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EXPERT CONSENSUS ON A PROTOCOL FOR CONDUCTING BIBLIOMETRIC ANALYSIS OF SCIENTIFIC ARTICLES ON GLOBAL MIGRATION HEALTH (GMH)

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EXPERT CONSENSUS ON A PROTOCOL FOR CONDUCTING BIBLIOMETRIC ANALYSIS OF SCIENTIFIC ARTICLES ON GLOBAL MIGRATION HEALTH (GMH)

Authors

Sweetmavourneen Pernitez-Agan[1*]
Mary Ann Bautista[1*]
Janice Lopez[1*]
Margaret Sampson[2]
Anuj Kapilashrami[3]
Melissa Garabiles[4]
Charles Hui[5]
Bontha V. Babu [6]
Roomi Aziz[7]
Lucy Jordan[8]
Teddy Rowell U. Mondres[9]
May Antonnette Lebanan[1]
Kolitha Wickramage[1,10*]
The Manila Consensus on Methodological Guidelines in Migration Health Bibliometric Analysis

Affiliation

[1]UN Migration Agency, International Organization for Migration, Makati City, Philippines
[2]Children's Hospital of Eastern Ontario, Ontario, Canada
[3] School of Health & Social Care, University of Essex & Migration Health South Asia Network
[4]Department of Psychology, De La Salle University, Philippines
[5]Pediatric Infectious Disease Specialist, University of Ottawa, Canada & Chair, MHADRI network
[6]Socio-Behavioural, Health Systems & Implementation Research Division, Indian Council of Medical Research, New Delhi, India
[7]Assistant Lecturer, School of Health and Social Care, University of Essex, United Kingdom, Regional Coordinator for Migration Health South Asia (MiHSA) network
[8]Department of Social Work and Social Administration; Associate Dean (UG), Faculty of Social Sciences, University of Hong Kong
[9]International Health Program, National Yang Ming Chiao Tung University, Taiwan
[10]On behalf of the Manila Consensus on Methodological Guidelines in Migration Health Bibliometric Analysis (Manila Consensus Group), UN Migration Agency, International Organization for Migration, Global Data Institute, Berlin, Germany

Correspondence

*MHD Research and Epidemiology Unit
UN Migration Agency
International Organization for Migration
BDO Tower, Paseo de Roxas, Makati City
Metro Manila, Philippines

UN Migration Agency (IOM), MHD Research Team

E-mail: mhdrap@iom.int

Keywords

ABSTRACT

Background: Migration and health are key priorities in global health and essential for protecting and promoting the health of migrants. To better understand the existing evidence on migration health, it is critical to map the research publication activity and evidence on the health of migrants and mobile populations. This paper presents a search strategy protocol for a bibliometric analysis of scientific articles on global migration health (GMH), leveraging the expertise of a global network of researchers and academics. The protocol aims to facilitate the mapping of research and evidence on the health of international migrants and their families, including studies on human mobility across international borders.

Methods: A systematic search strategy using Scopus will be developed to map scientific articles on global migration health. The search strategy will build upon a previous bibliometric study and will have two main search components: (1) "international migrant population", covering specific movements across international borders, and (2) "health". The final search strategy will be implemented to determine the final set of articles to be screened for the bibliometric analysis. Title and abstract screening will exclude irrelevant articles and classify the relevant articles according to predefined themes and subthemes. A combination of the following approaches will be used in screening: applying full automation (i.e., machine learning) and/or semi-automation (i.e., EndNote, MS Excel) tools, and manual screening. The relevant articles will be analyzed using MS Excel, Biblioshiny, and VOSviewer, which creates a visual mapping of the research publication activity around global migration health. This protocol is developed in collaboration with academic researchers and policymakers from the Global South, and a network of migration health and research experts, with guidance from a bibliometrics expert.

Ethics: The protocol will use publicly available data and will not directly involve human participants; an ethics review will not be required. The findings from the bibliometric analysis (and other research that can potentially arise from the protocol) will be disseminated through academic publications, conferences, and collaboration with relevant stakeholders to inform policies and interventions aimed at improving the health of international migrants and their families.

Key message:

WHAT IS ALREADY KNOWN ON THIS TOPIC

- The underlying search strategy in this protocol builds upon the foundational work by Sweileh et al. on global migration health research (2000–2016) [1].

WHAT THIS STUDY ADDS

- This protocol will map scientific articles on global migration health published from 2017 to 2022. Further, this study will provide an up-to-date and comprehensive mapping of the latest research evidence on the

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health of international migrants (i.e., including the families of international migrants, and short-term international migrant populations, e.g., tourists, travellers, and seasonal workers). Ultimately, the relevant articles from this study will be housed in a searchable public repository.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE, AND POLICY

- Assessing the status of research publication activity in global migration health (GMH) is critical to map the existing evidence base, identifying gaps, and advancing evidence-informed policies and practices at the national, regional, and global levels.

INTRODUCTION

Migration and human mobility are key social determinants of health. The bi-directional relationship between migration and health is a complex and dynamic one [2]. Scholars caution generalizability between and within migrant groups [3, 4].   A high degree of heterogeneity across migrant groups and movement/ mobility patterns mean differing social determinants, health risks, and health impacts across the migration phases [5]. Migrants may be exposed to various health risks at each stage of the migratory process: from leaving their place of origin, during travel/transit, through arrival at destination, and even upon their return. Conversely, migration may also enable and promote the health of migrants directly through better access to healthcare at their destination, or through remittance flows to migrant households, thereby improving nutrition and healthcare accessibility. Migrant populations have varying vulnerabilities and resiliencies/protective factors depending on their socio-demographic profile, legal status, or phase of the migration process [2, 6]. Moreover, restrictive migration policies, inadequate integration practices, and anti-migrant sentiments may inhibit migrants' access to healthcare, education, and safe and dignified living and working conditions [7, 8].

The health of migrants is a key global health priority and critical for achieving the Sustainable Development Goals (SDGs) [2-4]. Assessing the status of research publication activity in global migration health (GMH) is critical to map the existing evidence base, identifying gaps, and advancing evidence-informed policies and practices at the national, regional, and global levels. The 2nd Global Consultation on Migrant Health (2017) recognized the need to "take stock of current research, map the existing literature, identify areas of focus and gaps, and establish a global research agenda on migration health" [8]. The consultation emphasized the importance of analyzing the globally published peer-reviewed literature in the field of GMH. Further, strengthening data and research capacity was one of the expected outcomes in the 3rd Global Consultation on the health of refugees and migrants held in June 2023 [9].

Mapping Research Evidence on Migration Health: A Priority

Bibliometric analysis is the quantitative analysis of publications (e.g., research articles and books) using bibliographic data (i.e., author information, citation, and publication information) to produce measures of 'research activity or research publication activity (i.e., number of publications), 'research impact' (i.e., citation counts, journal impact factor, etc.), and national or international collaborations of authors, institutions or organizations, and countries (based on the co-authorship affiliation). Although the bibliometric method does not provide analysis and interpretation of the content and quality of a research publication, it provides useful information on the growth and impact of research publications, including important gaps, trends, emerging fields, and research networks, within a particular field or discipline [10, 11]. Hence, bibliometrics is firmly established as a scientific specialty and an integral part of research evaluation methodology.

In 2019, a coalition of organizations (i.e., IOM, Migration Health for South Asia or MiHSA network and its flagship Strengthening Policy and Research Capacities or SPARC project funded by the British Council, African Centre for

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Migration & Society or ACMS, and Migration Health and Development Research Initiative or MHADRI), facilitated two migration health research workshops in Nepal and South Africa. These meetings highlighted the importance of undertaking national, sub-regional, and regional 'deep dives' into mapping migration health research output for both international and internal migrants.

Recognizing the need to build research capacity to identify the gaps in research output on migration and health, IOM together with MHADRI and MiHSA, organized a workshop on undertaking bibliometric analysis in late 2019. The workshop was attended by research scholars and policymakers from South and Southeast Asia. This undertaking led to the formation of the "Manila consensus on methodological guidelines in migration health bibliometric analysis" (hereafter referred to as "Manila Consensus Group") that aims to advance actions towards providing greater conceptual and methodological clarity and analytical rigor for bibliometric analysis, as well as applying such standards to the migration health research field. One of the overarching aims of the Manila Consensus Group includes examining research publication activity in the following areas: global migration health (i.e., international migration or movement), internal migration and health, migration health assessments of migrants, and migrant health outcomes in areas ranging from infectious disease, non-communicable disease, and occupational health South and Southeast Asia [12].

The underlying search strategy in this protocol was initially developed through an expert consensus in the "Manila Consensus Group" following a critical review of key search terms, and builds upon the foundational work by Sweileh et al. on global migration health research (2000–2016) [1]. The current paper presents the protocol for mapping scientific articles on global migration health published from 2017 to 2022. Specifically, a bibliometric analysis will be conducted to determine the research publication activity trends/ patterns by author, country, institution/ organization, pre-defined health themes, and specific international migrant/ migration topics (e.g., international migration type, migrant population) including 'international human mobility'. Further, this analysis will provide an up-to-date and comprehensive mapping of the latest research evidence on the health of international migrants (i.e., including the families of international migrants, and short-term international migrant populations, e.g., tourists, travellers, and seasonal workers). Ultimately, the relevant articles from this study will be housed in a searchable public repository.

The seminal bibliometric analysis published in 2018 led to a few relevant research evidence mapping studies at the regional level, including a 2021 study that looked at the scientific research on the health of low-income migrants, including internally displaced populations (IDPs) and refugees in South Asia [13]. Another related work was done in response to the growing research on COVID-19, which looked at human mobility, migration, and health [14]. An information platform on health and migration in the Americas also highlights the growing interest and significance of this field [15].

METHODOLOGY

As there is no standard for reporting protocols of bibliometric studies, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [16] is used to guide the protocol development. This study will apply the bibliometric analysis method to map scientific articles on the health of international migrants and their families, including 'international human mobility'. The protocol will cover articles published from 2017 to 2022, updating the coverage of articles by publication year (i.e., 2000 to 2016) in the previous work by Sweileh et al., in 2018 [1], defining the scope of 'international migration' (including mobility across borders), and enhancing rigour through the use of a prospectively defined and publicly available protocol.

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Citation Database

Scopus, an abstract and citation database of peer-reviewed literature developed by Elsevier, will be used to retrieve scientific articles on migration and health. Scopus provides a comprehensive overview of global research output in different disciplines and covers 100 per cent of MEDLINE articles. This database was used in the first bibliometric study on global migration health [1].

Search Strategy and Selection Criteria

Development of the search strategy

The identification and selection of keywords will be based on the definition of terms provided above along with the search strategy and keywords from the previous GMH study [1],and other relevant systematic reviews on health [17, 18]. This study will build on the existing search queries to cover international migration, international human mobility, international migrant populations, and their families, based on IOM's definition of migrants and broader search terms on health. For this analysis, the terms 'international migrant', 'international migration', and 'international movement' will cover all forms of human movement across an international border away from his/her usual place of residence regardless of the cause, legal status, and length of the stay [9].

The previous GMH study by Sweileh et al., covered articles on the health of specific international migrant populations from publication years 2000 to 2016, but did not look at other international migrant populations (e.g., migrant families, travelers, etc.) [1]. A bibliometrics expert will review and validate the methodological rigor of the search strategy using the Peer Review of Electronic Search Strategies (PRESS) guideline [19].

DEFINITION OF TERMS

The following definition of terms related to migration and human mobility is provided to give context and clarity on the scope of this paper. The migrant categories mentioned are not meant to imply or create any new legal category of migrant populations.

Migrant is an umbrella term that is not defined under international law. Two approaches are generally adopted to define the term 'migrant': a broad definition considers the term 'migrant' as covering all forms of movements; while a more selective definition excludes those who flee wars or persecution (i.e., refugees, asylum seekers) [20].

The International Organization for Migration (IOM), the United Nation's Migration Agency, adopts the broad definition of *'migrant'* to cover "all individuals who move away from their place of usual residence, whether within a country (i.e., **internal migrant**) or across international borders (i.e., **international migrant**), temporarily or permanently, and for a variety of reasons." This definition applies regardless of the person's legal status, causes for movement, length of stay, and whether the movement is voluntary or forced (or involuntary). The movement of persons whether within a country (i.e., **internal migration**) or across international borders (i.e., **international migration**) is called **migration** [21].

