



A Systematic Review of Tropical Disease Prevalence among Migrants

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Abstract

BACKGROUND: Few studies have assessed the burden of tropical diseases among migrants into non-endemic countries.

AIM: This study aimed to systematically review the existing data of the prevalence of tropical diseases globally, including neglected tropical diseases globally.

MATERIALS AND METHODS: The authors conducted a systematic review reporting prevalence (including seroprevalence) of tropical diseases following the PRISMA guidelines and based on the database from PUBMED, WoS, and PROQUEST. All the identified records were screened according to the inclusion and exclusion criteria. The selected articles' quality was appraised using the mixed methods appraisal tool to ensure its quality.

RESULTS: Overall, 19 studies conducted in 13 countries published between the year 2017–2020 were included in the study. Based on the thematic analysis, two themes (type of organism) and 11 sub-themes (disease) were used. The prevalence of tropical diseases among migrants ranged from 0.2 to 31% for malaria; 3–20% for Chagas Disease; 3.2–3.5% for Giardiasis; 31.7–57.4% for Toxoplasmosis; 0.1–51%, for Schistosomiasis; 0.1–15.8%, for Strongyloidiasis; 0.3–3.8% for Trichuriasis; 0.2–0.9% for Ascariasis; 6.4–9.7% for Toxocariasis; 0.3% for Loiasis; and 0.5% for Filariasis. All migrants warrant thorough screening and testing, based on the country of origin of their last visit. Routine screening and follow-up may reduce the re-emergence of tropical disease in non-endemic countries.

CONCLUSION: Multiple approaches in managing social and health issues among migrants are vital to secure healthy labor forces for the country's economy and development. Public health sectors should implement strategic promotive, preventive, and curative programs targeted to this group.

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Introduction

The United Nations High Commissioner for Refugees (UNHCR) defines a migrant as any person who is moving or has moved across an international border from his/her residence, regardless of (a) the person's legal status; (b) whether the movement is voluntary or involuntary; (c) what the causes for the movement are; or (d) what the length of the stay is. In 2019, the number of international migrants worldwide reached 272 million (Figure 1) [1]. According to International Federation of Red Cross and Red Crescent Societies – IFRC (2021), migrants are persons who leave or flee their habitual residence to go to new places to seek opportunities or safer and better prospects [2]. Migration can be voluntary or involuntary, which includes labor migrants, stateless

migrants, migrants deemed irregular by public authorities, migrants displaced within their own country, and refugees and asylum-seekers. Migration takes on an increasing significance affecting national security, economics, climate change, and global health [3].

Human migration represents both a risk for the re-emergence of new infections in countries with the vector and the expansion of the geographical distribution of tropical disease cases to non-endemic countries. In general, migrants are at greater risk of infectious diseases due to the existing poverty driving them to migrate and the social and economic inequalities they often face once relocated [4].

In recent years, tropical diseases are closely related to the regions lacking in socioeconomic progress, substandard housing, lack of access to clean water and sanitation, filthy environment with abundant vectors, and insects contributing to infection

