

Development of an Auditing Tool for Clinical Occupational Health Services: A Modified Delphi Technique

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ABSTRACT

OBJECTIVE This study aim to develop a comprehensive auditing tool for clinical occupational health services (OHS) in corporate settings.

METHODS The design used a modified Delphi technique. The study was comprised of four steps: questionnaire construction and panelist selection, two rounds of questionnaires, and consensus determination. The participating experts included 31 occupational health professionals from 7 countries, representing management, occupational medicine, and auditing roles. Two rounds of questionnaires were administered to achieve 80.0% agreement on essential activities across the 7 key domains.

RESULTS The Delphi process yielded an audit tool encompassing 62 activities across seven domains: policy management (4 activities, 100.0% consensus), fitness for work assessment (7 activities, 85.7% consensus), medical surveillance programs (13 activities, 100% consensus), return to work assessment (7 activities, 71.4% consensus), occupational disease management (10 activities, 80.0% consensus), medical emergency preparedness (15 activities, 86.9% consensus), and health promotion (6 activities, 66.7% consensus). Experts' backgrounds influenced their focus, with hospital-based physicians emphasizing clinical protocols, company-based practitioners stressing implementation, management prioritizing governance, and auditors ensuring comprehensive assessments.

CONCLUSIONS This auditing tool required consideration of 7 domains, where experts rated the policy management and medical surveillance processes as the most important, whereas the domain of health promotion had the lowest importance score. This tool can help guide organizations in strengthening the foundational domains of OHS.

KEYWORDS basic occupational health services; audit tool; modified Delphi technique

INTRODUCTION

According to an International Labour Organization (ILO) report in 2023, the global landscape of occupational hazards showed concerning trends, with over 395 million non-fatal work injuries and 2.93 million work-related deaths recorded in 2019, marking a 12.0% increase since 2000. This

increase can be attributed to multiple factors, including increased workplace risk exposure, a 26.0% growth in the global workforce, and improved diagnostic capabilities. Enhancing workplace occupational safety and health management systems (OSHMS) is needed (1). OSHMS represents a complementary approach to workplace

health and safety. It provides a systematic administrative framework guided by international standards, such as BS 8800 (2), OHSAS 18001 (3), and ISO 45001 (4). However, OSHMS should not be directly equated with a safe work system, as management systems focus on administrative aspects rather than practical implementation. The limited focus of OSHMS on clinical activities and medical perspectives highlights the essential role of occupational health services (OHS) in providing direct medical care and health surveillance (5). OHS operates within a comprehensive framework encompassing disease detection, injury prevention, and promoting worker well-being (6). The effectiveness of OHS depends on ensuring comprehensive coverage, implementing evidence-based practices, utilizing multi-professional approaches, and maintaining strong integration with workplace systems (7).

Regulatory frameworks for OHS vary significantly across countries. In terms of legislation, the United States follows the OSHA standards (8), while the United Kingdom implements the Health and Safety at Work Act (9). Within the Association of Southeast Asian Nations (ASEAN), Singapore and Malaysia, both influenced by British law, have developed comprehensive systems through the Workplace Safety and Health Act of 2006 (10) and the Occupational Safety and Health Act of 1994 (11), respectively. These frameworks emphasize risk management, self-regulation, and worker consultation. In contrast, Thailand's legal framework, the Ministerial Regulation on Employees' Health Examination (12), places less emphasis on welfare provisions and workplace dialogue (13). Beyond legislation, guidance-based frameworks have been used, such as the UK's SEQOHS (14) and the American College of Occupational and Environmental Medicine's (ACOEM) Excellence in Corporate Health Achievement Award (15). These approaches offer flexibility, encourage stakeholder engagement, and allow for quicker adaptation to emerging risks. Corporate social responsibility codes have also become increasingly important (15).

A previous study in 2022 reported that most enterprises provided only legally mandated services, with expanded service delivery influenced by corporate policies and the presence of on-site occupational physicians (16). Similarly, a 2019 study on occupational health audit practices

revealed inconsistencies in audit implementation and limited dissemination of findings (17), whereas a 2015 study demonstrated that peer-review audit processes significantly improved report quality and reduced client complaints (18). These findings underscore the need for a standardized, comprehensive framework to evaluate clinical OHS performance across diverse organizational and national contexts.

Evaluation instruments can be developed using several research methods, such as systematic reviews or qualitative research (19). However, the audit framework must remain responsive to emerging workplace hazards and evolving healthcare delivery systems (20, 21). Given the complex nature of OHS quality standards and the need for comprehensive expert input, structured consensus-building methods are essential. For this study, a modified Delphi technique was chosen over the traditional one because predefined items had already been developed through an extensive literature review. This approach allows for efficient, structured evaluation, making it more practical given the time constraints and geographic dispersion of study participants (22).

Despite the extensive literature on OHS and various quality frameworks, there remains a significant gap in comprehensive tools for auditing clinical OHS across different settings and contexts. For that reason, this study aimed to develop a consensus-based audit tool to enhance practical aspects of clinical OHS delivery using the modified Delphi technique.

METHODS

Study design

A modified Delphi technique research design was employed between January 2024 and May 2024.

Study processes

The following four methodology steps were used: 1) questionnaire construction and expert recruitment, 2) first-round agreement of experts in the clinical activities of OHS, 3) second-round agreement of experts in the clinical activities of OHS, and, 4) consensus of the audit tool for clinical occupational health services (Figure 1).

Step 1. Questionnaire construction and expert recruitment. Experts in occupational health science were identified through conference participation,

referrals, and professional networks and were invited to participate in the study. The panel comprised 31 experts from diverse backgrounds in occupational health science.

Step 2. First-round questionnaire. The initial questionnaire was distributed to the expert panel by email with a link to an online survey platform. Experts were asked to rate the relevance of each item on a 5-point Likert scale and to provide additional comments or suggestions. Responses were collected over two months. The research team then analyzed the responses and calculated statistical measures using a more than 80.0% confidence level of agreement technique which meant that the sum of the proportions of levels 4 (agree) and 5 (totally agree) reached at least 80.0% (23).

Step 3. Second round questionnaire. This modified questionnaire was sent to the same expert panel. The experts were asked to review the group's responses and initial ratings, reconsider their responses, and potentially revise their judgments. This round allowed experts to clarify their views and help the study move towards a consensus. The responses were collected and analyzed.

Step 4. Consensus determination. After the second round, final analyses were conducted to determine which items had reached consensus based on an 80% confidence level of agreement technique. The final output was a consensus-based audit tool for the clinical aspects of occupational health services.

