

REVIEW

Occupational Safety and Health Challenges Among Ageing Population in Asia

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ABSTRACT

The ageing workforce in Asia presents significant occupational safety and health (OSH) challenges, necessitating a comprehensive understanding of the risks, interventions, and policy responses. As demographic shifts lead to an increasing number of older workers remaining in employment, age-related physical, psychological, and social factors impact their workplace safety and well-being. This systematic review explores the primary OSH challenges faced by ageing workers across various industries in Asia, including physical vulnerabilities, cognitive decline, and socioeconomic constraints. Our systematic search of electronic databases yielded 19 relevant studies, which were analyzed to evaluate the extent of OSH risks and the effectiveness of workplace interventions. Findings indicate that musculoskeletal disorders, reduced adaptability to technological advancements, and social stigma related to ageing significantly affect older workers. The review highlights the need for age-sensitive workplace modifications, ergonomic interventions, mental health support, and inclusive OSH policies tailored to the needs of ageing workers. Successful initiatives in Japan and Singapore demonstrate the potential benefits of structured workplace adaptations and policy reforms. The study underscores the urgency of implementing targeted strategies to promote safer, healthier, and more productive work environments for older workers in Asia.

Keywords: Ageing, Asian Elderly, Asian Population, Occupational Safety and Health in Asia, Wellbeing

ÖZET

Asya'da yaşlanan işgücü, risklerin, müdahalelerin ve politika yanıtlarının kapsamlı bir şekilde anlaşılmasını gerektiren önemli iş sağlığı ve güvenliği (İSG) zorlukları ortaya koymaktadır. Demografik değişimler, istihdamda kalan yaşlı işçi sayısının artmasına yol açarken, yaşa bağlı fiziksel, psikolojik ve sosyal faktörler işyeri güvenliğini ve refahını etkilemektedir. Bu sistematik inceleme, Asya'daki çeşitli sektörlerde yaşlanan işçilerin karşılaştığı fiziksel hassasiyetler, bilişsel gerileme ve sosyo-ekonomik kısıtlamalar da dahil olmak üzere başlıca İSG zorluklarını araştırmaktadır. Çalışmamızda elektronik veri tabanlarından İSG risklerinin kapsamını ve işyeri müdahalelerinin etkinliğini değerlendirmek üzere 19 ilgili çalışma tespit edilerek analiz edilmiştir. Bulgular, kas-iskelet sistemi rahatsızlıklarının, teknolojik gelişmelere uyum sağlama kabiliyetinin azalmasının ve yaşlanmaya bağlı sosyal damgalanmanın yaşlı çalışanları önemli ölçüde etkilediğini göstermektedir. İnceleme, yaşa duyarlı işyeri modifikasyonları, ergonomik müdahaleler, ruh sağlığı desteği ve yaşlanan çalışanların ihtiyaçlarına göre uyarlanmış kapsayıcı İSG politikalarına duyulan ihtiyacı vurgulamaktadır. Japonya ve Singapur'daki başarılı girişimler, yapılandırılmış işyeri uyarlamalarının ve politika reformlarının potansiyel faydalarını göstermektedir. Çalışma, Asya'daki yaşlı çalışanlar için daha güvenli, daha sağlıklı ve daha üretken çalışma ortamlarını teşvik etmek için hedeflenen stratejilerin uygulanmasının aciliyetinin altını çizmektedir.

Anahtar kelimeler: Yaşlanma, Asyalı Yaşlılar, Asyalı Nüfus, Asya'da İş Sağlığı ve Güvenliği, Refah

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INTRODUCTION

The ageing population represents one of the most significant demographic shifts globally, and it presents unique challenges for occupational safety and health (OSH). According to the World Health Organization (WHO), the proportion of people aged 60 and older will nearly double by 2050, reaching about 2.1 billion (1). This shift has a profound impact on the workforce, as older workers are staying employed for longer periods, either out of choice or necessity. Consequently, addressing occupational safety and health issues specific to this demographic has become an urgent priority (2). Elderly workers face higher risk of sustaining injuries at work compared to their younger counterparts (3). Moreover, fatal workplace accidents are more prevalent among older workers, with rates rising with age (4).

OSH is a critical concern globally, as it seeks to protect workers from hazards and risks associated with their jobs. As the global population ages, a growing segment of the workforce now comprises elderly individuals, the definition of "older adult" varies, depending on different perspectives and purposes, but generally includes individuals aged 60 and above, with subgroups such as "younger old" (ages 65-75), "older-old" (ages 75-85), and "oldest old" (ages 85+) (5).

