ISSN: 2345-2897; Health Education and Health Promotion. 2024;12(2):243-254. 6 10.58209/hehp.12.2.243





Prioritizing Occupational Safety, Health, and Wellbeing; An Analysis of Imperative Public **Health Trends**







ARTICLE INFO

Article Type

Systematic Review

Authors

Suharni S.1* MD

How to cite this article

Suharni S. Prioritizing Occupational Safety, Health, and Wellbeing; An Analysis of Imperative Public Health Trends. Health Education and Health Promotion. 2024;12(2):243-254.

¹Department of Public Health, Indonesian Muslim University. Makassar, Indonesia

*Correspondence

Address: Department of Public Health, Indonesian Muslim University, Jl. Urip Sumoharjo No.km.5, Panaikang, Kec. Panakkukang, Kota Makassar, Sulawesi Selatan, Indonesia. Postal Code: 90231

Phone: +62 882005596000 Fax: -

suharni.fachrin@umi.ac.id

Article History

Received: April 23, 2024 Accepted: June 16, 2024 ePublished: June 21, 2024

ABSTRACT

Aims The increased recognition of the significance of occupational safety and health in the workplace has attracted increasing attention in the field of public health. This study aimed to analyze recent trends in prioritizing worker safety, health, and well-being in the workplace, focusing on the connections between occupational safety and health and public health.

Information & Methods This systematic review employed a combined approach using the preferred reporting items for systematic reviews and meta-analyses model along with an analysis tool, VOSviewer, for a systematic review of the literature. The research process involved identifying search topics and pertinent keywords (such as occupational safety, health, well-being, and public health) and conducting a systematic literature search in the Scopus and SciSpace databases.

Findings A shift in awareness regarding occupational risks and their impact on mental and physical health was indicated. Moreover, the study underscored the significance of integrating occupational health with public health.

Conclusion The safety, health, and well-being of workers significantly influence not only individuals but also the overall welfare of society.

Keywords Occupational Safety; Health; Occupational Health; Public Health; Trends

CITATION LINKS

[1] Public, environmental, and occupational ... [2] A systematic review of literature ... [3] The transition from occupational safety and ... [4] Evaluating Oregon's occupational public ... [5] Occupational exposures and programmatic ... [6] Occupational health and safety practices ... [7] How client criminalisation under end-demand ... [8] FAnalysis of falls from height variables ... [9] Employee mental health during COVID-19 ... [10] Riskbased thinking as a basis for efficient ... [11] The use and perceived effectiveness of 48 ... [12] Health risks of polybrominated diphenyl ethers ... [13] Fatal occupational asthma in cannabis ... [14] Trends and opportunities of tertiary education ... [15] Barriers of occupational safety implementation ... [16] Re-thinking the mediating role of emotional valence ... [17] Relationship of occupational category with risk ... [18] Infection risks faced by public health laboratory ... [19] Understanding occupational safety and ... [20] Psychosocial risk prevention in a global ... [21] Improving working conditions to promote worker ... [22] Working in health and safety at work ... [23] HAZOP methodology based on the health ... [24] Healthy workplaces for a healthy ... [25] Perceptions and experiences of healthcare providers ... [26] A community-led mobile health clinic to improve ... [27] Trends in occupational infectious diseases ... [28] Health and safety practices and perceptions ... [29] Health care organization policies for employee ... [30] Projected health outcomes associated with 3 ... [31] Occupational and take-home lead exposure ... [32] Occupational health, public health ... [33] Considerations for incorporating "wellbeing" ... [34] What is sexual wellbeing and why does it matter ... [35] A study on occupational health ... [36] Exploration on the optimization of occupational ... [37] Occupational health could be the new ... [38] How are systematic reviews of prevalence conducted? ... [39] PRISMA reporting guidelines for meta-analyses ... [40] Preferred reporting items for systematic reviews ... [41] PRISMA 2020 explanation and elaboration: Updated ... [42] The continuing struggle between career civil servants and ... [43] Implementation of occupational safety and health ... [44] NIOSH risk-based model to resume field research ... [45] Bridging police work with the public health ... [46] Occupational safety and work-related injury ... [47] Firefighters as distributors of workplace ... [48] Who has higher willingness to pay for occupational ... [49] Representation of occupational information ... [50] Cancer prevention and worksite ...

Introduction

The increased recognition of the significance of occupational safety and health (OSH) in the workplace has garnered growing attention within the realm of public health [1, 2]. Workplace safety and health are no longer solely the responsibilities of individuals or organizations; they are also viewed as a public health necessity that profoundly influences the general well-being of society [3, 4]. Given the increasingly intricate shifts in the work environment, encompassing the impacts of globalization, technology, and economic dynamics, understanding the latest trends in OSH priorities is paramount [5]. OSH holds global significance, closely intertwined

OSH holds global significance, closely intertwined with the political, social, and economic landscapes of countries worldwide ^[6]. OSH stands as the culmination of workers' rights stemming from historical demands and struggles ^[7-9]. The nature of work acts as a crucial determinant affecting the human condition, quality of life, and health on a universal scale.

Work not only serves as a means of sustenance but also as a pathway to respect, integration, sociability, recognition, and the forging of bonds and friendships within society [10]. However, across the globe, the living conditions of workers are subject to the fluctuations of economic growth, industrialization, and periods of recession [11, 12]. Such variations often prompt governments to implement adjustment measures and enact financial cuts in various social sectors, including education, health, safety, transportation, housing, and employment [13].

Workers' endeavors to enhance OHS standards have a global impact, mirroring broader societal aspirations for dignity, fairness, and social justice [14, ^{15]}. The development of OSH policies and practices often originates from historical movements and labor activism aimed at securing fundamental rights and protections for workers worldwide [16]. Dealing with the intricacies of ensuring OSH on a global scale necessitates a comprehensive approach. This includes integrating legislative frameworks, robust enforcement mechanisms, employer accountability, worker empowerment, and public awareness campaigns [17, 18]. Furthermore, addressing systemic like income inequality, healthcare accessibility, and social protection is crucial for upholding the health and well-being of the global workforce. Initiatives to enhance OSH go beyond national borders, embodying universal aspirations for fair and inclusive progress [17-20]. This emphasizes the significance of collective action and cooperation among stakeholders to cultivate a culture of safety, respect, and dignity in workplaces worldwide.

