



The Value Proposition for the Occupational Safety and Health Professional: A Review of the Literature

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Abstract

This literature review was commissioned by the International Network of Safety & Health Practitioner Organisations with the purpose of reviewing the evidence in support of the value proposition for the occupational safety and health professional. As such, this report makes a small contribution to a range of activities currently being undertaken by the International Network of Safety & Health Practitioner Organisations designed to strengthen the occupational safety and health profession's international standing and acceptance as a profession. This literature review attempts to answer three research questions 1) what is the evidence that the occupational safety and health professional improves the occupational safety and health performance of an organization? 2) what knowledge, skills and attributes of the occupational safety and health professional might be linked with the effectiveness of the occupational safety and health professional? 3) does the impact of the occupational safety and health professional vary depending on industry and organizational size? Of the 58 articles retrieved during the literature search only two studies could be classified as providing strong evidence in support for the value proposition for the occupational safety and health professional. Two themes that emerged from the literature and which warrant further research are the importance of the line of report and the personal attributes of the occupational safety and health professional. This finding suggests that knowledge, without power and the ability to influence senior decisions makers, may negatively impact the occupational safety and health and professional's ability to add value.

Key words: Occupational safety and safety professional, value, injuries, fatalities

1. Introduction

There has been a long-standing interest in the value of the occupational safety and health professional OSHP (see for example Adams, 2000; Greer, 2001; Lawrence, 2008). This interest has been generated in the recent past by the Global Financial Crisis (GFC) although Hill (2006) suggests that interest in the need to demonstrate the business value of the OSHP can be traced back to at least 2000 due to downturns in the economy triggered by other financial crises. The GFC had a significant impact on the United States economy in particular, resulting in a range of cost cutting measures; measures from which OSHPs were not immune. As a result, OSHPs today are under increasing pressure to demonstrate their relevance and value. Professional bodies, in particular the American Society of Safety Engineers, have responded to this challenge through a



structured campaign to demonstrate the value proposition for the OSHP (Lawrence, 2008). Reflecting this trend, a recent article by Seabrook (2014) continues the call for OSHPs to demonstrate safety's business value in delivering sustainable and profitable organizations. While in a similar vein, Curtis (2014) questions if OSHPs are able to explain to top managers how safety practices contribute to the "bottom-line."

The aim of this research is to review the literature in an effort to identify the current evidence, and the strength of that evidence, in support of the value proposition for the OSHP, by answering the following research questions:

1. What is the evidence that the OSHP improves the OSH performance of an organization?
2. What knowledge, skills and attributes of the OSHP might be linked with the effectiveness of the OSHP?
3. Does the impact of the OSHP vary depending on industry and organizational size?

2. Methodology

An exhaustive search of the peer-reviewed using EBSCOhost as the host database was undertaken using 36 combinations (search strings) of the following search terms: "safety officer," "safety manager," "safety manag*", "safety professional," "safety practitioner," "safety coordinator," "safety specialist," improve*, org*, comp*, effect*, value, "value proposition of the safety professional," "value proposition," "cost effectiveness," "return on investment," "impact of," "safety performance," performance, "safety climate," "safety professionals strategies," successful, safety, prog*, influence

A total of 58 articles were retrieved, read, classified for relevance and categorized according to themes. Papers were classified according to a hierarchy of evidence as shown in Figure 1 designed specifically for this research and informed by other hierarchies of evidence, for example, those used by the Cochrane Collaboration and the Canadian Institute for Work and Health. Hierarchies of evidence are used to classify studies and to answer the question: "how strong is the evidence?" (Institute for Work and Health, 2006, p. 60). According to Davies and



Crombie (2001), double-blind randomized controlled trials sit at the top of the hierarchy and provide the strongest evidence. Case-control studies sit in the middle of the hierarchy providing moderate evidence; while expert opinion sits at the bottom of the hierarchy and provides the weakest evidence. The studies retrieved for this literature review fell well short of the methodological rigor called for in a traditional hierarchy of evidence. Traditional hierarchies of evidence, however, are used to decide which intervention studies are included or excluded from a systematic review or meta-analysis. Given that the focus of this research is a literature review and not a systematic review in the pure sense and, that the majority of studies retrieved were not intervention studies, it was deemed appropriate to develop a hierarchy of evidence that would reflect the range of studies retrieved for this review in order to capture as much of the current evidence on the value of the OSHP as possible. As a result, a four tier hierarchy of evidence based upon the methodological quality of the studies retrieved for this literature review was devised:

1. Studies with strong evidence of direct value (n=2).
2. Studies with moderate evidence of direct value but where the evidence is moderated by other variables (n=16)
3. Studies with moderate evidence of inferred value but where the evidence is moderated by other variables (n=6)
4. Studies with weak evidence of direct value and expert opinion (n=34).