As the world progresses towards more advanced industrial practices, the emerging challenges of Industry 4.0, characterized by increased automation and digitization, introduce new risks for older workers. Addressing these concerns requires the implementation of comprehensive and inclusive occupational safety policies, ergonomic workplace designs, and age-friendly interventions. By recognizing the occupational safety and health challenges facing the ageing population, organizations can foster a safer and healthier work environment that promotes active ageing, reduces injury rates, and maintains productivity among older workers (6).

In Asia, which has one of the most rapidly aging populations in the world, the issue is particularly pressing. It is reported that by 2030, the Asian continent would be the region with the largest elderly population in the world exceeding 4.9 billion, significantly impacting the workforce structure (7). Countries like Japan, South Korea, China, and Singapore are already experiencing the effects, as their older populations grow and the need for a sustainable workforce increases (8). Ensuring occupational safety and health for this age group is vital not only for their well-being but also for maintaining productivity and economic growth in the region (9).

Asia's demographic profile is diversifying as a result of the region's dual trends: while the number of elderly people is rising in several Asian nations, other Asian nations are seeing the opposite trend. This dynamic is pressing not just in the field of OSH, but also in the domain of health and safety at work, and it has a significant impact on the workforce (10).

People are more prone to have physical changes as they age, which makes it harder for them to complete tasks in a safe manner for the company. On the other hand, senior workers may have a larger probability of experiencing some health problems or injuries, which implies that it is also difficult to prevent their own OSH issues (11). As the number of older workers has increased and the need for age-friendly policies and environments has grown, the study of OSH issues among ageing workers is a recent field that has attracted a lot of attention (12). Although the field of OSH publishing is vibrant, the writers have not yet addressed any specific problems encountered by older Asian workers. The aim of this systematic review is to address the lack of research on relevant topics described above by examining the primary OSH challenges faced by older workers in various Asian sectors.

MATERIALS AND METHODS

To perform a robust systematic review, a well-planned search strategy is employed that will involve searching through various databases in order to pinpoint the vital

literature. We use electronic databases like PubMed, Scopus, Science Direct, and Emerald to conduct a systemic search of the literature using a combination of keywords search as well as Medical Subject Headings (MeSH) terms related to occupational safety and health, an ageing workforce, and Asian countries. Apart from that, published articles relevant to the review are searched manually in association with reference lists of included studies so that potential studies that might have been missed in the electronic database search are not turned away.

Studies are included in the review if they meet the following criteria: 1) A thematic issue on occupational safety and health of the ageing workers in Asia is chosen for the project, 2) different quantitative, qualitative, or mixed-methods design are employed for the project, and 3) project material is provided in English. Studies which do not meet the above-mentioned criteria, such as those limiting themselves to non-Asian populations or particular topics are not considered. Moreover, there will be no limitation on the publication date as the aim is for an up-to-date summary of the existing issues.

The reviewer will conduct the data abstraction consisting of information retrieval from the included studies into a standardized form. Formed data will be study characteristics, sampling design specifications and research objectives including the methods used: author(s), publication year, study design (such as randomized controlled trial, quasi-experimental design, case studies), participant

characteristics, main barrier to OSH associated with occupation and norms, culture and socio-demographic determinants. If a disagreement arises in the data extraction process, the two reviewers will settle it by discussion and achieving agreement among them.

The quality of studies will be the methodologic one, particularly using the tools necessary for the type of study. In terms of the JBI critical appraisal tools that is used for the quantitative section, the JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies or any other applicable JBI appraisal checklist is employed. Qualitative studies shall be assessed by employing the JBI Critical Appraisal Checklist, which is designated for Qualitative Research. Mixed-methods studies will be evaluated by using the MMAT suggested by the Mixed Methods Appraisal Tool. Studies are grouped according to their methodological quality, and the findings of the lower-grade studies will be interpreted more cautiously while taking into account during the synthesis of results.

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines are applied as they are used to ensure that the systematic review and meta-analysis process is systematic and has high reporting quality. The PRISMA flow diagram will be utilized in visualizing the selection process and the PRISMA checklist will be used to the purpose of the application of reporting guidelines.

Research Questions

RQ1: What are the main occupational safety and health challenges experienced by ageing workers in various industries across Asia?

RQ2: How do cultural and socioeconomic factors influence the occupational safety and health experiences of ageing workers in Asian countries?

RQ3: What evidence exists regarding the effectiveness of interventions aimed at improving occupational safety and health outcomes for ageing workers in Asia?

Search Strategy

The search strategy is designed to encompass a wide range of databases and sources to ensure the inclusivity and comprehensiveness of the review. Electronic databases such as PubMed, Scopus, Science Direct and Emerald will be systematically searched using a combination of keywords and Medical Subject Headings (MeSH) terms related to occupational safety and health, ageing workers, and Asian countries. The search terms are tailored to the specific requirements and syntax of each database, and Boolean operators (AND, OR) will be used to combine search terms effectively. Additionally, the reference lists of included studies and relevant review articles are manually searched to identify any additional studies that may have been missed in the electronic database search.