Data from international organizations, such as the International Labour Organization (ILO), the World Health Organization (WHO), and the Organisation for Economic Co-operation and Development (OECD) offer a clear depiction of the extensive impact of

occupational accidents and diseases globally. According to a recent report by the ILO, by 2022, there will be an estimated 2.78 million deaths annually due to work-related accidents and diseases. This statistic underscores the significant level of risk encountered by workers across various sectors and countries. In 2020, the WHO also shared concerning data, noting that as many as 16% of all deaths among adults aged 15-29 years are attributed to accidents and diseases arising in the workplace [21]. This emphasizes that this productive age group faces the highest vulnerability to risks in work environments. Beyond the human toll, occupational accidents and diseases carry substantial economic repercussions, as highlighted by the OECD in 2021. The costs linked to workplace accidents and diseases have amounted to approximately 4% of gross domestic product (GDP) in OECD member nations. This figure encompasses not only direct expenses, like medical care and compensation but also indirect costs such as reduced productivity and the enduring impact on the economy.

Prioritizing OSH is a principle now acknowledged as a crucial component of corporate strategy [22, 23]. This is substantiated by findings from various studies confirming that companies emphasizing safety, health, and well-being in the workplace gain an edge in averting potential negative costs. These studies demonstrate that companies that effectively prioritize OSH are more adept at handling occupational risks, diminishing the occurrence of workplace accidents, and mitigating costs linked to employee injuries or illnesses.

An occupational safety, health, and welfare management system serves as a crucial foundation for this endeavor, offering a structured framework for identifying, evaluating, and managing workplace risks. Through the implementation of an effective OSH management system, companies can enhance worker well-being, mitigate the risk of accidents and injuries, and decrease costs associated with operational inefficiencies legal or Moreover, prioritizing OSH also yields a positive impact on overall corporate performance. Companies that prioritize OSH tend to excel in terms of work productivity and operational efficiency [24-31]. By fostering a safe, healthy, and conducive work environment, companies can enhance employee performance, reduce absenteeism, and optimize productivity and work quality. Additionally, by minimizing the risk of workplace injuries or accidents, companies can lower expenses related to workers' compensation, insurance, or equipment replacement [6]. Therefore, prioritizing OSH is not solely a moral obligation for companies but also a strategic investment that can yield long-term benefits for overall operations and corporate performance.

Worker health surveillance centers on establishing and analyzing indicators of diverse health-related parameters. This encompasses monitoring mortality rates, disability and employability, the occurrence of occupational diseases and injuries, and other work-related health conditions [29, 30]. Furthermore, surveillance involves tracking absenteeism, the manifestation of symptoms linked to occupational exposures, and even lifestyle factors that could influence workers' health. Through the collection and analysis of such data, health professionals and policymakers can pinpoint emerging trends, patterns, and risks that necessitate attention and intervention.

Several previous studies have demonstrated that occupational safety, health, and well-being are crucial components of public health, with recent trends emphasizing their interconnected nature. The evolving landscape of OSH highlights the significance of public health. Recent trends underscore the connections between public health and occupational health, emphasizing the necessity for collaborative frameworks involving primary healthcare providers in various contexts [32]. Well-being, often mentioned alongside health, lacks a clear definition in policy, hindering its practical implementation [33]. Emphasis on occupational health indicators [34] and the prioritization of OSH keywords [35] underscores the importance of these factors in the public health domain. Furthermore, the integration of occupational health with public health objectives in settings, like workplaces, schools, homes, and leisure activities [36] underscores the need for a collaborative framework to enhance the health of the working population and, consequently, the population at large. Additionally, research has highlighted the impact of economic growth objectives on the quality of individuals' occupational health, underscoring the importance of balancing safety and development for effective governance and high-quality economic progress [37]. Prioritizing safety, health, and well-being in the workplace is crucial for advancing health equity, population well-being, and sustainable economic development within the public health domain.

This research holds significant importance as worker safety and health are crucial aspects of establishing a safe and healthy working environment for all workers. With a growing awareness of work-related risks and their impact on mental and physical wellbeing, the necessity to emphasize this aspect has become increasingly urgent. Furthermore, by prioritizing the safety, health, and well-being of workers, this research also contributes to efforts aimed at fostering a healthier society overall. Recognizing the strong connections between worker well-being, productivity, business sustainability, and societal welfare amplifies the importance of this research. Additionally, the research addresses trends and shifts in the work environment, technology, and demographics. Our objective was to comprehend the latest trends and identify optimal approaches to

tackle emerging challenges, thereby ensuring that workers' safety, health, and well-being remain central to the sustainable development of society. Hence, this research is not only significant but also pertinent and supportive in laying a robust foundation for a safer, healthier, and more sustainable work environment for all. Taking into account the present global landscape, as well as alterations in regulations and technology, this research delves into how priorities regarding OSH have progressed, the driving forces behind these changes, and their implications on overall public health. Therefore, this study aimed to scrutinize current trends in prioritizing worker safety, health, and well-being in the workplace. This needs a thorough examination of recent policies, practices, and initiatives that advocate for worker safety, health, and well-being.

Information and Methods

This systematic review employed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) model and VOSviewer software. VOSviewer is a valuable tool for mapping and visualizing information networks derived from bibliometric data. Through the utilization of VOSviewer, this research could pinpoint and analyze patterns of keyword co-occurrence, author relationships, and institutional collaborations within the scientific literature under review.