This hierarchy of evidence in Figure 1 will be used to present the results of the literature review.

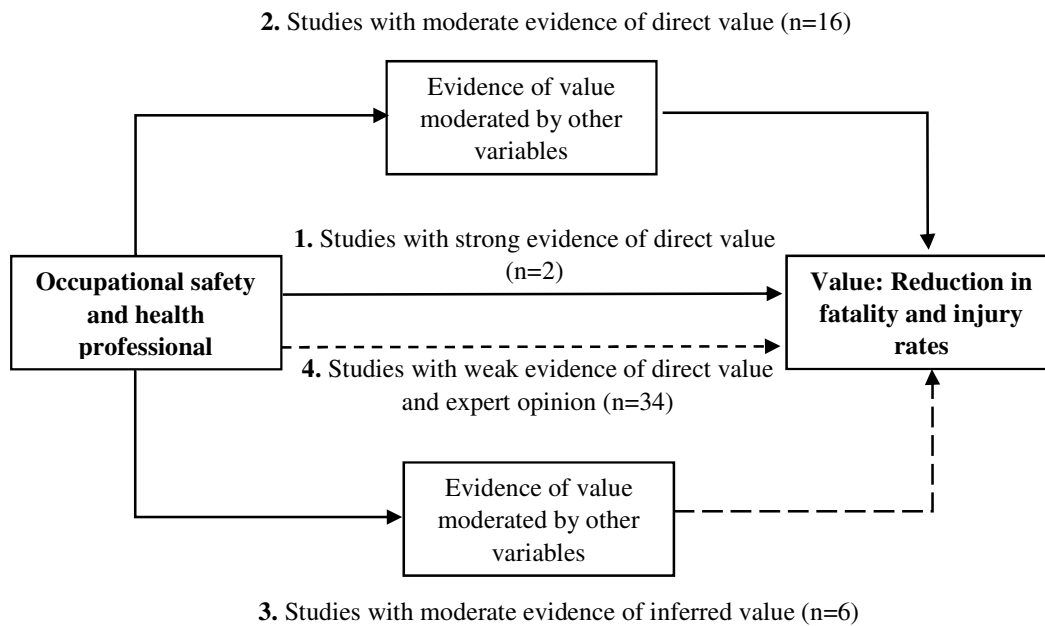


Figure 1 Hierarchy of evidence: Mapping the type of studies and the quality of the evidence

3. Results

3.1 Studies with strong evidence of direct value

To date, only two studies (Cameron, Hare and Duff, 2007; Rebbitt, 2012) have investigated if there is a direct relationship between OSHPs and value, where value is measured by lower injury rates (Cameron, Hare and Duff, 2007) and lower fatality rates (Rebbitt, 2012). Both studies were conducted in the construction industry. Cameron, Hare and Duff (2007), in a study conducted on behalf of the Institution of Occupational Safety and Health (IOSH) in the UK, found organizations that employed an in-house OSHP had an accident frequency rate (AFR) 60% lower than those using only external consultants. Furthermore, construction companies that gave their OSHP management authority in terms of their line of report (the higher up the organization the better) had an AFR that was 60% lower than those where the OSHP gave advice only and presumably had a lower level line of report.

Rebbitt (2012) compared the number of OSHPs with fatality rates in the US, UK and Canadian construction industry. Unlike the IOSH study, Rebbitt confined the measure of OSH performance to fatality rates due to the lack of reliability inherent in measures of injury



frequency rates. Rebbitt (2012) also studied the relationship between OSH professionals and OSH practitioners and their respective impact on fatality rates. Rebbitt found that higher numbers of safety professionals employed was significantly correlated with lower fatality rates. No correlation was found between the number of safety practitioners and reductions in fatality rates.