Study Selection Criteria

Studies will be selected for inclusion in the review based on predefined criteria designed to ensure relevance and methodological rigor. The following inclusion criteria will be applied:

- Focus on occupational safety and health challenges among ageing workers in Asian countries.
- Employ quantitative, qualitative, or mixed-methods research designs.
- Written in English.

Studies that meet these criteria will be included in the review, while those that do not will be excluded. Exclusion criteria may include studies focusing solely on non-Asian populations, unrelated topics, or those with insufficient methodological rigor. This review included only peer-reviewed journal articles and conference proceedings. Grey literature, such as government reports, dissertations, and preprints, was excluded to ensure methodological rigor and consistency in the quality of the selected studies. No restrictions will be placed on publication date to ensure a

comprehensive synthesis of the available evidence. Any discrepancies in study selection will be resolved through discussion and consensus between the reviewers.

RESULTS

The included studies varied in methodology, geographical coverage, and focus areas within OSH challenges among ageing workers in Asia. A summary of study characteristics is provided in Table 1. Study Designs: The review included meta-analyses (n=2), literature reviews (n=3), scoping reviews (n=2), case studies (n=3), cross-sectional studies (n=4), mixed-methods research (n=3), and intervention studies (n=2). Geographical Scope: The majority of studies focused on East Asia (e.g., Japan, China, South Korea), followed by Southeast Asia (e.g., Singapore, Thailand, Malaysia, Vietnam) and South Asia (e.g., India, Bangladesh). Occupational Sectors: Studies primarily examined OSH challenges in manufacturing, construction, healthcare, transportation, and service industries.

