

The Study of Exposure to Occupational Carcinogens in Iran: A Scoping Review

Mobina Karimiyan¹, Mohammad Ali Mohagheghi², Majid Fallahi³, Mohammad Hossien Sagh³, Mansoureh Feizabadi⁴, Aram Halimi⁵, Tina Khavari⁶, Fatemeh Azizi⁶, Fatameh Asadipour⁶, Mohammad Hasanzadeh⁷, Alireza Mosavi Jarrahi⁸

¹Department of Occupational Health Engineering, Student Research Committee, Sabzevar University of Medical Sciences, Sabzevar, Iran. ²Cancer Research Center, Cancer Institute, Tehran University of Medical Sciences, Tehran, Iran. ³Department of Environmental Health Engineering, School of Public Health, Sabzevar University of Medical Sciences, Sabzevar, Iran. ⁴Ph. D. in Knowledge and Information Science, Sabzevar University of Medical Sciences, Sabzevar, Iran. ⁵Research Center for Social Determinants of Health, Research Institute for Endocrine Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran. ⁶Department of Occupational Health and Safety, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran. ⁷Department of Environmental Health Engineering, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran. ⁸Cancer Research Centre, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

Abstract

Background: Occupational exposure to carcinogens is a significant issue in occupational health and public welfare, with carcinogens encompassing a wide range of substances such as chemicals, metals, dust particles, and organic materials. This scoping review aims to identify, map, and summarize the existing literature on occupational carcinogen exposure in Iran across various industries and settings. It categorizes the types of carcinogens investigated, evaluates the methodologies employed for exposure assessment, and identifies research gaps and areas needing further exploration. **Methods:** A systematic search was conducted across multiple databases including PubMed, Scopus, Web of Science, Scientific Information Database (SID), and Magiran. A total of 715 articles were identified, with inclusion criteria focusing on studies conducted in Iran, directly related to occupational carcinogen exposure, and available in full text in English or Persian. Title and abstract screening, followed by full-text evaluation, was performed by two independent reviewers. Key data were extracted and thematically analyzed to synthesize findings. **Results:** The review highlights prevalent types of occupational carcinogens studied in Iran and the industries that have been the primary focus of research. It discusses the various methodological approaches used to assess and quantify exposure levels, identifies key findings related to exposure and associated health risks, and uncovers significant gaps in the literature. **Conclusion:** This scoping review provides a nuanced portrait of occupational carcinogen exposure in Iran, identifying critical research gaps and offering a foundation for future studies. By consolidating existing knowledge, it aims to contribute to the enhancement of occupational health and safety practices in Iran, guiding the development of targeted interventions and regulatory policies.

Keywords: Occupational Carcinogens- Scoping Review- Protocol- Iran

Asian Pac Environ Cancer, 7 (1), 125-128

Submission Date: 05/09/2024 Acceptance Date: 06/24/2024

Introduction

Occupational exposure to carcinogens is a critical concern within the realm of occupational health and public welfare. Carcinogens are agents that possess the ability to initiate or promote cancer development in living organisms. They can encompass a broad

range of substances, such as chemicals, metals, dust particles, and organic materials, and they often exert their deleterious effects over prolonged periods of exposure. The International Agency for Research on Cancer (IARC), a branch of the World Health Organization, classifies

Corresponding Author:

Prof. Alireza Mosavi Jarrahi
Research Centre, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
Email: rmosavi@yahoo.com

numerous agents as occupational carcinogens based on substantial scientific evidence [1-6].

The Iranian workforce is distributed across diverse industries, spanning mining, manufacturing, agriculture, construction, and services. Each of these industries presents a unique milieu of potential carcinogen exposure scenarios. Workers in these sectors may encounter carcinogenic agents through inhalation, dermal contact, or ingestion, thereby facing inherent risks to their health. Ascertaining the extent and nature of exposure to occupational carcinogens in Iran is essential not only for safeguarding worker well-being but also for formulating effective public health policies and preventive measures [7-9].

Despite the potential gravity of occupational carcinogen exposure, the existing literature on this matter in Iran remains somewhat fragmented and scattered. While individual studies have investigated specific industries or agents, there exists a noticeable dearth of a comprehensive synthesis that holistically characterizes the scope and depth of research across multiple sectors. Conducting a scoping review on this topic will offer a panoramic view of the existing body of knowledge, unearth research gaps, and illuminate avenues necessitating further exploration.

