claims with arguments that violation of OHS regulations was insufficient and "evidence of danger" was needed, while concurrently, Quebec penal courts tended to accept such claims. Inspectors managed this regulatory ambiguity, which was accompanied by a lack of related training about workplace mental health, by avoiding such claims. Johnstone et al's Australian study (34) similarly found that OHS inspectors evaded psychological harm cases. The Australian inspectors chose to focus on traditional prevention activity, such as machine guarding, despite an inspectorate prioritizing of bullying and harassment. Inspectors in the Johnstone at al (34) and Quinlan's study (26) reported that psychological harm cases were problematic because they involved a heavy reliance on verbal evidence and were difficult to verify. They could be quite complex and difficult to clearly link to OHS. All of the studies in this concept found that workers fearing reprisals were reluctant to give evidence or talk to inspectors.

Organizational restructuring. A second area of enforcement challenge identified in the articles is in that of downsizing and workplace health, where organizational restructuring was under-recognized as a determinant of workplace OHS standards. Sorensen et al (19) found that workplace downsizing was a major motivation for Danish employers to merge safety and cooperation committees, which led to fewer employee representatives. Interestingly, workplace parties reported that OHS improved in the merged system because the fewer representatives had more contact with managers at the central level. Two other studies in this review describe detrimental OHS effects of workplace organizational restructuring. Hart (24) found that downsizing on Norwegian oil rigs reduced the number of internal safety supervisors, which limited coordinating OHS mechanisms at each rig. Quinlan's (26) review of OHS prosecution cases found that although Australian regulators and inspectors were aware that downsizing and restructuring impacted OHS standards, prosecutions were not launched because of the complexity of establishing a clear connection between downsizing and a deterioration of OHS processes. These varied findings suggest that the coordination and clarity of OHS communication between workplace and regulatory parties may be a factor related to whether OHS conditions are improved or hampered by OHS restructuring.

Complex contractual arrangements. A challenging area for OHS regulation is temporary work agencies and workers. Lippel et al (35) noted the difficulty of identifying the true employer in the context of three-way employment relationships in temporary work agencies. This has led to litigation in Quebec about the identity of the "true employer" and, in Ontario, workers' compensation regulators allocated extra investigative resources to identify the employers when an agency is small and intentionally avoids formal registration of workers. Studies of the Philippines (31) and Australia (36) noted challenges for OHS regulation in relation to subcontracting and temporary work because of deliberate risk-shifting and confusion amongst duty-holders. Increasingly complex and fragmented work arrangements put pressure on the logistical demands of administering OHS law. The ambiguity of legislation can create challenges for OHS inspectors as they try to apply enforcement.

With conditions of globalized supply chains, remote sourcing and outsourcing, there is a need for broadly applicable OHS legislation. Bluff et al (32) identified an absence of coordinated and strategic approaches to address responsibility of upstream parties. Their examination of Australian prosecutions for upstream duty holders considered acts or omissions of multiple parties as contributing to OHS risks. The study found that agencies rarely pursue upstream duty holders even though Australian OHS statutes generally impose obligations on designers, manufacturers, suppliers and importers of parts, and of importers of substances. Instead, inspectors tend to focus on non-compliance in relation to the local accident context (eg, unguarded stairwells), rather than on upstream responsibility for "duty to others" (eg, designs, suppliers).

In all, this theme describes three areas that have posed particular regulation implementation and prosecution challenges. Psychological harm cases can become enmeshed in industrial relations, both mental health and organizational restructuring problems can be difficult to clearly link to OHS, and complex contractual arrangements can create risk shifting and complex accountability.

OHS inspector organization and practice. How OHS inspectors are organized shapes how they address workplace health risk. This theme addresses the practical arrangements of inspector work.

Interpretive leeway. In a time of fast-changing technology and changing forms of work, specific laws in OHS regulation (eg, about a particular exposure hazard), can become quickly outdated. Several articles addressed the

increasing use across jurisdictions of non-specific laws, or general duty provisions, which impose broad obligations on employers to maintain safe workplaces. A challenge identified in the articles is that nonspecific provisions can be difficult for OHS inspectors to enforce. Grabe (23) noted that a clause in the UK's Health and Safety at Work Act offers the qualifier, "so far as is reasonably practicable", which creates interpretive challenges for inspectors and enforcement. Employers tend to interpret this as relating to reasonable cost investments, while inspectors also consider OHS risk and benefit.

