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Research Article

The health impacts of climate change on outdoor workers in urban Vietnam: A systematic review of Vietnamese-language and Vietnam-based studies

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ABSTRACT

Climate change presents severe challenges globally, with developing countries being the most vulnerable due to limited resources for adaptation. Outdoor workers, directly exposed to extreme weather, are particularly at risk of climate-related health impacts. This paper systematically synthesises peer-reviewed publications and dissertations in Vietnam to examine the health effects of climate change on outdoor workers in urban Asia and identify policy gaps. It provides a pioneering synthesis of Vietnamese-language research on this topic. By analysing Vietnamese-based sources, it uniquely broadens the scope of existing systematic reviews, which typically exclude non-English literature, and offers region-specific insights into urban health risks associated with extreme heat. The key findings highlight heat stress and respiratory diseases as primary health concerns, often exacerbated by inadequate protective measures and insufficient support structures. The review identifies a significant research gap, with predominant attention on formal sector workers and minimal focus on informal workers and their adaptation strategies. While employer-provided protective gear is frequently noted, governmental or broader social support for informal workers remains underexplored. This paper highlights the need for interdisciplinary research on climate change impacts across diverse outdoor occupations, with an emphasis on policy development to enhance health protections for vulnerable labour sectors in Vietnam and cities with similar socio-economic and environmental settings in Asia.

Key words: climate change, health, outdoor workers, urban Vietnam, systematic review, policy

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INTRODUCTION

Climate change poses a significant challenge to global public health, with the Intergovernmental Panel on Climate Change reporting a 1.1°C increase in average global temperature since pre-industrial times. This rise has led to more frequent extreme weather events—heat waves, droughts, floods, and storms—that threaten human health and socio-economic systems[1]. As the urgency for evidence-based interventions grows, developing countries like Vietnam must mitigate climate change and adapt to its impacts, prioritising the health and livelihoods of vulnerable populations to develop effective coping strategies[2].

Outdoor workers in urban settings are particularly exposed to climate-related health risks due to the nature of their work environments. Their direct exposure to extreme temperatures, varying precipitation patterns, and shifting seasonal conditions increase susceptibility to health conditions such as respiratory, gastrointestinal, and dermatological disorders. Moreover, natural events and disasters, including floods and droughts further compound their economic hardships by disrupting income and job stability.[3]

However, the research on climate change impact on outdoor workers has primarily focused on English-language sources and developed economies, thereby overlooking crucial regional and linguistic contexts. A study of 250 systematic reviews revealed a stark pattern: a third explicitly excluded non-English articles, another third implicitly omitted them despite no explicit exclusion, and the remaining third claimed no language restriction[4]. Among this latter third that purportedly included non-English sources, however, a mere 2% of the total systematic reviews actually incorporated such literature[4]. This disparity reveals a persistent bias in database coverage, systematically excluding journals "from certain countries and/or in certain languages"[5].

Initially, the paper aims to address this gap by systematically reviewing Vietnamese-language and Vietnam-based sources that examine the health impacts of climate change on urban outdoor workers across Asia. The objective was to contribute to a more

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comprehensive and regionally nuanced understanding of climate-related health impacts in urban Asia, drawing from Vietnamese literature. However, after applying the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) method [6] to search and select relevant documents—including those with an Asian geographical scope—the results reveal that studies in Vietnamese and those conducted in Vietnam predominantly focus on Vietnam itself, rather than extending to multiple Asian countries. Consequently, although the search strategy included keywords related to urban Asia, as outlined in the methods section, the findings of this paper focus exclusively on urban Vietnam.

This paper forms the initial part of our 30-month study that specifically investigates how climate change affects the health, livelihoods, and working conditions of precarious workers in Vietnam's mega-cities. The findings of this system review help identify existing academic gaps on this topic in Vietnam, thereby outlining the direction for the empirical research phase of our study.

METHODS

This systematic review examines the impacts of climate change and extreme weather events on outdoor workers' health in urban Asia, with a particular focus on Vietnamese research articles and Vietnam-based English publications. The review addresses four key research questions based on the objective of our empirical research project:

1. Which extreme weather events affect the health of outdoor workers in urban Asia?
2. What are the specific health impacts of climate change and extreme weather events on this workforce?
3. Which types of outdoor work and groups of workers are most vulnerable?
4. What coping and adaptation strategies have these workers adopted in response to climate change?