The findings from these studies are summarized in Figure 2.

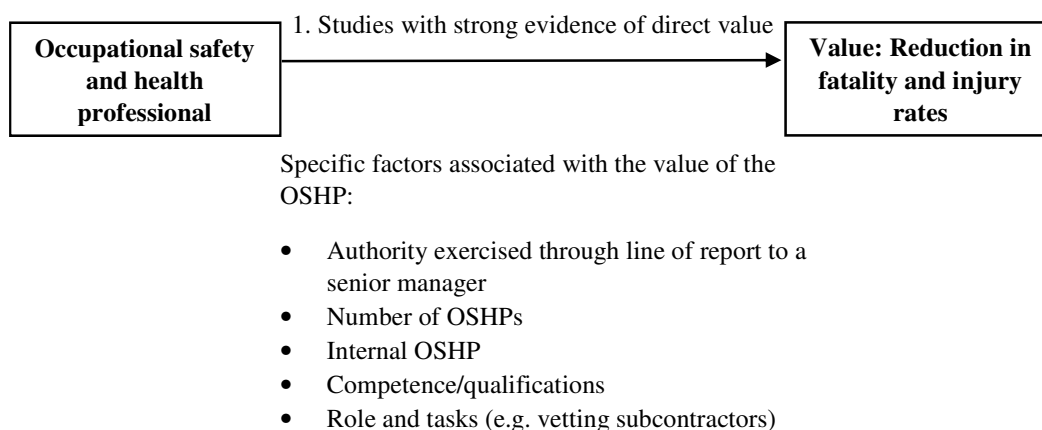


Figure 2 Strong evidence for the factors related to the direct value of the OSHP

3.2 Studies with moderate evidence of direct value in which evidence of value is moderated by other variables

Two types of studies fall within this category. First, studies with high methodological quality using matched pairs of companies with higher and lower accident rates (Cleveland et al., 1978, Cohen, 1977; Smith et al., 1978). Second, studies of weaker methodological quality typically relying on a sample of all companies in a specific industry sector (most often the construction industry). These studies investigate a range of safety management factors associated with lower injury rates (see for example Jaselskis, Anderson and Russell, 1996). The exception is an intervention study conducted across industry sectors in the Netherlands (Hale, Guldenmund, van Loenhout, and Oh, 2010). Leaving aside the issues associated with varying methodological quality, this group of studies provides moderate evidence of direct value in which evidence of value is moderated by other variables.



3.2.1 Studies of matched pairs of companies with higher and lower accident rates

The seminal work in this area was undertaken by the National Institute for Occupational Safety and Health (NIOSH) in the United States, comprising a series of three studies that commenced in 1974 (Cleveland et al., 1979; Cohen, 1977; Smith et al., 1978). The aim of this three-phase study was to determine the factors in successful safety programs. These studies drew on six prior research studies dating back to 1964. In a summary of these earlier studies Cohen (1977) identified nine general factors associated with safety performance. One of the nine general factors, “management commitment,” included the sub-category “safety officer holds high staff rank.” Of the six earlier studies, four identified safety staff as one factor associated with good safety performance. For example, a study by Davis and Stahl (as cited in Cohen, 1977) studied safety program practices in 12 coal mines that had won awards for reducing work-related injuries. This study found daily interactions between “safety officials,” supervisors and workers as being most important in their efforts to reduce injuries. Furthermore, this study found that the safety officer reporting directly to the mine manager was a significant factor. Of these six earlier studies, the study by Shafai-Sahrai (as cited in Cohen, 1977) was used as the basis for the NIOSH study with the aim of verifying and expanding upon Shafai-Sahrai’s results.

In summarizing the NIOSH study, Cohen (1977) states that one of the eight factors associated with low accident rate companies was management commitment reflected in the “rank and stature of the company safety officer” (p. 174).