The proposed scoping review seeks to delve into the multifaceted dimensions of exposure to occupational carcinogens in Iran. By amalgamating dispersed pieces of research into a coherent whole, this review will yield valuable insights into which industries or occupational settings have garnered significant attention in terms of carcinogen exposure research. Furthermore, the review aims to delineate the specific types of carcinogens that have been the subject of inquiry and to unravel the methodological landscape employed in assessing levels of exposure.

One of the pivotal motivations behind this scoping review is to pinpoint areas where the current body of literature falls short. By identifying these lacunae, the review will serve as a foundation for shaping the trajectory of future research endeavors. This, in turn, can facilitate the development of targeted interventions, regulatory policies, and preventative strategies that are informed by a more holistic understanding of the landscape of occupational carcinogen exposure in Iran.

In essence, the proposed scoping review endeavors to transcend the confines of individual studies and compile a comprehensive narrative that paints a nuanced portrait of exposure to occupational carcinogens in Iran. By doing so, it endeavors to contribute not only to the academic discourse but, more importantly, to the enhancement of occupational health and safety practices in the country.

2. Objectives

The overarching objectives of this scoping review are:

- To comprehensively identify, map, and summarize the existing literature concerning exposure to occupational carcinogens within various industries and settings in Iran.
- To categorize and analyze the types of carcinogens that have been investigated in these occupational contexts.
- To evaluate the methodologies employed in prior

studies for assessing and quantifying carcinogen exposure levels.

- To identify gaps, limitations, and areas of under-research in the current body of literature related to occupational carcinogen exposure in Iran.

3. Research Questions

To guide this scoping review, the following research questions will be addressed:

1. What are the prevalent types of occupational carcinogens studied in Iran?
2. Which industries or occupational settings have been the primary focus of research on carcinogen exposure?
3. What methodological approaches have been used to assess and quantify exposure to occupational carcinogens in Iranian workplaces?
4. What are the key findings and trends related to levels of carcinogen exposure and associated health risks?
5. In which areas is the current literature insufficient, and what potential areas for further research are indicated?

4. Search Strategy

The search strategy for this scoping review will be meticulously designed to capture a comprehensive range of literature related to exposure to occupational carcinogens in Iran. The strategy will encompass both English and Persian languages, utilizing a combination of controlled vocabulary terms and free-text keywords to ensure inclusivity. The following databases will be systematically searched: PubMed, Scopus, Web of Science, Scientific Information Database (SID), and Magiran.

The preliminary search terms include variations of the following keywords and phrases, adapted for each specific database's syntax and indexing system:

- Occupational carcinogens
- Workplace exposure
- Iran
- Carcinogenic agents
- Cancer risk
- Occupational health
- Occupational hazards
- Industry
- Occupational safety
- Carcinogen identification

The search terms will be combined using Boolean operators (AND, OR) to maximize relevancy while reducing false positives. To broaden the scope, synonyms and alternative terms for each concept will be incorporated. The search strategy will be refined iteratively, incorporating feedback from the research team and peer review.

Additionally, a manual search will be conducted to identify relevant studies from the reference lists of included articles and key review papers to ensure the comprehensiveness of the search results.

PubMed: 328 articles were found

“Iran”[Title/Abstract] AND (“Occupational Exposure”[MeSH Terms] OR (“occupant”[All Fields] OR “occupant s”[All Fields] OR “occupants”[All Fields]

OR “occupational”[All Fields] OR “occupations”[MeSH Terms] OR “occupations”[All Fields] OR “occupation”[All Fields]) AND “neoplasms”[MeSH Terms]) OR (((“occupant”[All Fields] OR “occupant s”[All Fields] OR “occupants”[All Fields] OR “occupational”[All Fields] OR “occupations”[MeSH Terms] OR “occupations”[All Fields] OR “occupation”[All Fields]) AND “malignancy”[Title/Abstract]) OR “occupational cancers”[Title/Abstract] OR “occupational carcinogen”[Title/Abstract] OR “workplace cancer”[Title/Abstract])).