Human Mobility is "a generic term covering all the different forms of movements of persons," thus encompassing migration [21].

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International migrant worker refers to an individual who is currently employed, or unemployed and seeking employment in a country that is not their usual country of residence for the purpose of employment [20].

Refugee is an individual who, owing to a well-founded fear of persecution for reasons of race, religion, nationality, membership of a particular social group, or political opinion, is outside the country of his/her nationality and is unable or, owing to such fear, is unwilling to avail of the protection of that country; or who, not having a nationality and being outside the country of his/her former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it [20].

Asylum seeker refers to an individual who is seeking international protection. In countries with individualized procedures, an asylum seeker is someone whose claim has not yet been finally decided on by the country in which he or she has submitted it. Not every asylum seeker will ultimately be recognized as a refugee, but every recognized refugee is initially an asylum seeker [20].

Trafficked international migrant refers to an international migrant who was abused or exploited by traffickers (a crime against human rights) [22, 23].

Smuggled international migrant refers to an international migrant who avails services of smugglers to facilitate movement across international borders where they are not a national or permanent resident (a crime against a State) [20, 24].

International student refers to an international migrant who moved for the purpose of education or who is enrolled outside of their country of origin [25].

Migrant patient across international borders (also referred to as 'medical tourists') refers to international migrants who travel to access medical treatment or cure that is often lacking and/or costly in their usual country of residence [26].

The search strategy will have two search components. The first component, 'global migration,' will consist of a general query for 'international migrant and migration' and specific queries on select 'international migrant categories,' that will not be captured in the general query, such as refugees and asylum seekers, trafficked and smuggled migrants, migrant patient across international borders (or 'medical tourists'), and international students. The query for 'international migrant and migration' covers all terms related to 'migrant', 'immigration', 'emigration', and 'international human mobility' which will serve as an overarching search query in the succeeding search queries of each migrant category. The outcome of these search queries will be combined using the Boolean operator 'OR.' The final combined terms for migration will be applied in the article TITLE to reduce the number of irrelevant articles.

The second search component will pertain to health. The search terms on health will be selected based on a careful review of previous bibliometric and systematic reviews. The resulting query on health will be applied to the TITLE-ABSTRACT-KEYWORDS fields.

The overall queries for the two search components will be combined using the Boolean operator 'AND' to produce the 'global migration health' search query.

Applying exclusions steps within the search strategy

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The following steps will be applied to the resulting 'global migration health' search query to reduce the number of irrelevant articles or false-positive results (i.e., irrelevant articles retrieved by the search query):

1. Restrict years to the following period: 2017 to 2022 (NB: This refers to the year of publication of the articles. This will be applied using the built-in filters in Scopus).

2. Limit document type to research articles and reviews. (NB: Scopus defines 'research articles' as original research or opinion, whereas 'reviews' refers to an article with a significant review of original research, also includes conference papers.) [27]]

3. Limit source type to journals (NB: Per Scopus definition, this refers to any peer-reviewed serial journal publication).

4. Exclude articles indexed in subject areas other than human health (e.g., Veterinary and Planetary Science) after careful review of the retrieved articles. (NB: Scopus classifies articles into one or more subject areas).

5. Exclude articles with irrelevant or out-of-scope topics using the following exclusion criteria:
    -   articles pertaining to animal, non-human studies, or cell migration
    -   articles that do not discuss health and/or well-being of international migrant populations
    -   articles retracted (or only cited the original publication in the erratum)

Validity of the search strategy

A two-step approach will be used to validate the search strategy.

First, the search strategy will be adjusted if known relevant articles are not captured in the search. The known relevant articles will be pre-selected by the research team from included studies of the previous systematic reviews and the research team's file. This step will determine the sensitivity of the search strategy. The known relevant articles used for testing will be documented.

Second, the first 200 retrieved records per publication year, including title and abstract (if available) will be screened using MS Excel or EndNote to identify irrelevant articles. Further, the built-in analysis feature in Scopus will be used to check journals and subject areas. These irrelevant articles will be examined to determine if they were retrieved by search terms that need to be modified, or if 'NOT' statements could safely exclude the selected record. In each step of the search query, a sample of the search results will be screened for validity. The search will be adjusted based on the quality of the screened sample until over 70-75 per cent of the retrieved articles are relevant or until no further improvements in precision can be obtained.

Data Items and Data Extraction in Scopus

The Scopus search output will be exported into several formats including CSV (for screening, classification, analysis, and visualization), RIS (for screening duplicates in EndNote), and BibTex (for analysis). All fields will be exported including the broad categories, citation information, bibliographic information, abstract and keywords, funding details (where available), and cited references.

Exported Scopus output will be screened for duplicates using MS Excel, EndNote based on the following parameters: author names; article title; source title; and volume and issue number. Further, duplicate screening will be explored using the AI tool prior to screening of relevant articles.

Screening and Classification of Relevant Articles

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Screening of relevant articles

For the TITLE-ABSTRACT screening of retrieved articles from the Scopus database, full automation (via machine learning tools and/or apps) and semi-automation (using EndNote and MS Excel) will be applied (whichever is feasible) [28, 29]. These combined approaches are expected to reduce the screening and classification (if an article is identified as relevant) workload versus the manual screening process [30]. Articles will be identified as 'Included' and 'Excluded'. Articles identified as 'Included' will then be classified into relevant migration health-related topics.

The following additional exclusion criteria will be applied at the title and abstract screening:

- articles pertaining to non-relevant migrant populations: internal migrants and/or internal migration (urban to rural migration, migration within countries) and/or internal human mobility (movement within countries)

- articles pertaining to brain drain and migrant nurses or physicians or health professions (NB: This was listed as an exclusion in Sweileh et. al. [1] Further, an initial review of search terms linked to brain drain, nurses, and health professionals captured many irrelevant publications).

Initially, manual TITLE-ABSTRACT screening and classification will be done by the authors. Note that the reviewers might need to retrieve the full text of the training set for ensure proper classification. This will serve as the training set of articles for the machine learning tool. Once sufficient training examples are available, as determined by the system, further eligibility screening will be done through machine learning with human intervention where the machine is unable to make a confident determination of eligibility.

Classification of relevant articles

Below is a list of classifications and subclassifications (Table 1), following the previous GMH paper [30] and a health and migration dashboard in the Americas [15]. Classification of eligible articles will be applied using machine learning tools and/or semi-automation (i.e., search article title, abstract, and/or keywords using MS Excel or EndNote), whichever is applicable. Where available, database descriptors such as age, sex, and medical subject headings (MeSH terms) will be considered in the classification. The full article will not be retrieved and examined. Therefore, the list of proposed classifications and subclassifications is dependent on the functionality of the AI and semi-automation tools, and the quality of the training set (i.e., initial set of manually screened articles).

Table 1: List of proposed classifications and subclassifications of relevant articles

Classification	Subclassification [code/ notes]
Year of publication	<Per actual year> *Note: Coverage of included articles is from 2017 to 2022*
Language	[as classified by Scopus]
Article type	Article, Review [as classified by Scopus]
Study design	Systematic review, cohort, case-control, etc.
Author/s	<Name/s of author/s>
International migrant type [study population topic/ data]	Asylum seeker, Displaced population, migrant, immigrant, student, refugee, etc.
Associated Dataset	Primary Secondary Combination
Flow of migration	Immigration/ in-migration/ in-bound [immigration] Emigration/ out-migration, outbound [emigration] Return [return]

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Classification	Subclassification [code/ notes]
Study setting	Camp setting Detention (and incarceration) Urban Rural Humanitarian emergency
Phase of migration	Pre-migration [premigration], transit [transit], arrival [arrival], return [return]
Type of migration/ movement/ mobility	Irregular migration [irregular], regular migration [regular], forced migration [forced], resettlement [resettlement], circular migration [circular], climate migration
Country topic/ coverage/ implementation	<Country name/s> Not specified *Note: Country topic refers to the country of study or implementation, country of origin, nationality or citizenship of study population, country source data, and/or country key or main topic of article.*
Country topic - income classification	Low-income country [LIC] Lower-middle income country [LMIC] Upper-middle-income country [UMIC] High-income country [HIC] <automate in excel>
Region topic	<automate in excel> *Note: Region topic refers to the region of the specified country of study or implementation (see country as described above).*
Country of origin	<as is, if applicable only>
Period of study	<Year start> - <Year end>
Population group by age	Infant Child Adolescent Adult Older adult Working Age (18-59 yrs) Not specified
Population group by sex and gender	Women of reproductive age (15-49 yrs) Women Men Trans LGBTQIA+ Not specified
Diseases and health conditions	Child health Infectious diseases Disability Non-communicable diseases Sexually transmitted infections Malnutrition Maternal health Sexual health Reproductive health Psychosocial, mental health and well-being Vaccine-preventable diseases

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Classification	Subclassification [code/ notes]
Determinants of health[1]	Individual factors (demographics, hereditary) Lifestyle/ behavioral factors Living conditions (access to safe housing, water, sanitation) Socio-cultural factors (discrimination, stigma, social inclusion) Governance (legislation, policies) Political determinants (wars, conflicts, policy) Commercial determinants Environmental determinants
Health promotion and education	Social behavioral change communication Health literacy (and health information)
Health systems and policies	Healthcare policies Healthcare models Healthcare services Healthcare financing Healthcare access Health workforce Health Information systems Human rights Gender-sensitive policies SDGs on health Universal health coverage Health system strengthening Financial protection/insurance Equity in healthcare Migration-specific policies Migration governance Migrant inclusion Migrant integration Procurement system
Environmental health	Climate-related migration SDGs on environmental health Disaster risk reduction
Occupational health	Work-related stress Work-related injuries Work-related disability Skin conditions Allergy and asthma Musculoskeletal disorders Chemical exposures Noise-induced hearing loss
Migration-specific	Travel-related health assessment Other health-related travel assistance Border management Flow monitoring Emergency response

Bibliometric analysis of relevant articles

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[1] Health of Migrants https://www.migrationdataportal.org/themes/migration-and-health

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MS Excel and Biblioshiny (RStudio) will be used to analyze bibliometric information including authors, citations, articles, and sources (or journals). Biblioshiny is an open-source web-interfaced bibliometrics tool that uses the R programme, a statistical software package[31]. Biblioshiny provides metrics on intra-country (SCP) and inter-country (MCP) collaboration including a summary of single-authored and multiple-authored articles. MS Excel will be used to produce descriptive counts and percentages of classified articles by theme, subtheme, migrant topic, and country topic/coverage [32]. It is important to note that bibliometric analysis relies mainly on the quantitative analysis of bibliometric information, and the qualitative analysis is an interpretation only. Further, the bibliometrics method is used when the scope is broad, and the dataset is too large for manual review [33].

Visualization mapping VOSviewer version 1.6.19 [34], a software tool for constructing and visualizing bibliometric networks, will be used to analyze and visualize the networks of co-authorship relations among authors, countries, and institutions, and co-occurrence relations between keywords. To present a clean map, VOSviewer thesaurus files will be prepared to standardize terms and exclude generic and out-of-scope terms [35].

Patient and public involvement

The protocol will use publicly available data and will not directly involve patients and the public.

Limitations

The depth and breadth of the findings from bibliometric analysis will depend on the information available in Scopus and the search strategy applied. Limitations inherent in a bibliometric study are as follows: (1) Relevant articles might be missed, particularly, those published in preprint servers. Research papers in the online preprint servers are not indexed in Scopus as these have yet to be peer-reviewed or accepted by traditional academic journals. Nevertheless, articles-in-press (i.e., pre-published versions of accepted research articles) are included in Scopus. (2) New articles might be missed due to time lag in the Scopus indexing (NB: fully indexed articles are estimated to appear in Scopus within three to four weeks of the article appearing on the publisher's website). (3) Bibliometrics only measures impact in terms of research publication activity and not the research quality. (4) Search results reflect how the article information was recorded and presented in Scopus. For example, active institutions, author names, and countries with different spellings will be spread out in the results. Another example is that relevant articles are not captured because the title and/or abstract do not contain the identified search terms. A possible reason for such scenario is when authors of the relevant articles do not indicate the term 'migrant' in the title and/or abstract when referring to some migrant populations that they may not recognize and/or classify as 'International Migrant' (e.g., populations crossing the shared Bangladesh and India border).