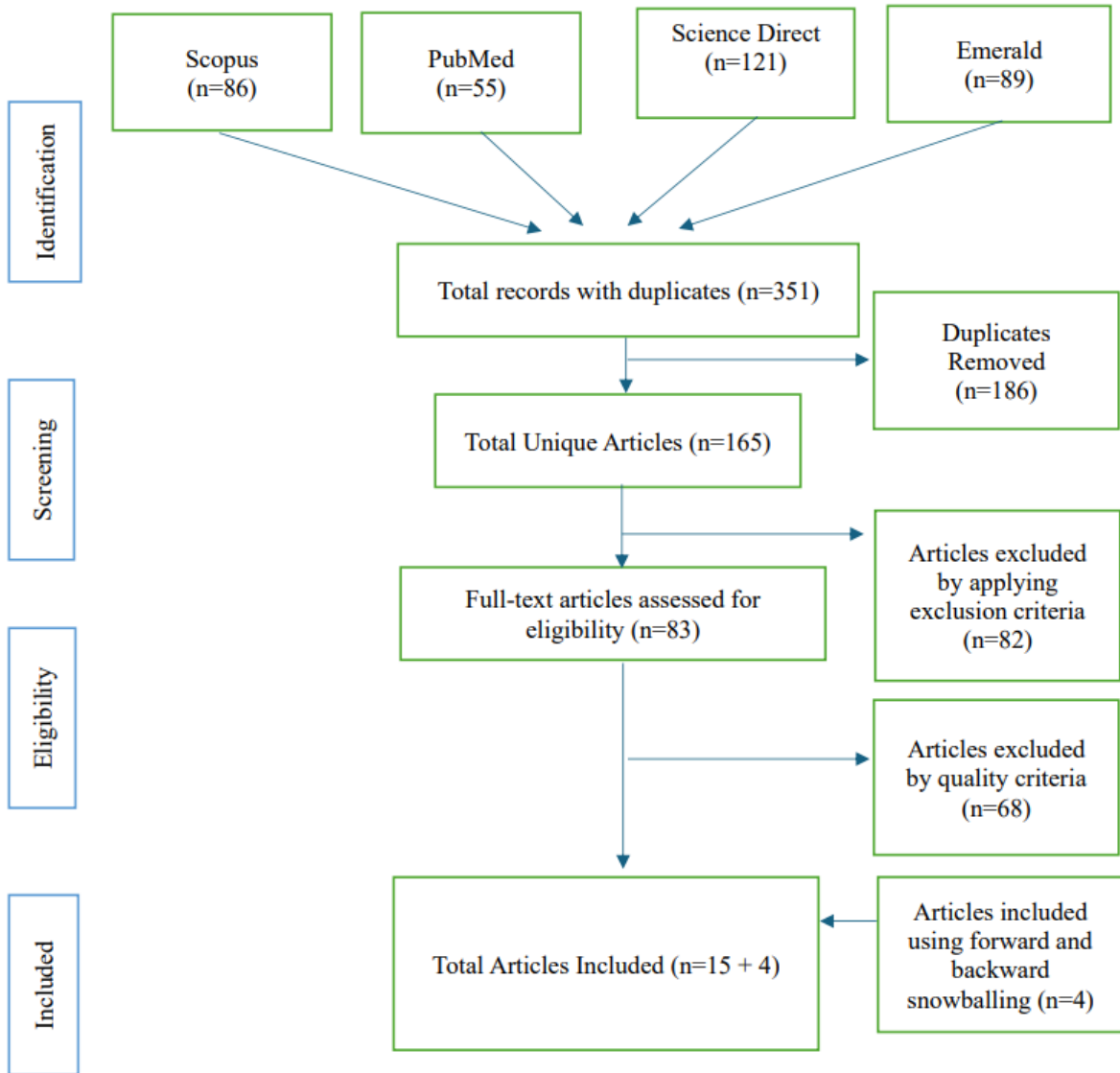


Figure 1. Article selection flowchart for the systematic literature review

Table 1. Review Article Summary

Author Name	Year	Title of Study	Study Design	Sample Size	Main Outcome
Peng L. & Chan A.H.	2019	A meta-analysis of the relationship between ageing and occupational safety and health	Meta-analysis	Multiple	Older workers face higher risks of injuries and health declines.
Chand M.	2018	Ageing in South Asia: challenges and opportunities	Literature review	Not specified	Identified socioeconomic and health challenges for aging workers in South Asia.
Romli M.H. et al.	2017	Falls amongst older people in Southeast Asia: a scoping review	Scoping review	Multiple	High prevalence of falls linked to physical decline in older workers.
Phillips D.R. et al.	2010	Ageing in a global context: The Asia-Pacific region	Comparative analysis	Not specified	Highlighted regional disparities in OSH policies for aging populations.
Anantanasuwong D.	2021	Population ageing in Thailand: critical issues in the twenty-first century	Case study	Not specified	Emphasized workplace adaptability gaps for older Thai workers.
Varianou-Mikellidou C. et al.	2019	Occupational health and safety management in the context of an ageing workforce	Mixed-methods	500+	Age-related vulnerabilities require tailored safety protocols.
Tiraphat S. et al.	2020	Age-friendly environments in ASEAN plus three: Case studies	Multi-country case study	5 countries	Cultural and environmental factors impact OSH outcomes.
Lim W.S. et al.	2020	COVID-19 and older people in Asia	Cross-sectional	1,200	Pandemic exacerbated mental and physical health risks for older workers.
Papadopoulou S.K.	2020	Sarcopenia: a contemporary health problem among older adult populations	Review	Not specified	Muscle loss increases injury risks in physically demanding jobs.
Cheng S.Y. et al.	2020	Advance care planning in Asian culture	Qualitative	150	Cultural norms influence retirement and healthcare decisions.

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Seck P.A. et al.	2021	Gendered impacts of COVID-19 in Asia and the Pacific	Quantitative	2,000+	Highlighted gender disparities in work- related stress among older adults.
Rudnicka E. et al.	2020	The WHO approach to healthy ageing	Policy review	Not specified	Stressed holistic policies for aging workers' health.
Zhao D.	2021	Epidemiological features of cardiovascular disease in Asia	Epidemiological study	Not specified	Cardiovascular issues prevalent in aging workers with hazardous exposures.
Mao J.J. et al.	2022	Integrative oncology: Addressing global challenges of cancer prevention	Review	Not specified	Occupational carcinogen exposure risks for older workers.
Sepúlveda- Loyola W. et al.	2020	Impact of social isolation due to COVID-19 on health in older people	Mixed-methods	800	Social isolation worsened mental health outcomes.
Schwatka N.V. et al.	2012	An Aging Workforce and Injury in the Construction Industry	Longitudinal	5,000+	Older construction workers face higher injury rates.
Bravo G. et al.	2022	Do older workers suffer more workplace injuries?	Systematic review	Multiple	Confirmed higher injury rates and chronic conditions among older workers.
Kenji Kushida	2024	Japan's Aging Society as a Technological Opportunity	Literature Review & Case Study Analysis	Not specified	Japan's aging population presents challenges but also technological opportunities, particularly in automation and workforce augmentation.
Chng J & Sim BK	2018	Healthier Workers, Happier Workers' Programme: A Person-Centric Approach to Health & Safety at the Workplace for Bus-Drivers in Singapore	Intervention Study	2114	Improved chronic condition management and ergonomic training led to better health outcomes for bus drivers.