Initially, a systematic review of the literature on worker safety, health, and well-being was carried out using the PRISMA model [38, 39]. The process involved identifying search topics and pertinent keywords (such as occupational safety, health, well-being, and public health) and conducting a systematic literature search in the Scopus and SciSpace databases. The study was confined to articles published between 2014 and 2024 to ensure a focus on current trends and recent advancements in the realm of worker safety, health, and welfare. Article selection was based on stringent inclusion and exclusion criteria, followed by data extraction from the chosen articles and subsequent analysis to pinpoint trends, key themes, and current research recommendations in the field of OSH. The authors specifically conducted data selection using the following formula:

(TITLE-ABS-KEY ("Occupational Safety") OR TITLE-ABS-KEY ("Occupational Health Well-being") AND TITLE-ABS-KEY ("Public Health") AND PUBYEAR>2014 AND PUBYEAR<2024 AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (PUBSTAGE, "final")) AND (LIMIT-TO (SRCTYPE, "j")) AND (LIMIT-TO (LANGUAGE, "English")) AND (LIMIT-TO (OA, "all")) AND (LIMIT-TO (SUBJAREA, "MEDI") OR LIMIT-TO (SUBJAREA, "SOCI") OR LIMIT-TO (SUBJAREA, "ENVI").

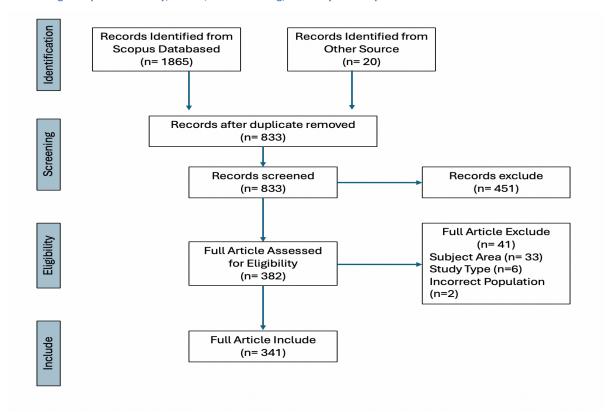


Figure 1. PRISMA flowchart of the literature research

Following the acquisition of relevant literature through the PRISMA model (Figure 1), the subsequent step involved conducting analysis using VOSviewer software. At this juncture, the most pertinent and frequently encountered keywords in the relevant literature were pinpointed for further examination [33, 40, 41]. VOSviewer was employed to scrutinize the co-occurrence among keywords, authors, and institutions associated with the research topic. This process aids in identifying relationships between key concepts in the literature and visualizing collaboration networks and research trends in the realm of worker safety, health, and wellbeing. By amalgamating the PRISMA model for a systematic review of the literature with an analytical tool like VOSviewer, this study offered a comprehensive comprehension of current trends in worker safety, health, and well-being and the contributions of scientific literature to this domain. This methodology not only assists in prioritizing efforts to enhance working conditions and worker health but also furnishes a robust foundation for shaping sustainable public health policies and interventions.

Findings

Trends in publication

Regarding the trend of research publications concerning "Occupational Safety," "Occupational Health Well-being," and "Public Health" from 2014 to 2024, there was a rise in the number of publications

over the period (Figure 2). This increase can be attributed to several factors influencing the dynamics of scientific publications. Firstly, the growing recognition of the significance of occupational safety, health, well-being, and overall public health has spurred increased interest in research related to these subjects. A rising number of researchers are delving into aspects linked to worker well-being and its broader societal impact. Secondly, augmented funding for research in this field has also played a crucial role in boosting the publication count. The additional resources available enable researchers to conduct more comprehensive and extensive studies on workplace safety and health issues.

Moreover, policy changes that prioritize OSH have served as another catalyst for the expansion of research in this domain. Regulatory and policy shifts encourage researchers to delve into issues concerning evolving work environments and practices. However, while the trend demonstrated an increase up to 2021, there was a decline in the number of publications from 2021 to 2024. This decline could be attributed to factors, such as shifting research priorities, fluctuations in funding, or a redirection of research focus towards other critical areas. Nevertheless, the role of public awareness, funding, and policy adjustments in fostering research growth in occupational safety, health, well-being, and public health more broadly remains a significant aspect of academic and practical advancements in the field.



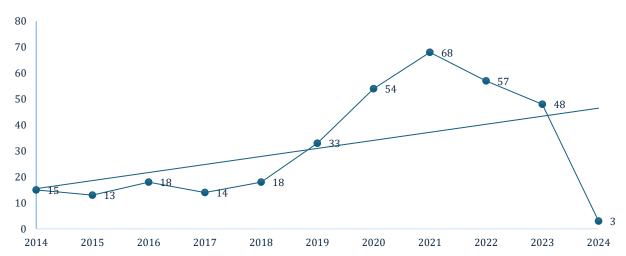


Figure 2. The trend in document publications from 2014 to 2024

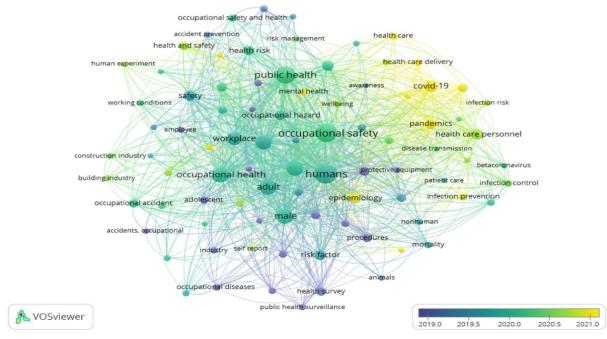


Figure 3. Network visualization map

The network visualization map offers a bibliometric analysis of publications from 2014 to 2024, focusing on terms associated with "Occupational Safety," "Occupational Health Welfare," and "Public Health" (Figure 3). The color gradient assigned to the nodes signifies the publication timeline, with each year within the specified period represented by a distinct color. Upon examining the map, several insights emerge. Firstly, the blue nodes, encompassing terms, like 'occupational safety and health,' 'working conditions,' 'workplace,' and 'employee,' exhibit a consistent emphasis in the literature, particularly before 2019. This indicates sustained interest and ongoing research in these areas leading up to that year. Furthermore, the green node denoting 'public health' displays a notable surge in publications around 2019. The proximity of 'public health' to

'occupational health' suggests interdisciplinary research between these fields during the specified period. Moreover, the emergence of yellow nodes highlighting terms, such as 'COVID-19,' 'pandemic,' 'healthcare workers,' and 'infection risk', signifies a rise in research concerning these topics from 2019 onwards. This surge was directly linked to the global COVID-19 pandemic, marking a significant shift in the literature toward understanding the pandemic's impact on occupational safety, health well-being, and public health. Additionally, as the color transitions from yellow to orange, terms, like 'infection prevention,' 'personal protective equipment,' and 'disease transmission' gain prominence, indicating an increased focus on strategies to mitigate infection risks in the workplace as a direct response to the pandemic.