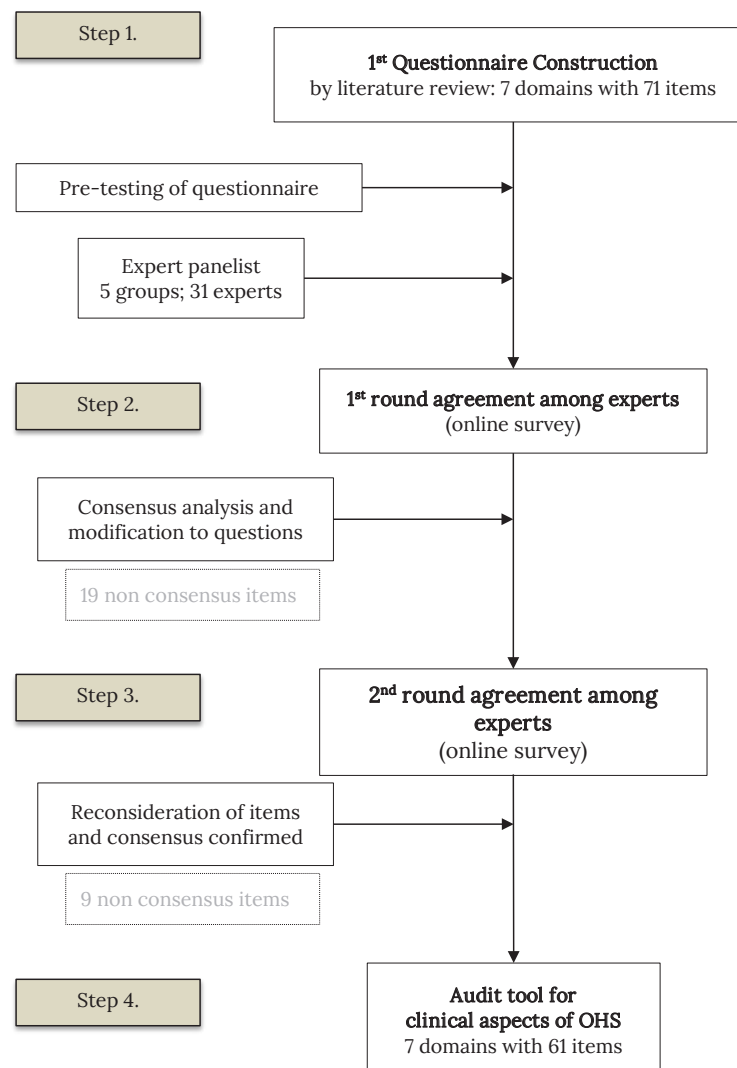


Figure 1. The modified Delphi method used in this study

Expert panel selection

The panel of 31 experts were purposively sampled. The number of experts was calculated according to the minimum required number of participants for the modified Delphi technique in order to detect the slightest discrepancy of opinion among 17 people (24). Experts were recruited from the USA, Bulgaria, Malaysia, Singapore, the Philippines, Indonesia, and Thailand. The expert panelists consisted of experts with the qualification of having experience in their position and specialization for at least 5 years and were classified into 5 groups: 1) individuals who had practiced in roles and positions of management, 2) occupational health physicians (OHP) working at a hospital/occupational medicine clinic, 3) OHPs working at a company, 4) individuals with an academic background relating to occupational health studies, and 5) individuals working as an auditor in quality assessment or on evaluations of occupational health and safety.

Research tools

There were two questionnaires: the first-round questionnaire was comprised of questions regarding the experts' background and ratings of domains and activities of clinical OHS; the second-round questionnaire was comprised of ratings and consensus measurements of domains and activities of clinical OHS.

The first-round questionnaire was developed based on a comprehensive literature review to identify key concepts and current knowledge in the field of OHS. Based on this review, the questionnaire was developed, focusing on 7 domains: policy management, fitness for work evaluation, medical surveillance program, return to work evaluation, occupational disease management, first-aid and medical emergency preparedness, and health promotion. The questionnaire was divided into 7 domains with a total of 71 activities. The questionnaire validity test was performed by 3 validators who were occupational physicians but not researchers. Item objective congruence (IOC) was used to assess the questionnaire content validity. An IOC index between 0.5 and 1.00 suggests that the question is acceptable (25).

The second-round questionnaire was developed by incorporating the statistical summary of the first-round responses and modifications to the items suggested by the experts.

Data collection

An online survey platform was sent to each panel member through an invitation email with a link to both questionnaires. The email requested the participant's consent to participate, and the responses were recorded anonymously. Each of the two rounds lasted two months, with three reminder emails sent to the panelists to remind them to complete the questionnaire.

Data analysis

The demographics of the experts were analyzed, and their expertise and years of workplace experience were evaluated. The consensus agreement was analyzed using a 5-point Likert scale for each item. The questions were analyzed using an agreement technique with a confidence level of > 80.0% for both questionnaire rounds. Data was analyzed using IBM SPSS Statistics, version 28.0 (IBM Corp., Armonk, NY, USA). Consensus on the audit tool was achieved after two rounds of the agreement technique. All domain questions were used to construct the audit tool for clinical OHS.

Ethical considerations

Ethical approval for this study (HE661325) was obtained from the Ethics Committee of Khon Kaen University. This study was exempt from review by the institutional review board, and the data were collected anonymously and were uninfluenced by the research team.

RESULTS

The results comprised the demographic data of the experts, the first and second rounds of agreement of experts on the clinical activities in OHS, and consensus on the audit tool for clinical occupational health services.

The demographic data of experts

A total of 31 experts from seven countries (Thailand (13), Singapore (6), Malaysia (5), the USA (4), Bulgaria (1), Indonesia (1), and the Philippines (1)) were included in the study to ensure diverse perspectives. The experts' demographic data were categorized according to their roles and sectors. Managerial experts were from hospitals, governments, and universities. Hospital experts were exclusively from hospital settings. All company experts were from private companies. Academic experts were from university settings. The auditors

were from hospitals, private companies, governments, and universities. Each group had varying years of experience (Table 1).

The first and second rounds of agreement of experts in the clinical activities of OHS

In the first round of agreement, the experts completed a questionnaire on OHS activities. In the second-round agreement, the experts reconfirmed and modified non-consensus questions. The results of both questionnaires are presented (Table 2). The full statistical results and the final audit tool are provided in the supplementary materials.

Domain 1 – Policy Management: Consensus was achieved on all four activities (100.0%). In the first round, the experts showed strong agreement on the fundamental aspects of policy management, including comprehensive OHS policies, effective communication, policy-aligned activities, and oversight committees. In the second round, consensus was reached on all four key items: company policy covering OHS, policy communication, activity implementation, and the establishment of an oversight committee.

Domain 2 – Fitness for work (FFW) assessment: A consensus was reached in 6 out of the 7 activities (85.7%) including the need for job classification and job-specific examinations, particularly for safety-sensitive positions, with the agreement of the OHP. It was noted that there is also a need for documentation and privacy control of the records. In addition, employee immunization management was included as optional for specific industries, e.g., healthcare, livestock, and food.