The review followed a structured five-phase methodological approach based on the PRISMA method: (i) The development of comprehensive search strings incorporating both English and Vietnamese keywords across six main filters based on PICO framework [7] : Climate, Health, Employment, Society, Urban areas, and Asia; (ii) The establishment of detailed inclusion and exclusion criteria; (iii) The pilot search and identification process; (iv) The full database search and screening; and (v) The systematic data extraction. More details on the systematic evidence review methodology are provided in Appendix.

The search was conducted across three primary Vietnamese academic databases: EBSCO Discovery Service of the Central Library (HCM VNU Lib), National Database on Science and Technology (MOST Pub Database), and Google Scholar, supplemented by additional sources including the Vietnam Medical Journal. The review identified 88 initial works, which were subsequently filtered to eight documents (four research articles and four dissertations) based on rigorous inclusion criteria.

Starting with the year 2000[a] as the reference point for the review and applying the search strings detailed in the Appendix, a total of 88 papers were sourced from various databases. After removing duplicates and conducting an initial screening of titles and abstracts, 46 papers were selected for full manuscript review. A further assessment of these 46 full-text papers against additional inclusion and exclusion criteria led to 8 documents progressing to the systematic evidence review. Ultimately, these 8 documents—consisting of 4 peer-reviewed journal articles and 4 dissertations—were analysed and organised into a tabular format, summarising key themes, sub-themes, research questions, and other relevant aspects, including health impacts, types of extreme weather events, forms of outdoor work, coping strategies, and policy recommendations. (see Figure 1).

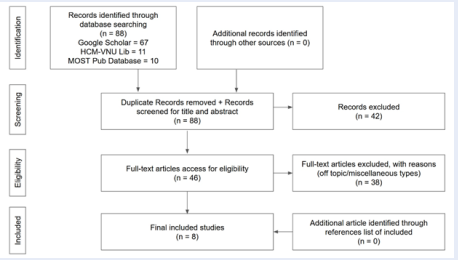

Figure 1: The flow diagram of screening process of included studies on the impacts of climate change on Asian urban outdoor workers' health *[Source: The authors]*

RESULTS AND DISCUSSION

The findings primarily reflect insights pertinent to Vietnam, including its unique challenges, policies, governance, and cultural contexts. Our analysis begins with a systematic examination of the reviewed literature using NVivo software. After translating the Vietnamese extracted data of the eight literature into English, we generated a word cloud from these data to analyse the keyword frequency (see Figure 2). This

visualisation illuminates the distribution and prominence of key terms—offering insight into the predominant themes within the literature, from which we identified several key trends.

For clarifying the word cloud of data extracted from all eight articles, the most frequently occurring keywords were "workers" (2.40%) and "health" (1.52%), indicating a strong emphasis on these subjects, which were in the search strings. Other common terms included "years" (1.25%), "working" (1.21%), and "work" (0.85%). Notably, "factors" recorded an incidence of 0.72%, suggesting many studies focus on how weather and climate variables impact outdoor workers' health in urban Vietnam. The word cloud highlights that terms related to heat, such as "heat" (0.85%), "radiation" (0.76%), and "temperature" (0.49%), were the most prevalent of climatic terms, while references to "rainy," "humidity," and "noise" were less frequent, underscoring the literature's primary focus on heat-related health impacts.

Figure 2: The word cloud of key themes *[Source: The authors]*

From Vietnam's scope to northern slope: the geographical imbalance of Vietnam studies

The geographical distribution of studies shows a bias towards the country's northern provinces. The studies are distributed across 13 localities, with a notable concentration in the northern region, followed by the southern and central regions. In the north, Hanoi is the most frequently studied city, with four studies [8–11], followed by Lang Son [10], Quang Ninh [12], Thai Nguyen [12], and Hai Phong [10,13]. In the southern region, the research focused on Ho Chi Minh City [10,14], Can Tho [10], and Long An [15]. The central region had comparatively less coverage, with Da Nang and Dak Lak each represented by only one study each [10] (see Figure 3). This coverage reflects the urban population distribution in Vietnam, with Hanoi and Ho Chi Minh City being the primary focal points of urban research.