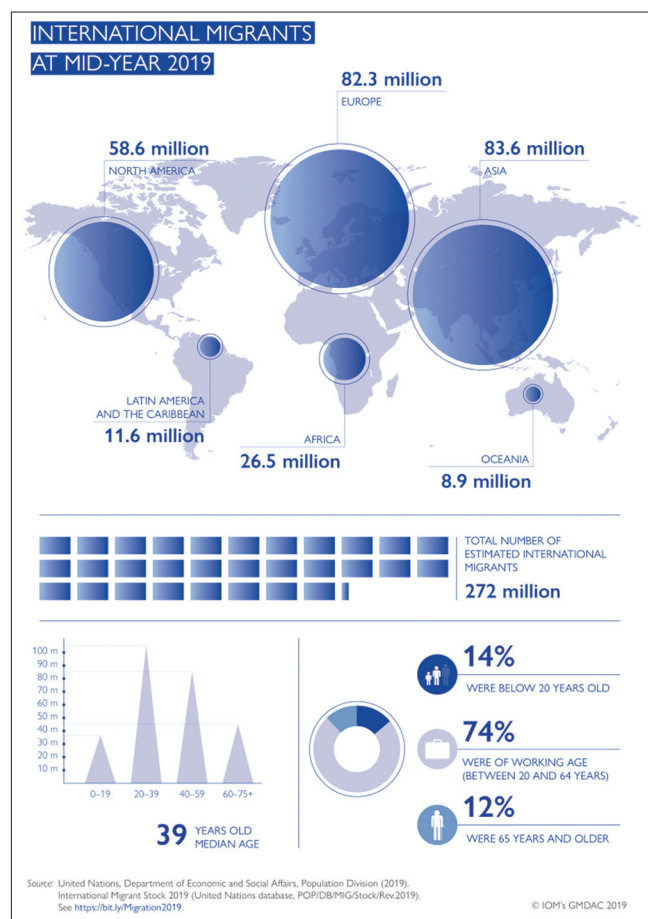


Figure 1: The number and characteristics of international migrants in 2019

transmission [5]. These events are widespread among the migrants where they were displaced, affecting them directly or indirectly while harboring tropical diseases along the way. The purpose of this review is to appraise the recent literatures on prevalence of tropical diseases among migrants, explore the issues behind the transmission of diseases among migrants, and how tropical diseases affect their general wellbeing and public health [5].

Methodology

The review protocol-PRISMA

The study was guided by the PRISMA review protocol [6]. Based on this review protocol, we started the systematic search that consists of three main sub-processes: identification, screening (inclusion and exclusion criteria), and eligibility. Next, we appraised the selected articles' quality using the mixed methods appraisal tool (MMAT) Version 2018 [7] to corroborate the articles' quality for reviewing. Finally, we explored in detail the data that were extracted for analysis and validation.

Formulation of research questions

The formulation of the research question for this review was based on PICO's three main concepts, namely, Population or Problem, Interest, and Context [8]. Based on these concepts, we included the three main aspects in the review namely migrant (Population), tropical disease (Interest), and prevalence (context) which guided us to formulate the main research question: "What is the prevalence of tropical diseases among migrants?"

Systematic searching strategies

The three main processes in the systematic searching strategies process were identification, screening, and eligibility (Figure 2).

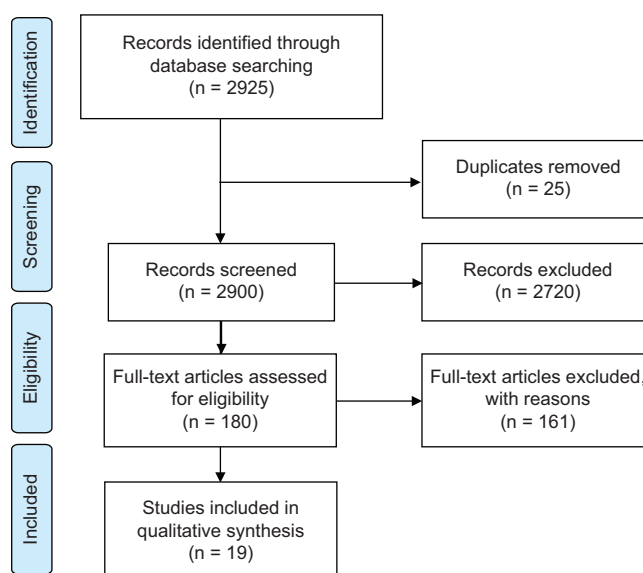


Figure 2: The PRISMA flow diagram

Identification

The identification process involved searching for any synonyms, related terms, and variations of the main keywords, which were prevalence, tropical disease, and migrants. This process provided more extensive coverage in findings of the related articles within the selected databases (PUBMED, WOS, and PROQUEST). We managed to enrich the existing keywords and developed a full search string (based on Boolean operator, phrase searching, truncation, wild card, and field code functions) for the three main databases (Table 1). Some of the distinct features from these databases were extensive literature, high-quality articles, and advanced search functions.