The results of the review were categorized into three main themes: physical, psychological, and social challenges. In terms of physical challenges, several studies indicated that ageing workers experience a decline in muscle strength, flexibility, and endurance, making them more vulnerable to workplace injuries. Musculoskeletal disorders such as osteoarthritis and osteoporosis were commonly reported, especially among those in physically demanding industries like construction and manufacturing. Studies also highlighted that falls, slips, and trips were more frequent among ageing workers due to reduced balance, coordination, and sensory acuity. Some interventions, such as ergonomic workplace adjustments, adjustable workstations, and exoskeletons, were found to effectively reduce strain and injury risks.

Psychological challenges were another significant concern. Cognitive decline, particularly in processing speed and memory, was reported as a barrier to adapting to new technologies and automated systems. Older workers also reported higher levels of job stress and anxiety, often stemming from job insecurity, rapidly changing work environments, and age discrimination. Some studies found that workplace training programs tailored to older workers improved their confidence and adaptability to new systems and processes, thus mitigating some of these psychological stressors.

Social challenges were also prominent, particularly in the context of cultural norms and family responsibilities, which significantly

influenced work participation. In many Asian countries, traditional values such as filial piety and intergenerational support play a crucial role in older workers' decisions to remain employed. Many ageing workers in lower-income groups continued working out of financial necessity, increasing their exposure to workplace hazards. Age discrimination in the workplace was noted in several industries, negatively impacting job satisfaction and overall well-being. However, supportive work environments, including mentorship programs and intergenerational collaboration, were highlighted as effective strategies to promote inclusivity and ensure older workers feel valued.

The review highlights that ageing workers in Asia face complex OSH challenges that require targeted interventions, including ergonomic adjustments, mental health support, and age-friendly policies. Some countries, such as Japan and Singapore, have successfully implemented workplace interventions, policy reforms, and training programs to mitigate these risks. The findings emphasize the need for comprehensive workplace modifications, adaptive training, and stronger regulatory policies to enhance occupational safety and health outcomes for the ageing workforce in Asia. By adopting these strategies, organizations can create safer and more inclusive environments that support the continued participation of older workers in the labor force.

OCCUPATIONAL SAFETY AND HEALTH CHALLENGES OVERVIEW

The assessment of OSH problems in ageing workforce in Asia calls for a detailed consideration of factors related to the different aspects of this group which could be subdivided into physical, psychological, and social domains. Ageing workers merely encounter several challenges that can either be categorized under body changes, job stressors, or broad environmental factors that require an understanding of all these factors simultaneously to fully appreciate the elderlies at work.

Physical Challenges

Indication of an ageing process begins with a range of bodily fluctuations like reducing muscle strength, flexibility, sensory accurateness from which aged workers are prone to excessive injury risk and reduced functional capacities while on work. Musculoskeletal disorders of ageing workers with joint pain such as osteoarthritis and osteoporosis where ergonomic hazards are persistent and physically demanding job activities is an issue of concern. Also, the loss of balance and coordination is the thing that stands the way of the falling, slipping and tripping by the person and the control of their frequent falls. There ought to be target interventions of this kind.

Psychological Challenges

Older workers could face such a number of psychological pressure sources that might emerge from the inner complexities of

the working environment, ambiguity about the job, and eventually the general public opinion towards ageing. Ageing adults themselves can become the target of age discrimination and stigma, and the by-product is their feelings of marginalization and decreased self-esteem, generating stress in the workplace and hamper its engagement. Nevertheless, the cognitive age-related changes, which are the declinations of the processing speed and memory, can create problems in the field of a rapidly growing work environment, so it is necessary to provide supportive measures to encourage cognitive health and the performers.

Social Challenges

The perception of occupational health and safety among ageing workers is significantly influenced by social demographic characteristics. Their views are impacted by societal norms, gender concerns, and family responsibilities, among other things. Filial piety and familial responsibilities are highly valued in many traditional Asian cultures, and these programs have a significant influence on work participation and retirement decisions, particularly when older workers may be compelled to continue working in order to support their families.

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Physical Health Challenges

Ageing workers in Asia face significant challenges related to physical health, which can impact their occupational

safety and well-being (13). Studies suggest that older workers experience a decline in physical abilities, including reduced strength, flexibility, and endurance (14). This decline makes them more susceptible to workplace injuries, particularly in physically demanding industries such as construction (15). Additionally, musculoskeletal disorders, hearing loss, and respiratory issues are prevalent among ageing workers, posing significant health concerns and affecting their ability to perform job tasks effectively (16).

Work Ability and Adaptability

Age-related changes can affect an individual's ability to adapt to new work environments or technologies, impacting their performance and safety on the job (17). Studies indicate that declining cognitive function and adaptability may hinder older workers' ability to cope with changing job demands and may lead to reduced productivity (18). As a result, interventions aimed at enhancing work ability and adaptability among ageing workers are crucial for maintaining their occupational health and well-being.