3.2.2 Studies of a sample of companies within an industry sector or across industry sectors and injury rates

This group of studies found that employing an OSHP is one, among a number of safety management factors, associated with lower injury rates. These studies also found that it is critical that the OSHP reports to a senior manager (Abudayyeh, Fredericks, Butt and Shaar, 2006; Findley, 2004; Hallowell and Calhoun, 2011; McDonald et al., 2009). Conversely, other studies either failed to identify employing an OSHP as a safety management factor associated with well-performing companies (Hinze and Wilson, 2000) or that employing an OSHP was less cost-effective than investments in management commitment to safety (Hallowell, 2010). In a study exploring the diffusion of injury prevention strategies in the construction industry, Esmaeili and



Hallowell (2012) found that employing a site safety manager was one of three innovations less frequently implemented. They conclude that the industry has reached saturation point with respect to safety innovations, which presumably includes employing a site safety manager. A study of the management practices that contribute to a safe work environment in 62 hospitals in the US healthcare industry found that the OSHP had no impact on injury rates (Vredenburg, 2002). Despite this finding, Vredenburg proposes that one implication of this study is that the OSHP should hold a “management-level classification” (p. 259).

An intervention evaluation study conducted in the Netherlands investigated 17 projects across 29 companies, this time drawn from different sectors of industry (Hale, Guldenmund, van Loenhout, and Oh, 2010, see also Guldenmund and Hale, 2012; Guldenmund, Hale, van Loenhout, and Oh, 2008; Hale, Jacobs and Oor, 2010). This study found that the OSHP was central to the successful implementation of a range of safety initiatives. Hale et al. (2010) found that a distinguishing factor in successful interventions was “the amount of energy and creativity injected by top managers and, above all, by the coordinator (safety professional)” (p. 1026). They found that the OSHP or the top manager were the “active motor to make the change” (p. 1033). When interventions were not being driven by these motors, particularly the OSHP, companies were five times more likely to be unsuccessful in implementing OSH initiatives.

The findings from these studies are summarized in Figure 3.

2. Studies with moderate evidence of direct value

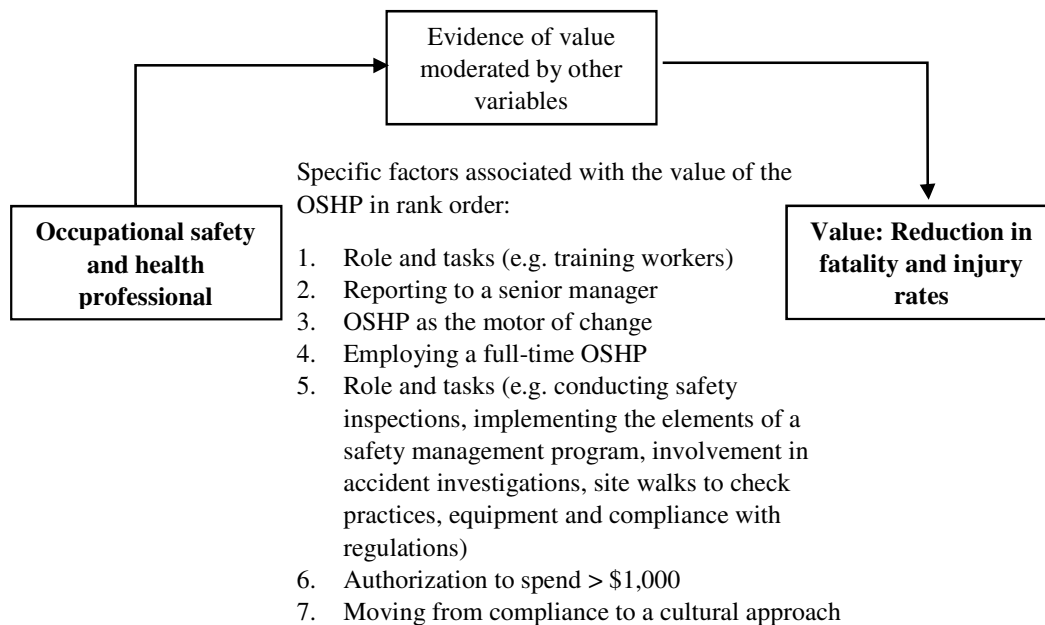


Figure 3 Moderate evidence for the factors related to the direct value of the OSHP