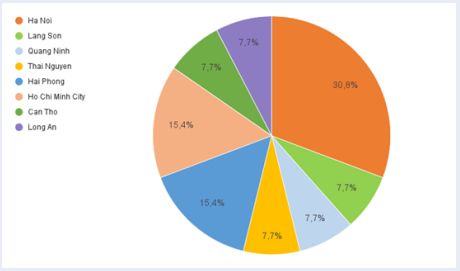

Figure 3: The geographical research scope distribution of identified studies *[Source: The authors]*

The methodological variation: The predominant use of cross-sectional descriptive methods and quantitative approaches

Most studies employed a cross-sectional descriptive method using a purely quantitative approach with primary data [8,11–15]. This method captures data from a representative sample at a single point in time to describe characteristics without intervention [16]. Two studies mentioned qualitative methods, but did not provide the details on the data collection techniques like in-depth interviews or focus groups discussions [14,15]. One quasi-experimental study combined both methods, including interviews and focus group discussions [9]. A study on traffic police officers used a cross-sectional method alongside a retrospective study, incorporating primary and Ministry of Public Security data on health and working conditions [10]. Six of eight studies were from medical or public health perspectives, with two published in medical journals and four being dissertations in the field of public health, medicine, and preventive medicine. There was one published in the economic journal. Only one document was published in a social science journal (see Table 1), showing limited input from social science perspectives and presenting the human context in a reductionist manner, blurring human portraits in this topic.

When risks intersect: The vulnerabilities of outdoor work under extreme weather

The primary climatic stressors affecting outdoor workers' health in urban Vietnam are high temperatures and heat radiation, with most studies focusing on northern regions [9,11,13,14]. Steel workers and traffic police officers face particularly intense heat, often exceeding meteorological station reports [13,15]. Meanwhile, cold weather, though less studied, contributes to musculoskeletal disorders among some workers [9,10]. Besides, heavy rain significantly impacts

Table 1: The distribution of documents by publication field

Publication field	Sources	Count
Health and medicine	Vietnam Medical Journal	1 [11]
	Vietnam Journal of Preventive Medicine	1 [13]
	Dissertation in Public Health	2 [9,10]
	Dissertation in Medicine	1 [8]
Economic/Human Resources Management	Ho Chi Minh City Open University Journal of Science - Economics and Business Administration	1 [15]
Social Sciences	Journal of Social Sciences	1 [14]

[Source: The authors]

fishing and aquaculture families in Can Gio, with over 90% experiencing illness during the rainy season [15]. Adverse weather conditions are noted as stress factors for power company workers in Long An, albeit without specific details [16].

Overall, the studies highlight diverse environmental stressors affecting urban outdoor workers in Vietnam, predominantly focusing on heat (see Figure 4). Specifically, 50.0% of studies mention heat-related phenomena, such as heat waves and high temperatures, as significant impacts on workers' health. Cold or extreme cold weather accounts for 25.0% of studies. Meanwhile, bad weather in general and heavy rain each account for 12.5% of the reviewed literature. In addition, despite not a phenomenon of climate change, air and noise pollution poses significant intersectional risks, especially in industrialised and motorcycle-dominated areas [11,12]. Workers at power companies, for instance, face harsh weather and polluted environments, including air and noise pollution [12].

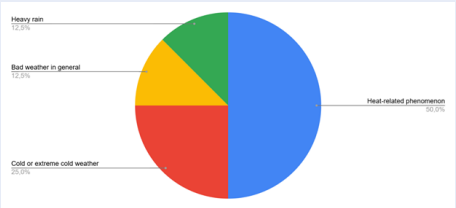

Figure 4: The types and forms of extreme weather distribution *[Source: The authors]*

Moreover, the vulnerabilities of outdoor work under extreme weather are exacerbated when outdoor workers lack adequate support from the government and their employers to protect their health. Indeed, the identified studies explore various aspects of outdoor workers' vulnerability, spanning from inadequate labour policies to severe health risks associated with strenuous working conditions [8,9,12,15].