Domain 3 – Medical Surveillance: The data showed that all 13 activities (100.0%) reached a consensus regarding the medical surveillance

programs being conducted using a hazard-based design by a multidisciplinary team. Surveillance would start with identifying and reviewing the hazards, followed by health risk assessment, regular medical evaluation, followed by interpretation by the OHP. If abnormal results were presented, after the evaluation actions and re-evaluation of the workplace were to be performed.

Domain 4 – Return to Work (RTW) assessment: Consensus was reached for 5 out of the 7 activities, including requirements for RTW indications and OHP evaluation of the relationship between health and work, and suggesting any job alterations or other recommendations as needed. The evaluation should include physical and psychosocial conditions and should establish distinctive management approaches for work-related and non-work-related health conditions.

Domain 5 – Occupational Disease Management: The results showed that a consensus was reached on 8 of 10 activities (80.0%). Those activities focused on employee education regarding health risks, early screening systems, referral programs, and providing information about compensation and benefits as well as management systems for employers, such as the investigation of and reporting systems for occupational diseases.

Domain 6 – Medical Emergency Preparedness: The results demonstrated that consensus was achieved in this domain in 13 out of 15 activities (86.9%). Emergency preparedness requirements covered first-aid protocols and training as well as emergency planning to anticipate all risks, including safety and medical issues. The emergency plan included a referral system, equipment preparation, regular training, and continuous improvement.

Table 1. Demographic data of experts

Expertise groups	Number of experts	Workplace of experts				Years of experience Median (IQR)
		Hospital	Private company	Government sector	University	
Managerial position	6	3	-	1	2	13.5 (8-20)
Hospital-based OHP	7	7	-	-	-	8.0 (7-12)
Company-based OHP	6	-	6	-	-	13.5 (6-35)
Academic OM	6	-	-	-	6	15.5 (8-25)
Auditor	6	1	3	1	1	17.0 (17-20)

OHP, occupational health physicians; OM, occupational medicine

Table 2. Expert agreements on each domains and components of clinical occupational health services audit tool

Occupational health services (OHS) activities	Sum of proportions of level 4 and 5		Consensus
	1 st round n = 31 (%)	2 nd round n = 31 (%)	
Domain 1 Policy management			
1.1 A company has a policy covering occupational health services	100.0	100.0	Yes
1.2 A company communicates the policy throughout the company	100.0	100.0	Yes
1.3 A company implements and plans activities according to the policy	100.0	100.0	Yes
Domain 2 Fitness for Work Examination (FFW)			
2.1 Employees get FFW examination according to their job titles or similar exposure group (SEG) determined by occupational health physician	96.8	90.3	Yes
2.2 A company has jobs that qualify as safety sensitive job e.g. working in confined space, at heights, driver, or handling toxic, corrosive, or explosive materials that should have fit for work examination	93.6	96.8	Yes
2.3 Occupational health physicians conclude the FFW examination	100.0	100.0	Yes
Domain 3 Medical Surveillance Program			
3.1 The medical surveillance team designs the medical surveillance program according to the result of hazard identification and health risk assessment	100.0	100.0	Yes
3.2 A company performs medical surveillance program regularly according to the health hazard	100.0	100.0	Yes
3.3 Occupational physicians evaluate and interpret the results, correlating them with the exposure	100.0	100.0	Yes
3.4 A company provides medical removal action and follow up examination in employees with abnormal results	96.8	93.6	Yes
Domain 4 Return to work assessment (RTW)			
4.1 A company has documents indicating which conditions, diseases, or injuries to do RTW examination	90.3	87.1	Yes
4.2 A company evaluates individuals based on their health and psychosocial condition, medication, and job demand	96.8	100.0	Yes
4.3 The physicians provide a Return-to-work certification with recommendation of job modification if necessary	100.0	96.8	Yes
4.4 Old – The return-to-work evaluation is done by occupational health physicians, or occupational health doctor, or employees' attending physicians Modify – The return-to-work evaluation can be done by employees' attending physicians but should be re-evaluate by occupational health doctor for the appropriate recommendation	77.4	87.1	Yes
Domain 5 Screening, Diagnosis, and Treatment of occupational diseases			
5.1 A company set a system to trigger a screening for early detection of occupational or work-related diseases	96.8	100.0	Yes
5.2 Old – A company assigns supervisors to be able to detect employees' health condition Modify – Supervisors are aware of the existing health hazard in the workplace	54.8	67.7	No
Domain 6 First aid and medical emergency preparedness			
6.1 A company assigns first-aiders according to the local authorities	96.8	96.8	Yes
6.2 A company trains first-aid practice to supervisors and employees	96.8	90.3	Yes
6.3 A company maintains readiness of the first-aid equipment and facilities	100.0	96.8	Yes
6.4 A company recognizes possible emergencies from workplace health hazards and makes emergency plan accordingly	96.8	100.0	Yes
6.5 A company exercises the emergency plan both discussions based, and operation based	100.0	100.0	Yes
6.6 A company trains Basic life support to employees, annually	67.7	74.2	No
Domain 7 Health promotion			
7.1 The information providers are knowledgeable and qualified to give the information	90.3	100.0	Yes
7.2 A company recognizes the health problems among the employees	93.6	90.3	Yes
7.3 A company provides information about health promotion and wellness including non-occupational injury and illness management	96.8	93.6	Yes

Table 3. Summary of consensus analysis of the audit tool

Domains	Consensus activities n (%)	All activities	Range of consensus on items (median)
1. Policy management	4 (100.0)	4	100-100 (100.0)
2. Fitness for work assessment	6 (85.7)	7	74.2-100 (96.8)
3. Medical surveillance program	13 (100.0)	13	80.7-100 (100.0)
4. Return to work assessment	5 (71.4)	7	64.5-100 (87.1)
5. Occupational diseases management	8 (80.0)	10	61.3-100 (100.0)
6. Medical emergency preparedness	13 (86.9)	15	74.2-100 (96.8)
7. Health promotion	4 (66.7)	6	58.1-100 (85.5)

Domain 7 – Health Promotion: Four out of six activities (66.7%) reached consensus, including the implementation scale of health promotion, recognizing health problems, providing information on health and wellness, evaluating employees, and organizing intervention programs.

In summary, as shown in Table 3, the policy management and medical surveillance program domains achieved the highest consensus, with all activities in these domains reaching 100%, reflecting unanimous agreement among the participants on their importance. Both domains also exhibited a narrow consensus range across individual items, with a median of 100.0%, underscoring consistent prioritization. In contrast, the FFW, occupational disease management, and medical emergency preparedness domains reached consensus levels of 85.7%, 80.0%, and 86.9%, respectively, demonstrating strong agreement but with slightly broader ranges of consensus for individual items. The lowest levels of consensus were observed in the RTW and health promotion domains, with 71.4% and 66.7% consensus, respectively. These findings indicate a more significant variability in the perceived implementation of activities within these domains, as reflected in their broader consensus ranges (median values of 87.1% and 85.5%, respectively). This analysis highlights the variability in consensus across the seven domains, suggesting differing levels of agreement on their criticality and implementation in occupational health.