3.3 Studies with moderate evidence of inferred value in which evidence of value is moderated by other variables

Some studies of safety climate and safety culture suggest that companies employing an OSHP have better safety climate scores, with better safety climate scores associated with lower injury rates (Cameron and Duff, 2007; Smith and Wadsworth, 2009a; Smith and Wadsworth, 2009b; Wu, Lin and Shiau, 2010; Wu, Liu, and Lu, 2007; Zohar, 1980) A UK study of safety culture conducted by Smith and Wadsworth (2009a) on behalf of IOSH explored the relationship between safety culture, competent safety and health advice and safety performance. This study found a significant relationship between “favourable” safety cultures and better safety performance. Smith and Wadsworth (2009b) also found a significant, yet independent, relationship between OSHP advice and safety performance, although the “relationship between advice and performance is more complicated and there’s no clear pattern” (p. 8). They found that “less positive corporate safety performance was associated with more competent safety and health advice” (Smith and Wadsworth, 2009a, p. 64), which is on the face of it is a negative

finding about the value of well-trained OSHPs. In considering this finding, however, the researchers suggest that high risk industries are more likely to employ more highly qualified OSHPs. The findings of this study are difficult to interpret with no clear pattern emerging for the value or otherwise of the OSHP. As a result, the findings of this study and how to interpret them remain unclear.

The findings from these studies are summarized in Figure 4.

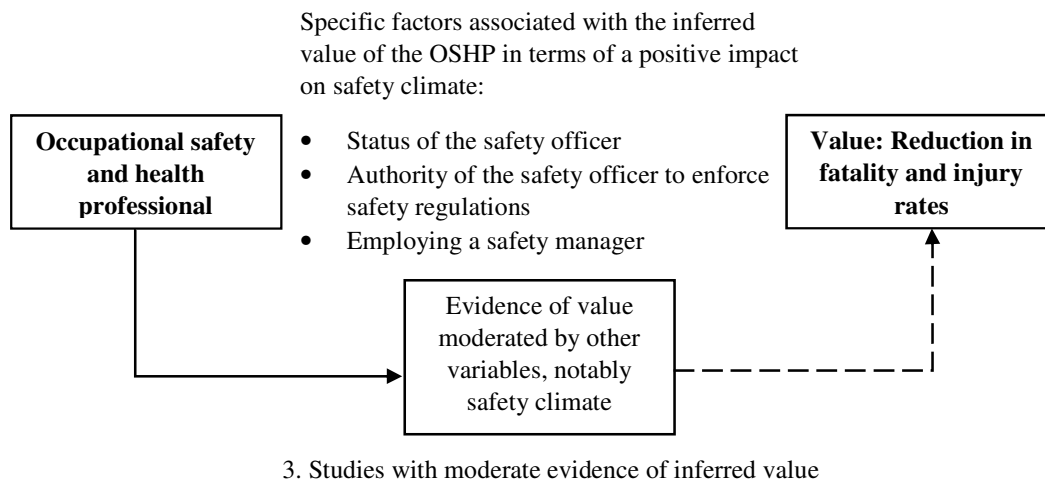


Figure 4 Moderate evidence for the factors related to the inferred value of the OSHP

3.4 Studies with weak evidence of direct value and expert opinion

There have been a number of studies that have returned ambiguous and often difficult to interpret findings on the relationship between the OSHP and value. Indeed some of these studies seem to suggest a negative, or at best ambiguous, relationship between OSHP and value (Mearns, Whitaker and Flin, 2001; Shannon, Mayr and Haines, 1997).

A second group of studies and expert opinion speculate on the status or line of report of the OSHP and value (Hopkins, 2007; IOSH, 2012; Mearns, Whitaker and Flin, 2001; Minnick, 2013) with no clear picture emerging on who the OSHP should report to. A recent salary and attitude survey, however, conducted by IOSH (2012) of 3,939 OSHPs, titled “The Value of