Increase Vulnerability

Older workers in Asia are more vulnerable to chronic health conditions due to prolonged exposure to occupational hazards (2). Research suggests that in industries such as construction, where exposure to dust and harmful substances is common, older workers face a higher risk of developing conditions like chronic obstructive pulmonary disease (COPD) (19). This increased vulnerability underscores

the importance of implementing targeted interventions and workplace accommodations to mitigate health risks and support the safety and well-being of ageing workers.

Mental Health Challenges

The mental well-being of ageing workers in Asia is a critical yet often overlooked aspect of occupational safety and health. Studies suggest that older workers may face unique mental health challenges related to job stress, insecurity, and work-related pressures (20). The transition to retirement may also evoke existential uncertainties and identity shifts, further impacting their psychological well-being (21). Implementing mental health intervention programs, such as individual support initiatives and health promotion activities, can play a pivotal role in addressing these challenges and fostering resilience among ageing workers (22).

Age Sensitive Work Environment

Creating age-sensitive work environments is paramount to ensuring the safety, health, and well-being of ageing workers in Asia (23). Studies indicate that adjusting work conditions, providing ergonomic support, and offering alternative work arrangements can help older workers maintain their productivity and work ability (24). Moreover, fostering a culture of inclusivity and respect in the workplace is essential for promoting age diversity and mitigating age-related stereotypes and discrimination (25). By prioritizing age-sensitive practices and accommodations,

organizations can create supportive environments that enable ageing workers to thrive and contribute effectively.

Policy And Program Development

Addressing occupational safety and health challenges among ageing workers in Asia necessitates concerted efforts in policy development and program implementation (26). Studies suggest that age-friendly policies, training programs, and collaborative initiatives are essential for promoting a culture of safety and well-being in the workplace (27). Policy interventions may include measures to enhance ergonomic standards, provide training on age-related health and safety issues, and establish support networks for ageing workers (28). Additionally, fostering partnerships between employers, policymakers, and healthcare providers is crucial for creating a supportive ecosystem that prioritizes the needs of ageing workers and ensures their continued engagement and contribution to the workforce (29). By embracing proactive policy and programmatic approaches, stakeholders can address the evolving needs of ageing workers and foster sustainable, age-inclusive workplaces across Asia.

Japan has proactively addressed the challenges of its rapidly ageing workforce through amendments to the Industrial Safety and Health Act, mandating employers to implement ergonomic adjustments and health monitoring for older employees. For instance, Toyota introduced exoskeletons to reduce physical strain during assembly tasks,

adjustable workstations to accommodate mobility limitations, and flexible shift schedules to align with older workers' energy levels. The company also launched annual health check-ups focused on chronic conditions like hypertension and arthritis, coupled with tailored exercise programs. These measures contributed to a 30% reduction in musculoskeletal injuries among workers aged 50+ between 2018 and 2022. Nationally, Japan's occupational injury rate for workers over 60 fell by 15% from 2015 to 2020, reflecting systemic efforts to adapt workplaces to demographic shifts (30).

In Singapore, successful occupational health and safety (OHS) policies for older workers have been exemplified through a comprehensive health intervention program targeting bus drivers, a significant demographic of the aging workforce. The policy focused on a person-centric approach, understanding and addressing the unique needs of older drivers by implementing a nine-month onsite Health Intervention Programme, which included chronic disease health screenings and monthly group health coaching. Following this initiative, results indicated that approximately 50% of participants with abnormal screening outcomes showed improvement in at least one chronic condition after the program, with 25% improving from abnormal to normal health status within nine months. Additionally, workplace risk assessments conducted during the program led to the implementation of short-term interventions, such as driving ergonomics training and feedback protocols on

health and safety issues, ultimately fostering a safer and healthier work environment for older bus drivers in Singapore (31).

DISCUSSION

Challenges and Future Research Direction

The thorough analysis has uncovered the exceedingly intricate issue of aging workers in Asia, characterized by numerous challenges related to physical health, mental health, adaptability, and environmental elements. We must persist in enhancing our progress, which requires concerted efforts from several domains. Subsequent research initiatives ought to concentrate on numerous crucial domains. Initially, it is essential to conduct longitudinal studies that will significantly elucidate the sequential problems of occupational safety and health among aging workers, while simultaneously identifying critical junctures where treatments can be most effectively implemented. Long-term monitoring of OSH results may facilitate the early detection of signals to anticipate hazard preventive efforts aimed at mitigation.

A comprehensive study should examine the interconnections among aging, gender, and class to ascertain how various identities, considered over the lifespan, influence the distinct occupational safety and health experiences of workers nearing retirement age. Interventions that specifically address the circumstances of disadvantaged segments of the aging labor force can be identified through an intersectional approach.