The inadequate state oversight of outdoor working standards

The identified studies shed light on the working conditions of outdoor workers in Vietnam, revealing several areas of concern. A study in two districts of Hanoi found that nearly 10% of solid waste collection workers exceeded eight working hours per week, with 98.1% working up to six days weekly [9]. Workers in shipbuilding and steel production at the Ha Long Shipbuilding Company and Thai Nguyen Iron and Steel Company typically have shifts lasting six to eight hours per day. According to a study [8], this contrasts with practices in some developed countries, where a study noted that workers in certain specialised professions, particularly those in strenuous outdoor jobs, have regulated work hours of six to seven hours per day and a five-day work week. The discrepancy suggests that Vietnamese outdoor workers may face longer working hours compared to international standards for similar professions. In addition, construction workers lack protective equipment against sunlight, heat, and cold, unlike indoor working conditions. [8]

Worker awareness of labour rights appears to be a significant issue. A study reveals that under 10% of workers were aware of their right to work fewer than 40 hours per week. Similarly, low percentages were found for awareness of rights to adequate rest areas, drinking water, first aid facilities, and occupational health assessments. This lack of awareness could potentially lead to the exploitation of workers and hinder their ability to advocate for better working conditions. [9]

The occupational hazards accelerate health deterioration

Outdoor work inherently exposes workers to environmental elements and industry-specific hazards. For instance, employees at the Ha Long Shipbuilding Company and Thai Nguyen Iron and Steel Company regularly encounter hazardous conditions, including coal dust, toxic fumes, and high heat radiation during their shifts (six to eight hours). Welders face multiple risks, including toxic fumes, intense heat,

and UV radiation, indicating a critical need for enhanced safety measures and possibly reduced exposure times [12]. In the construction sector, workers on the Nhat Tan Bridge lacked adequate protection against extreme weather, which increases health risks and diminishes productivity [8]. In the electrical industry, a study examining how age and health interact with job demands found that older workers with pre-existing conditions are less likely to work outdoors [15]. Additionally, most traffic police personnel possess Class II health status[b], with none classified as Class IV or above [10]. These findings underscore the urgent need for improved occupational safety standards across high-risk industries.

It can be observed from the studies that outdoor jobs involving strenuous work led to higher levels of health deterioration. In this systematic review, it is evident that workers in shipbuilding, power industry, and welding sectors, industries characterised by their physically demanding nature, face a higher degree of exposure to health risks compared to traffic police officers.

The common health impacts: Heat-related and respiratory problems

Intersectional vulnerabilities pose significant health impacts to outdoor workers. This systematic review identified 21 health issues affecting outdoor workers, including heat-related problems (e.g., heat stress, heatstroke), respiratory diseases, musculoskeletal problems, dermatological diseases, neuropsychiatric disorders, vestibular disorders, and occupational accidents (see Figure 5). Heat-related issues were most frequently reported, appearing in five studies [8,9,13–15]. For instance, over 80% of workers on the Nhat Tan bridge project reported struggling with extreme temperatures, exacerbated by a lack of protective gear [8]. Other studies noted additional risk factors, such as high humidity and poor ventilation [13].

Respiratory diseases, dermatological diseases, and musculoskeletal problems were each mentioned in three studies. Traffic police officers and workers at the Thanh Tri Power Company were especially vulnerable to respiratory conditions [10,11]. Musculoskeletal disorders, including pain and fatigue, were prevalent among solid waste collectors in Hanoi [9].

Neuropsychiatric and vestibular disorders were less commonly mentioned, linked to extreme weather conditions [14]. Less frequent conditions, such as occupational accidents, digestive, heart, and urinary diseases, as well as dengue, appeared in only one study each [9,11]. Overall, the review highlights the diverse health risks faced by outdoor workers, with heat and respiratory issues most prominent.

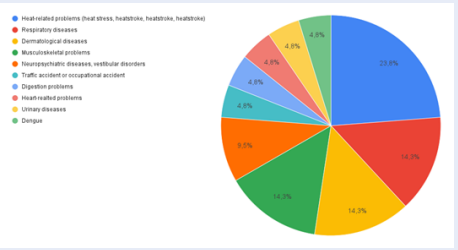

Figure 5: The health impacts on outdoor workers *[Source:The authors]*

The employment status: The predominance of formal over informal

The research subjects in the systematic review mainly target formal workers [9–13,15], including electricity company workers [11,15], welders/steel rolling mill workers, coke furnace workers [12], solid waste collectors [9], shipyard workers [13] , and traffic police officers [10]. Only one study focused on informal workers, specifically farmers in the semi-urban Can Gio area, Ho Chi Minh City [14]. One study on workers constructing the Nhat Tan Bridge (including welders, ironworkers, construction workers, machine operators, and others) did not clearly identify whether the study subjects were formal workers with employment contracts or informal workers without contracts [8] (see Figure 6).