Additionally, experts offered diverse insights across the seven OHS domains. Overall, there was a strong consensus on the importance of OHP involvement in fitness-for-work evaluations, medical surveillance, and return-to-work processes. Company-based OHPs emphasized the need for

context-specific approaches, particularly in policy management and emergency preparedness, reflecting differences in organizational size, resources, and risk profiles. Academics and auditors tended to stress the integration of clinical quality and balanced emphasis on health and safety, while management and company-based OHPs focused more on operational feasibility. Health promotion was widely acknowledged as beneficial, but was consistently recommended only after core protection measures were in place. These perspectives help inform a more nuanced understanding of practical implementation challenges across various occupational settings (Table 4).

DISCUSSION

The modified Delphi technique was used to develop a comprehensive audit tool for evaluating the quality of clinical OHS in corporate settings. While maintaining anonymity and iteration with controlled feedback, the diverse expert panel reached a high level of consensus, supporting the tool's relevance and potential alignment with established practices.

OHS policies differ significantly across countries owing to variations in regulatory frameworks, cultural contexts, and economic conditions. In countries such as the USA (8) and Singapore (10), OHS regulations are well-defined and strictly enforced, focusing on workplace safety and health promotion, including mental health initiatives. In particular, Singapore is notable for integrating occupational health with broader public health systems and promoting wellness alongside traditional safety measures. In contrast, Thailand (26), and the Philippines (27) face challenges in enforcement, with OHS practices primarily concentrated on meeting basic regulatory requirements,

Table 4. Additional comments from experts on each domain

Domains	Management level	Hospital based OHP	Company based OHP	Academics on Occupational Health Sciences	Occupational Health and Safety Auditors
1. Policy Management	Policy/planning must be edited by occupational health services (OHS) team and worker representative before presenting to executives, they may lack the knowledge of the OHS	Internal audit depends on company size/type; more relevant for large hazardous companies	Robust governance from the executives and internal oversight were needed but depending on company resources and understandings from the employer.	Should integrate clinical quality into holistic control	Audit should be equitable in all areas, the OHS should have equal weightage to safety and the boards should be aware of the importance of the OHS
2. Fit for work assessment	occupational health physicians (OHP) should be the one to do Fitness for work (FFW)	Functional capacity evaluation (FCE) only for impaired employees in safety-sensitive jobs	FFW must be risk-based and job-specific; no one-size-fits-all tests	FCE can be outsourced, or could consider trade tests as FCE alternative	FCE/trade tests were important for objective assessment
3. Medical Surveillance Program	Special exams must include specific diagnostics based on worker histories	Design team must include OHP (in-house/external) and the procedure should be written clearly	OHP should work with organization representatives for understanding hazards and the implementation of the program	Can outsource to third party but must include OHP	OHP and safety officer were needed to design the program
4. Return to work assessment	Company should assist unfit employees to transfer to appropriate work; by having discussions between employer, employee, and the OHP	Return to work (RTW) should be done by OHP, early return to work can best benefit the worker	Need clear policy for RTW and different handling for work vs non-work conditions, the work adaptation should be done to shorten lost workdays	No specific comment provided	Must be handled by trained personnel or OHP considering company policies
5. Occupational diseases management	All top management should be aware of workplace health hazards and exposure risks	No specific comment provided	Supervisors should identify concerning behaviours, not diagnosing conditions	Can use general screening questionnaire in screening or follow local guidelines	Medical personnel should evaluate health, not supervisors
6. Emergency preparedness	Need specific details on facility accessibility, considering distance/time and clinical guidelines for golden period	No specific comment provided	Response guarantees should not be set, it can be varied by company hazards/size	Transport can be outsourced; consider limitations for small enterprises	Employer should decide provisions based on multiple factors e.g. hazards, safety risks
7. Health Promotion	It is a primary prevention; align with Universal Health Care, but it should be done after satisfying all core workers protection.	It is a preventive service; it can include only company-controlled aspects	Promoting health and lifestyle can benefit on productivity and financial returns	Health promotion is a part of basic OH	Health promotion is a part of prevention and can improve productivity

which are often limited to physical safety and medical surveillance, without addressing broader health promotion or mental well-being issues.

In addition, across the seven domains covered by the tool, consensus was achieved on 53 of 62 individual audit activities, with agreement exceeding 80.0% in each case. This strong consensus underscores the validity of the tool and its concordance with established OHS guidelines of leading organizations, including the ILO Conventions and Recommendations (28, 29), the American Medical Association (30), and the WHO (31).

The experts reached unanimous consensus (100.0%) in the policy management domain. The results showed three critical activities that scored 100% agreement in both rounds: policy establishment, communication throughout the organization, and systematic implementation of activities. Employers must provide OHS (28) and management-level and company-based OHP experts advocated executive involvement in policy development. However, they also commented on executives' lack of expertise and understanding of OHS, highlighting the need for leadership-level education and training. This was evidenced by a study of Japanese companies, where only 12 out of 267 responding companies fully integrated occupational health elements into their OSHMS, with over 50.0% of companies which were planning implementation being uncertain about how to incorporate occupational health activities, demonstrating a significant knowledge gap at the management level (32). In addition, hospital-based experts recommended scaling requirements based on the company size and hazard levels. Lau et al. (33) demonstrated how standardized policies might not effectively account for varying operational capacities and clinical demands across healthcare settings.

In examining the second domain, FFW assessment, an 85.7% consensus was reached, establishing crucial requirements for job-specific examinations. The experts agreed on three key elements: examination protocols based on job titles or similar exposure groups; special attention to safety-sensitive positions, e.g., confined spaces, heights, driving, or handling hazardous materials (34); and oversight by occupational health physicians. The consensus in this domain emphasized the critical role of occupational health physicians

including FFW examinations. As supported by the ACOEM's core competency of OHP, OHP should have the knowledge and skills to determine whether workers can safely be at work and perform the required job tasks (35).

Medical surveillance revealed the highest consensus (100.0%) among the panelists. The core requirements outlined in the tool were hazard-based program design, regular monitoring, and OHP result interpretation. Surveillance is a key indicator of exposure control effectiveness and triggers early intervention, thereby reducing the burden of occupational illness. This was demonstrated in both the reviewed studies. Mandanach's analysis showed how effective surveillance enabled the monitoring of occupational disease prevalence and the adoption of preventive measures (36).