Screening

We screened all the 2900 selected articles by choosing the criteria for articles selection based on the inclusion and exclusion criteria, as stated in

Table 1: The search string in the main databases

Database	Search String
PUBMED	((Migrants[Title/Abstract] OR Immigrants[Title/Abstract] OR Foreigners[Title/Abstract] OR Aliens[Title/Abstract] OR Emigrants[Title/Abstract] OR Undocumented Person[Title/Abstract] OR Undocumented Immigrant[Title/Abstract] OR Undocumented Alien[Title/Abstract] OR Unauthorized Immigrant[Title/Abstract] OR Squatter[Title/Abstract] OR Illegal Immigrant[Title/Abstract] OR Displaced Person[Title/Abstract] OR Illegal Alien[Title/Abstract] OR Undocumented Person[Title/Abstract] OR Transient[Title/Abstract] OR Refugee[Title/Abstract] OR Non-native[Title/Abstract] OR Non-citizen[Title/Abstract] OR Exile[Title/Abstract] OR Deportee[Title/Abstract] OR Evacuee[Title/Abstract]) AND ((Neglected Tropical Disease[Title/Abstract] OR Tropical Disease[Title/Abstract] OR Neglected Diseases[Title/Abstract] OR Tropical Diseases[Title/Abstract])) AND (Prevalence[Title/Abstract] OR Epidemiology[Title/Abstract] OR Commonness[Title/Abstract] OR Frequency[Title/Abstract] OR Frequentness[Title/Abstract] OR Chronicity[Title/Abstract] OR Constancy[Title/Abstract] OR Continuous[Title/Abstract] OR Regularity[Title/Abstract] OR Occurrence[Title/Abstract] OR Vital Statistic[Title/Abstract] OR Morbidity[Title/Abstract] OR Basic Reproduction Number[Title/Abstract] OR Population Characteristics[Title/Abstract] OR Demography[Title/Abstract] OR Epidemiologic Measurements[Title/Abstract] OR Appearance[Title/Abstract])
WoS	TITLE: (Migrants OR Immigrants OR Foreigners OR Aliens OR Emigrants OR Undocumented Person OR Undocumented Immigrant OR Undocumented Alien OR Unauthorized Immigrant OR Squatter OR Illegal Immigrant OR Displaced Person OR Illegal Alien OR Undocumented Person OR Transient OR Refugee OR Non-native OR Non-citizen OR Exile OR Deportee OR Evacuee) AND TITLE: ((Neglected Tropical Disease OR Tropical Disease OR Neglected Diseases OR Tropical Diseases) AND TITLE: (Prevalence OR Epidemiology OR Commonness OR Frequency OR Frequentness OR Chronicity OR Constancy OR Continuous OR Regularity OR Occurrence OR Vital Statistic OR Morbidity OR Basic Reproduction Number OR Population Characteristics OR Demography OR Epidemiologic Measurements OR Appearance))
PROQUEST	(Migrants OR Immigrants OR Foreigners OR Aliens OR Emigrants OR Undocumented Person OR Undocumented Immigrant OR Undocumented Alien OR Unauthorized Immigrant OR Squatter OR Illegal Immigrant OR Displaced Person OR Illegal Alien OR Undocumented Person OR Transient OR Refugee OR Non-native OR Non-citizen OR Exile OR Deportee OR Evacuee) AND ti ((Neglected Tropical Disease OR Tropical Disease OR Neglected Diseases OR Tropical Diseases) AND (Prevalence OR Epidemiology OR Commonness OR Frequency OR Frequentness OR Chronicity OR Constancy OR Continuous OR Regularity OR Occurrence OR Vital Statistic OR Morbidity OR Basic Reproduction Number OR Population Characteristics OR Demography OR Epidemiologic Measurements OR Appearance))

Table 2. The selection criteria were based on the research question, as suggested by Kitchenham and Charters [9]. Only studies that included migrants and tropical diseases were accepted. However, those that included migrants from a different state within the same country, and diseases that were endemic throughout the world were excluded from the study. Furthermore, as it was challenging for us to review all the existing published articles from inception, we restricted the search as according to Okoli who suggested that the researchers should determine the range of periods that they were able to review [10]. In this systematic review, only articles published from the year 2011 to 2020 were included in the study.