Overall, informal and precarious workers in urban areas, such as street vendors, construction workers, porters, and ride-hailing drivers, remain underrepresented in domestic studies related to health impacts of climate change and extreme weather conditions. This is despite the fact that outdoor workers in Vietnam are predominantly informal, low-income workers with limited access to social services [17].

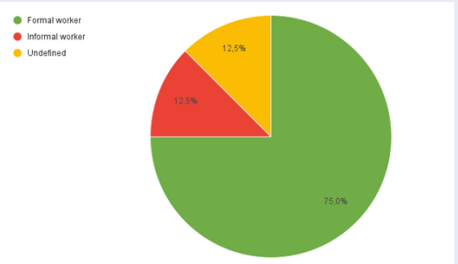

Figure 6: The outdoor workers' employment status distribution *[Source: The authors]*

The outdoor workers' coping strategies: Primarily using personal protective equipment

The literature on coping strategies for outdoor workers facing health risks from climate change and extreme weather is sparse, with only three out of eight studies addressing this issue [8,9,12]. The primary strategies identified involve the use of personal protective equipment, including masks, gloves, protective clothing, and reflective gear for heat and cold protection [8,9,12] . A word cloud generated from the data highlights the prominence of terms like "protective," "equipment," and "personal" (see Figure 7).

Most solid waste collectors in Hanoi are provided with appropriate personal protective equipment [9], while welders and steel rollers in Quang Ninh and Thai Nguyen generally utilise helmets, gloves, and goggles [12]. However, notable gaps exist, such as steel rolling mill workers often neglecting eye protection and welders exposing their arms to the sun by rolling up their sleeves. Both studies about solid waste collectors in Hanoi and welders and steel rollers in Quang Ninh and Thai Nguyen focus on formal workers with company-provided personal protective equipment, whereas the study on constructing workers on the Nhat Tan bridge showed that these workers lacked adequate protection against extreme weather [8]. Besides, additional strategies like regular exercise, taking breaks, avoiding overexertion, and changing postures to prevent musculoskeletal problems were also recorded in the study on solid waste collectors [9]. These findings underscore significant gaps in protection, especially for informal workers.

Figure 7: The word cloud of outdoor workers' coping strategies *[Source: The authors]*

The policy landscape: The current actions and recommendations

The current landscape of policy actions

Four out of the eight studies addressed policy actions supporting outdoor workers' adaptation to climate change in Vietnam [11–14]. Most actions were employer-driven, including heat adaptation measures, comprehensive personal protective equipment provision, and healthcare benefits for specific age groups. Only one study mentioned local authority actions, noting improved healthcare services in Can Gio Mangrove Biosphere Reserve, albeit with a low doctor-to-population ratio [14].

The systematic review reveals that policy support for outdoor workers primarily stems from employers, whilst government actions tend to be general, public policies rather than outdoor worker-specific measures. Consequently, informal outdoor workers appear to lack targeted support from both businesses and government in managing climate-related health impacts.

The recommendations for policy improvement

Six out of eight documents provide policy recommendations, spread across four aspects including improving the working environment; health propaganda and education; applying technology to reduce human effort working outdoors; reasonable division of working shifts for workers; increasing the availability of protective equipment; and increasing the ratio of doctors per 1,000 citizens.

a) Improving the working environment

Among identified studies, there was one advocating widespread heat adaptation measures across shipyard departments to safeguard workers' health [13]. Another study recommends enhancing the physical aspects of power company work environments, particularly in high-risk areas, and providing more mental support measures [15]. They further propose improving compensation packages, offering skills training, and providing career advancement opportunities to reduce stress amongst power company staff.

b) The health propaganda and education

A study proposes that welding workshops should intensify health education and promotion to ensure welders understand the proper use of standard welding goggles or masks for eye protection [12] . Similarly, another study recommends that solid waste collection companies maintain communication activities and health education programmes on the prevention of occupational diseases, particularly musculoskeletal disorders, with a special emphasis on training in correct working postures [9]. The study also highlights the urgency of promoting occupational health and safety and occupational disease prevention through regular team meetings within the company.