Scopus: 173 articles were found

(TITLE-ABS-KEY (Iran) AND TITLE-ABS-KEY (occupational AND exposure OR occupational AND carcinogen OR occupational AND cancer OR workplace AND cancer)).

Web of Sciences: 71 articles were found

Iran (Topic) and occupational exposure OR occupational carcinogen OR workplace cancer OR occupational cancer (Topic).

Embase: 194

‘iran’:ti,ab,kw AND (‘occupational exposure’:ti,ab,kw OR ‘occupational carcinogen’:ti,ab,kw OR ‘occupational cancer’:ti,ab,kw OR ‘workplace cancer’:ti,ab,kw).

Duplicates: 153 duplicated files were removed

How many did articles were found in international databases after removing duplicates? 613 articles

Iranian databases

Magiran & SID search results: 102 related articles were found but as u know national databases had not an exact search engine>>> so maybe it needs to search on google

The Final number of Articles: International and national databases: 715 articles

5. Inclusion and Exclusion Criteria

Inclusion criteria:

- Studies conducted within Iran.
- Research specifically related to exposure to occupational carcinogens.
- Articles available in full text.
- Studies published in English or Persian languages.
- Studies of all publication dates.

Exclusion criteria:

- Studies conducted outside Iran.
- Research not directly related to occupational carcinogen exposure.
- Conference abstracts, editorials, letters, and reviews.
- Articles not accessible in full text.
- Non-English and non-Persian language studies (due to resource limitations).

6. Study Selection

Two independent reviewers will perform title and abstract screening using the predefined inclusion and

exclusion criteria. Full-text articles that pass the initial screening will then undergo a similar evaluation. Any discrepancies in study selection will be resolved through discussion between the reviewers. If necessary, a third reviewer will be consulted to reach a consensus.

7. Data Extraction

A standardized data extraction form will be developed to capture key information from selected studies. This form will include details such as study characteristics (title, authors, publication year), study design, population/sample characteristics, type of industry/occupation, specific carcinogens studied, exposure assessment methods, and major findings.

8. Data Analysis

The data analysis process for this scoping review will encompass several iterative steps to derive meaningful insights from the accumulated studies. A narrative synthesis approach will be employed to capture the diversity and breadth of the literature on exposure to occupational carcinogens in Iran.

8.1 Data Coding and Categorization

Initially, the extracted data will be coded and categorized into meaningful groups. This will involve identifying commonalities in terms of industry/occupation, types of carcinogens studied, methodologies employed for exposure assessment, and key findings. The goal is to create a structured framework that organizes the diverse information present in the selected studies.

8.2 Thematic Clustering

Once the data is categorized, thematic clustering will be applied to identify recurring patterns and themes. This involves grouping studies with similar characteristics, methodologies, and findings. Themes might emerge around specific industries (e.g., manufacturing, mining, agriculture), types of carcinogens (e.g., asbestos, benzene), exposure assessment methods (e.g., biomonitoring, air sampling), and reported health risks.

8.3 Gap Identification and Research Trends

Through the thematic clustering process, gaps and trends in the existing literature will become apparent. Areas with a dearth of research or specific industries that lack adequate attention in terms of carcinogen exposure studies will be highlighted. This step is crucial for identifying research areas that require further investigation and for informing potential policy interventions.

8.4 Synthesis of Findings

The synthesis of findings is a pivotal stage in the scoping review process, where the diverse array of data is distilled into a coherent narrative that addresses the research questions and illuminates the landscape of exposure to occupational carcinogens in Iran. This synthesis involves the integration of qualitative insights, trends, and patterns identified through thematic clustering, along with a consideration of any quantitative data that

might emerge from the selected studies.

8.4.1 Qualitative Synthesis

The thematic clustering process will provide a foundation for weaving together recurring themes and patterns across the studies. Qualitative synthesis will involve identifying overarching narratives related to the industries or occupational settings that have been the primary focus of research, the types of carcinogens that have garnered attention, and the methodologies employed to assess exposure levels.

Key findings regarding the prevalence and nature of occupational carcinogen exposure, as well as the associated health risks, will be highlighted. These qualitative insights will be structured in a way that provides a comprehensive overview of the state of knowledge while acknowledging gaps and limitations in the existing research.