Application of the Protocol

This protocol will be useful for researchers who wish to do a similar mapping specific to their region of country/ies of interest.

ETHICS

This bibliometric analysis will draw on publicly available data and will not directly involve human participants; ethical review will not be required. The findings from the bibliometric analysis (and other related research that can potentially arise from the protocol) will be disseminated through academic publications, conferences, and other

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forms of collaboration with relevant stakeholders to inform policies and interventions aimed at improving the health of international migrants and their families.

AUTHOR'S CONTRIBUTION

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CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Section and topic	Item No	Checklist item	Mark Yes, if available	Notes
ADMINISTRATIVE INFORMATION				
Title:				
Identification	1a	Identify the report as a protocol of a systematic review	Not applicable	Protocol for a bibliometrics study
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	Not applicable	
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number	Not applicable	
Authors:				
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	Yes	
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	Yes	
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	Yes	
Support:				
Sources	5a	Indicate sources of financial or other support for the review	Not applicable	
Sponsor	5b	Provide name for the review funder and/or sponsor	Not applicable	
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	Not applicable	
INTRODUCTION				
Rationale	6	Describe the rationale for the review in the context of what is already known	Yes	
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	Yes	
METHODS				
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	Yes	
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial	Yes	

		registers or other grey literature sources) with planned dates of coverage		
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	Yes	
Study records:				
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	Yes	
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	Yes	
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	Yes	
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	Yes	
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	Not applicable	
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	Not applicable	
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	Not applicable	
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2, Kendall's τ)	Not applicable	
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	Not applicable	
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	Bibliometric analysis	
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	Not applicable	
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	Not applicable	

* It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.

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EXPERT CONSENSUS ON A PROTOCOL FOR CONDUCTING BIBLIOMETRIC ANALYSIS OF SCIENTIFIC ARTICLES ON GLOBAL MIGRATION HEALTH (GMH)

Authors

Sweetmavourneen Pernitez-Agan[1]*
Mary Ann Bautista[1]*
Janice Lopez[1]*
Margaret Sampson[2]
Anuj Kapilashrami[3]
Melissa Garabiles[4]
Charles Hui[5]
Bontha V. Babu [6]
Roomi Aziz[7]
Lucy Jordan[8]
Teddy Rowell U. Mondres[9]
May Antonnette Lebanan[1]
Kolitha Wickramage[1,10]*
The Manila Consensus on Methodological Guidelines in Migration Health Bibliometric Analysis

Affiliation

[1]UN Migration Agency, International Organization for Migration, Makati City, Philippines
[2]Children's Hospital of Eastern Ontario, Ontario, Canada
[3] School of Health & Social Care, University of Essex & Migration Health South Asia Network
[4]Department of Psychology, De La Salle University, Philippines
[5]Pediatric Infectious Disease Specialist, University of Ottawa, Canada & Chair, MHADRI network
[6]Socio-Behavioural, Health Systems & Implementation Research Division, Indian Council of Medical Research, New Delhi, India
[7]Assistant Lecturer, School of Health and Social Care, University of Essex, United Kingdom, Regional Coordinator for Migration Health South Asia (MiHSA) network
[8]Department of Social Work and Social Administration; Associate Dean (UG), Faculty of Social Sciences, University of Hong Kong
[9]International Health Program, National Yang Ming Chiao Tung University, Taiwan
[10]On behalf of the Manila Consensus on Methodological Guidelines in Migration Health Bibliometric Analysis (Manila Consensus Group), UN Migration Agency, International Organization for Migration, Global Data Institute, Berlin, Germany

Correspondence

*MHD Research and Epidemiology Unit
UN Migration Agency
International Organization for Migration
BDO Tower, Paseo de Roxas, Makati City
Metro Manila, Philippines

UN Migration Agency (IOM), MHD Research Team

E-mail: kwickramage@iom.int

ABSTRACT

Background: Migration and health are key priorities in global health and essential for protecting and promoting the health of migrants. To better understand the existing evidence on migration health, it is critical to map the research publication activity and evidence on the health of migrants and mobile populations. This paper presents a search strategy protocol for a bibliometric analysis of scientific articles on global migration health (GMH), leveraging the expertise of a global network of researchers and academics. The protocol aims to facilitate the mapping of research and evidence on the health of international migrants and their families, including studies on human mobility across international borders.

Methods: A systematic search strategy using Scopus will be developed to map scientific articles on global migration health. The search strategy will build upon a previous bibliometric study and will have two main search components: (1) "international migrant population", covering specific movements across international borders, and (2) "health". The final search strategy will be implemented to determine the final set of articles to be screened for the bibliometric analysis. Title and abstract screening will exclude irrelevant articles and classify the relevant articles according to predefined themes and subthemes. A combination of the following approaches will be used in screening: applying full automation (i.e., machine learning) and/or semi-automation (i.e., EndNote, MS Excel) tools, and manual screening. The relevant articles will be analyzed using MS Excel, Biblioshiny, and VOSviewer, which creates a visual mapping of the research publication activity around global migration health. This protocol is developed in collaboration with academic researchers and policymakers from the Global South, and a network of migration health and research experts, with guidance from a bibliometrics expert.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- A major strength of the study is the collaboration with different researchers and/or experts on GMH including from the Global South.
- This study will provide an up-to-date and comprehensive mapping of scientific articles on global migration health published from 2017 to 2022, which will then be housed in a searchable online public repository.
- Assessing the status of research publication activity on global migration health is critical to map the existing evidence base, identifying gaps, and advancing evidence-informed policies and practices at the national, regional, and global levels.
- By classifying articles into pre-defined themes using a human trained AI tool, the current methodology goes beyond the conventional bibliometric approach.
- The bibliometrics method has inherent limitations, wherein the research output is dependent on the search strategy, the scope and indexed journals of the citation database, and the analysis software; its aim is primarily to quantify research productivity and not to assess the study quality of included articles and therefore limited in providing insights into the impact on policy, society, or practical applications.

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INTRODUCTION

Migration and human mobility are key social determinants of health. The bi-directional relationship between migration and health is a complex and dynamic one [1]. Scholars caution generalizability between and within migrant groups [2, 3].   A high degree of heterogeneity across migrant groups and movement/ mobility patterns mean differing social determinants, health risks, and health impacts across the migration phases [4]. Migrants may be exposed to various health risks at each stage of the migratory process: from leaving their place of origin, during travel/transit, through arrival at destination, and even upon their return. Conversely, migration may also enable and promote the health of migrants directly through better access to healthcare at their destination, or through remittance flows to migrant households, thereby improving nutrition and healthcare accessibility. Migrant populations have varying vulnerabilities and resiliencies/protective factors depending on their socio-demographic profile, legal status, or phase of the migration process [1, 5]. Moreover, restrictive migration policies, inadequate integration practices, and anti-migrant sentiments may inhibit migrants' access to healthcare, education, and safe and dignified living and working conditions [6, 7].

The health of migrants is a key global health priority and critical for achieving the Sustainable Development Goals (SDGs) [1-3]. Assessing the status of research publication activity in global migration health (GMH) is critical to map the existing evidence base, identifying gaps, and advancing evidence-informed policies and practices at the national, regional, and global levels. The 2nd Global Consultation on Migrant Health (2017) recognized the need to "take stock of current research, map the existing literature, identify areas of focus and gaps, and establish a global research agenda on migration health" [7]. The consultation emphasized the importance of analyzing the globally published peer-reviewed literature in the field of GMH. Further, strengthening data and research capacity was one of the expected outcomes in the 3rd Global Consultation on the health of refugees and migrants held in June 2023 [8].

Mapping Research Evidence on Migration Health: A Priority

Bibliometric analysis is the quantitative analysis of publications (e.g., research articles and books) using bibliographic data (i.e., author information, citation, and publication information) to produce measures of 'research activity or research publication activity (i.e., number of publications), 'research impact' (i.e., citation counts, journal impact factor, etc.), and national or international collaborations of authors, institutions or organizations, and countries (based on the co-authorship affiliation). Although the bibliometric method does not provide analysis and interpretation of the content and quality of a research publication, it provides useful information on the growth and impact of research publications, including important gaps, trends, emerging fields, and research networks, within a particular field or discipline [9, 10]. Hence, bibliometrics is firmly established as a scientific specialty and an integral part of research evaluation methodology.

In 2019, a coalition of organizations (i.e., IOM, Migration Health for South Asia or MiHSA network and its flagship Strengthening Policy and Research Capacities or SPARC project funded by the British Council, African Centre for Migration & Society or ACMS, and Migration Health and Development Research Initiative or MHADRI), facilitated two migration health research workshops in Nepal and South Africa. These meetings highlighted the importance of undertaking national, sub-regional, and regional 'deep dives' into mapping migration health research output for both international and internal migrants.

Recognizing the need to build research capacity to identify the gaps in research output on migration and health, IOM together with MHADRI and MiHSA, organized a workshop on undertaking bibliometric analysis in late 2019. The workshop was attended by research scholars and policymakers from South and Southeast Asia. This undertaking led

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to the formation of the "Manila consensus on methodological guidelines in migration health bibliometric analysis" (hereafter referred to as "Manila Consensus Group") that aims to advance actions towards providing greater conceptual and methodological clarity and analytical rigor for bibliometric analysis, as well as applying such standards to the migration health research field. One of the overarching aims of the Manila Consensus Group includes examining research publication activity in the following areas: global migration health (i.e., international migration or movement), internal migration and health, migration health assessments of migrants, and migrant health outcomes in areas ranging from infectious disease, non-communicable disease, and occupational health South and Southeast Asia [11].

The underlying search strategy in this protocol was initially developed through an expert consensus in the "Manila Consensus Group" following a critical review of key search terms, and builds upon the foundational work by Sweileh et al. on global migration health research (2000–2016) [12]. The current paper presents the protocol for mapping scientific articles on global migration health published from 2017 to 2022. Specifically, a bibliometric analysis will be conducted to determine the research publication activity trends/ patterns by author, country, institution/ organization, pre-defined health themes, and specific international migrant/ migration topics (e.g., international migration type, migrant population) including 'international human mobility'. Further, this analysis will provide an up-to-date and comprehensive mapping of the latest research evidence on the health of international migrants (i.e., including the families of international migrants, and short-term international migrant populations, e.g., tourists, travellers, and seasonal workers). Ultimately, the relevant articles from this study will be housed in a searchable online public repository and may serve as a starting point for high-level evidence reviews by country, regional, and/or specific themes.

The seminal bibliometric analysis published in 2018 led to a few relevant research evidence mapping studies at the regional level, including a 2021 study that looked at the scientific research on the health of low-income migrants, including internally displaced populations (IDPs) and refugees in South Asia [13]. Another related work was done in response to the growing research on COVID-19, which looked at human mobility, migration, and health [14]. An information platform on health and migration in the Americas also highlights the growing interest and significance of this field [15].

METHODOLOGY

As there is no standard for reporting protocols of bibliometric studies, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [16] is used to guide the protocol development. This study will apply the bibliometric analysis method to map scientific articles on the health of international migrants and their families, including 'international human mobility'. The protocol will cover articles published from 2017 to 2022, updating the coverage of articles by publication year (i.e., 2000 to 2016) in the previous work by Sweileh et al., in 2018 [12], defining the scope of 'international migration' (including mobility across borders), and enhancing rigour through the use of a prospectively defined and publicly available protocol. The study commenced in September 2023 with an estimated completion in September 2024.

Citation Database

Scopus, an abstract and citation database of peer-reviewed literature developed by Elsevier, will be used to retrieve scientific articles on migration and health. Scopus provides a comprehensive overview of global research output in different disciplines and covers 100 per cent of MEDLINE articles. Scopus has been shown to have more complete

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coverage of publications in health and medical sciences than Web of Science or Dimensions [17]. Further, Scopus was the data source used for the 2000-2016 period [12], and so this database was selected for this update for comparability.