c) Applying technology to reduce outdoor labour

Technological measures to alleviate the burden of outdoor work can be applied specifically in certain industries. For instance, the study on solid waste collectors suggested that these workers' companies should gradually implement mechanisation in urban solid waste collection to reduce the physical burden on workers [9]. Additionally, another study proposes that the government should improve the road surveillance camera system and implement a mechanism for issuing traffic violation fines based on photographic evidence (post-incident fines) to reduce outdoor working hours for traffic police officers. [10]

d) The reasonable division of working shifts

The study on traffic police officers recommends that traffic police units should organise shifts reasonably for traffic control, avoiding situations where a police team must stand in one fixed location for extended periods to reduce the risk of neck and back pain. [10]

e) Increasing protective equipment

The study on traffic police officers further recommends that these public servants should be provided with adequate protective equipment when working outdoors, including dust masks and umbrellas or parasols to reduce ultraviolet radiation exposure. [10]

f) Enhancing the doctor-to-population ratio

In addition to the above recommendations, another study proposes a policy solution related to upgrading the scope of service of the universal healthcare system, focusing on increasing the ratio of doctors per 1,000 residents [14] (see Table 2).

CONCLUSIONS

As one of the pioneers using data extracted from Vietnamese-language and Vietnam-based studies, this paper systematically reviews Vietnamese literature on the health effects of climate change on Vietnamese urban outdoor workers, revealing several key findings with notable limitations. The research is geographically restricted mainly to northern Vietnam. Health impacts, mainly related to extreme heat and thermal radiation, included heat exhaustion, heat stroke, and sunstroke. Comparative studies across different outdoor occupational groups were lacking, with most research focused on formal sector workers and only one study on informal workers.

Among the eight documents reviewed, only one explicitly focused on informal workers, while the others examined formal labour or did not specify their research subjects. This highlights a significant gap in Vietnam-based literature concerning the health impacts of informal and precarious outdoor workers in urban Vietnam within the context of climate change. In addition, adaptation strategies were largely overlooked, with only three studies discussing personal protective equipment provided by employers. There was little exploration of individual coping mechanisms or governmental social welfare support, particularly for informal workers. These gaps highlight the need for more comprehensive studies across urban Asia, including comparisons between occupational groups and greater focus on both individual and governmental adaptation strategies to protect this vulnerable workforce from climate-related risks.

LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

This paper is considered one of the pioneers in examining how the impacts of climate change on outdoor workers in Vietnamese urban areas are currently studied in Vietnamese-language and Vietnam-based research. By presenting its findings in English while utilising Vietnamese data, this study integrates local knowledge into the global academic discourse on the health impacts of climate change on outdoor workers. Its value is further enhanced by providing indigenous data from Vietnam as one of the Asia-Pacific countries most affected by climate change. The academic and policy gaps revealed in this local dataset have the potential to foster stronger collaboration between international and local researchers in this field.

Since this paper solely reviews Vietnamese literature, the findings reflect the most recent trends and reality of the domestic works on the topic related to climate change's impacts on outdoor workers' health in Asian cities. However, several shortcomings remain. Even though the initial search strings encompassed groups of keywords related to urban Asia, aiming to explore how a regional and global issue was discussed by local researchers, the results then were geographically limited to Vietnam instead of wider Asian scope. Therefore, future Vietnam-based studies should consider extending the scope across Asia as well as provide comparative perspectives between Vietnam and other countries to enhance the domestic understanding of a regional and global topic.

Moreover, the fact that only eight studies in Vietnamese were identified highlights a significant lack of local publications on this topic. Among these studies, research specifically focusing on informal or precarious workers is almost absent, despite the fact that this group is more vulnerable than formal workers,

Table 2: The policy recommendations

Policy recommendations	
Policy fields	***Policy details***
Improving the working environment	- Applying thermal adaptation solutions across all production departments [13].
	- Improving the working environment to ensure physical and mental health, prioritising safety. [15]
Health propaganda and education	- Conducting regular health protection propaganda and education for welders. [12]
	- Maintaining health education activities to prevent occupational diseases, especially musculoskeletal disorders. [9]
Applying technology to reduce outdoor labour	- Implementing mechanisation in urban solid waste collection to reduce workers' labour burden [9].
	- Developing projects for surveillance cameras and traffic management to enhance road safety for police officers working outdoors [10].
Reasonable division of working shifts	- Organising reasonable shifts for traffic control to minimise prolonged standing and reduce neck pain [10].
Increasing protective equipment	- Equipping traffic police with dust masks and sunshades to mitigate UV exposure [10].
Enhancing the doctor-to-population ratio	- Increasing the doctor-to-population ratio to enhance healthcare service quality [14].