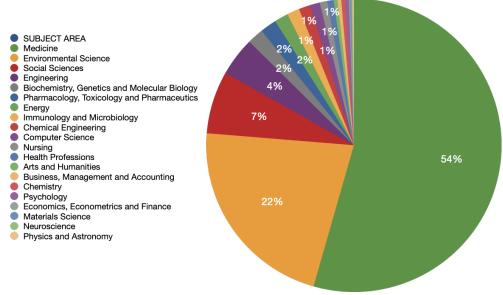


Figure 4. The trend in publications by subject area

Documents by country or territory

Compare the document counts for up to 15 countries/territories.

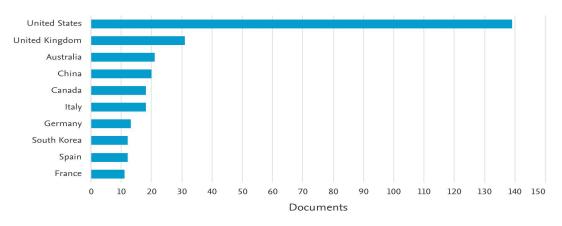


Figure 5. The trend in publications by country

Overall, this map illustrates the shifts observed in research focus and publication trends over time, particularly toward issues related to the pandemic and its implications for occupational and public health, driven by recent global events. The report also underscores the evolution of research priorities to address immediate issues stemming from the pandemic, such as workplace disease prevention and control, which received less emphasis before 2019. Regarding the identification of publication trend analysis by research subject area related to "Occupational Safety," "Occupational Health Wellbeing," and "Public Health" in 2014-2024, there was a significant increase in several key areas (Figure 4). Firstly, the field of nursing experienced the most substantial increase in publications, reaching 54% by 2024, indicating a heightened interest and research focus concerning OSH. Concurrently, the field of chemistry demonstrated the second-largest increase in publications, reaching 22% by 2024, underscoring

the significance of research in comprehending the interaction of chemicals with worker health. Conversely, the energy field exhibited the third largest increase in publications, reaching 7% by 2024, highlighting a research emphasis on addressing OSH issues within the energy sector. immunology, Fields. such as microbiology, biochemistry, genetics, and molecular biology each displayed a notable increase in publications by 2024, reflecting a keen interest in understanding infectious diseases and the mechanisms of work-related illnesses. Furthermore, the field of engineering also depicted a significant increase in publications, emphasizing the importance of developing technologies and solutions to enhance the safety and health of workers across various industrial sectors. disciplines, including social sciences, environmental sciences, pharmacology, toxicology, pharmacy, and psychology, also experienced an uptick in publications, showcasing the diverse range

of research efforts aimed at addressing various OSH challenges. Overall, this trend affirmed the increasing significance and widespread research endeavors in this domain to tackle diverse workplace health and safety challenges.

An analysis of research publication trends from 2014 2024 related to "Occupational Safety," "Occupational Health Well-being," and "Public Health" revealed a significant increase in certain countries. The United States ranked first with the highest number of publications in 2024, totaling 140 documents, affirming its position as a research leader in all three areas. In second place, the UK contributed 110 documents, underlining its significant role in research within this domain. Australia secured the third spot with 90 documents, showcasing its active engagement in related research. Moreover, China experienced a notable surge in publications, with a percentage increase of 133% by 2024, indicating a substantial uptick in research endeavors within the country. Similarly, Canada, Italy, Germany, and South Korea also demonstrated a significant increase in publications by 2024. Additionally, several other countries, such as Spain, France, Japan, the Netherlands, and Brazil observed an increase in publications, signifying the global proliferation of research in the realms of "Occupational Safety," "Occupational Health Well-being," and "Public Health" (Figure 5). Several factors influence research publication trends in a country, including adequate research funding, the availability of researchers, government policies supporting research, and national research priorities. Countries with higher research funding typically produce more research publications, as do countries with a larger pool of researchers. Supportive government policies can also stimulate an increase in publications. Furthermore, research priorities established by governments and research institutions can shape the nature of research undertaken and published. The trend analysis of research publications spanning the period

2014-2024 related to "Occupational Safety." "Occupational Health Well-being," and "Public Health," showed a notable increase across various journals, websites, and other sources (Figure 6). The International Journal of Environmental Research and Public Health emerged as the leading source with the highest number of publications in 2024, totaling 40 documents, solidifying its pivotal role in the field. Following closely was Safety Science with 35 documents and BMC Public Health with 30 documents in the same year, highlighting the substantial contributions of these journals to the advancement of research in this domain. Beyond journals, online platforms, like Melinta Therapeutics, Inc. and the University of California, Irvine witnessed a significant increase in 2024, underscoring the valuable contribution of digital sources in disseminating knowledge within the realms of "Occupational Safety," "Occupational Health Wellbeing," and "Public Health." Furthermore, several other sources, such as the National Institutes of Health (NIH), Centers for Disease Control and Prevention (CDC), and the World Health Organization (WHO) also experienced an uptick in publications, indicating their increasingly active involvement in related research endeavors.

Factors influencing the publication trend of a source include the quality of the published research, the reputation of the source, the research focus, and the publication policy. Sources that consistently publish high-quality research and hold a strong reputation in their respective fields generally produce more publications. Moreover, sources concentrating on research within the domains of "Occupational Safety," "Occupational Health Well-being," and "Public Health" typically exhibit higher publication rates in these specific areas. Transparent and accessible publication policies can also impact the volume of publications, facilitating broader dissemination of knowledge among the scientific community and relevant practitioners.