Search Strategy and Selection Criteria

Development of the search strategy

The identification and selection of keywords will be based on the 'Definition of Terms' provided along with the search strategy and keywords from the previous GMH study [12],and other relevant systematic reviews on health [18, 19]. This study will build on the existing search queries to cover international migration, international human mobility, international migrant populations, and their families, based on IOM's definition of migrants and broader search terms on health [9].

The previous GMH study by Sweileh et al., covered articles on the health of specific international migrant populations from publication years 2000 to 2016 (i.e., migrant workers, refugees/asylum seekers/displaced people (not internally displaced), international students, trafficked victims/victims of human smuggling, patients' mobility across borders, and international migrants/immigration), but did not look at other international migrant populations (e.g., migrant families, travelers, etc.) [12]. A bibliometrics expert will review and validate the methodological rigor of the search strategy using the Peer Review of Electronic Search Strategies (PRESS) guideline [20].

DEFINITION OF TERMS

The following definition of terms related to migration and human mobility is provided to give context and clarity on the scope of this paper. The migrant categories mentioned are not meant to imply or create any new legal category of migrant populations.

Human mobility is "a generic term covering all the different forms of movements of persons," thus encompassing migration [21].

International human mobility and **International migration** refers to movement of persons across international borders away from his/her usual place of residence regardless of the cause, legal status, and length of the stay [21].

Migration refers to the movement of persons whether within a country (i.e., **internal migration**) or across international borders (i.e., **international migration**) [21].

Migrant is an umbrella term that is not defined under international law. Two approaches are generally adopted to define the term 'migrant': a broad definition considers the term 'migrant' as covering all forms of movements; while a more selective definition excludes those who flee wars or persecution (i.e., refugees, asylum seekers) [22]. The International Organization for Migration (IOM), the United Nation's Migration Agency, adopts the broad definition of *'migrant'* to cover "all individuals who move away from their place of usual residence, whether within a country (i.e., **internal migrant**) or across international borders (i.e., **international migrant**), temporarily or permanently, and for a variety of reasons." This definition applies regardless of the person's legal status, causes for movement, length of stay, and whether the movement is voluntary or forced (or involuntary) [21].

International migrant refers to individuals who move away from their place of usual residence across international borders [21].

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International migrant worker refers to an individual who is currently employed, or unemployed and seeking employment in a country that is not their usual country of residence for the purpose of employment [22].

Refugee is an individual who, owing to a well-founded fear of persecution for reasons of race, religion, nationality, membership of a particular social group, or political opinion, is outside the country of his/her nationality and is unable or, owing to such fear, is unwilling to avail of the protection of that country; or who, not having a nationality and being outside the country of his/her former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it [22].

Asylum seeker refers to an individual who is seeking international protection. In countries with individualized procedures, an asylum seeker is someone whose claim has not yet been finally decided on by the country in which he or she has submitted it. Not every asylum seeker will ultimately be recognized as a refugee, but every recognized refugee is initially an asylum seeker [22].

Trafficked international migrant refers to an international migrant who was abused or exploited by traffickers (a crime against human rights) [23, 24].

Smuggled international migrant refers to an international migrant who avails services of smugglers to facilitate movement across international borders where they are not a national or permanent resident (a crime against a State) [22, 25].

International student refers to an international migrant who moved for the purpose of education or who is enrolled outside of their country of origin [26].

Migrant patient across international borders (also referred to as 'medical tourists') refers to international migrants who travel to access medical treatment or cure that is often lacking and/or costly in their usual country of residence [27].

The search strategy will have two search components. The first component, 'global migration,' will consist of a general query for 'international migrant and migration' and specific queries on select 'international migrant categories,' that will not be captured in the general query, such as refugees and asylum seekers, trafficked and smuggled migrants, migrant patient across international borders (or 'medical tourists'), and international students. The query for 'international migrant and migration' covers all terms related to 'migrant', 'immigration', 'emigration', and 'international human mobility' which will serve as an overarching search query in the succeeding search queries of each migrant category. The outcome of these search queries will be combined using the Boolean operator 'OR.' The final combined terms for migration will be applied in the article TITLE to reduce the number of irrelevant articles.

The second search component will pertain to health. The search terms on health will be selected based on a careful review of previous bibliometric and systematic reviews. Search queries on health include generic terms relating to health, disorder, injury, clinical examination, diagnosis, treatment, therapy, health risks, epidemiology, disease categories (i.e., communicable diseases, non-communicable diseases), and other areas in health (e.g., maternal and reproductive health, nutrition, and mental health).

The resulting query on health will be applied to the TITLE-ABSTRACT-KEYWORDS fields.

The overall queries for the two search components will be combined using the Boolean operator 'AND' to produce the 'global migration health' search query.

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Applying exclusions steps within the search strategy

The following steps will be applied to the resulting 'global migration health' search query to reduce the number of irrelevant articles or false-positive results (i.e., irrelevant articles retrieved by the search query):

1. Restrict years to the following period: 2017 to 2022 (NB: This refers to the year of publication of the articles. This will be applied using the built-in filters in Scopus).

2. Limit document type to research articles and reviews. (NB: Scopus defines 'research articles' as original research or opinion, whereas 'reviews' refers to an article with a significant review of original research, also includes conference papers.) [28]]

3. Limit source type to journals (NB: Per Scopus definition, this refers to any peer-reviewed serial journal publication).

4. Exclude articles indexed in subject areas other than human health (e.g., Veterinary and Planetary Science) after careful review of the retrieved articles. (NB: Scopus classifies articles into one or more subject areas).

5. Exclude articles with irrelevant or out-of-scope topics using the following exclusion criteria:
   - articles pertaining to animal, non-human studies, or cell migration
   - articles that do not discuss health and/or well-being of international migrant populations
   - articles retracted (or only cited the original publication in the erratum)

Validity of the search strategy

A two-step approach will be used to validate the search strategy.

First, the search strategy will be adjusted if known relevant articles are not captured in the search. The known relevant articles will be pre-selected by the research team from included studies of the previous systematic reviews and the research team's file. This step will determine the sensitivity of the search strategy. The known relevant articles used for testing will be documented.

Second, the first 200 retrieved records per publication year, including title and abstract (if available) will be screened using MS Excel or EndNote to identify irrelevant articles. Further, the built-in analysis feature in Scopus will be used to check journals and subject areas. These irrelevant articles will be examined to determine if they were retrieved by search terms that need to be modified, or if 'NOT' statements could safely exclude the selected record. In each step of the search query, a sample of the search results will be screened for validity. The search will be adjusted based on the quality of the screened sample until over 70-75 per cent of the retrieved articles are relevant or until no further improvements in precision can be obtained.

Data Items and Data Extraction in Scopus

The Scopus search output will be exported into several formats including CSV (for screening, classification, analysis, and visualization), RIS (for screening duplicates in EndNote), and BibTex (for analysis). All fields will be exported

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including the broad categories, citation information, bibliographic information, abstract and keywords, funding details (where available), and cited references.

Exported Scopus output will be screened for duplicates using MS Excel, EndNote based on the following parameters: author names; article title; source title; and volume and issue number. Further, duplicate screening will be explored using the AI tool prior to screening of relevant articles.

Screening and Classification of Relevant Articles

Screening of relevant articles

For the TITLE-ABSTRACT screening of retrieved articles from the Scopus database, full automation (via machine learning tools and/or apps) and semi-automation (using EndNote and MS Excel) will be applied (whichever is feasible) [29, 30]. These combined approaches are expected to reduce the screening and classification (if an article is identified as relevant) workload versus the manual screening process [31]. Articles will be identified as 'Included' and 'Excluded'. Articles identified as 'Included' will then be classified into relevant migration health-related topics.

The following additional exclusion criteria will be applied at the title and abstract screening:

- articles pertaining to non-relevant migrant populations: internal migrants and/or internal migration (urban to rural migration, migration within countries) and/or internal human mobility (movement within countries)

- articles pertaining to brain drain and migrant nurses or physicians or health professions (NB: This was listed as an exclusion in Sweileh et. al. [12] Further, an initial review of search terms linked to brain drain, nurses, and health professionals captured many irrelevant publications).

Initially, manual TITLE-ABSTRACT screening and classification will be done by the authors. This manual process will serve as the training set for the machine learning tool. To support the accuracy of the training set, full text articles may be screened if the information from the TITLE-ABSTRACT screening precludes a clear determination of whether the population and/or human mobility pertains to an international migrant population and/or movement across countries. This will serve as the training set of articles for the machine learning tool. Once sufficient training examples are available, as determined by the system, further eligibility screening will be done through machine learning with human intervention where the machine is unable to make a confident determination of eligibility.

Classification of relevant articles

Below is a list of classifications and subclassifications (Table 1), following the previous GMH paper [30] and a health and migration dashboard in the Americas [15]. Classification of eligible articles will be applied using machine learning tools and/or semi-automation (i.e., search article title, abstract, and/or keywords using MS Excel or EndNote), whichever is applicable. Where available, database descriptors such as age, sex, and medical subject headings (MeSH terms) will be considered in the classification. Therefore, the list of proposed classifications and subclassifications is dependent on the functionality of the AI and semi-automation tools, and the quality of the training set (i.e., initial set of manually screened articles).

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Table 1: List of proposed classifications and subclassifications of relevant articles

Classification	Subclassification [code/ notes]
Year of publication	<Per actual year> *Note: Coverage of included articles is from 2017 to 2022*
Language	[as classified by Scopus]
Article type	Article, Review [as classified by Scopus]
Study design	Systematic review, cohort, case-control, etc.
Author/s	<Name/s of author/s>
International migrant type [study population topic/ data]	Asylum seeker, Displaced population, migrant, immigrant, student, refugee, etc.
Associated Dataset	Primary, Secondary, Combination
Flow of migration	Immigration/ in-migration/ in-bound [immigration]; Emigration/ out-migration; outbound [emigration]; Return [return]
Study setting	Camp setting; Detention (and incarceration); Urban; Rural; Humanitarian emergency
Phase of migration	Pre-migration [premigration]; transit [transit]; arrival [arrival]; return [return]
Type of migration/ movement/ mobility	Irregular migration [irregular]; regular migration [regular]; forced migration [forced]; resettlement [resettlement]; circular migration [circular]; climate migration
Country topic/ coverage/ implementation	<Country name/s>; Not specified *Note: Country topic refers to the country of study or implementation, country of origin, nationality or citizenship of study population, country source data, and/or country key or main topic of article.*
Country topic - income classification	Low-income country [LIC]; Lower-middle income country [LMIC]; Upper-middle-income country [UMIC]; High-income country [HIC] <automate in excel>
Region topic	<automate in excel> *Note: Region topic refers to the region of the specified country of study or implementation (see country as described above).*
Country of origin	<as is, if applicable only>
Period of study	<Year start> - <Year end>
Population group by age	Infant; Child; Adolescent; Adult; Older adult; Working Age (18-59 yrs); Not specified
Population group by sex and gender	Women of reproductive age (15-49 yrs); Women; Men; Trans; LGBTQIA+; Not specified
Diseases and health conditions	Child health; Infectious diseases; Disability; Non-communicable diseases; Sexually transmitted infections; Malnutrition; Maternal health; Sexual health Reproductive health; Psychosocial; mental health and well-being; Vaccine-preventable diseases
Determinants of health[1]	Individual factors (demographics, hereditary); Lifestyle/ behavioral factors; Living conditions (access to safe housing, water, sanitation); Socio-cultural factors (discrimination, stigma, social inclusion); Governance (legislation, policies) Political determinants (wars, conflicts, policy); Commercial determinants; Environmental determinants
Health promotion and education	Social behavioral change communication; Health literacy (and health information)
Health systems and policies	Healthcare policies; Healthcare models; Healthcare services; Healthcare financing;

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[1] Health of Migrants https://www.migrationdataportal.org/themes/migration-and-health

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Classification	Subclassification [code/ notes]
	Healthcare access; Health workforce; Health Information systems; Human rights; Gender-sensitive policies; SDGs on health; Universal health coverage; Health system strengthening; Financial protection/insurance; Equity in healthcare; Migration-specific policies; Migration governance; Migrant inclusion; Migrant integration; Procurement system
Environmental health	Climate-related migration; SDGs on environmental health; Disaster risk reduction
Occupational health	Work-related stress; Work-related injuries; Work-related disability; Skin conditions; Allergy and asthma; Musculoskeletal disorders; Chemical exposures; Noise-induced hearing loss
Migration-specific	Travel-related health assessment; Other health-related travel assistance; Border management; Flow monitoring; Emergency response

Bibliometric analysis of relevant articles

MS Excel and Biblioshiny (RStudio) will be used to analyze bibliometric information including authors, citations, articles, and sources (or journals). Biblioshiny is an open-source web-interfaced bibliometrics tool that uses the R programme, a statistical software package[32]. Biblioshiny provides metrics on intra-country (SCP) and inter-country (MCP) collaboration including a summary of single-authored and multiple-authored articles. MS Excel will be used to produce descriptive counts and percentages of classified articles by theme, subtheme, migrant topic, and country topic/coverage [33]. It is important to note that bibliometric analysis relies mainly on the quantitative analysis of bibliometric information, and the qualitative analysis is an interpretation only. Further, the bibliometrics method is used when the scope is broad, and the dataset is too large for manual review [34].