Table 2: The Inclusion and exclusion criteria

Criteria	Inclusion	Exclusion
Timeline	2011–2020	<2010
Document type	Article journal (empirical data)	Systematic reviews, editorials and animal studies
Language	English	N/A
Tropical Diseases	Non-endemic tropical diseases	N/A
Migrants Country of Origin	International migrants from different countries	N/A

Eligibility

We, further, ensured eligibility of articles by individually appraising the retrieved articles to make certain that all the remaining articles were in line with the research question. We included articles on research that reported prevalence and seroprevalence rather than expert opinions or review papers, on tropical diseases including neglected tropical diseases and not those that were endemic to the country of interest, and on international migrants rather than on local migrants.

Quality appraisal

The remaining articles from the eligibility process were examined to ensure that the quality of methodology was free from any bias [11]. MMAT for the systematic review of mixed studies was used to ensure the value of diverse study designs in this

review. We focused on the 25 criteria that cover five categories of the articles. For the articles to be included in the review, both authors who appraised an article must mutually agree. Any disagreement was resolved with a discussion until consensus was achieved.

Data extraction and analysis

This study relied on the integrative review method. This technique allowed diverse research designs (quantitative, qualitative, and mixed-method) to be included in the review. According to Whittemore and Knafl, the best way to synthesize or analyze integrative data is using qualitative or mixed-method techniques that enable the researcher to conduct iterative comparisons across the primary data sources [12]. Data abstraction was conducted based on the research questions. Subsequently, we performed a thematic analysis that identified themes and sub-themes based on efforts related to noting patterns and themes, clustering, counting, noting similarities, and relationship that existed within the extracted data [13]. Thematic analysis is considered the most suitable in synthesizing a mixed research design (integrative) [14]. It is explained as a descriptive method that reduces the data in a flexible model that merges with other data analysis techniques [15].

The first step of thematic analysis is to generate themes. We identified patterns that emerged among all reviewed articles' extracted data in the process. Any similar or related extracted data were pooled in a group, and eventually, a total of two main groups were created. We then re-examined the two groups of data and distinguished 11 sub-groups. The next process involved reviewing the accuracy of these themes. In this process, we re-examined all the main and sub-themes generated to ensure its usefulness and accurate data representations. Then, we proceeded to the next stage by naming the themes for each group and their sub-group, as shown in Table 3.

Table 3: Themes and sub-themes

Theme (Type of organism)	Sub-theme (Diseases)	Number of studies
Protozoa	Malaria	7
	Chagas	5
	Giardiasis	2
	Toxoplasmosis	2
	Strongyloidiasis	6
Helminths	Schistosomiasis	8
	Strongyloidiasis	6
	Ascariasis	4
	Trichuriasis	3
	Toxocariasis	2
	Loiasis	1
	Filariasis	1

Results

Background of selected articles

There were 2900 articles obtained from all the databases after 25 duplicates were removed. Another 2720 articles were excluded after restricting published period from 2011 to 2020. A final list of 19 articles were selected after eligibility assessment and quality appraisal (Figure 2). Based on the thematic analysis, two themes were developed, namely, diseases caused by protozoa and diseases caused by helminths. Further, analysis of the themes resulted in 11 sub-themes, as shown in Table 3. Out of 19 selected articles, four studies were conducted in Spain, three studies were conducted in Italy, two studies were conducted in the USA, and one study each from Qatar, Netherlands, Brazil, Switzerland, Pakistan, Australia, Malaysia, Germany, Mexico, and Thailand. Further, eight studies were published in 2017, six in 2016, two in 2018, two in 2019, and one article was published in 2020, as stated in Table 4. The list of tropical diseases identified among migrants and the number of studies according to their origin are as illustrated in Figure 3.