Documents per year by source

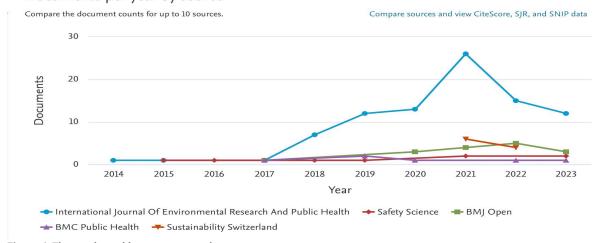


Figure 6. The trend in publications per year by source.

Table 1. Top ten articles addressing public health, occupational safety, and related topics adopted from Scopus, 2024

Author(s)	Title	Source	Year	Citations
Infante [42]	The continuing struggle between career civil servants and political appointees in the development of government public health standards	International Journal of Occupational and Environmental Health. 22(4);269-273.	2016	3
Fitrijaningsih <i>et al.</i> [43]	Implementation of occupational safety and health management system in the education sector	Indonesian Journal of Occupational Safety and Health. 12(3);363-371.	2023	0
Johns et al. [44]	NIOSH risk-based model to resume field research and public health service in 2020 during the COVID-19 pandemic	American Journal of Public Health. 112(8);1138-1141.	2022	0
Holzer [45]	Bridging police work with the public health domain: An occupational safety and health perspective	International Journal of Safety and Security Engineering. 10(5);579-587.	2020	2
Consunji et al. [46]	Occupational safety and work-related injury control efforts in Qatar: Lessons learned from a rapidly developing economy	International Journal of Environmental Research and Public Health. 17(18);6906.	2020	4
Keller & Cunningham [47]	Firefighters as distributors of workplace safety and health information to small businesses	Safety Science. 87;87-91.	2016	7
Li <i>et al</i> . ^[48]	Who has a higher willingness to pay for occupational safety and health? -Views from groups with different public identities and differences in attention	International Journal of Environmental Research and Public Health. 15(8);1667.	2018	3
Wang & Liao [16]	Re-thinking the mediating role of emotional valence and arousal between personal factors and occupational safety attention levels	International Journal of Environmental Research and Public Health. 18(11);5511.	2021	7
Rajamani <i>et al.</i> ^[49]	Representation of occupational information across resources and validation of the occupational data for the health model	Journal of the American Medical Informatics Association. 25(2);197- 205.	2018	9
Allweiss et al. [50]	Cancer prevention and worksite health promotion: Time to join forces	Preventing Chronic Disease. 11;E128.	2014	9

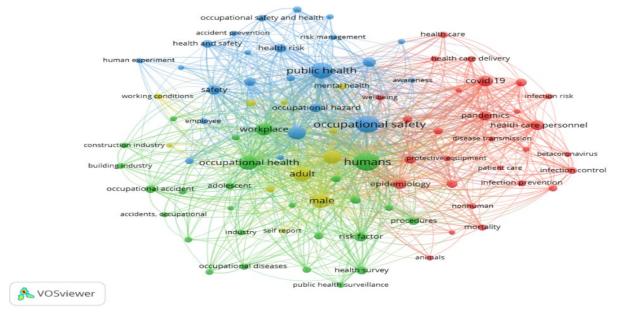


Figure 7. Network analysis

We found top articles addressing public health, occupational safety, and related topics (Table 1). These articles address significant issues, such as the conflict between career civil servants and political appointees in formulating government public health standards, the establishment of safety systems within the education sector, and NIOSH's risk model for sustaining field research and public health services amidst the COVID-19 pandemic. Furthermore, there were articles exploring the intersection of police work with public health, efforts for controlling workrelated injuries in Qatar as a case study of a growing economy, and the role of fire departments in workplace disseminating safety and

information to small businesses. The articles also shed light on the willingness to invest in workplace safety and health, as well as emotional factors influencing the attention given to safety measures. Encompassing publication years from 2014 to 2024, these articles offered comprehensive insights into pertinent aspects of public health and occupational safety.

The network visualization map showcases the relationships and co-occurrence of terms associated with "Occupational Safety," "Occupational Health and Well-being," and "Public Health" in research publications spanning from 2014 to 2024 (Figure 7). Nodes within the map symbolize the terms, with the

size of each node reflecting the frequency of the term's occurrence. Lines connecting the nodes signify relationships between terms, with the thickness of the lines indicating the strength of these connections.

Key trends based on network analysis

- 1. Integration of occupational health and public health: The map revealed a robust connection between occupational safety and public health, signifying a research trend that acknowledges the intersection of workplace health with the broader public health landscape. This is underscored by the central positioning of terms, like "workplace," "occupational health," and "public health."
- 2. Focus on human factors: Clear clusters around terms, such as "human," "adult," "male," and "occupational health" indicated a focus on human factors within occupational health research, exploring demographic-specific issues or the effects of work on particular groups.
- 3. Increased pandemic-related research: The notable presence of terms, like "COVID-19," "pandemic," "infection risk," and "healthcare workers" in reddish color showed a surge in research in these areas since approximately 2019. The pandemic has evidently become a primary focus of recent research, influencing discussions in occupational safety and health.
- 4. Healthcare and disease transmission: Terms related to healthcare and disease transmission, such as "healthcare," "disease transmission," "protective equipment," and "infection prevention," were closely linked and have gained prominence in recent years due to the necessity for enhanced health and safety measures amid the pandemic.

- 5. Work-related risk and prevention: Terms, like "accident prevention," "risk management," "occupational hazards," and "safety" were interconnected, indicating a sustained research interest in understanding and mitigating workplace risks
- 6. Mental health and well-being: The inclusion of "mental health" and "well-being" acknowledged the psychological aspects of occupational health, although these terms appeared slightly less central than others, suggesting potential for increased emphasis in future research.
- 7. Industry and accidents: Terms, like "construction industry," "building industry," and "workplace accidents" were linked, highlighting a focus on industries with elevated safety risks and the necessity for industry-specific safety research.