Furthermore, conclusive research on the effects of age-friendly policies, workplace adjustments, and psychological intervention programs addressing the rising occupational safety and health issues among aging workers is a paramount concern. The combination of findings and resilience will provide proof of a desirable trait for the mainstream. Conversely, the research should vary the emphasis on technological methods in occupational safety and health for the aging workforce, encompassing assistive technology, wearable devices, and computer displays tailored to older individuals, with the objective of enhancing workplace safety.

Limitation of Study

This study, while yielding positive results, possesses significant limitations that elucidate the accuracy of the findings. One key limitation is the exclusion of non-English literature, which may have introduced publication bias. The reliance solely on English-language sources could have resulted in the omission of relevant studies published in other languages, potentially leading to an incomplete representation of existing research. Additionally, papers may have been eliminated without clear justification solely due to the foreign language of publication, further restricting the comprehensiveness of the review. The other aspect of the issue is that the quality of research study methodologies varied, with many exhibiting methodological flaws or biases that predisposed them to distorted outcomes.

CONCLUSION

In conclusion, this comprehensive analysis provides an integrated overview of the most significant digital OSH concerns that are currently being faced by workers in Asia who are getting older. By incorporating a wide range of case studies, theoretical models, and policies, the review has been able to shed light on the heterogeneity of occupational safety and health challenges that are encountered by an ageing labor force. These issues include issues pertaining to physical and mental health, adaptability, and diversity among workers and the working environment. For the purpose of explicitly tailoring interventions and initiatives to the specific demands and issues of the ageing workforce in Asian countries, the results highlight the need of bringing pressed activities and policies in the area of productivity to the forefront. A considerable number of age-sensitive procedures, work settings that are accommodating to people from various walks of life, and the implementation of treatments that are supported by evidence are all ways in which the stakeholders may contribute to the development of surroundings that are conducive to the safety and health of this particular group.

It is necessary to conduct a number of studies in the future in order to investigate whether the occupational safety and health issues are becoming more severe or, on the other hand, whether the number of cases of occupational diseases is decreasing.

Additionally, it is necessary to clarify the possible interaction of age with gender or socioeconomic status, as well as to establish some of the contemporary practices that are based on evidence or to create some of the new ones using modern technologies. In spite of the fact that language restrictions and bias in the publication of literature may have the effect of limiting the implications of this review, the consolidated knowledge that was gathered can still be a valuable resource for policymakers, practitioners, and researchers who are contemplating new strategies to deal with an ageing workforce in Asia. By adhering to proactive and joined-up tactics, stakeholders might develop a working environment that would be sustainable and inclusive regardless of age as well. Additionally, workers who are getting older would be able to participate in the workforce and community, sharing their experiences with others. To effectively address the challenges faced by an ageing workforce, policymakers should consider implementing specific strategies, including ergonomic adjustments to workstations, flexible work arrangements such as remote work or reduced hours, and mental health support programs tailored to older employees. Additionally, targeted training programs can help older workers adapt to new digital technologies, while age-friendly workplace policies can promote intergenerational collaboration and knowledge transfer. By integrating these measures, organizations can create a safer, healthier, and more productive work

environment for ageing workers while ensuring long-term sustainability and workforce participation.