8.4.2 Quantitative Synthesis and Meta-Analysis

In cases where the selected studies provide quantitative data (e.g., exposure levels, incidence rates, prevalence), a meta-analysis approach might be considered. Meta-analysis involves pooling and statistically analyzing quantitative findings from multiple studies to generate a summary effect size. However, it's important to note that the inclusion of meta-analysis in a scoping review depends on the availability of homogeneous and comparable quantitative data across studies.

If feasible, the process of meta-analysis will involve:

1. Data Extraction: Quantitative data, such as exposure levels or cancer incidence rates, will be extracted from the selected studies.

2. Heterogeneity Assessment: The degree of variability among the extracted data will be evaluated using appropriate statistical tests.

3. Effect Size Calculation: If the data are deemed sufficiently homogeneous, effect sizes (such as mean differences or odds ratios) will be calculated to quantify the magnitude of the relationship between exposure and health outcomes.

4. Meta-Analysis: A meta-analysis will be performed using appropriate statistical techniques to combine the effect sizes from different studies, generating a pooled estimate of the relationship.

It's important to note that while meta-analysis can provide valuable quantitative insights, scoping reviews primarily aim to provide a broad overview of the literature rather than a comprehensive statistical synthesis. Depending on the nature of the data and the degree of heterogeneity, the inclusion of meta-analysis findings will be considered while maintaining a focus on the narrative synthesis.

References

1. Delva F, Andujar P, Lacourt A, Brochard P, Paireon JC. Occupational risk factors for lung cancer. *Revue Des Maladies Respiratoires*. 2016 06;33(6):444-459. <https://doi.org/10.1016/j.rmr.2015.10.003>
2. Falzone L, Marconi A, Loreto C, Franco S, Spandidos DA, Libra M. Occupational exposure to carcinogens: Benzene, pesticides and fibers (Review). *Molecular Medicine Reports*. 2016 Nov;14(5):4467-4474. <https://doi.org/10.3892/mmr.2016.5791>
3. Loomis D, Guha N, Hall A, Straif K. Identifying occupational carcinogens: An update from the IARC Monographs. *Occupational and Environmental Medicine*. 2018 05 16;75:oemed-2017. <https://doi.org/10.1136/oemed-2017-104944>
4. Carles C, Verdun-Esquer C, Leclerc I, Baldi I. [Occupational cancers: Risks and prevention]. *Bulletin Du Cancer*. 2019;106(7-8):665-677. <https://doi.org/10.1016/j.bulcan.2018.10.010>
5. Brinchmann BC, Bugge MD, Nordby K, Alfonso JH. Firefighting and melanoma, epidemiological and toxicological associations: a case report. *Occupational Medicine (Oxford, England)*. 2022 02 22;72(2):142-144. <https://doi.org/10.1093/occmed/kqab183>
6. Paris L, Scarselli A, Marinaccio A, Massari S. Assessment of Occupational Carcinogenic Risk by Comparing Data from the Italian Register of Occupational Exposures to Carcinogens (SIREP) with the International Agency for Research on Cancer (IARC) Evidence. *International Journal of Environmental Research and Public Health*. 2023 05 17;20(10):5850. <https://doi.org/10.3390/ijerph20105850>
7. Hosseini B, Hall AL AL, Zandehdel K, Kromhout H, Onyije FM, Moradzadeh R, Zamanian M, Schüz J, Olsson A. Occupational Exposure to Carcinogens and Occupational Epidemiological Cancer Studies in Iran: A Review. *Cancers*. 2021 07 16;13(14):3581. <https://doi.org/10.3390/cancers13143581>
8. Zhang L, Sun P, Sun D, Zhou Y, Han L, Zhang H, Zhu B, Wang B. Occupational health risk assessment of the benzene exposure industries: a comprehensive scoring method through 4 health risk assessment models. *Environmental Science and Pollution Research International*. 2022 Dec;29(56):84300-84311. <https://doi.org/10.1007/s11356-022-21275-x>
9. Khoshakhlagh AH, Chuang K, Kumar P. Health risk assessment of exposure to ambient formaldehyde in carpet manufacturing industries. *Environmental Science and Pollution Research International*. 2023 02;30(6):16386-16397. <https://doi.org/10.1007/s11356-022-23353-6>



This work is licensed under a Creative Commons Attribution-Non Commercial 4.0 International License.