Overall, the data indicated a strong and dynamic body of research prominently shaped by the repercussions of COVID-19 on occupational safety and public health. There were signs of a holistic approach to occupational health encompassing physical, mental, and environmental factors, with a notable emphasis on comprehending and addressing challenges stemming from the pandemic. The ongoing interaction between occupational and public health, with an emphasis on preventing and addressing health risks in the workplace, emerged as a significant research trend during this period.

Gap analysis

The density visualization generated by VOSviewer offers insights into the clustering of research topics related to "Occupational Safety," "Occupational Health and Well-being," and "Public Health" from 2014 to 2024 (Figure 8).

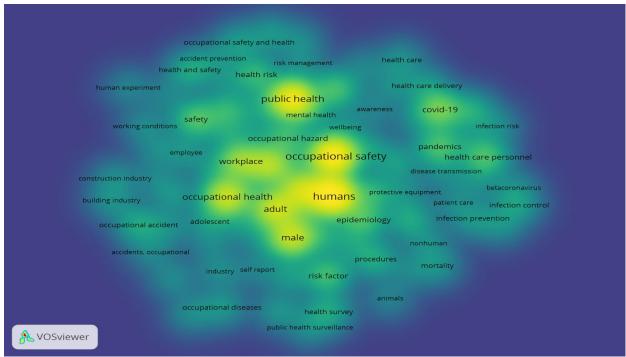


Figure 8. Density analysis

Utilizing a range of colors, this visualization emphasized the density of terms, with yellow denoting higher density or stronger relationships between terms.

At the core of the cluster, terms, like "occupational health," "human," "adult," "male," and "workplace" were distinctly highlighted in shades of yellow to their indicating prevalence interconnectedness within the research domain. This underscores significant emphasis comprehending the direct influence of occupational health on various demographic groups in work settings. On the right side of the map, COVID-19related terms, such as "COVID-19," "pandemic," "health workers," and "disease transmission" were portrayed in shades of yellow, signifying the upsurge in research in response to the ongoing pandemic. This underscores a notable trend in the literature focusing on the repercussions of COVID-19 on public health and occupational health. Peripheral topics, such as "construction industry," "building industry," and "occupational accidents" were depicted in hues of blue to green, indicating their presence in the research landscape while suggesting they were not closely linked to the central topics of current interest. Identifying research gaps

- 1. Industry-specific occupational health: The less dense areas surrounding the "construction industry" and "building industry" could suggest a research gap in addressing occupational safety and health within these sectors specifically.
- 2. Human experiments in occupational health: "Human experiment" positioned on the left side of the map, distanced from the central cluster, may indicate a gap in empirical studies or experimental research within occupational health settings.
- 3. Mental health and well-being: While "mental health" and "well-being" are present, they exhibited lower density compared to "occupational health" and "COVID-19". This observation could imply a necessity for further research on the psychological aspects of occupational health and their correlation with overall well-being, particularly in the context of the pandemic.
- 4. Long-term pandemic impact: Despite a focus on the immediate effects of COVID-19, there might be a requirement for additional studies on the enduring impact of the pandemic on occupational safety and health practices.
- 5. Aging workforce: The emphasis on "adult" and "male" may indicate a need for more inclusive research that considers the aging workforce and gender disparities in occupational health.
- 6. Emerging risks and protective measures: Given the ongoing pandemic, research may need to concentrate more on emerging occupational hazards and the efficacy of new protective measures and protocols.

In conclusion, while the visualization illustrated a substantial amount of research on occupational safety and health, particularly concerning the COVID-

19 pandemic, there were clear indications of areas that may warrant further attention. These areas included industry-specific safety concerns, the enduring effects of the pandemic, mental health and well-being in the workplace, and the requirements of a diverse and aging workforce.

Discussion

This study aimed to scrutinize current trends in prioritizing worker safety, health, and well-being in the workplace. The findings underscored the significance of OSH in enhancing individual well-being and the broader health of society. The increasing awareness and prioritization of OSH signify a growing recognition of workplace hazards and their extensive societal impact. The integration of occupational health into the public health framework represents a significant advancement that promotes a holistic approach to worker well-being.

In comparison with prior studies, there was a consistent emphasis on the connections between occupational health and public health. For instance, the study by Rinsky *et al.* [31] underscores the fundamental link between occupational health and public health, suggesting that enhancements in worker health directly contribute to community health outcomes. Similarly, Schulte *et al.* [33] emphasize the necessity of incorporating well-being into public policies for the workplace, advocating for comprehensive strategies that address both the physical and mental health aspects of workers.

Our findings align with trends identified in recent research. Magalhães *et al.* [35] observed a rise in research publications concentrating on OSH, propelled by heightened public awareness and policy modifications. This trend is mirrored in our data, showcasing an uptick in publications on OHS topics from 2014 to 2024, reaching a peak during global events like the COVID-19 pandemic. The pandemic, in particular, has expedited research on infection prevention and the utilization of personal protective equipment, underscoring a shift in research priorities toward immediate workplace health challenges.

Moreover, our study unveiled that despite a notable increase in OHS-related publications, the recent decline from 2021 to 2024 may suggest a shift in research priorities or a reallocation of funds. This observation resonates with the discoveries of Kiran [37], who highlighted that economic fluctuations and alterations in the policy landscape frequently redirect focus from established research areas toward emerging issues.

In conclusion, the incorporation of occupational health into broader public health strategies remains crucial for establishing sustainable and healthy work environments. Sustained attention to evolving workplace dynamics, technological advancements, and shifting demographics is vital for upholding and enhancing worker safety and health. This research

not only enriches the existing knowledge base but also lays a robust groundwork for future policy formulation and interventions aimed at enhancing global OSH standards.

To ensure sustained enhancements in OHS standards. policymakers should embrace a holistic approach that integrates OHS into broader public health strategies. This entails considering the physical and mental well-being of workers, alongside addressing workplace dynamics and technological advancements. Continuous research and adaptation are crucial for tackling emerging workplace health challenges, necessitating the reallocation of funds and resources to areas of immediate concern, such as infection prevention during a pandemic while maintaining a focus on long-term OHS priorities. Improving OHS standards directly influences public health outcomes. By enhancing worker health, we can cultivate healthier communities, underscoring the extensive benefits of robust OHS practices. Future research should persist in exploring the connections between occupational health and public health, concentrating on the evolving needs of the workforce, which include addressing changing demographics, technological progress, and the impact of global events on workplace health.