Visualization mapping VOSviewer version 1.6.19 [35], a software tool for constructing and visualizing bibliometric networks, will be used to analyze and visualize the networks of co-authorship relations among authors, countries, and institutions, and co-occurrence relations between keywords. To present a clean map, VOSviewer thesaurus files will be prepared to standardize terms and exclude generic and out-of-scope terms [36].

Patient and public involvement

None.

Application of the Protocol

This protocol will be useful for researchers who wish to do a similar mapping specific to their region or country/ies of interest. Further, findings from this protocol will be a useful starting point for content analysis on specific migration health themes and/or international migrant population.

ETHICS AND DISSEMINATION

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This bibliometric analysis will draw on publicly available data and will not directly involve human participants; ethical review will not be required. The findings from the bibliometric analysis (and other related research that can potentially arise from the protocol) will be disseminated through academic publications, conferences, and other forms of collaboration with relevant stakeholders to inform policies and interventions aimed at improving the health of international migrants and their families.

AUTHOR'S CONTRIBUTION

KW conceived the idea for the study. KW, SA, MB, and JL were involved in the development of the study protocol. SA prepared the first draft of the study protocol based on extensive consultations with the Manila Consensus on Methodological Guidelines in Migration Health Bibliometric Analysis as scientific advisors. MS reviewed and validated the search strategy development. All authors (i.e., KW, MB, JL, MS, AK, MG, CH, BB, RA, LJ, TM, ML) critically reviewed, revised, and approved the subsequent and final version of the protocol.

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EXPERT CONSENSUS ON A PROTOCOL FOR CONDUCTING BIBLIOMETRIC ANALYSIS OF SCIENTIFIC ARTICLES ON GLOBAL MIGRATION HEALTH (GMH)

SEARCH STRATEGY (IN SCOPUS)
Updated: As of November 20, 2023

OBJECTIVE

To determine the research publication activity trends/ patterns by author, country, institution/ organization, pre-defined health themes, and specific international migrant/ migration topics (e.g., international migration type, migrant population) including 'international human mobility'. Further, this analysis will provide an up-to-date and comprehensive mapping of the latest research evidence on the health of international migrants (i.e., including the families of international migrants, and short-term international migrant populations, e.g., tourists, travellers, and seasonal workers). Ultimately, the relevant articles from this study will be housed in a searchable public repository (Migration Health Research Portal).

METHODOLOGY

A systematic search strategy using Scopus will be developed to map scientific articles on global migration health. The search strategy will build upon a previous bibliometric study and will have two main search components: (1) "international migrant population", covering specific movements across international borders, and (2) "health". The final search strategy will be implemented to determine the final set of articles to be screened for the bibliometric analysis. Title and abstract screening will exclude irrelevant articles and classify the relevant articles according to predefined themes and subthemes. A combination of the following approaches will be used in screening: applying full automation (i.e., machine learning) and/or semi-automation (i.e., EndNote, MS Excel) tools, and manual screening. The relevant articles will be analyzed using MS Excel, Biblioshiny, and VOSviewer, which creates a visual mapping of the research publication activity around global migration health. This protocol is developed in collaboration with academic researchers and policymakers from the Global South, and a network of migration health and research experts, with guidance from a bibliometrics expert.

Inclusion/ Exclusion Criteria

Criteria	Inclusion	Exclusion
Migrant population/ movement	Articles pertaining to **international migrant populations** (including migrant workers, international students, refugees, asylum seekers,) and their families, and international human mobility (i.e.	Articles pertaining to non-relevant international migrant populations: internal migrants and/or internal migration (urban to rural migration, migration within countries) and

	patient mobility across borders, tourists, travelers, etc.).	internal human mobility (movement within countries)
Type of articles	Research and review articles	Articles retracted (or only cited the original article in the erratum)
Focus of study	Articles pertaining to health and/OR well-being (i.e., tackles health and well-being related to exposure, outcome, conceptual frameworks, datasets)	Articles that do not discuss health and/or well-being
Countries of study	All	No restrictions set
Language	Articles in English OR those whose Title AND Abstract have English translation	Non-English articles without an English translation of the Title AND Abstract

Search Strategy in SCOPUS

1. **Apply global migration health search queries (in Scopus)**
   This section enumerates the search queries for each key concept outlined in the Inclusion/Exclusion criteria. Each search query will be combined to come up with the overall search query on global migration and health.

   a. **International migrant or migration, and specific migrant population query**

   To capture articles pertaining to international migrant and migration, three search queries will be applied to cover the generic terms relating to 'international,' 'migrant,' and migration.' Further, search queries were developed for specific migrant groups.

Key concept	Related terms/ notes	Search query	ID
International	International, overseas, cross-border, non-citizen/s, non-national/s, transnational/s, expatriate/s, alien/s, foreign-born, overseas-born,	TITLE-ABS-KEY ((overseas OR "cross-border" OR "non-citizen*" OR "non-national*" OR foreign* OR transnational* OR expatriate*) PRE/1 (person* OR population* OR people OR citizen* OR child* OR wom?n OR m?n OR female* OR male* OR adult* OR adolescent* OR elderl*)) OR TITLE-ABS-KEY(alien pre/0 person* OR population* OR people OR citizen* OR child* OR wom?n OR m?n OR female* OR male* OR adult* OR adolescent* OR elderl*)	1.1
Migrant	immigrant/s, emigrants	TITLE (*migrant*) OR KEY (*migrant*)	1.2
Migration	Immigration, emigration, migration, migratory	TITLE (*migrat*) OR KEY (*migrat*)	1.3

Key concept	Related terms/ notes	Search query	ID
International and migrant or migration terms	International migrant, overseas migrant, etc.	1.1 OR 1.2 OR 1.3	**1.4**
Specific migrant groups – refugees, asylum seeker, displaced population	Refugees and asylum seekers	(TITLE (refugee* OR asylum OR asylee* OR exile*) OR TITLE ((stateless OR uprooted) PRE/1 (person* OR population* OR people)) OR TITLE (displaced W/1 (person* OR population* OR people OR overseas OR foreigner*)) OR KEY (refugee* OR "asylum seek*" OR "stateless person*"))	**1.5**
Specific migrant group –human trafficking and smuggling	Trafficked and smuggled persons	((TITLE (forced PRE/1 (labor OR prostitut*)) OR TITLE ("sexual slavery"))) OR ((TITLE (traffick* OR smuggl*) AND TITLE (human OR child* OR sex* OR prostitut* OR girl* OR wom?n OR female* OR male* OR victim* OR people OR m?n OR mistress*)))	**1.6**
Specific migrant group – migrant patient mobility (across international borders)	Specific terms on - transnational care, cross-border care	TITLE ("transnational care" OR "cross-border care")	1.7
	Patient	TITLE (patient*)	1.8
	Transnational care/ cross-border care plus patient combined with international and migrant/ migration terms	1.7 OR (1.8 AND 1.4)	**1.9**
Specific migrant group – international student		(KEY ((foreign* OR international OR overseas OR transnational OR "cross-border" OR "non-national" OR "non-citizen" OR expatriate*) PRE/0 student*) OR TITLE ((foreign* OR international OR overseas OR transnational OR "cross-border" OR "non-national" OR "non-citizen" OR expatriate*) PRE/0 student*))	**1.10**
Specific migrant group – international migrant workers	Migrant, migration + labour e.g. migrant workers, labour migration	(TITLE(overseas OR "cross-border" OR "non-citizen*" OR "non-national*" OR transnational* OR expatriate* OR alien* OR *migrant* OR *migrat*) AND TITLE(worker* OR workforce* OR labor* OR labour* OR gardener* OR farmworker* OR "farm-worker*" OR "domestic employee*" OR "domestic maid")) OR TITLE("high-skilled *migrant" OR "low-skilled *migrant*" OR "foreign worker*" OR "international worker*" OR "international labour*" OR "international labor*" OR "international industry* worker*" OR "foreign PRE/2 worker*" OR "agricultur* migrant worker*" OR "foreign domestic helper*") OR KEY("foreign worker*" OR "*migrant* worker*" OR "labour *migrat*" OR "labour *migrant*" OR "labor*migrat*" OR "labor *migrant*")	**1.11**
All international migrants groups		1.4 OR 1.5 OR 1.6 OR 1.9 OR 1.10 OR 1.11	**1.12**

b. General health query

The search query for health will be applied in the abstract, title and keywords of articles. Aim is to cover all possible health topics.

Key concept	Related terms/ notes	Search string	ID
Health	Health, family health, sexual health, reproductive health, mental health, public health, health emergencies, health crisis, health equity, health policy, healthcare, health system, adolescent health, maternal health, health disparity, health communication, telehealth, occupational health, social determinants of health, women's health, adolescent health, infant health, oral health, population health, community health, global health, health services, health screening, health examination, etc.	TITLE-ABS-KEY (*health* OR health)	2.1
Medical, clinical	Medical, clinical, medical screening, medical procedure, medical examination, medical procedure, diagnosis, diagnostic, etc.	TITLE-ABS-KEY (medic* OR clinic* OR diagnos*)	2.2
Physical fitness and well-being	fitness, well-being, physical activity, wellness, hygiene	TITLE-ABS-KEY (fitness OR wellness OR "well-being" OR "physical *activity" OR hygien*)	2.3
Symptoms	Symptoms, fever, headache, allergy, lethargy, dyspnea	TITLE-ABS-KEY (symptom* OR fever OR flu OR headache OR anemia OR allerg* OR diarrhea OR letharg* OR dyspnea OR pain OR chill* OR paresthesia)	2.4
Nutrition	Nutrition, overnutrition, malnutrition, nutritional deficiency micronutrition, obesity, overweight, wasting, stunting, underweight, bmi, food security, food intake, food recall	TITLE-ABS-KEY (*nutrition* OR *weight OR obese OR obesity OR malnutrition OR malnourish* OR wasting OR wasted OR stunting OR stunted OR bmi OR "body-mass- index" OR food OR breast* OR starvation)	2.5
Vaccination	vaccination, vaccine, immunization	TITLE-ABS-KEY (vaccin* OR immuni?*)	2.6
Therapy	Therapy, therapist*, therapeutic, treatment, telemedicine, medicine	TITLE-ABS-KEY (*therap* OR drug* OR *medic* OR treat* OR antibiotic* OR hospital*) Excluded patient as this should be captured in query 1	2.7
Disease, disorder, injury, death	disease, disorder, illness, risk, syndrome, injury, death	TITLE-ABS-KEY (disease* OR disorder* OR disabilit* OR ill* OR sick* OR risk* OR syndrom?* OR pain OR injur* OR wound* OR death*) Note: morbidity and mortality in ID 2.14	2.8
Communicable diseases	Communicable, infectious diseases Note: The search will include the term "noncommunicable", "non-	TITLE-ABS-KEY (*infect* OR *communicable OR hepatitis OR hiv OR tubercul* OR malaria OR Chagas)	2.9