In contrast, Sen et al.'s comparative analysis revealed that countries with robust surveillance systems were better able to identify high-risk areas and implement targeted prevention programs, ultimately reducing the occupational disease burden through early intervention (37). Moreover, expert consensus on effective medical surveillance requires close collaboration between occupational health professionals and safety specialists. As Murthy emphasized, maintaining a safe and healthy workplace requires integrated expertise from all occupational health domains, including industrial hygienists, safety officers, occupational health nurses, and practicing physicians (38).

The fourth domain, RTW assessment, reached a 71.4% consensus, reflecting divergence in implementation approaches. The agreed components included documentation of qualifying conditions, comprehensive individual evaluation considering health and psychosocial factors, and physician certification with modification recommendations. The experts emphasized the need for OHP recommendations to ensure that the workplace context was adequately considered. This collaborative approach aligns with the research by Tan et al., who demonstrated through case evidence that a successful return to work requires careful evaluation of functional impairment against job demands and workplace capabilities (39). Additionally, Nastasia et al. found that even in resource-limited settings, such as SMEs, early return with informal but monitored task modifications could

be effective when adequately supported by occupational health professionals, leading to better outcomes and faster recoveries (40). Both studies reinforced the experts' view that OHPs are crucial in bridging the gap between medical care, workplace capabilities, and worker needs during the return-to-work process.

Occupational disease management achieved an 80.0% consensus, focusing on two core elements: implementing early detection systems and enhancing workplace hazard awareness. Based on the established legal principles outlined by Henshaw et al., employers bear the primary responsibility for worker protection because they control work methods and conditions (41). Griffin noted that this requires management and supervisor training to recognize work-related illness signs to help ensure prompt response and impact mitigation (42). The expert panelists emphasized that integrating these elements with regulatory compliance and voluntary prevention measures was critical for program success.

Medical emergency preparedness showed a strong consensus (86.9%) across five key areas: first-aid assignment, training programs, equipment maintenance, emergency planning, and exercise programs. Experts also commented on the need for flexibility in setting response time standards based on the specific hazards present and the accessibility of emergency medical services. These practices emphasize the importance of a well-rehearsed and adaptable emergency response capability. According to a systematic review by Dagrenat et al., workplace first-aid practices and standards showed significant variations in regulation, organization, and training requirements. These differences highlight the need for emergency response capabilities that adapt to local contexts while maintaining core training standards. That study found that despite the universal recognition of the importance of workplace first aid, countries lacked uniform recommendations, enabling flexible implementation (43).

Health promotion received the lowest consensus among the domains evaluated (66.7%), despite expert acknowledgment of its significance in disease prevention and productivity enhancement. Some management-level respondents advocated prioritizing traditional occupational health pro-

tection over health promotion. This perspective aligns with the hierarchical framework of occupational health services (OHS) proposed by Guidotti et al., who conceptualized health promotion as an extension of the basic occupational medical care (30). Emerging frameworks, such as the Total Worker Health (TWH) approach developed by the National Institute for Occupational Safety and Health (NIOSH), advocate the integration of health protection and promotion. The TWH model emphasizes that comprehensive strategies are essential for optimizing worker well-being. Incorporating these elements into OHS reduces healthcare expenditures and enhances overall employee productivity and quality of life within and beyond the workplace (44).

This systematic approach to clinical occupational health service audits fills significant gaps in existing standards, such as SEQOHS (14), ACOEM (15), and WHO guidelines (31), particularly in addressing detailed clinical quality metrics. It also serves as a practical instrument for organizations to ensure compliance with Thailand's ministerial regulation on employee health examinations (12). The tool provides practical guidance and supports continuous quality improvement in OHS delivery.

Strengths and limitations

The strength of this study lies in its comprehensive coverage of seven key domains of clinical OHS, offering a comprehensive approach to evaluating and improving service delivery. A strong consensus (80.0% agreement) on essential activities across these domains further validates the tool's reliability. Additionally, the tool emphasizes continuous quality improvement, providing a structured framework for organizations to assess and refine their OHS practices over time.

A limitation of the study was that it focused primarily on organizational settings but was not suitable for informal workers' settings. Additionally, cultural and regional variations in occupational health practices may not be fully represented. This tool may require significant adaptation to different national regulatory contexts. Moreover, the study did not include field testing of the audit tool in a real-world setting. Therefore, audit tools should be pretested and modified according to the country's practices.

Recommendations

Companies can use the audit tool to help provide a quality OHS to their employees. These implications extend to service delivery, management approaches, and potential outcomes for holistic employee healthcare. This tool can serve as a basis for developing or enhancing OHS programs and facilitating dialogue between management, health professionals, and workers. The tool is designed to be flexible, allowing for adaptation to different organizational contexts and sizes. This tool enables organizations to identify strengths and gaps in their clinical occupational health services, promote consistency in service delivery, and support continuous quality improvement. A phased implementation approach is recommended, starting with the core activities that reached a high level of consensus.

CONCLUSIONS

Clinical OHS audit tools may include 7 domains: policy management, medical assessment for FFW, medical surveillance programs, medical assessment for RTW, occupational disease management, medical emergency preparedness, and health promotion. These domains established a comprehensive framework including valuable insights from experts from diverse professional backgrounds and OHS settings. This diversity of perspectives contributes to a more robust and practical audit tool that balances ideal practices with real-world implementation possibilities.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

ADDITIONAL INFORMATION

The data supporting the findings of this study are available within the article and its supplementary materials.

Supplementary materials

The following supporting information can be downloaded at: [Supplementary appendix](#)

REFERENCES

1. International Labour Organization. A call for safer and healthier working environments. ILO (Internet). 2023 (cited 2025 Jan 12). Available from: <https://researchrepository.ilo.org/esploro/outputs/report/995343988202676>
2. British Standards Institution. BS 8800: guide to occupational health and safety management systems. London: The Institution; 1996.
3. British Standards Institution. OHSAS 18001:2007 Occupational health and safety management systems - requirements. London: The Institution; 2007.
4. International Organization for Standardization. ISO 45001:2018 - Occupational health and safety management systems - requirements with guidance for use. Geneva: The Organization; 2018.
5. Caponecchia C, Wyatt A. Defining a "safe system of work." *Saf Health Work*. 2021;12(4):421-3.
6. World Health Organization, International Labour Organization. WHO/ILO joint estimates of the work-related burden of disease and injury, 2000-2016: global monitoring report. (Internet). Geneva: World Health Organization; 2021 Sep (cited 2023 Apr 20). Available from: <https://www.who.int/publications-detail-direct/9789240034945>
7. Rantanen J. Occupational health services: an overview. Copenhagen: World Health Organization Regional Office for Europe; 1990.
8. Occupational Safety and Health Act of 1970, Pub. L. No. 91-596, 84 Stat. 1590 (Dec. 29, 1970) (Internet). Washington, DC: United States Department of Labor; 1970 (cited 2023 Apr 18). Available from: <https://www.osha.gov/laws-regs/oshact/completeoshact>
9. Health and Safety at Work Act 1974, c. 37 (UK). London: Her Majesty's Stationery Office; 1974.
10. Ministry of Manpower. Workplace Safety and Health Act 2006. Singapore; 2006.
11. Department of Occupational Safety and Health Malaysia. Occupational Safety and Health Act of 1994. Malaysia: DOSH; 1994.
12. Royal Thai Government Gazette. Ministerial Regulation on the Prescribing of Standards for Services of Occupational Health Units B.E. 2567 (A.D. 2024). Sect. Pt 73 k Nov 25, 2024 p. 38-46.
13. Tang KHD. A comparative overview of the primary Southeast Asian safety and health laws. *IJWHM* 2020; 13:601-32.