Examination of recent trends highlights the evolving priorities concerning OSH, with a growing recognition of work-related risks and their effects on mental and physical health. Additionally, this research emphasized the significance of integrating occupational health with public health and the necessity of focusing on human factors to cultivate a safe and healthy work environment.

Conclusion

The safety, health, and well-being of workers significantly influence not only individuals but also the overall welfare of society.

Acknowledgments: Nothing declared by the author.

Ethical Permissions: Nothing declared by the author.

Conflicts of Interests: Nothing declared by the author.

Authors' Contribution: Suharni S (First Author),
Introduction Writer/Methodologist/Main
Researcher/Discussion Writer/Statistical Analyst (100%)

Funding/Support: Nothing declared by the author.

References

- 1- Sweileh WM, Zyoud SH, Al-Jabi SW, Sawalha AF. Public, environmental, and occupational health research activity in Arab countries: Bibliometric, citation, and collaboration analysis. Arch Public Health. 2015;73(1):1.
- 2- Bentley T, Onnis LA, Vassiley A, Farr-Wharton B, Caponecchia C, Andrew C, et al. A systematic review of literature on occupational health and safety interventions for older workers. Ergonomics. 2023;66(12):1968-83.
- 3- Micheli GJL, Cagno E, Calabrese A. The transition from occupational safety and health (OSH) interventions to OSH outcomes: An empirical analysis of mechanisms and contextual factors within small and medium-sized

- enterprises. Int J Environ Res Public Health. 2018;15(8):1621.
- 4- Yang L, Weston C, Cude C, Kincl L. Evaluating Oregon's occupational public health surveillance system based on the CDC updated guidelines. Am J Ind Med. 2020;63(8):713-25.
- 5- Murphy DL, Barnard LM, Drucker CJ, Yang BY, Emert JM, Schwarcz L, et al. Occupational exposures and programmatic response to COVID-19 pandemic: An emergency medical services experience. Emerg Med J. 2020;37(11):707-13.
- 6- Debela MB, Deyessa N, Begosew AM, Azage M. Occupational health and safety practices and associated factors among workers in Ethiopia's Metehara and Wonji sugar industries: A convergent parallel mixed design. BMJ Open. 2023;13(2):e065382.
- 7- McDermid J, Murphy A, McBride B, Wu S, Goldenberg SM, Shannon K, et al. How client criminalisation under enddemand sex work laws shapes the occupational health and safety of sex workers in Metro Vancouver, Canada: A qualitative study. BMJ Open. 2022;12(11):e061729.
- 8- Rey-Merchán MC, Gómez-De-gabriel JM, López-Arquillos A, Choi SD. Analysis of falls from height variables in occupational accidents. Int J Environ Res Public Health. 2021;18(24):13417.
- 9- Chen Y, Ingram C, Downey V, Roe M, Drummond A, Sripaiboonkij P, et al. Employee mental health during COVID-19 adaptation: Observations of occupational safety and health/human resource professionals in Ireland. Int J Public Health. 2022;67:1604720.
- 10- Rudakov M, Gridina E, Kretschmann J. Risk-based thinking as a basis for efficient occupational safety management in the mining industry. Sustainability. 2021;13(2):470.
- 11- Van Kampen J, Lammers M, Steijn W, Guldenmund F, Groeneweg J. What works in safety. The use and perceived effectiveness of 48 safety interventions. Saf Sci. 2023;162:106072.
- 12- Ohajinwa CM, Van Bodegom PM, Osibanjo O, Xie Q, Chen J, Vijver MG, et al. Health risks of polybrominated diphenyl ethers (PBDEs) and metals at informal electronic waste recycling sites. Int J Environ Res Public Health. 2019;16(6):906.
- 13- Weaver VM, Hua JT, Fitzsimmons KM, Laing JR, Farah W, Hart A, et al. Fatal occupational asthma in cannabis production-Massachusetts, 2022. MMWR Morb Mortal Wkly Rep. 2023;72(46):1257-61.
- 14- Laciok V, Sikorova K, Fabiano B, Bernatik A. Trends and opportunities of tertiary education in safety engineering moving towards safety 4.0. Sustainability. 2021;13(2):524. 15- Abu Aisheh YI, Tayeh BA, Alaloul WS, Jouda AF. Barriers of occupational safety implementation in infrastructure projects: Gaza strip case. Int J Environ Res Public Health. 2021;18(7):3553.
- 16- Wang J, Liao PC. Re-thinking the mediating role of emotional valence and arousal between personal factors and occupational safety attention levels. Int J Environ Res Public Health. 2021;18(11):5511.
- 17- Ahn J, Kim NS, Lee BK, Park J, Kim Y. Relationship of occupational category with risk of physical and mental health problems. Saf Health Work. 2019;10(4):504-11.
- 18- Wong CK, Tsang DNC, Chan RCW, Lam ETK, Jong KK. Infection risks faced by public health laboratory services teams when handling specimens associated with coronavirus disease 2019 (COVID-19). Saf Health Work. 2020;11(3):372-7.