Key concept	Related terms/ notes	Search string	ID
	communicable", "non-infectious"		
Non-communicable diseases	NCD, diabetes, stroke	TITLE-ABS-KEY (NCD OR diabetes OR stroke OR cancer* Or tumor* OR tumour OR heart OR diabet* OR dermatology* OR gastro* OR diarrhea OR cardiac OR cardio* OR endocrine OR heart* OR coronary OR vascular* OR cerebrovasc* OR infarct* OR hypertens* OR neoplas* OR oncol* OR "chronic respiratory" OR copd OR "chronic obstructive" OR asthma* OR "pulmonary hypertens*" OR (occupation* W/1 lung))	2.10
Parasitic infections	Parasitic infections, leptospirosis	TITLE-ABS-KEY(parasitic OR leptos*)	2.11
Pathogen	Bacteria, bacterial, viral, virus	TITLE-ABS-KEY (bacteri* OR viral OR virus*)	2.12
Mental health	Mental state, substance abuse, trauma, violence, psychiatry, PTSD, post-traumatic, depression	TITLE-ABS-KEY (mental OR psychological OR psychiatry* OR abuse OR emotion* OR addict* OR trauma* OR psych* OR depress* OR anxiety* OR coping OR *stress* OR fear OR guilt OR hostility OR suicide OR behavior* OR behaviour* OR distress* OR resilienc* OR lonel* OR burnout OR ptsd OR "substance abuse" OR "self-injurious beha*" OR violen*)	2.13
Maternal and reproductive health	Childbirth, pregnancy, maternal, reproductive behavior, sexual behavior, abortion, contracept* OR condom	TITLE-ABS-KEY (*birth OR pregnan* OR maternal OR *natal OR reproductive OR sex* OR abortion OR contracept* OR condom)	2.14
Epidemiology		TITLE-ABS-KEY (epidemiology OR outbreak* OR pandemic* OR epidemic* OR endemic OR mortality OR morbidity)	2.15
All health terms		2.1 OR 2.2 OR 2.3 OR 2.4 OR 2.5 OR 2.6 OR 2.7 OR 2.8 OR 2.9 OR 2.20 OR 2.11 OR 2.12 OR 2.13 OR 2.14 OR 2.14 OR 2.15	**2.16**

c. **International migrant and health query**

Key concept	Related terms/ notes	Search string	ID
International migrant and health terms		1.12 AND 2.16	3.1
Additional migrant & health in source title		SRCTITLE (*migrant* OR *migrat*) AND SRCTITLE (health)	3.2
All international migrant and health		3.1 OR 3.2	**3.3**

2. Apply selected limitation and exclusion functions (in Scopus)

Scopus has a function to limit and/or exclude the search results by publication year and subject areas. During the search strategy development process, title screening of articles by subject areas was performed using the built-in analysis feature of Scopus. Exclusion of subject areas was applied after verification.

Key concept	Search string	ID
Limit to publication years, 2017 to 2022	LIMIT-TO (PUBYEAR, 2017) OR LIMIT-TO (PUBYEAR, 2018) OR LIMIT-TO (PUBYEAR, 2019) OR LIMIT-TO (PUBYEAR, 2020) OR LIMIT-TO (PUBYEAR, 2021) OR LIMIT-TO (PUBYEAR, 2022)	4.1
Irrelevant subject areas (Engineering, Chemical Engineering, Earth and Planetary Sciences, Energy, Physics and Astronomy, Veterinary, and Materials Science)	EXCLUDE (SUBJAREA, "ENGI") OR EXCLUDE (SUBJAREA, "EART") OR EXCLUDE (SUBJAREA, "CENG") OR EXCLUDE (SUBJAREA, "ENER") OR EXCLUDE (SUBJAREA, "CHEM") OR EXCLUDE (SUBJAREA, "PHYS") OR EXCLUDE (SUBJAREA, "VETE") OR EXCLUDE (SUBJAREA , "MATE")	4.2
Source type, journal	LIMIT-TO (SRCTYPE,"j ")	4.3
Documentation type, articles, and reviews	LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "re")	**4.4**

3. Exclusion of irrelevant articles

The following terms were identified as irrelevant after careful title and abstract screening of the first 200 retrieved articles by year, for the period 2017-2022. This was an iterative process that involved rechecking by year, subject area, and journals/ sources.

Key concept	Search string	ID
Irrelevant journals/ sources	SRCTITLE (linguistics OR english* OR education* OR teacher OR literature OR language OR "social inquiry" OR buddhist* OR dialectic* OR discourse OR law OR "land use" OR econom* Or business* OR histor* OR ethnic* OR contemporary OR urban* OR philanthropy" OR philosoph*" OR punishment OR sport OR crim* OR rural OR evaluation OR "kurdish studies" OR area OR religio*)	5.1
FALSE international migration terms	TITLE-ABS-KEY (migrat* W/1 (animal OR herd OR arthroplasty OR catheter OR cell OR "cell enriched" OR cephalad OR clip OR coil OR device OR droplet OR electro* OR intranasal OR "intrauterine device" OR "inhibitory factor" OR orbital OR radionucleotide OR range OR screw OR scrotal OR shunt OR stent OR submucosal OR tooth OR transepithelial OR "voice system" OR web OR neutrophil* OR epithelium OR "epithelium viability" OR "MLL1 promotes" OR "and invasion of liver cancer HepG2")) OR TITLE-ABS-KEY ("fish species" OR "animal experiment" OR "fiducial marker*" OR "migrated intra-uterine" OR "nonmigrating tides" OR "plant	5.2

	use" OR "foreign-body" OR "endangered specie*" OR "wild geese") OR TITLE-ABS-KEY (migratory W/1 (specie* OR animal* OR fish* OR bird*))	
Retracted articles	TITLE (retract*)	5.3
	4.4 AND NOT (5.1 OR 5.2 OR 5.3)	**5.4**

4. Search Strategy Validity

The search strategy was reviewed by Margaret Sampson, MLIS, Ph.D., AHIP, of the Children's Hospital of Eastern Ontario, Canada using the PRESS Peer Review of Electronic Search Strategies: 2015 Guideline Statement.

PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Section and topic	Item No	Checklist item	Mark Yes, if available	Notes
ADMINISTRATIVE INFORMATION				
Title:				
Identification	1a	Identify the report as a protocol of a systematic review	Not applicable	Protocol for a bibliometrics study
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	Not applicable	
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number	Not applicable	
Authors:				
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	Yes	
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	Yes	
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	Yes	
Support:				
Sources	5a	Indicate sources of financial or other support for the review	Not applicable	
Sponsor	5b	Provide name for the review funder and/or sponsor	Not applicable	
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	Not applicable	
INTRODUCTION				
Rationale	6	Describe the rationale for the review in the context of what is already known	Yes	
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	Yes	
METHODS				
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	Yes	
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial	Yes	

		registers or other grey literature sources) with planned dates of coverage		
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	Yes	
Study records:				
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	Yes	
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	Yes	
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	Yes	
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	Yes	
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	Not applicable	
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	Not applicable	
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	Not applicable	
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2, Kendall's τ)	Not applicable	
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	Not applicable	
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	Bibliometric analysis	
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	Not applicable	
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	Not applicable	

* It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.

EXPERT CONSENSUS ON A PROTOCOL FOR CONDUCTING BIBLIOMETRIC ANALYSIS OF SCIENTIFIC ARTICLES ON GLOBAL MIGRATION HEALTH (GMH)

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2023-080729.R2
Article Type:	Protocol
Date Submitted by the Author:	30-Apr-2024
Complete List of Authors:	Pernitez-Agan, Sweetmavourneen; International Organization For Migration Manila, Migration Health Division Bautista, Mary Ann; International Organization for Migration, Migration Health Division Lopez, Janice; International Organization for Migration, Migration Health Division Sampson, Margaret; Children's Hospital of Eastern Ontario Kapilashrami, Anuj; University of Essex School of Health and Social Care Garabiles, Melissa; De La Salle University, Department of Psychology Hui, Charles; University of Ottawa Babu, Bontha; Indian Council of Medical Research, Health Systems and Implementation Research Division Aziz, Roomi; University of Essex Jordan, Lucy P.; The University of Hong Kong Faculty of Social Sciences, Department of Social Work and Social Administration Mondres, Teddy Rowell U.; National Yang Ming Chiao Tung University, International Health Program Lebanan, May Antonnette; International Organization For Migration Manila, Migration Health Division Wickramage, Kolitha; International Organization For Migration Manila, Migration Health Division Collaborator, Manila Consensus Group; International Organization For Migration Manila
Primary Subject Heading:	Global health
Secondary Subject Heading:	Public health
Keywords:	PUBLIC HEALTH, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, International health services < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

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EXPERT CONSENSUS ON A PROTOCOL FOR CONDUCTING BIBLIOMETRIC ANALYSIS OF SCIENTIFIC ARTICLES ON GLOBAL MIGRATION HEALTH (GMH)

Authors

Sweetmavourneen Pernitez-Agan[1*]
Mary Ann Bautista[1*]
Janice Lopez[1*]
Margaret Sampson[2]
Anuj Kapilashrami[3]
Melissa Garabiles[4]
Charles Hui[5]
Bontha V. Babu [6]
Roomi Aziz[7]
Lucy Jordan[8]
Teddy Rowell U. Mondres[9]
May Antonnette Lebanan[1]
Kolitha Wickramage[1,10*]
The Manila Consensus on Methodological Guidelines in Migration Health Bibliometric Analysis

Affiliation

[1]UN Migration Agency, International Organization for Migration, Makati City, Philippines
[2]Children's Hospital of Eastern Ontario, Ontario, Canada
[3] School of Health & Social Care, University of Essex & Migration Health South Asia Network
[4]Department of Psychology, De La Salle University, Philippines
[5]Pediatric Infectious Disease Specialist, University of Ottawa, Canada & Chair, MHADRI network
[6]Socio-Behavioural, Health Systems & Implementation Research Division, Indian Council of Medical Research, New Delhi, India
[7]Assistant Lecturer, School of Health and Social Care, University of Essex, United Kingdom, Regional Coordinator for Migration Health South Asia (MiHSA) network
[8]Department of Social Work and Social Administration; Associate Dean (UG), Faculty of Social Sciences, University of Hong Kong
[9]International Health Program, National Yang Ming Chiao Tung University, Taiwan
[10]On behalf of the Manila Consensus on Methodological Guidelines in Migration Health Bibliometric Analysis (Manila Consensus Group), UN Migration Agency, International Organization for Migration, Global Data Institute, Berlin, Germany

Correspondence

*MHD Research and Epidemiology Unit
UN Migration Agency
International Organization for Migration
BDO Tower, Paseo de Roxas, Makati City
Metro Manila, Philippines

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UN Migration Agency (IOM), MHD Research Team

E-mail: kwickramage@iom.int

ABSTRACT

Background: Migration and health are key priorities in global health and essential for protecting and promoting the health of migrants. To better understand the existing evidence on migration health, it is critical to map the research publication activity and evidence on the health of migrants and mobile populations. This paper presents a search strategy protocol for a bibliometric analysis of scientific articles on global migration health (GMH), leveraging the expertise of a global network of researchers and academics. The protocol aims to facilitate the mapping of research and evidence on the health of international migrants and their families, including studies on human mobility across international borders.

Methods: A systematic search strategy using Scopus will be developed to map scientific articles on global migration health. The search strategy will build upon a previous bibliometric study and will have two main search components: (1) "international migrant population", covering specific movements across international borders, and (2) "health". The final search strategy will be implemented to determine the final set of articles to be screened for the bibliometric analysis. Title and abstract screening will exclude irrelevant articles and classify the relevant articles according to predefined themes and subthemes. A combination of the following approaches will be used in screening: applying full automation (i.e., DistillerSR's machine learning tool) and/or semi-automation (i.e., EndNote, MS Excel) tools, and manual screening. The relevant articles will be analyzed using MS Excel, Biblioshiny, and VOSviewer, which creates a visual mapping of the research publication activity around global migration health. This protocol is developed in collaboration with academic researchers and policymakers from the Global South, and a network of migration health and research experts, with guidance from a bibliometrics expert.