14. Standards for safe effective quality occupational health service (SEQOHS) (Internet). London: Faculty of Occupational Medicine; 2023 (cited 2024 Apr 23). Available from: <https://www.seqohs.org/CMS/Page.aspx?PageId=77>
15. American College of Occupational and Environmental Medicine. Guide to the health, safety and environmental management (HSEM) system. Elk Grove Village (IL): The College; 2005.
16. Pokkapat Prasatkettkarn. Enterprises' expectation on competencies of occupational physicians and occupational health administration in Thailand. *Dis Control J*. 2022;48:626-36.
17. Cashman C. A survey of current audit practice in occupational health. *Occup Med*. 2019;69:287-9.
18. Lalloo D, Demou E, Macdonald EB. Impact of peer review audit on occupational health report quality. *Occup Med*. 2015;65:440-3.
19. Rahman MS. The advantages and disadvantages of using qualitative and quantitative approaches and methods in language "testing and assessment" research: a literature review. *J Educ Learn*. 2016;6:102-12.
20. Michalak J. Quality assessment in occupational health services: a review. *Int J Occup Med Environ Health*. 2002;15:165-71.
21. Bilban M. Quality assurance in occupational medicine. *Saf Eng*. 2014;4:17-24.
22. Meesil N. Delphi technique: avoidance of misconception. *Veridian E-Journal Silpakorn Univ Humanit Soc Sci Arts*. 2016;9:1256-67.
23. Von Der Gracht HA. Consensus measurement in Delphi studies. *Technol Forecast Soc Change*. 2012;79:1525-36.
24. Macmillian TT. The Delphi technique. Paper presented at the annual meeting of the California Junior Colleges Associations Committee on Research and Development; 1971 May 3-5; Monterey; 1971.
25. Ismail FKM, Zubairi AMB. Item objective congruence analysis for multidimensional items content validation of a reading test in Sri Lankan university. *Engl Lang Teach*. 2022;15:106-17.
26. Royal Thai Government Gazette. Occupational health and safety and environment Act B.E. 2554 (A.D. 2011). Sect. Pt 4 k Jan 17, 2011 p. 5-25.
27. Republic of the Philippines. Republic Act No. 11058: An Act strengthening compliance with occupational safety and health standards and providing penalties for violation thereof. Quezon City: Republic of the Philippines; 2018.
28. International Labour Organization. Convention No. 161 concerning occupational health services. Geneva: The Organization; 1985.
29. International Labour Organization. Recommendation No. 171 concerning occupational health services. Geneva: The Organization; 1985.
30. Guidotti TL. The occupational health care system. In: Guidotti TL. Occupational health services: a practical approach. 2nd ed. Oxon: Routledge/Taylor & Francis Group; 2013. p. 1-17
31. World Health Organization Regional Office for Europe. Good practice in occupational health services: a contribution to workplace health. Copenhagen: The Organization; 2002.
32. Ikeda Y, Kameda T, Shirakawa C, Nagata T, Zama S, Kayashima K, et al. The relation among expertise level of occupational health physician, implementation of occupational safety and health management system (OSHMS) and occupational safety and health activity level in Japan in the companies listed on Tokyo stock exchange first section. *J UOEH*. 2007;29:469-84.
33. Lau B, Miguel SS, Chow J. Policy and clinical practice: audit tools to measure adherence. *Ren Soc Australas J*. 2010;6:36-40.
34. Lee LP, Martin DW, Kancelbaum B, Israel M, Reid N, Pick TA, Schumann SC, Thies RE. Occupational medicine: a basic guide. A publication of the ACOEM private practice section [DRAFT]. Elk Grove Village: ACOEM; 2018.
35. Hartenbaum NP, Baker BA, Levin JL, Saito K, Sayeed Y, Green-McKenzie J. ACOEM OEM core competencies: 2021. *J Occup Environ Med*. 2021;63:e445-61.
36. Mandanach C. Patterns in medical surveillance of workers exposed to lung carcinogens. *RJOM*. 2023; 74:23-9.
37. Şen S, Barlas G, Yakıştıran S, Derin İG, Şerifi BA, Özlü A, et al. Prevention of occupational diseases in Turkey: deriving lessons from journey of surveillance. *Saf Health Work*. 2019;10:420-7.
38. Murthy LI. Implementing workplace safety and health surveillance. *Ann N Y Acad Sci*. 1997;837(1):100-104.
39. Tan KWA, Koh D. Long COVID—Challenges in diagnosis and managing return-to-work. *J Occup Health*. 2023;65(1):e12401. PubMed PMID: 37098838
40. Nastasia I, Coutu MF, Lederer V, Lecours A, Rives R. Insights into small and medium enterprises practices of early return to work with modified tasks following a work-related injury [Abstract]. *Occup Med*. 2024;74(Supplement_1):i339.
41. Henshaw JL, Gaffney SH, Madl AK, Paustenbach DJ. The employer's responsibility to maintain a safe and healthful work environment: an historical review of societal expectations and industrial practices. *Empl Responsib Rights J*. 2007;19:173-92.
42. Griffin MJ. Negligent exposures to hand-transmitted vibration. *Int Arch Occup Environ Health*. 2008;81: 645-59.
43. Dagrenat C, Cassan P, Issard D, Loeb T, Baer M, Des-catha A. 541 First aid in the workplace in the world: a systematic review. *Occup Environ Med*. 2018;75(Suppl_2):A114.
44. National Institute for Occupational Safety and Health (NIOSH). Fundamentals of Total Worker Health approaches: essential elements for advancing worker safety, health, and well-being. Cincinnati (OH): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, NIOSH; 2016. DHHS (NIOSH) Publication No. 2017-112.