- 19- Yang L, Branscum A, Kincl L. Understanding occupational safety and health surveillance: Expert consensus on components, attributes and example measures for an evaluation framework. BMC Public Health. 2022;22(1):498.
- 20- Chirico F, Heponiemi T, Pavlova M, Zaffina S, Magnavita N. Psychosocial risk prevention in a global occupational health perspective. A descriptive analysis. Int J Environ Res Public Health. 2019;16(14):2470.
- 21- Sorensen G, Peters S, Nielsen K, Nagler E, Karapanos M, Wallace L, et al. Improving working conditions to promote worker safety, health, and wellbeing for low-wage workers: The workplace organizational health study. Int J Environ Res Public Health. 2019;16(8):1449.
- 22- Lancman S, Bruni MT, Giannini R, Sales VB, Barros JO. Working in health and safety at work: Reflections on the construction of an integrated policy. Ciencia & Saude Coletiva. 2022;27(11):4265-76.
- 23- Choi JY, Byeon SH. HAZOP methodology based on the health, safety, and environment engineering. Int J Environ Res Public Health. 2020;17(9):3236.
- 24- The Lancet Public Health. Healthy workplaces for a healthy living. Lancet Public Health. 2022;7(9):e725.
- 25- Shahil Feroz A, Pradhan NA, Hussain Ahmed Z, Shah MM, Asad N, Saleem S, et al. Perceptions and experiences of healthcare providers during COVID-19 pandemic in Karachi, Pakistan: An exploratory qualitative study. BMJ Open. 2021;11(8):e048984.
- 26- Guillot-Wright S, Farr NM, Cherryhomes E. A community-led mobile health clinic to improve structural and social determinants of health among (im) migrant workers. Int J Equity Health. 2022;21(1):58.
- 27- Shin S, Yoon WS, Byeon SH. Trends in occupational infectious diseases in South Korea and classification of industries according to the risk of biological hazards using k-means clustering. Int J Environ Res Public Health. 2022;19(19):11922.
- 28- Crizzle AM. Health and safety practices and perceptions of COVID-19 in long-haul truck drivers. J Occup Environ Med. 2022;64(2):173-8.
- 29- Siddique S, Rice S, Bhardwaj M, Gore R, Coupal H, Punnett L. Health care organization policies for employee safety and COVID-19 pandemic response: A mixed-methods study. J Occup Environ Med. 2023;65(1):1-9.
- 30- Gaffney A, Himmelstein DU, Dickman S, Myers C, Hemenway D, McCormick D, et al. Projected health outcomes associated with 3 us supreme court decisions in 2022 on COVID-19 workplace protections, handgun-carry restrictions, and abortion rights. JAMA Netw Open. 2023;6(6):e2315578.
- 31- Rinsky JL, Higgins S, Angelon-Gaetz K, Hogan D, Lauffer P, Davies M, et al. Occupational and take-home lead exposure among lead oxide manufacturing employees, North Carolina. Public Health Rep. 2018;133(6):700-6.
- 32- Quinn MM. Occupational health, public health, worker health. Am J Public Health. 2003;93(4):526.
- 33- Schulte PA, Guerin RJ, Schill AL, Bhattacharya A, Cunningham TR, Pandalai SP, et al. Considerations for incorporating "well-being" in public policy for workers and workplaces. Am J Public Health. 2015;105(8):e31-44.
- 34- Mitchell KR, Lewis R, O'Sullivan LF, Fortenberry JD. What is sexual wellbeing and why does it matter for public health? Lancet Public Health. 2021;6(8):e608-13.

- 35- Magalhães LMCA, Silva Costa KT, Capistrano GN, Leal MD, De Andrade FB. A study on occupational health and safety. BMC Public Health. 2022;22:2186.
- 36- Wang Q, Liu Q, Zhu T. Exploration on the optimization of occupational injury and employment protection of takeout workers in the context of public health. Front Public Health. 2023;11:1115128.
- 37- Kiran S. Occupational health could be the new normal challenge in the trade and health cycle: Keywords analysis between 1990 and 2020. Saf Health Work. 2021;12(2):272-6.
- 38- Borges Migliavaca C, Stein C, Colpani V, Barker TH, Munn Z, Falavigna M, et al. How are systematic reviews of prevalence conducted? A methodological study. BMC Med Res Methodol. 2020;20(1):96.
- 39- Arya S, Kaji AH, Boermeester MA. PRISMA reporting guidelines for meta-analyses and systematic reviews. JAMA Surg. 2021;156(8):789-90.
- 40- O'Dea RE, Lagisz M, Jennions MD, Koricheva J, Noble DWA, Parker TH, et al. Preferred reporting items for systematic reviews and meta-analyses in ecology and evolutionary biology: A PRISMA extension. Biol Rev. 2021;96(5):1695-722.
- 41- Page MJ, Moher D, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. PRISMA 2020 explanation and elaboration: Updated guidance and exemplars for reporting systematic reviews. BMJ. 2021;372:n160.
- 42- Infante PF. The continuing struggle between career civil servants and political appointees in the development of government public health standards. Int J Occup Environ Health. 2016;22(4):269-73.
- 43- Fitrijaningsih F, Purnamawati D, Srisantyorini T, Baktiasyah A, Triyono A. Implementation of occupational safety and health management system in the education sector. Indones J Occup Saf Health. 2023;12(3):363-71.
- 44- Johns DO, Yeoman KM, Harney JM, Howard J, Poplin GS. NIOSH risk-based model to resume field research and public health service in 2020 during the COVID-19 pandemic. Am J Public Health. 2022;112(8):1138-41.
- 45- Holzer M. Bridging police work with the public health domain: An occupational safety and health perspective. Int J Saf Secur Eng. 2020;10(5):579-87.
- 46- Consunji RJ, Mehmood A, Hirani N, El-Menyar A, Abeid A, Hyder AA, et al. Occupational safety and work-related injury control efforts in Qatar: Lessons learned from a rapidly developing economy. Int J Environ Res Public Health. 2020;17(18):6906.
- 47- Keller BM, Cunningham TR. Firefighters as distributors of workplace safety and health information to small businesses. Saf Sci. 2016;87:87-91.
- 48- Li S, Chen H, Huang X, Long R. Who has higher willingness to pay for occupational safety and health? Views from groups with different public identities and differences in attention. Int J Environ Res Public Health. 2018;15(8):1667.
- 49- Rajamani S, Chen ES, Lindemann E, Aldekhyyel R, Wang Y, Melton GB. Representation of occupational information across resources and validation of the occupational data for health model. J Am Med Inform Assoc. 2018;25(2):197-205. 50- Allweiss P, Brown DR, Chosewood LC, Dorn JM, Dube S, Elder R, et al. Cancer prevention and worksite health promotion: Time to join forces. Prev Chronic Dis. 2014;11:E128.