Ethics and Dissemination: The protocol will use publicly available data and will not directly involve human participants; an ethics review will not be required. The findings from the bibliometric analysis (and other research that can potentially arise from the protocol) will be disseminated through academic publications, conferences, and collaboration with relevant stakeholders to inform policies and interventions aimed at improving the health of international migrants and their families.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- A major strength of the study is the collaboration with different researchers and/or experts on GMH including from the Global South.
- This study will provide an up-to-date and comprehensive mapping of scientific articles on global migration health published from 2017 to 2022, which will then be housed in a searchable online public repository.
- Assessing the status of research publication activity on global migration health is critical to map the existing evidence base, identifying gaps, and advancing evidence-informed policies and practices at the national, regional, and global levels.

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- By classifying articles into pre-defined themes using a human trained machine learning tool, the current methodology goes beyond the conventional bibliometric approach.
- The bibliometrics method has inherent limitations, wherein the research output is dependent on the search strategy, the scope and indexed journals of the citation database, and the analysis software; its aim is primarily to quantify research productivity and not to assess the study quality of included articles and therefore limited in providing insights into the impact on policy, society, or practical applications.

INTRODUCTION

Migration and human mobility are key social determinants of health. The bi-directional relationship between migration and health is a complex and dynamic one [1]. Scholars caution generalizability between and within migrant groups [2, 3]. A high degree of heterogeneity across migrant groups and movement/ mobility patterns mean differing social determinants, health risks, and health impacts across the migration phases [4]. Migrants may be exposed to various health risks at each stage of the migratory process: from leaving their place of origin, during travel/transit, through arrival at destination, and even upon their return. Conversely, migration may also enable and promote the health of migrants directly through better access to healthcare at their destination, or through remittance flows to migrant households, thereby improving nutrition and healthcare accessibility. Migrant populations have varying vulnerabilities and resiliencies/protective factors depending on their socio-demographic profile, legal status, or phase of the migration process [1, 5]. Moreover, restrictive migration policies, inadequate integration practices, and anti-migrant sentiments may inhibit migrants' access to healthcare, education, and safe and dignified living and working conditions [6, 7].

The health of migrants is a key global health priority and critical for achieving the Sustainable Development Goals (SDGs) [1-3]. Assessing the status of research publication activity in global migration health (GMH) is critical to map the existing evidence base, identifying gaps, and advancing evidence-informed policies and practices at the national, regional, and global levels. The 2nd Global Consultation on Migrant Health (2017) recognized the need to "take stock of current research, map the existing literature, identify areas of focus and gaps, and establish a global research agenda on migration health" [7]. The consultation emphasized the importance of analyzing the globally published peer-reviewed literature in the field of GMH. Further, strengthening data and research capacity was one of the expected outcomes in the 3rd Global Consultation on the health of refugees and migrants held in June 2023 [8].

Mapping Research Evidence on Migration Health: A Priority

Bibliometric analysis is the quantitative analysis of publications (e.g., research articles and books) using bibliographic data (i.e., author information, citation, and publication information) to produce measures of 'research activity or research publication activity (i.e., number of publications), 'research impact' (i.e., citation counts, journal impact factor, etc.), and national or international collaborations of authors, institutions or organizations, and countries (based on the co-authorship affiliation). Although the bibliometric method does not provide analysis and interpretation of the content and quality of a research publication, it provides useful information on the growth and impact of research publications, including important gaps, trends, emerging fields, and research networks, within a particular field or discipline [9, 10]. Hence, bibliometrics is firmly established as a scientific specialty and an integral part of research evaluation methodology.

In 2019, a coalition of organizations (i.e., IOM, Migration Health for South Asia or MiHSA network and its flagship Strengthening Policy and Research Capacities or SPARC project funded by the British Council, African Centre for Migration & Society or ACMS, and Migration Health and Development Research Initiative or MHADRI), facilitated two migration health research workshops in Nepal and South Africa. These meetings highlighted the importance of

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undertaking national, sub-regional, and regional 'deep dives' into mapping migration health research output for both international and internal migrants.

Recognizing the need to build research capacity to identify the gaps in research output on migration and health, IOM together with MHADRI and MiHSA, organized a workshop on undertaking bibliometric analysis in late 2019. The workshop was attended by research scholars and policymakers from South and Southeast Asia. This undertaking led to the formation of the "Manila consensus on methodological guidelines in migration health bibliometric analysis" (hereafter referred to as "Manila Consensus Group") that aims to advance actions towards providing greater conceptual and methodological clarity and analytical rigor for bibliometric analysis, as well as applying such standards to the migration health research field. One of the overarching aims of the Manila Consensus Group includes examining research publication activity in the following areas: global migration health (i.e., international migration or movement), internal migration and health, migration health assessments of migrants, and migrant health outcomes in areas ranging from infectious disease, non-communicable disease, and occupational health South and Southeast Asia [11].

The underlying search strategy in this protocol was initially developed through an expert consensus in the "Manila Consensus Group" following a critical review of key search terms, and builds upon the foundational work by Sweileh et al. on global migration health research (2000–2016) [12]. The current paper presents the protocol for mapping scientific articles on global migration health published from 2017 to 2022. Specifically, a bibliometric analysis will be conducted to determine the research publication activity trends/ patterns by author, country, institution/ organization, pre-defined health themes, and specific international migrant/ migration topics (e.g., international migration type, migrant population) including 'international human mobility'. Further, this analysis will provide an up-to-date and comprehensive mapping of the latest research evidence on the health of international migrants (i.e., including the families of international migrants, and short-term international migrant populations, e.g., tourists, travellers, and seasonal workers). Ultimately, the relevant articles from this study will be housed in a searchable online public repository and may serve as a starting point for high-level evidence reviews by country, regional, and/or specific themes.

The seminal bibliometric analysis published in 2018 led to a few relevant research evidence mapping studies at the regional level, including a 2021 study that looked at the scientific research on the health of low-income migrants, including internally displaced populations (IDPs) and refugees in South Asia [13]. Another related work was done in response to the growing research on COVID-19, which looked at human mobility, migration, and health [14]. An information platform on health and migration in the Americas also highlights the growing interest and significance of this field [15].

METHODOLOGY

As there is no standard for reporting protocols of bibliometric studies, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [16] is used to guide the protocol development. This study will apply the bibliometric analysis method to map scientific articles on the health of international migrants and their families, including 'international human mobility'. The protocol will cover articles published from 2017 to 2022, updating the coverage of articles by publication year (i.e., 2000 to 2016) in the previous work by Sweileh et al., in 2018 [12], defining the scope of 'international migration' (including mobility across borders), and enhancing rigour through the use of a prospectively defined and publicly available protocol. The study commenced in September 2023 with an estimated completion in September 2024.

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Citation Database

Scopus, an abstract and citation database of peer-reviewed literature developed by Elsevier, will be used to retrieve scientific articles on migration and health. Scopus provides a comprehensive overview of global research output in different disciplines and covers 100 per cent of MEDLINE articles. Scopus has been shown to have more complete coverage of publications in health and medical sciences than Web of Science or Dimensions [17]. Further, Scopus was the data source used for the 2000-2016 period [12], and so this database was selected for this update for comparability.

Search Strategy and Selection Criteria

Development of the search strategy

The identification and selection of keywords will be based on the 'Definition of Terms' provided (see boxed text) along with the search strategy and keywords from the previous GMH study [12], and other relevant systematic reviews on health [18, 19]. This study will build on the existing search queries to cover international migration, international human mobility, international migrant populations, and their families, based on IOM's definition of migrants and broader search terms on health [9].

The previous GMH study by Sweileh et al., covered articles on the health of specific international migrant populations from publication years 2000 to 2016 (i.e., migrant workers, refugees/asylum seekers/displaced people (not internally displaced), international students, trafficked victims/victims of human smuggling, patients' mobility across borders, and international migrants/immigration), but did not look at other international migrant populations (e.g., migrant families, travelers, etc.) [12]. A bibliometrics expert will review and validate the methodological rigor of the search strategy using the Peer Review of Electronic Search Strategies (PRESS) guideline [20].

DEFINITION OF TERMS

The following definition of terms related to migration and human mobility is provided to give context and clarity on the scope of this paper. The migrant categories mentioned are not meant to imply or create any new legal category of migrant populations.

Human mobility is "a generic term covering all the different forms of movements of persons," thus encompassing migration [21].

International human mobility and **International migration** refers to movement of persons across international borders away from his/her usual place of residence regardless of the cause, legal status, and length of the stay [21].

Migration refers to the movement of persons whether within a country (i.e., **internal migration**) or across international borders (i.e., **international migration**) [21].

Migrant is an umbrella term that is not defined under international law. Two approaches are generally adopted to define the term 'migrant': a broad definition considers the term 'migrant' as covering all forms of movements; while a more selective definition excludes those who flee wars or persecution (i.e., refugees, asylum seekers) [22]. The International Organization for Migration (IOM), the United Nation's Migration Agency, adopts the broad definition of *'migrant'* to cover "all individuals who move away from their place of usual residence, whether

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within a country (i.e., **internal migrant**) or across international borders (i.e., **international migrant**), temporarily or permanently, and for a variety of reasons." This definition applies regardless of the person's legal status, causes for movement, length of stay, and whether the movement is voluntary or forced (or involuntary) [21].

International migrant refers to individuals who move away from their place of usual residence across international borders [21].

International migrant worker refers to an individual who is currently employed, or unemployed and seeking employment in a country that is not their usual country of residence for the purpose of employment [22].

Refugee is an individual who, owing to a well-founded fear of persecution for reasons of race, religion, nationality, membership of a particular social group, or political opinion, is outside the country of his/her nationality and is unable or, owing to such fear, is unwilling to avail of the protection of that country; or who, not having a nationality and being outside the country of his/her former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it [22].

Asylum seeker refers to an individual who is seeking international protection. In countries with individualized procedures, an asylum seeker is someone whose claim has not yet been finally decided on by the country in which he or she has submitted it. Not every asylum seeker will ultimately be recognized as a refugee, but every recognized refugee is initially an asylum seeker [22].

Trafficked international migrant refers to an international migrant who was abused or exploited by traffickers (a crime against human rights) [23, 24].

Smuggled international migrant refers to an international migrant who avails services of smugglers to facilitate movement across international borders where they are not a national or permanent resident (a crime against a State) [22, 25].

International student refers to an international migrant who moved for the purpose of education or who is enrolled outside of their country of origin [26].

Migrant patient across international borders (also referred to as 'medical tourists') refers to international migrants who travel to access medical treatment or cure that is often lacking and/or costly in their usual country of residence [27].

The search strategy will have two search components. The first component, 'global migration,' will consist of a general query for 'international migrant and migration' and specific queries on select 'international migrant categories,' that will not be captured in the general query, such as refugees and asylum seekers, trafficked and smuggled migrants, migrant patient across international borders (or 'medical tourists'), and international students. The query for 'international migrant and migration' covers all terms related to 'migrant', 'immigration', 'emigration', and 'international human mobility' which will serve as an overarching search query in the succeeding search queries of each migrant category. The outcome of these search queries will be combined using the Boolean operator 'OR.' The final combined terms for migration will be applied in the article TITLE to reduce the number of irrelevant articles.

The second search component will pertain to health. The search terms on health will be selected based on a careful review of previous bibliometric and systematic reviews. Search queries on health include generic terms relating to health, disorder, injury, clinical examination, diagnosis, treatment, therapy, health risks, epidemiology, disease

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categories (i.e., communicable diseases, non-communicable diseases), and other areas in health (e.g., maternal and reproductive health, nutrition, and mental health).

The resulting query on health will be applied to the TITLE-ABSTRACT-KEYWORDS fields.

The overall queries for the two search components will be combined using the Boolean operator 'AND' to produce the 'global migration health' search query.

Applying exclusions steps within the search strategy

The following steps will be applied to the resulting 'global migration health' search query to reduce the number of irrelevant articles or false-positive results (i.e., irrelevant articles retrieved by the search query):

1. Restrict years to the following period: 2017 to 2022 (NB: This refers to the year of publication of the articles. This will be applied using the built-in filters in Scopus).