Gunningham (28) found that Australian inspectors were most comfortable enforcing specific regulations and encountered difficulties when laws left significant room for interpretation, such as with the assessment of an organization's adherence to performance standards. He further noted that significant training is needed for successful management-based regulation and there were clear gaps in small or less well-resourced jurisdictions. A further challenge occurs when OHS inspectors have considerable discretion about how they approach their role because this can result in inspectors taking dissimilar approaches to the same set of circumstances.

Inspector training. General duty laws that require considerable inspector discretion call for well-trained inspectors with skills and judgement to assess a wide range of complex OHS situations. However, not all inspectors possess this training. Gunningham (28) described Australian OHS inspectors as lacking consistent skillsets to gather robust evidence, which in turn can contribute to a reluctance to bring prosecutions. In their analysis of enforcement of psychosocial hazard standards in Quebec workplaces, Lippel et al (33) also raised the reluctance or inability of inspectors, due to inadequate training, to prosecute breaches of OHS law. They proposed that lack of training about complex psychosocial hazards limited inspector enforcement activity. Both Quinlan (26) and Johnstone et al (34) described how Australian inspectors have traditionally had trade backgrounds but are now increasingly being recruited from a wider range of backgrounds in order to have the capacity to deal with complex hazards and investigations.

Inspectorate staffing. Many articles raised the issue of OHS inspectorate under-resourcing and how this can lead to a focus on simple and quickly resolvable issues (23, 26, 28, 31–34). Understaffing can prompt the creation of a priority system that leads inspectors to address the most noticeably risky firms and not engage in proactive inspection visits or consider firms that are lower risk. Further, complex situations, such as psychosocial complaints and risk audits, may be avoided because of the relatively extended time required to investigate and the limited outcomes achieved (23, 32, 34).

Altogether, this theme links the training and organization of OHS inspectorates with their ability to apply regulation advice and enforcement. Non-specific regulations require a highly trained and flexible inspectorate. They also provide interpretive leeway to inspectors, which can make their performance difficult to monitor. Under-resourcing can direct inspectors' focus to areas that are most quickly and easily resolved, leaving complex challenges under-addressed.

Worker representation in OHS. Ultimately, OHS systems are established for workers. This theme considers how and whether workers are consulted about workplace health risks and their role in injury prevention.

Worker consultation. OHS inspectors do not always consult workers during workplace visits, which can lead to under-informed inspector assessments. Grabe (23) noted this problem, observing that worker OHS representatives in the UK rarely had the opportunity to talk to inspectors during workplace visits. Similarly, Gunningham (28) describes how Australian miners and their trade unions identified a problematic lack of contact with inspectors.

Temporary workers are a growing group of workers who are systematically excluded from OHS representation. Lippel at al (35) noted that despite the legal mandate in Ontario that all workplaces with ≥20 workers have a joint worker-management OHS committee, this mandate fits poorly with temporary work agencies because workers are transient and dispersed.

Nature of worker involvement. The nature of worker involvement in workplace OHS systems was the focus of several articles. Some posed the question of *which workers* best represent their peer's OHS needs. Harris et al (37) found that workplace technical experts, who might match the traditional "inspector role", did not necessarily have a stronger impact on workplace OHS than administrative workers. Their examination of implementation in New Zealand workplaces of a newly legislated worker OHS participation role found that workers welcomed having any type of worker within their workplace as a legitimate channel to voice OHS concerns and provide avenues to solve them.

Two studies raised the representativeness of workers when they are not situated within a worksite. In their study of hospital workers in Denmark, Jeppesen & Boggild (38) described a system where workers were formally represented on committees, but did not always provide adequate representation when negotiating representatives were working at a community level and not employed in that workplace. In another case, Hart (24) described a lack of worker consensus among Norwegian oil workers about the role of trade unions in OHS and disagreement about wherever the senior,

non-worksite-based trade union officials should legitimately be considered as OHS representatives. In another study, workers were seen as adequately involved but disorganized amongst themselves, leaving gaps in OHS oversight (38).