Diseases caused by protozoa

Malaria

Seven studies reported migrants with malaria. Three studies were conducted in Spain, and one study

each from Netherland, Switzerland, Pakistan, and Australia. We summarized the migrant's countries of origin in Table 5. Four studies reported that they originated from the African countries and one each from Asia, South East Asia, North America, Oceania, Europe, Afghanistan, and Eastern Mediterranean. The total number of samples was 15,131. Out of seven, one study involved only pediatric migrants while the rest included all age groups. Most of the study included both male and female. The prevalence of malaria among migrants found from the studies ranged from 3.8% (12/316) [16], 4.4% (107/2426) [17], 5.7% (14/244) [18], and 24.5% (1482/6060) [19]. However, a study in refugee camps by Wahid *et al.* shown the prevalence of 0–0.2%–0.4–9% by rapid diagnostic test and 0–1.39% and 5–15% by polymerase chain reaction for *Plasmodium falciparum* and *Plasmodium vivax*, respectively [20]. The prevalence of anti-malarial antibodies to *P. falciparum* antigens was 3–11% and 17–45% for *P. vivax* antigens. Schlagenhauf *et al.*, in 2018, analyzed malaria among Eritrean migrants and found that 31% of them had malaria [21]. Another study by De Gier *et al.* reported that malaria incidence in asylum seekers was 57.5% (214/372) [22]. Therefore, the range of prevalence of malaria among migrants was found to be 0.2–31%.

Chagas disease

Five studies reported Chagas disease among migrants. Two studies were conducted in Spain, and one study each from Brazil, Italy, and Mexico. Two studies reported that migrants originated from the African countries, two from Bolivia, and one from Guatemala. The total number of samples was 4395. Most of the study included both male and female. Prevalence of Chagas among migrants found from the studies was 3.0% (72/2426) [17], 3.1% (12/392) [23], 4.4% (28/633) [24], and 3.9% (7/180) [25], 20% [26], giving a range of 3–20%.

Table 4: The year, country, and diseases reviewed from the studies

No	Studies	ID	Year	Country	Protozoa				Helminths						
					Malaria	Chagas	Giardia-sis	Toxopl-asmosis	Scishto-somiasis	Strongy-loidiasis	Ascaria-sis	Trichu-riasis	Toxoca-riasis	Filariasis	Loiasis
1	(De Gier <i>et al.</i>)	1	2017	Netherlands	/										
2	(Herrador <i>et al.</i>)	2	2019	Spain	/										
3	(Luna <i>et al.</i>)	4	2017	Brazil		/									
4	(Schlagenhauf <i>et al.</i>)	6	2018	Switzerland	/										
5	(Wahid <i>et al.</i>)	7	2016	Pakistan	/										
6	(Zwi <i>et al.</i>)	8	2017	Australia	/				/	/					
7	(Herrick <i>et al.</i>)	13	2020	USA			/			/	/		/	/	
8	(Lingscheid <i>et al.</i>)	14	2017	USA					/						
9	(Marchese <i>et al.</i>)	15	2018	Italy					/						
10	(Abu-Madi <i>et al.</i>)	17	2016	Qatar					/	/	/	/			
11	(Cobo <i>et al.</i>)	19	2016	Spain	/	/			/	/	/	/			/
12	(Martelli <i>et al.</i>)	22	2017	Italy		/			/	/			/	/	
13	(Sahimin <i>et al.</i>)	23	2017	Malaysia				/							
14	(Theuring <i>et al.</i>)	25	2016	Germany					/						
15	(Blasco-Hernández <i>et al.</i>)	28	2016	Spain		/									
16	(Connors <i>et al.</i>)	29	2017	Mexico		/									
17	(Fradejas <i>et al.</i>)	30	2019	Spain	/										
18	(Gualdieri <i>et al.</i>)	31	2016	Italy			/		/	/	/	/			
19	(Van Enter <i>et al.</i>)	35	2017	Thailand				/							
Total					7	5	2	2	8	6	4	4	2	1	1

Table 5: The number of studies that specify the migrant’s country of origin and disease involved

No.	Disease	Africa	Asia					America		Oceania	Europe	Afghanistan	East. Mediter-ranean		
			SEA	Asia*	Bangladesh	Pakistan	India	Nepal	South America					North America	
1	Malaria	4	1	1					1	1	1	1			
2	Giardiasis							2							
3	Chagas	2						3							
4	Toxoplasmosis		2				1								
5	Schistosomiasis	4	1	2					2	1					
6	Ascariasis	2		2											
7	Loiasis	1													
8	Trichuriasis	3		1	1		1								
9	Strongyloidiasis	1		1	1		1	1				1			
10	Toxocariasis	1													
11	Filariasis	1	1												
Total		19	5	7	2		2	2	2	8	3	2	1	1	2

* The exact Asia country was not specified in the respective study.