2. Limit document type to research articles and reviews. (NB: Scopus defines 'research articles' as original research or opinion, whereas 'reviews' refers to an article with a significant review of original research, also includes conference papers.) [28]]

3. Limit source type to journals (NB: Per Scopus definition, this refers to any peer-reviewed serial journal publication).

4. Exclude articles indexed in subject areas other than human health (e.g., Veterinary and Planetary Science) after careful review of the retrieved articles. (NB: Scopus classifies articles into one or more subject areas).

5. Exclude articles with irrelevant or out-of-scope topics using the following exclusion criteria:
   - articles pertaining to animal, non-human studies, or cell migration
   - articles that do not discuss health and/or well-being of international migrant populations
   - articles retracted (or only cited the original publication in the erratum)

Validity of the search strategy

A two-step approach will be used to validate the search strategy.

First, the search strategy will be adjusted if known relevant articles are not captured in the search. The known relevant articles will be pre-selected by the research team from included studies of the previous systematic reviews and the research team's file. This step will determine the sensitivity of the search strategy. The known relevant articles used for testing will be documented.

Second, the first 200 retrieved records per publication year, including title and abstract (if available) will be screened using MS Excel or EndNote to identify irrelevant articles. Further, the built-in analysis feature in Scopus will be used to check journals and subject areas. These irrelevant articles will be examined to determine if they were retrieved by search terms that need to be modified, or if 'NOT' statements could safely exclude the selected record. In each step of the search query, a sample of the search results will be screened for validity. The search will be adjusted

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based on the quality of the screened sample until over 70-75 per cent of the retrieved articles are relevant or until no further improvements in precision can be obtained.

Data Items and Data Extraction in Scopus

The Scopus search output will be exported into several formats including CSV (for screening, classification, analysis, and visualization), RIS (for screening duplicates in EndNote), and BibTex (for analysis). All fields will be exported including the broad categories, citation information, bibliographic information, abstract and keywords, funding details (where available), and cited references.

Exported Scopus output will be screened for duplicates using MS Excel or EndNote based on the following parameters: author names; article title; source title; and volume and issue number. To further facilitate duplicate screening, a systematic review software called, DistillerSR (Evidence Partners, Ottawa, Canada) will be used prior to screening of relevant articles.

Screening and Classification of Relevant Articles

Screening of relevant articles

For the TITLE-ABSTRACT screening of retrieved articles from the Scopus database, full automation (i.e., DistillerSR's machine learning-based algorithm that ranks articles for screening given the estimated relevance of articles) and semi-automation (using EndNote and MS Excel) will be applied (whichever is feasible) [29, 30]. These combined approaches are expected to reduce the screening and classification (if an article is identified as relevant) workload versus the manual screening process [31]. Articles will be identified as 'Included' and 'Excluded'. Articles identified as 'Included' will then be classified into relevant migration health-related topics.

The following additional exclusion criteria will be applied at the title and abstract screening:

- articles pertaining to non-relevant migrant populations: internal migrants and/or internal migration (urban to rural migration, migration within countries) and/or internal human mobility (movement within countries)

- articles pertaining to brain drain and migrant nurses or physicians or health professions (NB: This was listed as an exclusion in Sweileh et. al. [12] Further, an initial review of search terms linked to brain drain, nurses, and health professionals captured many irrelevant publications).

Initially, manual TITLE-ABSTRACT screening and classification will be done by the authors. This manual process will serve as the training set for the machine learning tool. To support the accuracy of the training set, full text articles may be screened if the information from the TITLE-ABSTRACT screening precludes a clear determination of whether the population and/or human mobility pertains to an international migrant population and/or movement across countries. This will serve as the training set of articles for the machine learning tool. Once sufficient training examples are available, as determined by the system, further eligibility screening will be done through machine learning with human intervention where the machine is unable to make a confident determination of eligibility.

Classification of relevant articles

Below is a list of classifications and subclassifications (Table 1), following the previous GMH paper [30] and a health and migration dashboard in the Americas [15]. Classification of eligible articles will be applied using machine learning tool and/or semi-automation (i.e., search article title, abstract, and/or keywords using MS Excel or EndNote),

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whichever is applicable. Where available, database descriptors such as age, sex, and medical subject headings (MeSH terms) will be considered in the classification. Therefore, the list of proposed classifications and subclassifications is dependent on the functionality of the machine learning and semi-automation tools, and the quality of the training set (i.e., initial set of manually screened articles).

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Table 1: List of proposed classifications and subclassifications of relevant articles

Classification	Subclassification [code/ notes]
Year of publication	<Per actual year> *Note: Coverage of included articles is from 2017 to 2022*
Language	[as classified by Scopus]
Article type	Article, Review [as classified by Scopus]
Study design	Systematic review, cohort, case-control, etc.
Author/s	<Name/s of author/s>
International migrant type [study population topic/ data]	Asylum seeker, Displaced population, migrant, immigrant, student, refugee, etc.
Associated Dataset	Primary, Secondary, Combination
Flow of migration	Immigration/ in-migration/ in-bound [immigration]; Emigration/ out-migration; outbound [emigration]; Return [return]
Study setting	Camp setting; Detention (and incarceration); Urban; Rural; Humanitarian emergency
Phase of migration	Pre-migration [premigration]; transit [transit]; arrival [arrival]; return [return]
Type of migration/ movement/ mobility	Irregular migration [irregular]; regular migration [regular]; forced migration [forced]; resettlement [resettlement]; circular migration [circular]; climate migration
Country topic/ coverage/ implementation	<Country name/s>; Not specified *Note: Country topic refers to the country of study or implementation, country of origin, nationality or citizenship of study population, country source data, and/or country key or main topic of article.*
Country topic - income classification	Low-income country [LIC]; Lower-middle income country [LMIC]; Upper-middle-income country [UMIC]; High-income country [HIC] <automate in excel>
Region topic	<automate in excel> *Note: Region topic refers to the region of the specified country of study or implementation (see country as described above).*
Country of origin	<as is, if applicable only>
Period of study	<Year start> - <Year end>
Population group by age	Infant; Child; Adolescent; Adult; Older adult; Working Age (18-59 yrs); Not specified
Population group by sex and gender	Women of reproductive age (15-49 yrs); Women; Men; Trans; LGBTQIA+; Not specified
Diseases and health conditions	Child health; Infectious diseases; Disability; Non-communicable diseases; Sexually transmitted infections; Malnutrition; Maternal health; Sexual health Reproductive health; Psychosocial; mental health and well-being; Vaccine-preventable diseases
Determinants of health[1]	Individual factors (demographics, hereditary); Lifestyle/ behavioral factors; Living conditions (access to safe housing, water, sanitation); Socio-cultural factors (discrimination, stigma, social inclusion); Governance (legislation, policies) Political determinants (wars, conflicts, policy); Commercial determinants; Environmental determinants
Health promotion and education	Social behavioral change communication; Health literacy (and health information)
Health systems and policies	Healthcare policies; Healthcare models; Healthcare services; Healthcare financing; Healthcare access; Health workforce; Health Information systems; Human rights;

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[1] Health of Migrants https://www.migrationdataportal.org/themes/migration-and-health

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Classification	Subclassification [code/ notes]
	Gender-sensitive policies; SDGs on health; Universal health coverage; Health system strengthening; Financial protection/insurance; Equity in healthcare; Migration-specific policies; Migration governance; Migrant inclusion; Migrant integration; Procurement system
Environmental health	Climate-related migration; SDGs on environmental health; Disaster risk reduction
Occupational health	Work-related stress; Work-related injuries; Work-related disability; Skin conditions; Allergy and asthma; Musculoskeletal disorders; Chemical exposures; Noise-induced hearing loss
Migration-specific	Travel-related health assessment; Other health-related travel assistance; Border management; Flow monitoring; Emergency response

Bibliometric analysis of relevant articles

MS Excel and Biblioshiny (RStudio) will be used to analyze bibliometric information including authors, citations, articles, and sources (or journals). Biblioshiny is an open-source web-interfaced bibliometrics tool that uses the R programme, a statistical software package[32]. Biblioshiny provides metrics on intra-country (SCP) and inter-country (MCP) collaboration including a summary of single-authored and multiple-authored articles. MS Excel will be used to produce descriptive counts and percentages of classified articles by theme, subtheme, migrant topic, and country topic/coverage [33]. It is important to note that bibliometric analysis relies mainly on the quantitative analysis of bibliometric information, and the qualitative analysis is an interpretation only. Further, the bibliometrics method is used when the scope is broad, and the dataset is too large for manual review [34].

Visualization mapping VOSviewer version 1.6.19 [35], a software tool for constructing and visualizing bibliometric networks, will be used to analyze and visualize the networks of co-authorship relations among authors, countries, and institutions, and co-occurrence relations between keywords. To present a clean map, VOSviewer thesaurus files will be prepared to standardize terms and exclude generic and out-of-scope terms [36].

Patient and public involvement

None.

Limitations

The depth and breadth of the findings from bibliometric analysis will depend on the information available in Scopus and the search strategy applied. Limitations inherent in a bibliometric study are as follows: (1) Relevant articles might be missed, particularly, those published in preprint servers. Research papers in the online preprint servers are not indexed in Scopus as these have yet to be peer-reviewed or accepted by traditional academic journals. Nevertheless, articles-in-press (i.e., pre-published versions of accepted research articles) are included in Scopus. (2) New articles might be missed due to time lag in the Scopus indexing (NB: fully indexed articles are estimated to appear in Scopus within three to four weeks of the article appearing on the publisher's website). (3) Bibliometrics only measures impact in terms of research publication activity and not the research quality. (4) Search results reflect how the article information was recorded and presented in Scopus. For example, active

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institutions, author names, and countries with different spellings will be spread out in the results. Another example is that relevant articles are not captured because the title and/or abstract do not contain the identified search terms. A possible reason for such scenario is when authors of the relevant articles do not indicate the term 'migrant' in the title and/or abstract when referring to some migrant populations that they may not recognize and/or classify as 'International Migrant' (e.g., populations crossing the shared Bangladesh and India border).

Application of the Protocol

This protocol will be useful for researchers who wish to do a similar mapping specific to their region or country/ies of interest. Further, findings from this protocol will be a useful starting point for content analysis on specific migration health themes and/or international migrant population.

ETHICS AND DISSEMINATION

This bibliometric analysis will draw on publicly available data and will not directly involve human participants; ethical review will not be required. The findings from the bibliometric analysis (and other related research that can potentially arise from the protocol) will be disseminated through academic publications, conferences, and other forms of collaboration with relevant stakeholders to inform policies and interventions aimed at improving the health of international migrants and their families.

AUTHOR'S CONTRIBUTION

KW conceived the idea for the study. KW, SA, MB, and JL were involved in the development of the study protocol. SA prepared the first draft of the study protocol based on extensive consultations with the Manila Consensus on Methodological Guidelines in Migration Health Bibliometric Analysis as scientific advisors. MS reviewed and validated the search strategy development. All authors (i.e., KW, MB, JL, MS, AK, MG, CH, BB, RA, LJ, TM, ML) critically reviewed, revised, and approved the subsequent and final version of the protocol.

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CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Section and topic	Item No	Checklist item	Mark Yes, if available	Notes
ADMINISTRATIVE INFORMATION				
Title:				
Identification	1a	Identify the report as a protocol of a systematic review	Not applicable	Protocol for a bibliometrics study
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	Not applicable	
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number	Not applicable	
Authors:				
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	Yes	
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	Yes	
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	Yes	
Support:				
Sources	5a	Indicate sources of financial or other support for the review	Not applicable	
Sponsor	5b	Provide name for the review funder and/or sponsor	Not applicable	
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	Not applicable	
INTRODUCTION				
Rationale	6	Describe the rationale for the review in the context of what is already known	Yes	
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	Yes	
METHODS				
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	Yes	
Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial	Yes	

		registers or other grey literature sources) with planned dates of coverage		
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	Yes	
Study records:				
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	Yes	
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	Yes	
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	Yes	
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	Yes	
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	Not applicable	
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	Not applicable	
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	Not applicable	
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2, Kendall's τ)	Not applicable	
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	Not applicable	
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	Bibliometric analysis	
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	Not applicable	
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	Not applicable	

* It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.

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