Health and Safety,” found that 55% of OSHPs already report directly to the board. Disturbingly, however, the IOSH survey found also that respondents were unable to articulate the value of their proposed safety interventions. This finding is supported by a study of Australian Chief Executive Officers (Peter Wager and Associates, 2010, p. 110) and a study on the return on investment of the environmental health and safety function in the US (BLR, 2006). The OSH profession is not immune to these criticisms and has taken it upon itself to promote the need for OSHPs to be able to argue the business case for safety and health (see for example Byrne, 2013; Hill, 2006; Veltri, 1992; Veltri et al., 2007; Veltri et al., 2013 and Williamson et al. nd). Various proposals for arguing the business case for safety and health include the use of cost-benefit analysis (see for example Behm, Veltri and Kleinsorge, 2004; Deshkar, 2010). Indeed, the need to evaluate the business value of the safety function was recognized over 20 years ago by Veltri (1992), who proposed a conceptual model for evaluating the safety function. Veltri argued that OSHPs must demonstrate the strategic value of what they do. Instead of focusing solely on regulatory compliance, Veltri argues that OSHPs must also contribute to productivity and business performance.

This perceived inability of the OSHPs to articulate the business value of safety calls into question whether or not educational programs are providing OSHPs with the necessary competencies to fulfill their roles. OSHP competencies have been the subject of much conjecture (see for example Blair, 2000; Chang et al., 2012; Leeman, 2005). Leemann (2005) proposes a matrix showing the relationship between OSHPs roles, functions and competencies; linked to the core competencies and products of an organization. An interesting inclusion in this framework is the interpersonal skills of the OSHP, the latter being an area that is overlooked in the safety science literature. Pryor (2014), however, in a grounded theory study of exploring the strategic influence of the OSHPs in Australia found that trust was central to the OSHPs being able to influence the strategic decision making of their senior manager. Although Leemann’s framework and Pryor’s findings fall short of demonstrating the value of the OSHP in direct terms, a picture starts to emerge that an OSHP who enjoys high status (power) would benefit from complementing their role and functions with business competence (business knowledge) and a set of personal attributes (influence).



A third group of studies explore the role and tasks/functions of the OSHP but fall-short of correlating these with the value they may (or may not) add (Borys, Else, Pryor and Sawyer, 2006; Brun and Loiselle, 2002; DeJoy, 1993; Hale and Ytrehus, 2004). The role of the OSHP is variously described as one of a “politically reflective navigator” (Broberg and Hermund, 2004; Olsen, 2012), “change agent” (see for example Brown and Larson, 1998; Brun and Loiselle, 2002; Hasle and Jensen, 2006; Hill, 2006; Limborg, 1995; Swuste and Arnoldy, 2003) or “compliance agent” (Hopkins, 2007).

The fourth group of studies failed to find a relationship between industry sector, size of organization and the functions of an OSHP (DeJoy, 1993), and safety climate scores based on organizational size and location (Wu, Liu and Lu, 2007).

The findings from these studies are summarized in Figure 5.