Audit tool – Prototype

This audit tool aims to evaluate the clinical part of occupational health services provided in companies. It can be used as a recommendation or a guideline in operating occupational health services. However, the need to comply with local authorities is still needed as a fundamental practice. [Evaluation- Yes/No]

Occupational health services activities

OHS activities	Evaluation
Domain 1 Policy management	
1.1 A company has a policy covering occupational health services	
1.2 A company communicates the policy throughout the company	
1.3 A company implements and plans activities according to the policy	
1.4 A company has a committee overseeing the implementation of the policy	
Domain 2 Fit for Work examination (FFW)	
2.1 Employees get FFW examination according to their job titles or similar exposure group (SEG) determined by occupational health physician	
2.2 A company has jobs that qualify as safety sensitive job e.g. working in confined space, at heights, driver, or handling toxic, corrosive, or explosive materials that should have fit for work examination	
2.3 Occupational health physicians conclude the FFW examination	
2.4 A company shows evidence of a system for employees' health record keeping including informed consent from employees and accessibility control of the records	
2.5 A company documents FFW examinations results and keeps them individually for further reference	
Optional for this domain	
2.6 A company requires specific testing, e.g. functional capacity evaluations (FCE) or trade test, to evaluate employees in the safety sensitive job	
2.7 A company reviews immunization status and provides prophylaxis vaccination for employees (health services, food industry, or livestock industry)	
Domain 3 Medical Surveillance Program	
3.1 A company shows evidence of a mechanism process to get hazard identification and health risk assessment	
3.2 A company reviews all the information from the safety data sheet and industrial hygiene data	

OHS activities	Evaluation
3.3 The medical surveillance team designs the medical surveillance program according to the result of hazard identification and health risk assessment	
3.4 A company performs medical surveillance program regularly according to the health hazard	
3.5 A company performs the medical examination in an appropriate location	
3.6 Occupational physicians evaluate and interpret the results, correlating them with the exposure	
3.7 A company reports the results to the employees	
3.8 A company provides reconfirmation and diagnosis to employees with abnormal results	
3.9 A company provides medical removal action and follow up examination in employees with abnormal results	
3.10 A company reevaluates work environment and control measures	
3.11 A company makes changes by hierarchy of control according to the information from the evaluation (from 3.10)	
3.12 A company documents and keeps the examination results according to their health hazard exposure group for further reference	
3.13 A company has a medical surveillance design team which should include at least: 1) human resources or safety officers, 2) occupational health professionals, and 3) supervisors	
Domain 4 Return to work assessment (RTW)	
4.1 A company has documents indicating which conditions, diseases, or injuries to do RTW examination	
4.2 A company evaluates individuals based on their health and psychosocial condition, medication, and job demand	
4.3 The return-to-work evaluation is done based on scientific/relevant organization guidelines (e.g. AMA)	
4.4 The physicians provide a Return-to-work certification with recommendation of job modification if necessary	
4.5 The return-to-work evaluation can be done by employees' attending physicians but should be re-evaluated by occupational health doctor for the appropriate recommendation	
4.6 A company attempts to alter the job based on recommendations, and the supervisors and safety officers are aware of the need and make the changes as practical and appropriate as possible.	
4.7 A company advises and assists on compensation and vocational rehabilitation for employees who are unfit to work	
Domain 5 Occupational diseases management	
5.1 A company educates employees about their hazards and possible health risks and how to prevent and manage the risks	

OHS activities	Evaluation
5.2 A company set a system to trigger a screening for early detection of occupational or work-related diseases	
5.3 A company has a referral program to the specialist for employees with occupational diseases or injuries	
5.4 A company documents the referral	
5.5 A company provides information about compensation, or disabilities benefits to the employees	
5.6 A company provides an investigation report of occupational disease or injuries	
5.7 A company uses the investigation report to propose actions and act accordingly with follow-up inspection and evaluation of the changes	
5.8 A company reports cases in compliance with the local regulations	
5.9 A company has general screening questionnaires for screening and early detection of occupational diseases	
5.10 Supervisors are aware of the existing health hazard in the workplace	
Domain 6 First aid and medical emergency preparedness	
6.1 A company assigns first-aiders according to the local authorities	
6.2 A company trains first-aid practice to supervisors and employees	
6.3 The BLS trainers are qualified or certified for first-aid training	
6.4 A company observes and documents or records the training session, results, and evaluation of the first-aid training	
6.5 A company maintains readiness of the first-aid equipment and facilities	
6.6 A company has a referral system for emergency condition	
6.7 A company provides medical forms and contact people for referral system	
6.8 A company provides transportation with capabilities of transferring patients	
6.9 A company recognizes possible emergencies from workplace health hazards and make emergency plan accordingly	
6.10 A company provides appropriate PPE and treatment for the anticipated medical emergency	
6.11 A company assigns roles of Incident Command System and Emergency Operation Center to employers and employees	
6.12 A company exercises the emergency plan both discussions based, and operation based	
6.13 A company discusses and makes improvement of the plan after the exercise	
6.14 A company trains Basic life support to employees, annually	
6.15 A company has prepared a process of transferring emergency patients promptly.	

OHS activities	Evaluation
Domain 7. Health promotion	
7.1 The information providers are knowledgeable and qualified to give the information	
7.2 A company recognizes the health problems among the employees	
7.3. A company provides information about health promotion and wellness including non-occupational injury and illness management	
7.4 A company provides health promotion based on employees age group and common problems	
7.5 A company has intervention program to support employees' behavior changes	
7.6 A company evaluates employees after the program	

Statistical Results and Consensus Analysis of each item

Occupational health services activities

OHS activities	1 st round	2 nd round	Consensus
Domain 1 Policy management			
1.1 A company has a policy covering occupational health services	100	100	Yes
1.2 A company communicates the policy throughout the company	100	100	Yes
1.3 A company implements and plans activities according to the policy	100	100	Yes
1.4 A company has a committee overseeing the implementation of the policy	96.8	100	Yes
Domain 2 Fit for Work examination (FFW)			
2.1 Employees get FFW examination according to their job titles or similar exposure group (SEG) determined by occupational health physician	96.8	90.3	Yes
2.2 A company has jobs that qualify as safety sensitive job e.g. working in confined space, at heights, driver, or handling toxic, corrosive, or explosive materials that should have fit for work examination	93.6	96.8	Yes
2.3 Occupational health physicians conclude the FFW examination	100	100	Yes
2.4 A company shows evidence of a system for employees' health record keeping including informed consent from employees and accessibility control of the records	96.8	100	Yes
2.5 A company documents FFW examinations results and keeps them individually for further reference	96.8	100	Yes
2.6 Old – A company has special tests or functional capacity evaluations to evaluate the employees in the safety sensitive job Modify – A company requires specific testing, e.g. functional capacity evaluations (FCE) or trade test, to evaluate employees in the safety sensitive job	58.1	74.2	No
2.7 Old – A company reviews employee's immunization status (optional, used in company that requires immunization e.g. health services, food industry, or livestock industry) Old – A company provides fundamental and prophylaxis vaccinations to the non-immune employees (optional, used in company that requires immunization e.g. health services, food industry, or livestock industry)	77.4 74.2	96.8	Yes