Giardiasis

Two studies reported Giardiasis among migrants. One study was conducted in the USA while another in Italy. These studies reported that they were migrants that originated from South America. The total number of samples was 2,283. Most of the studies included both male and female. The prevalence of Giardiasis among migrants found in the studies is 3.2% (69/2150) [27] and 3.5% (4/125) [28], giving a range of 3.2–3.5%.

Toxoplasmosis

Two studies reported Toxoplasmosis among migrants. One study was conducted in Malaysia while another in Thailand. These studies reported that they were migrants that originated from Indonesia, Myanmar, and Nepal. The total number of samples was 684. One study only included pregnant female migrants. The prevalence of Toxoplasmosis among migrants found from the studies was 31.7% (63/199) [29] and 57.4% (278/484) [30], giving a range of 31.7–57.4%.

Diseases caused by helminth

Schistosomiasis

Eight articles documented Schistosomiasis among the migrant population. The studies were performed in Italy [3], Germany [1], Spain [1], Qatar [1], Europe [1], and Australia [1]. Four studies reported that the migrants came from Africa, two from Asia, two from North America, one from Oceania, and South East Asia, respectively. All the studies included both male and female migrants. All the studies were carried out among the adult population except, for one which was performed among refugee children [16]. The prevalence of Schistosomiasis was 51% [31], 36% [32], 15% [16], 11.5% [17], 5.97% [25], 5.2% [33], 1.3% [27], and 0.1% [34], giving a range of 0.1–51%.

Strongyloidiasis

Six articles reported on Strongyloidiasis among the migrant population. The studies were located in Italy [2], Spain [1], the USA [1], Qatar [1], and