Finally, Sorensen et al (19) noted that management inherently holds more power in workplaces than workers. They examined the introduction of voluntary local worker-employer agreements in Denmark and noted that this decentralized approach of worker-manager agreements, which relies more on local management activities than on state mandates and oversight, may create an uneven power balance at local level, favoring employers.

In all, this theme shows how workers can play a key role in OHS systems by identifying hazards. It raises questions about the mechanics of worker representation, including whether representation is best provided by more senior or more local workers.

Discussion

This meta-ethnographic analysis illuminates how different parts of OHS systems, from regulation formation to policy implementation to policy recipients, interact with each other and how their ability to coordinate is shaped by issues such as the logic and power relations embedded OHS systems, inspectorate training and resources, and quality of worker representation. The findings are relevant to OHS researchers and policy-makers.

Overall, synthesis findings raise the specter of how OHS legislation can be based on normative presumptions about worker and employer behavior and also shaped by politics and power relations contingent on economic and publicity resources of different parties. This "underbelly" of OHS regulations formation requires greater attention from researchers. A second key synthesis finding is how OHS legislation may be present, but difficult to implement because of mal-coordination of authorities, under-resourced inspectorates, and workplace conditions that limit worker representation. A shift toward general duty approaches, which hold employers broadly responsible for workplace OHS, appears common in many jurisdictions, but brings with it new challenges of imprecise and diffuse responsibility for OHS. This suggests that greater attention is needed to understand implementation realities and how executable OHS policies can be designed.

This discussion considers the findings of this review in relation to three main components of OHS systems: regulation formation, policy implementation, and policy recipients.

OHS regulation formation

This synthesis draws attention to the need for an articulation of new vision for OHS regulation in advanced economies that extends beyond the 1972 Robens' report. While the move away from specific law to a general duties approach is well suited to the contemporary fast-changing landscape where any specific law can become quickly outdated as technologies and economic relationships change, other Robens' era components contain assumptions about the nature of employer and worker interactions that are now out of date. Globalized trade conditions and advances in communication technology have radically changed employment contracts and distribution of risks faced by workers. A key change is the growth of international supply chains (39, 40), temporary work agencies (41, 42), and limited term employment contracts (43, 44). The theme of regulation challenges draws attention to practical realities of implementation in relation to complex health conditions and workplaces. The grey zones of OHS, such as where accountability is unclear in the case of workplace relationships (eg, bullying) and employer relationships (eg, temporary work agencies), are particularly difficult to address. The implications for OHS of fragmentation of previously integrated systems of production and service delivery has been a source of concern (40, 45). More qualitative research on this topic could support the fine-tuning of OHS regulation that is adapted to contemporary business organization and practices. Moreover, policy-makers need to consider how inspectors can become aware of and act on the juncture between labor relations and occupational health (46, 47). Proposals for renewed OHS regulation design, which include reducing reliance on complaints-based approaches, strategic targeting of OHS regulative resources, and legislation aimed at OHS management (2, 40, 48–51), have been put forward but have not been a focus for qualitative research. Qualitative OHS researchers could focus more on how OHS authorities adapt to complex conditions including "upstream" accountabilities in relation to problems such as design of imported equipment as well as those related to outsourcing risk, for instance, advanced economy jurisdictions contracting clothing manufacturing in Bangladesh.

A noticeable gap in OHS regulation qualitative research literature is a focus on small businesses. Genn (22) mentioned that the small business response to OHS regulation may be different than that of large firms. Small businesses are important to consider because the international growth in outsourcing means that many workers once covered by OHS systems in large workplaces are now working in small enterprises, which have well-documented and particular OHS risks (18, 52). Another noticeable gap in the literature is research

on precarious employment. Lippel et al (35) noted legal ambiguities with temporary agency workers. More knowledge of this area is needed, including how to regulate work-at-home and owner-operator arrangements.