OHS activities	1 st round	2 nd round	Consensus
Modify – Optional, a company reviews immunization status and provides prophylaxis vaccination for employees (health services, food industry, or livestock industry)			
Domain 3 Medical Surveillance Program			
3.1 A company shows evidence of a mechanism process to get hazard identification and health risk assessment	93.6	100	Yes
3.2 A company reviews all the information from the safety data sheet and industrial hygiene data	100	96.8	Yes
3.3 The medical surveillance team designs the medical surveillance program according to the result of hazard identification and health risk assessment	100	100	Yes
3.4 A company performs medical surveillance program regularly according to the health hazard	100	100	Yes
3.5 A company performs the medical examination in an appropriate location	96.8	100	Yes
3.6 Occupational physicians evaluate and interpret the results, correlating them with the exposure	100	100	Yes
3.7 A company reports the results to the employees	96.8	100	Yes
3.8 A company provides reconfirmation and diagnosis to employees with abnormal results	96.8	87.1	Yes
3.9 A company provides medical removal action and follow up examination in employees with abnormal results	96.8	93.6	Yes
3.10 A company reevaluates work environment and control measures	100	100	Yes
3.11 A company makes changes by hierarchy of control according to the information from the evaluation (from 3.10)	100	100	Yes
3.12 A company documents and keeps the examination results according to their health hazard exposure group for further reference	100	96.8	Yes
3.13 Old – A company has a team in designing the medical surveillance program Old – the team members consist of safety officer and occupational health professionals and industrial hygienist and production team representatives Modify – A company has a medical surveillance design team which should include at least: 1) human resources or safety officers, 2) occupational health professionals, and 3) supervisors	74.2 71.0	80.7	Yes

OHS activities	1 st round	2 nd round	Consensus
Domain 4 Return to work assessment (RTW)			
4.1 A company has documents indicating which conditions, diseases, or injuries to do RTW examination	90.3	87.1	Yes
4.2 A company evaluates individuals based on their health and psychosocial condition, medication, and job demand	96.8	100	Yes
4.3 The return-to-work evaluation is done based on scientific/relevant organization guidelines (e.g. AMA)	100	100	Yes
4.4 The physicians provide a Return-to-work certification with recommendation of job modification if necessary	100	96.8	Yes
4.5 Old – The return-to-work evaluation is done by occupational health physicians, or occupational health doctor, or employees' attending physicians Modify – The return-to-work evaluation can be done by employees' attending physicians but should be re-evaluate by occupational health doctor for the appropriate recommendation	77.4	87.1	Yes
4.6 Old – A company alters the job based on the recommendation Old – A company provides supervisor feedback after the job modification Modify –A company attempts to alter the job based on recommendations, and the supervisors and safety officers are aware of the need and make the changes as practical and appropriate as possible.	71.0 79.0	74.2	No
4.7 Old – A company provides information about vocational rehabilitation for employees unfit to work Old – A company provides information about compensation for employees who are unfit to work Modify – A company advice and assists on compensation and vocational rehabilitation for employee who are unfit to work	64.5 74.2	64.5	No
Domain 5 Screening, Diagnosis, and Treatment of occupational diseases			
5.1 A company educates employees about their hazards and possible health risks and how to prevent and manage the risks	96.8	100	Yes
5.2 A company set a system to trigger a screening for early detection of occupational or work-related diseases	96.8	100	Yes

OHS activities	1 st round	2 nd round	Consensus
5.3 A company has a referral program to the specialist for employees with occupational diseases or injuries	96.8	100	Yes
5.4 A company documents the referral	96.8	100	Yes
5.5 A company provides information about compensation, or disabilities benefits to the employees	100	100	Yes
5.6 A company provides an investigation report of occupational disease or injuries	100	100	Yes
5.7 The investigation report proposes preventive actions From previous activities, a company manages or changes according to the proposal From previous activities, a company has a follow-up inspection and evaluation of the changes Combining above activities A company uses the investigation report to propose actions and act accordingly with follow-up inspection and evaluation of the changes	100 100 100	96.8	Yes
5.8 A company reports cases in compliance with the local regulations	96.8	93.6	Yes
5.9 Old – A company has specific tests or questionnaires for screening and early detection for occupational diseases Old – A company has specific questionnaires for screening for specific hazard such as asbestos, lead, silica, pesticides, or confined space Modify – A company has general screening questionnaires for screening and early detection of occupational diseases	67.7 77.4	61.3	No
5.10 Old – A company assigns supervisors to be able to detect employees' health condition Modify – Supervisors are aware of the existing health hazard in the workplace	54.8	67.7	No
Domain 6 First aid and medical emergency preparedness			
6.1 A company assigns first-aiders according to the local authorities	96.8	96.8	Yes
6.2 A company trains first-aid practice to supervisors and employees	96.8	90.3	Yes
6.3 The BLS trainers are qualified or certified for first-aid training	100	96.8	Yes
6.4 A company observes and documents or records the training session, results, and evaluation of the first-aid training	100	96.8	Yes
6.5 A company maintains readiness of the first-aid equipment and facilities	100	96.8	Yes

OHS activities	1 st round	2 nd round	Consensus
6.6 A company has a referral system for emergency condition	100	100	Yes
6.7 A company provides medical forms and contact person for referral system	100	100	Yes
6.8 A company provides transportation with capabilities of transferring patients	93.6	93.6	Yes
6.9 A company recognizes possible emergencies from workplace health hazards and makes emergency plan accordingly	96.8	100	Yes
6.10 A company provides appropriate PPE and treatment for the anticipated medical emergency	100	100	Yes
6.11 A company assigns roles of Incident Command System and Emergency Operation Center to employers and employees	100	100	Yes
6.12 A company exercises the emergency plan both discussions based, and operation based	100	100	Yes
6.13 A company discusses and makes improvement of the plan after the exercise	100	100	Yes
6.14 A company trains Basic life support to employees, annually	67.7	74.2	No
6.15 Old – The available healthcare service is located within 10 Kms. Old – A company can transfer patients to the available healthcare service within 10 minutes Modify –A company sets guarantee duration for emergency conditions and can practice accordingly	58.1 61.3	77.4	No
Domain 7. Health promotion			
7.1 The information providers are knowledgeable and qualified to give the information	90.3	100	Yes
7.2 A company recognizes the health problems among the employees	93.6	90.3	Yes
7.3. A company provides information about health promotion and wellness including non-occupational injury and illness management	96.8	93.6	Yes
7.4 A company provides health promotion based on employees age group and common problems	90.3	80.7	Yes
7.5 A company evaluates employees after the program	74.2	58.1	No
7.6 A company has an intervention program to support employees' behavior changes	77.4	64.5	No