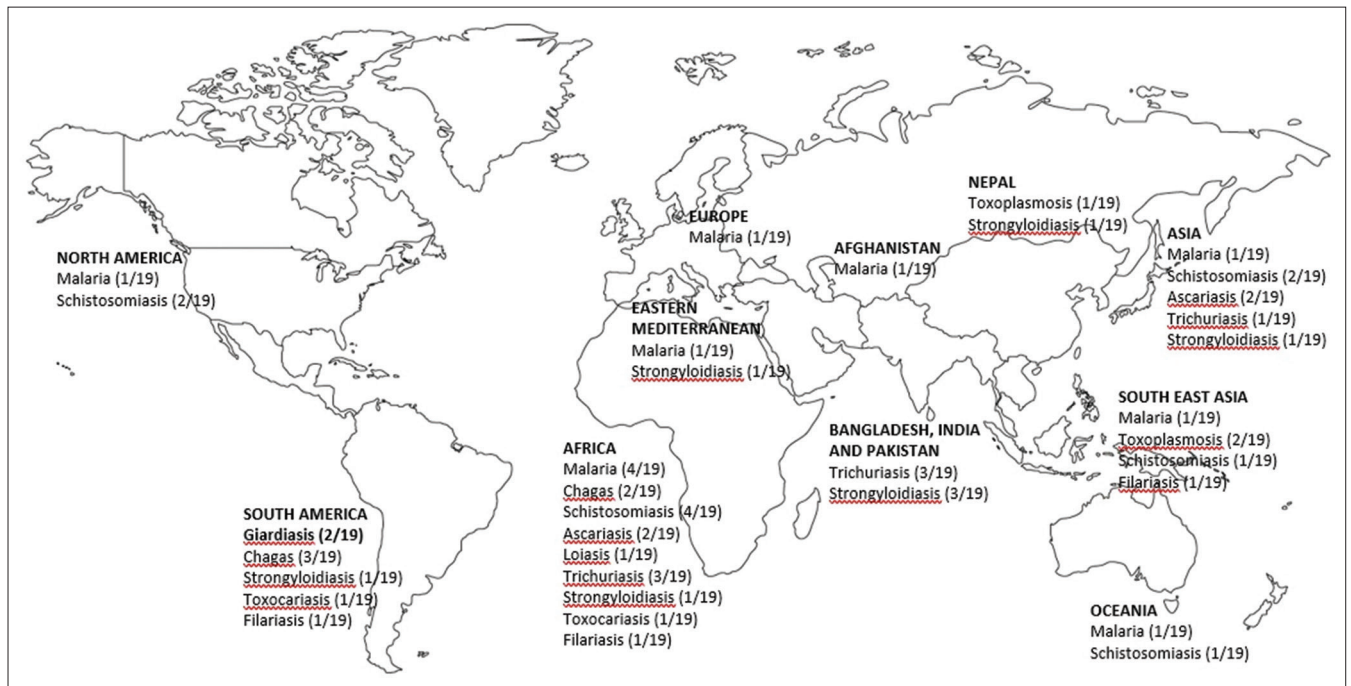


Figure 3: The list of tropical diseases identified among migrants and the number of studies according to their origin

Australia [1]. The majority of the migrants came from Africa, Asia, Pakistan, Bangladesh, India, Nepal, South America, and Eastern Mediterranean countries. Both male and female migrants of all age groups were included in this review. The prevalence of Strongyloidiasis were 15.8% [17], 4.51% [25], 4% [28], 3% [16], 0.4% [27], and 0.1% [34], giving a range of 0.1–15.8%.

Trichuriasis

Four studies reported on Trichuriasis, namely, in Qatar, Italy, Spain, and the USA. The majority of the migrants came from Africa, Asia, Bangladesh, Pakistan, and India. Both male and female adult migrants were included in this review. The prevalence of Trichuriasis was 3.8% [27], 1.8% [28], 1.7% [17], and 0.3% [34], giving a range of 0.3–3.8%.

Ascariasis

Four studies reported on Ascariasis, namely, in the USA, Spain, Italy, and Qatar. Migrants from 1 year old to 78 years old were included in the review. Both genders were included and the majority came from Africa and Asia. The prevalence of Ascariasis was 0.9% [28], 0.8% [17], 0.6% [27], and 0.2% [34], giving a range of 0.2–0.9%.

Toxocariasis

Two studies reported Toxocariasis among migrants. One study was conducted in the USA while another in Italy. These studies reported that they were migrants that originated from Africa and South America. The total number of samples was 1063. Both of the studies included males and females of all age groups. The prevalence of Toxocariasis among migrants found from the studies was 9.7% [25] and 6.4% [28].

Loiasis

There was only one study that reported on Loiasis among migrants. The study was conducted in Spain. The migrants originated from Sub-Saharan Africa, with a sample size of $n = 4$ ($p = 0.634$) recorded out of the total sample of 2426 patients. The majority of immigrants from Sub-Saharan Africa had an illegal immigration status (50.7%) [17]. The mean age of the migrants was 31.1 years ($SD \pm 9.01$), and 83.7% were male. The prevalence of Loiasis among the Sub-Saharan Africa migrants who lived in Spain for less than 3 years was 0.2% and those who resided there for more than 3 years were 0.3% [17].

Filariasis

We managed to find only one study that reported Filariasis among migrants. It was conducted in

Italy. This study reported that there were migrants that originated from Africa, SEA, and South America. The total number of samples was 930. The study included both male and female migrants of all age groups. The prevalence of Filariasis among migrants found in the studies is 0.5% [25].

Discussion

The organisms retrieved from the review mainly are from pathogenic parasites that can cause diseases in humans. The review of 19 articles included in this article which revealed some issues about tropical diseases among the migrants.