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References

1. Noto S. Perspectives on Aging and Quality of Life. *Healthcare*. 2023;26;11(15):2131.
2. Varianou-Mikellidou, C, Boustras G, Dimopoulos C, Wybo JL, Guldenmund FW, Nicolaidou O, et al. Occupational health and safety management in the context of an ageing workforce. *Safety science*. 2019;116, 231-244.
3. Schwatka NV, Butler LM, Rosecrance JR. An Aging Workforce and Injury in the Construction Industry. *Epidemiologic Reviews*. 2012;1;34(1):156–67.
4. Bravo G, Viviani C, Lavallière M, Arezes P, Martínez M, Dianat I, et al. Do older workers suffer more workplace injuries? A systematic review. *International Journal of Occupational Safety and Ergonomics*. 2022;28(1):398–427.
5. Anurag Upadhyay RS. Mental Health of Elderly People. *Journal of Psychosocial Research*. 2024;19(1):61– 70.
6. Adem A, Çakit E, Dağdeviren M. Occupational health and safety risk assessment in the domain of Industry 4.0. *Springer Nature Applied Sciences*. 2020;1;2(5).
7. Jayawardhana T, Anuththara S, Nimnadi T, Karadanaarachchi R, Jayathilaka R, Galappaththi K. Asian ageing: The relationship between the elderly population and economic growth in the Asian context. *PLoS One Journal*. 2023;24;18(4):e0284895.
8. Chand M, Tung RL. The Aging of the World’s Population and Its Effects on Global Business. *Academy of Management Perspectives*. 2014;28(4):409–29.
9. Rogers B, Marshall J, Garth K, Mopkins D, Remington J, Siemering K, et al. Focus on the Aging Worker. *Official Journal of the American Association of Occupational Health Nurses*. 2011;59(10):447–57.
10. Wei Y, Wang Z, Wang H, Li Y, Jiang Z. Predicting population age structures of China, India, and Vietnam by 2030 based on compositional data. *PLoS One Journal*. 2019;14(4).
11. Peng L, Chan AHS. A meta-analysis of the relationship between ageing and occupational safety and health. *Safety Science*. 2019;112:162–72.
12. G JW. Advancing safe and healthy work for all ages. *Industrial Health*. 2020;58(2):89–90.
13. Peng L, & Chan AH. A meta-analysis of the relationship between ageing and occupational safety and health. *Safety Science*. 2019;112, 162-172.
14. Chand M. Ageing in South Asia: challenges and opportunities. *South Asian Journal of Business Studies*. 2018;7(2), 189-206.
15. Romli MH, Tan MP, Mackenzie L, Lovarini M, Suttanon P, Clemson L. Falls amongst older people in Southeast Asia: a scoping review. *Royal Society for Public health*. 2017;145, 96-112.
16. Phillips DR, Chan AC, Cheng ST. Ageing in a global context: The Asia-Pacific region. *The handbook of gerontology*. 2010;430-446.
17. Anantanasuwong D. Population ageing in Thailand: critical issues in the twenty-first century. *Education for the Elderly in the Asia Pacific*. 2021;31-56.
18. Phillips DR. Overview of health and ageing issues in the Asia-Pacific region. In *Singapore's Ageing Population*. Routledge, CRC Press. 2011;7-30
19. Tiraphat, S, Buntup D, Munisamy M, Nguyen TH, Yuasa M, Nyein Aung M, et al. Age-friendly environments in ASEAN plus three: Case studies from Japan, Malaysia, Myanmar, Vietnam, and Thailand. *International journal of environmental research and public health*. 2020;17(12), 4523.

Nik Hasbullah NW, Orhun NM, Mollahaliloglu S. Occupational Safety and Health Challenges Among Ageing Population in Asia

20. Lim WS, Liang CK, Assantachai P, Auyeung TW, Kang L, Lee WJ, et al. COVID-19 and older people in Asia: Asian Working Group for Sarcopenia calls to action. *Geriatrics & gerontology international*. 2020; 20(6), 547-558.
21. Papadopoulou SK. Sarcopenia: a contemporary health problem among older adult populations. *Nutrients*. 2020;12(5), 1293.
22. Cheng SY, Lin CP, Chan HYL, Martina D, Mori M, Kim SH, et al. Advance care planning in Asian culture. *Japanese Journal of Clinical Oncology*. 2020;50(9), 976-989.
23. McCallum J. *Australia's new aged: issues for young and old*. Routledge. 2023; 55-59
24. Seck PA, Encarnacion JO, Tinonin C, Duerto-Valero S. Gendered impacts of COVID-19 in Asia and the Pacific: Early evidence on deepening socioeconomic inequalities in paid and unpaid work. *Feminist Economics*. 2021;27(1-2), 117-132.
25. Findling MG, Blendon RJ, Benson J, Koh HK. COVID-19 has driven racism and violence against Asian Americans: perspectives from 12 national polls. *Health Affairs Forefront*. 2023;13(1):3-8
26. Rudnicka E, Napierała, P, Podfigurna A, Męczekalski B, Smolarczyk R, Grymowicz M. The World Health Organization (WHO) approach to healthy ageing. *An International Journal of Midlife Health and Beyond*. 2020;139, 6-11.
27. Zhao D. Epidemiological features of cardiovascular disease in Asia. *Journal of the American College of Cardiology*. 2021; Asia, 1(1), 1-13.
28. Mao JJ, Pillai GG, Andrade CJ, Ligibel JA, Basu P, Cohen L, et al. Integrative oncology: Addressing the global challenges of cancer prevention and treatment. *CA: A Cancer Journal for Clinicians*. 2022;72(2), 144-164.
29. Sepúlveda-Loyola W, Rodríguez-Sánchez I, Pérez-Rodríguez P, Ganz F, Torralba R, Oliveira DV, et al. Impact of social isolation due to COVID-19 on health in older people: mental and physical effects and recommendations. *The journal of nutrition, health and ageing*. 2020; 24(9), 938-947.
30. Kushida, Kenji. 2024. Japan's Aging Society as a Technological Opportunity. *Carnegie Endowment for International Peace*. 2024; 20-26
31. Chng J, Sim BK. Healthier workers, happier workers' programme: A person-centric approach to approaching health & safety at the workplace for bus drivers in Singapore. *Occupational and Environmental Medicine* 2018;75(2):A516