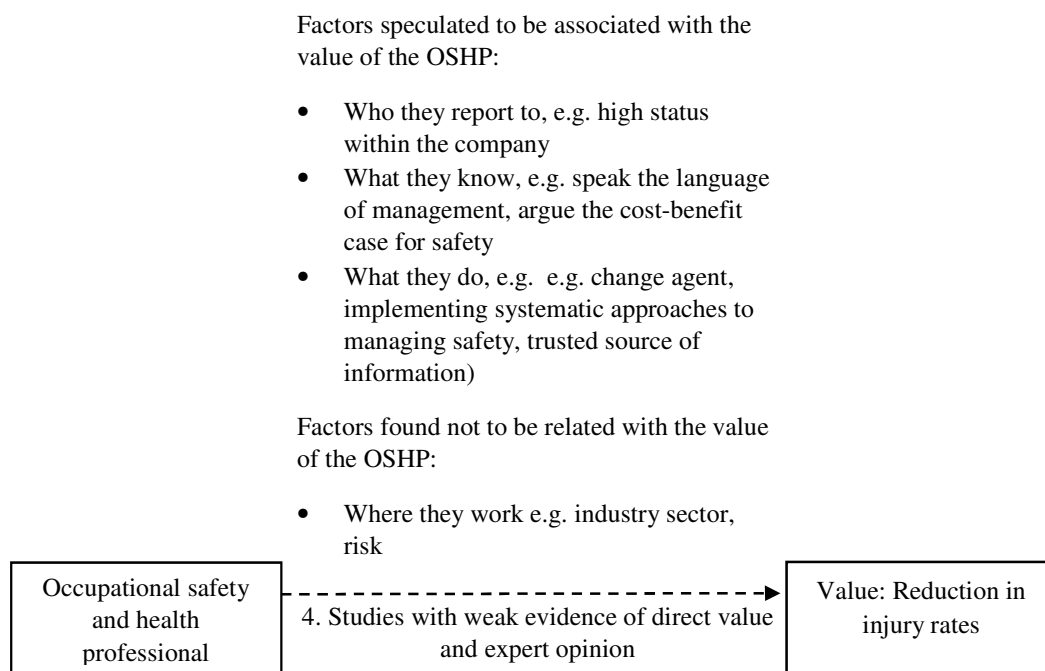


Figure 5 Weak evidence for the factors with speculated value of the OSHP



4. Discussion

To date, only two studies have been conducted that provide strong evidence in support of the value proposition of the OSHP. These studies are important because the value of the OSHP is not moderated by other variables or factors investigated to have a relationship with lower injury rates. Of concern is that all the studies included in this literature review measure the value of the OSHP in terms of either a reduction in fatality or injury rates. There are no similar studies that explore the rates of disease and ill-health. This is a glaring omission. Furthermore, the methodological quality of all the studies weakens the strength of the evidence. The early NIOSH study (Cleveland et al., 1979; Cohen, 1977; Smith et al., 1978) represents the highest methodological quality by using matched pairs of companies with high and low accident rates. Unfortunately this study investigated the value of the OSHP as one among many variables resulting in only moderate evidence for the value of the OSHP. Furthermore, this study is over 40 years old and few if any studies have replicated this study design. This represents a lost opportunity and one that should be addressed now. The study with arguably the second highest methodological quality is the intervention evaluation study conducted by Hale et al. (2010). This study employed a before and after design, but like the NIOSH study, investigated the value of the OSHP as one among many variables resulting in this study being classified as providing only moderate evidence for the value of the OSHP.

A recurring theme in the literature is the importance placed on the status and line of report for the OSHP. Although there is no strong evidence to support this claim, the pervasiveness of this idea in the literature should not be overlooked and represents an area for further research. Another emerging area of research interest is the personal attributes of the OSHP. The study by Pryor (2014) suggests that the line of report, role and tasks and qualifications/competence of the OSHP will only be effective to the extent to which the OSHP is influential with senior decision makers. Conversely, OSHPs who lack the personal skills to engage senior managers may be missing out on the opportunity to add value, irrespective of their knowledge and skills. This is an area that warrants further research.

Based on this literature review the relationship between the OHSP and business value is conceptualized as a value pyramid (Figure 6) with the strength of the evidence for the value proposition of OSHP mapped against the value pyramid elements in Table 1.