[Source: The authors]

as their rights are not protected by employment contracts. This gap may arise for several reasons, one of which is the presumably limited interest of local academia in this subject. In response, this paper is published in a domestic journal to draw greater national attention to a research area that is becoming increasingly urgent in Vietnam. In particular, it underscores the need to focus more on informal workers, providing a scientific basis for policy advocacy aimed at protecting this vulnerable group from the escalating health risks posed by climate change.

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ENDNOTE

[a] We selected the year 2000 as the starting point for our review, as most research on the health impacts of climate change on outdoor workers emerged after this period. An examination of IPCC reports and literature searches in major databases indicated a substantial rise in climate change-related studies from 2000 onwards. In contrast, the research on these issues was scarce before this time, with only a limited number of relevant studies identified in searches covering the period from 1990 to 2000.

[b] Circular No. 62/2023/TT-BCA of the Ministry of Public Security of Vietnam stipulates specific health standards and health examinations for the People's Public Security forces. It includes six levels from I to VI, corresponding to health statuses ranging from very healthy to very weak. Within this classification, Class II represents a rather good health condition.

COMPETING INTERESTS

The authors declare that they have no competing interests.

AUTHORS' CONTRIBUTIONS

Nguyen Duc Loc: Defined the topic and scope, assessed the quality of studies, conducted data analysis, and contributed to writing the manuscript.

An Thuy Thi Vo: Conducted the literature search, screened and selected studies, assessed the quality of

studies, extracted data, conducted data analysis, and contributed to writing the manuscript.

Ngoc Anh Vu: Defined the topic and scope, assessed study quality, and substantially revised the paper for coherence and quality.

Jonathan Rigg: Provided intellectual insights and made significant structural and clarity revisions to the manuscript.

All authors read and approve the final manuscript.

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Tác động của biến đổi khí hậu đến sức khỏe người lao động ngoài trời tại các đô thị Việt Nam: Tổng quan hệ thống các nghiên cứu bằng tiếng Việt và thực hiện tại Việt Nam

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TÓM TẮT

Biến đổi khí hậu đang gây ra những thách thức toàn cầu nghiêm trọng, đặc biệt với các nước đang phát triển vốn thiếu nguồn lực thích ứng. Lao động ngoài trời tại đô thị châu Á - những người trực tiếp làm việc trong thời tiết khắc nghiệt, đối diện với nhiều rủi ro sức khoẻ. Bài viết này sử dụng phương pháp tổng quan bằng chứng hệ thống tài liệu tiếng Việt, nhằm xem xét tác động của biến đổi khí hậu đến sức khỏe của lao động ngoài trời ở đô thị châu Á và các khoảng trống chính sách hiện nay. Đây có thể xem là một trong những nghiên cứu đầu tiên tổng hợp nguồn tài liệu tiếng Việt về đề tài. Thông qua phân tích tài liệu từ Việt Nam, bài viết này mở rộng phạm vi của các tổng quan hệ thống hiện có (thường bỏ qua các tài liệu không phải tiếng Anh) và chỉ ra các nguy cơ sức khỏe đô thị liên quan đến nắng nóng cực đoan, ô nhiễm không khí. Kết quả cho thấy say nắng và bệnh hô hấp là hai vấn đề chính, trầm trọng hơn bởi sự thiếu vắng biện pháp bảo vệ và hỗ trợ phù hợp. Dù một số doanh nghiệp đã trang bị bảo hộ cho người lao động, vẫn còn thiếu sự hỗ trợ từ chính phủ và xã hội. Bài viết nhấn mạnh sự cần thiết của việc nghiên cứu liên ngành về tác động của biến đổi khí hậu đối với các nghề ngoài trời, trong đó chú trọng phát triển chính sách bảo vệ sức khỏe cho người lao động dễ tổn thương tại các đô thị châu Á.

Từ khoá: biến đổi khí hậu, sức khoẻ, lao động ngoài trời, đô thị Việt Nam, tổng quan hệ thống, chính sách

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