Migrants who live in the rural and more impoverished socioeconomic areas from endemic countries (e.g., Chagas disease from South America) have a higher prevalence of getting infected by the disease [17]. As these vector-borne diseases (VBDs) are disproportionately higher in low- and middle-income countries in the tropical and subtropical regions, poverty plays essential roles in shaping the living environment among the migrants. Poor housing materials as a result of poverty resulted in mediocre protection from entry of vectors and hence risk for infections [20], [23]. Living with non-hygienic and poor sanitation practices among migrants could also enhance parasitic infection transmission despite a complete medical treatment course [27]. The increase of urban slums resulted from crowded population density, absence of urban planning, unsustainable housing, inadequate infrastructure for water and sanitation, and improper sewerage system could increase mosquitoes breeding sites, thus, amplifying the incidence of VBDs [35]. Therefore, countries with elimination program of diseases such as malaria and Chagas disease must employ prevention and control measures among migrants' communities, focusing on environmental issues boosted with a multisectoral approach on health promotions and education.

The lack of disease education and awareness on disease prevention could increase the migrant's vulnerability to disease transmission [23], [26]. Having more knowledge regarding the disease would improve the individual level of perceived risk on the disease, thus may increase the level of awareness by practicing protective behaviors. Correct information on the disease will allow the prevention and control measures activity to succeed, as it is the best approach that could change the population's behavior. For example, appreciating how the mosquitoes transmit diseases such as malaria, dengue, chikungunya, and filariasis would allow the community itself to practice good sanitary habits, clean environment, applying protective equipment, and dissemination of protective measures

among others [20], [26]. Besides recognizing disease transmission, health-care providers should also provide information on the symptoms, diagnosis, and management of the disease. Some diseases would not manifest but remain as asymptomatic carriers in the human host's body. Therefore, promoting adequate knowledge and awareness may help public health sectors on screening programs, vaccination programs, and control measures to be applied in migrant communities [36]. Special attention by the health authorities to vulnerable communities like migrants is crucial to tackle public health concerns. The previous studies have shown that vulnerable communities within a healthy region are still subjected to the health issues associated with social health determinants inequity, such as high prevalence of tropical diseases [37].

Other than that, level of education, type of occupation, socioeconomic status, and life experiences also determine the depth of knowledge of a disease [23], [24]. Accurate information dissemination of a disease could avoid misconceptions and myths regarding the disease within a community. For example, some rural communities believe that malaria can be inherited [38]. Some believe that Chagas disease will not harm the humans infected [26]. These misconceptions about tropical diseases would make the control measure strategies difficult. Educating the migrants through community empowerment has proven to be the most reliable approach in tackling misconceptions and perceptions. Sharing experiences among each other would elicit a reason to undergo screening and testing for tropical diseases such as Chagas disease and malaria [26], [36].

Overall, from all the appraised articles, this review had considered most of the underprivileged and deprived migrant communities around the world. We managed to cover a wide range of countries and regions, including the American, African, and Asian continents, and also the Middle East. Deprivation of clean water and sanitation, suitable housing, and clean and hygienic environments in their mother countries had shown to result in increased prevalence of multiple tropical diseases among migrants when they seek asylum or migrate to another country. This is evidenced by a high prevalence of tropical diseases among children in developing countries, which may also manifest into their adulthood during migration [39]. The social determinants of health play a pivotal role in shaping a migrant's well-being; hence, it is imperative that health and immigration authorities deliberate efforts to improve equitable health outcome for migrants [40].

This review has several limitations. The tropical diseases that are mentioned mostly consist of two major groups of helminths and protozoa. It is not extensive because it does not include other tropical diseases such as dengue fever, cholera, Buruli fever, and leprosy. The format presented in terms of prevalence data, incidence data, and diagnostic tests are not standard and mostly

used according to the country of study that conducted the research. It could be prevented by creating a better surveillance system, and risk assessment of the population studied according to the WHO guidelines on gold-standard testing, surveillance data sourcing, and notification systems.

Conclusion

All new migrants warrant thorough screening and testing. Accessibility to health-care facilities for routine screening and follow-up may reduce the incidence of re-emerging tropical diseases in the non-endemic countries. The integrated and multisectoral approach in managing social and health issues among this marginalized community is mandatory to secure labor forces for the country's economy and development [41]. Public health sectors should implement strategic promotive, preventive, and curative programs targeted to vulnerable groups like migrants in alignment with the WHO, UN Migration Agency, and UNHCR policies.

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