Several articles in this review challenged the notion that employers and workers share a community of interest. This notion of shared interests among workplace parties is integral to propositions for cooperative self-regulation approaches. While it can be argued that employers and workers have some common ground, this review shows that it is also important not to underplay the relevance of power dynamics between labor and management. These influence who sets the agenda, what interests are given priority, and what is considered as OHS terrain (53). Articles in this review highlighted the tenuous conditions for OHS policy; for instance, regulations formed or removed in reaction to public accidents or fluctuating influence of labor depending on economic conditions. Future qualitative research could trace the political processes of policy formation. It could also consider not simply whether employers and workers cooperate, but how they cooperate. That is, what are fruitful topics for cooperation, and how are cooperative agreements supported? The integration theories of policy formation, such as Sabatier & Weible's Advocacy Coalition Framework (54), which considers the development of policies and how stakeholders take different parts in it related to their resources, might provide a useful framework for analysis of OHS policy for both researchers and policy-makers alike.

Inspectors and policy implementation

Even in relatively well-resourced, enforcement-oriented jurisdictions, such as Ontario (46), certain conditions can stifle enforcement. This review shows that inspectors are reluctant to apply enforcement when they see a low likelihood of conviction, as is the case with management standards approaches (28) and complex workplace psychosocial health issues where labor relations are entangled with occupational health (33, 34). This raises the question for OHS policy-makers of whether changes are needed to make OHS law more precise or if inspectors with an enhanced ability to deal with complex hazards and investigations are needed. A recent strategy in Australian and Swedish inspectorates has been to expand inspector OHS skillsets. This has resulted in a shift from a largely male, blue-collar workforce to one that includes women and workers with a white-collar background (2, 34, 55). Bruhn (55) suggested that an "academization" and "feminization" of the Swedish inspectorate led to stronger team approaches among inspectors and an interest in psychological OHS issues. However, Frick et al (2) argued that in Sweden this new recruitment approach has led to inspectors who lack competence of management systems and organizational development. More implementation studies are needed of how enforcement can be applied in situations where there are significant grey zones for interpretation.

Policy recipients

Several articles in this systematic review addressed the role of workers in OHS systems. It is important to consider contextual variation in worker roles; for instance, collective representation for workers is limited in some sectors and jurisdictions. Even where there is a broad union presence, internal rules and productivity requirements may mean that workers have limited means for influencing workplace safety (56). Further research might investigate how workers OHS needs are represented in unionized versus non-unionized workplaces, or high- versus low-risk jobs. As well, OHS policy-makers might consider how the growing numbers of temporary workers can participate meaningfully in workplace health systems and what knowledge is lost by excluding these workers.

A gap in this synthesis was studies of employers as policy recipients. Although some articles in the regulation formation theme identified employers as being cost-focused, this may be a blunt depiction that provides only minimal insight into how regulators can work with employers. Purse & Dorrian (57) proposed bounded rationality as a helpful framework for understanding employer OHS behavior. Rather than assuming that employer decision-making about OHS practices is based on costs and benefits, other issues such as information, time, and cognitive capacity constraints could be considered. It would be helpful to see researchers and policy-makers focus on what conditions motivate employers to participate fully in OHS systems.

Methodological comments

This review considers studies published 1990 and later in order to capture research in the context of contemporary globalized labor market conditions. It is important to consider that over time there have been variations and fluctuations in economic and related contexts. As such, the contribution of this review is not to declare that certain conditions presently exist, but rather to draw attention to contemporary concerns and issues in OHS literature, including policy implications, and consider areas for policy consideration and future research.

A strength of the review is its capacity to pull these seemingly disparate studies together as a whole and comment on what this means for understanding the broader context. This was supported by an experienced research team composed of experts in qualitative research methodology, systematic review procedure, and OHS who

were based in Canada, Sweden, and Australia, thereby providing a close lens on different regulatory systems.

A limitation of this review is that it included only English-language papers. Therefore information about OHS regulation and enforcement systems published in other languages was not captured. As well, the studies included in this synthesis were from a limited range of countries in Australasia, North America, and Northern and Western Europe. The inclusion of knowledge about OHS regulation formation and implementation in Asia, South America, and Africa would have enhanced this review.

Concluding remarks

This is the first systematic review of qualitative literature addressing political, economic and social processes that shape OHS regulation. A meta-ethnographic synthesis yielded four themes based on 18 eighteen qualitative research articles that met relevance and quality criteria. The synthesis identifies the multidimensional nature of how OHS legislation is formed and the ways legislative and practical resources affect implementation of OHS legislation. The review points to promising areas for further research in grey zones of legislation implementation.

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