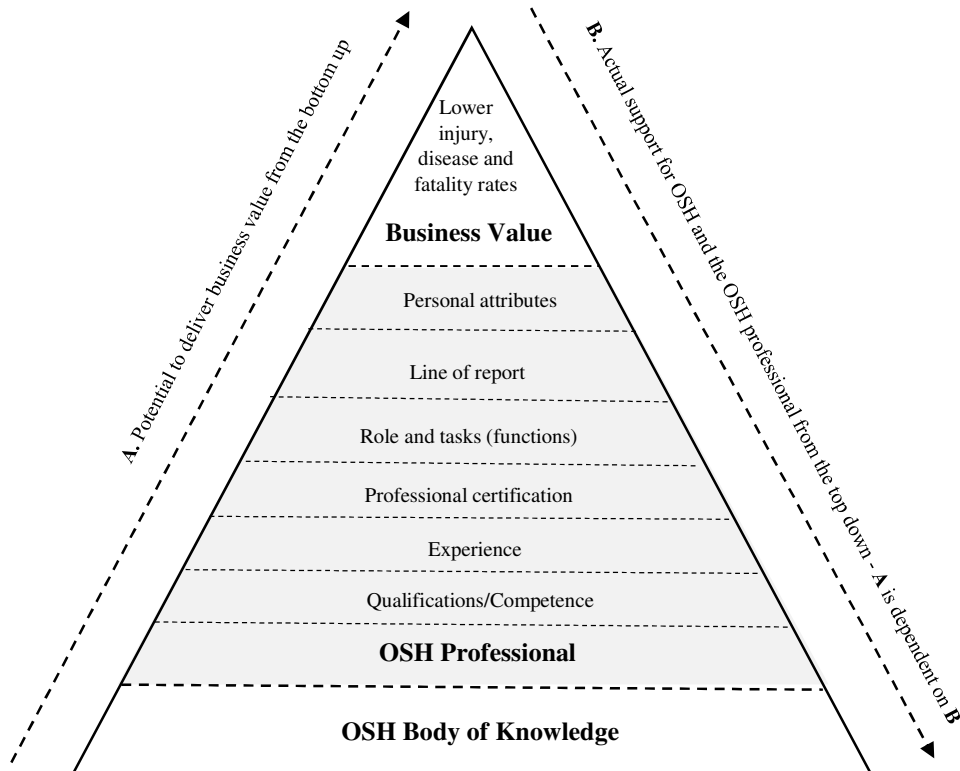


Figure 6 The value pyramid: Conceptualizing the relationship between the occupational safety and health professional and business value

Table 1

Strength of the evidence mapped against the value pyramid elements

| Strength of the evidence Value pyramid elements | Strong evidence for the factors associated with business value | Moderate evidence for the factors associated with business value | Weak evidence for the factors associated with business value |
|--|--|---|--|
| Personal attributes | | | <ul style="list-style-type: none"> Trusted source of information |
| Line of report | | <ul style="list-style-type: none"> Reporting to a senior manager Status of the safety officer | <ul style="list-style-type: none"> High status within the company |
| Role and tasks (functions) | <ul style="list-style-type: none"> Vetting subcontractors | <ul style="list-style-type: none"> Training workers OSHP as the motor of change Conducting safety inspections Implementing the elements of a safety management program Involvement in accident investigations Site walks to check practices, equipment and compliance with regulations Authorization to spend > \$1,000 Moving from compliance to a cultural approach Authority of the safety officer to enforce safety regulations | <ul style="list-style-type: none"> Speak the language of management, Argue the cost-benefit case for safety Change agent Implementing systematic approaches to managing safety |
| Professional certification | <ul style="list-style-type: none"> Membership of a professional body | | |
| Experience | | | |
| Qualifications | <ul style="list-style-type: none"> Competence/qualifications | | |
| Safety and health professional (including number of and employed in-house) | <ul style="list-style-type: none"> Number of OSHPs Internal OSHP | <ul style="list-style-type: none"> Employing a full-time OSHP Employing a safety manager | |
| Safety and Health Body of Knowledge | | | |

The aim of this literature review was to explore the evidence in support of the value proposition for the OSHP and to provide answers to three research questions:



1. What is the evidence that the OSHP improves the OHS performance of an organization?

There is strong evidence from the construction industry that employing an in-house OSHP results in lower fatality and injury rates.

2. What knowledge, skills and attributes of the OSHP might be linked with the effectiveness of the OSHP?

There is strong evidence from the construction industry that the knowledge, skills and attributes of the OSHP, expressed through qualifications, professional certification and the role and tasks they perform, results in lower fatality and injury rates.

3. Does the impact of the OSHP vary depending on industry and organizational size?

There is no evidence that the impact of the OSHP varies according to industry, organizational size or levels of risk.

6. Conclusion

OSHPs are facing increasing pressure to justify their value to their organizations, driven in part by a struggling global economy which is placing pressure on organizations to cut costs wherever they can. Being forced to justify one's value, however measured, is never easy. The sole purpose of the OSH profession must be to assist organizations to protect the safety and health of people at work. This is a moral measure of value from which economic benefits will flow to individual workers, organizations and society. In tough economic times it is easy to marginalize the role of the OSHP. The purpose of this literature review was to determine the strength of the evidence in support of the value proposition for the OSHP. While many studies have investigated a range of safety management factors associated with better safety performance, only two studies bring into sharp relief the value of the OSHP in reducing workplace fatalities and injuries. This finding is at once disappointing and encouraging – disappointing due to the dearth of studies on such an important topic, encouraging because there is at least a modicum of evidence for the value proposition of the OSHP. The challenge before the profession and safety researchers is to work together to conduct further research on this topic so as to strengthen the evidence in the hope that in the future, the OSHP will be immune to the knock-on effects of a struggling global economy.



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