RESEARCH ARTICLE

Bibliometrics of the 100 most-cited articles on refugee populations [version 1; referees: awaiting peer review]

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Abstract
Background: Bibliometrics is a form of quantitative analysis that employs peer-reviewed research, journal articles and citation counts to examine the content of current literature on a particular topic. The authors aim to identify the major academic disciplines that dominate the landscape of published materials and research endeavors on the topic of refugees.

Methods: Using the Web of Science, a database of most-cited articles was created by a team with expertise in bibliometrics.

Results: Citations ranged between 1,493 and 105; averaging 203 citations per article. The publications spanned the years from 1973 to 2010. The year 2004 had the highest number of publications. All articles were published by 45 journals. In total, 294 investigators authored these articles. Psychiatry, psychology and public health constituted the top three fields of affiliation, with the most investigated feature being the mental health of refugees. Single investigators authored a quarter of all articles.

Conclusion: This bibliometric evaluation allowed a multi-dimensional outlook on the conditions of refugee populations across the globe, through collation of relevant peer-reviewed research journal articles. This specialized form of assessment has resulted in a multi-disciplinary compendium of publications on the subject.

Keywords
refugee, resettlement, bibliometric, citation analysis, mental health

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Introduction
According to the Office of the United Nations High Commissioner for Refugees (UNHCR), “a refugee is someone who has been forced to flee his or her country because of persecution, war, or violence”. Refugees fear persecutions owing to their ethnicity, religious beliefs, and nationality in resettlement areas and foreign lands. Despite these fears, they cannot return to their home-countries due to ongoing wars, ethnic, tribal and religious violence and conflicts.

Recent estimates affirm a global refugee population of 21.3 million, with the majority of refugees from Syria, Afghanistan, and Somalia. Beset by a diverse set of health concerns and diseases, the well-being of refugees is contingent on the quality of the available health care, as mandated by responsible resettlement authorities. The resettlement of refugees in Europe and North America also drives changes in the sociocultural landscape and epidemiology of diseases requiring an update in healthcare system of the host country, and generation of new policy frameworks. These emerging social and political issues demand a review of current research initiatives in the literature concerning refugees.

Bibliometrics is a form of quantitative analysis that employs peer-reviewed research, journal articles and citation counts to examine the content of current literature on a particular topic. This form of review evaluates a given topic through three main facets: i) outlining the most and least investigated research areas; ii) providing a summary of the journals containing publications on the topic; and iii) providing a summary of relevant authors on the topic. In this way, this type of study effectively: i) gauges the dimensions of available literature on the topic; ii) identifies the journals that accommodate publications on the topic; and iii) maps out the quality of current research on the topic; and iv) guides and prioritizes forthcoming research. In addition, bibliometrics can help connect researchers pursuing similar interests, opening up the possibility for joint research ventures.

The bibliometric assessment performed in the present study explores a diverse set of academic research on refugee populations around the world. Using a method of “citation analysis”, this study examines this topic through citation counts accompanying peer-reviewed scientific publications. These citation counts provide an appraisal of the current bibliographic data through a calculation of the number of references associated with each article. Bibliometrics have been published in a number of medical disciplines, and the authors have published on the topic as well. The current study seeks to highlight the diversity of the body of research on refugee communities. In effect, it will identify the major academic disciplines that dominate the landscape of published materials and research endeavors on this topic.

Methods
Search methodology
Using Thomas Reuters’ Web of Science (WOS), a database of peer-reviewed scientific journal articles and citation index, the search item: “refugee” was plugged into the search bar. The option, “All Databases” was selected to ensure a comprehensive result list. Subsequently, the feature, “most cited to least cited,” was used to sort the generated result list in descending order of citation counts.

This bibliometric assessment was conducted in June 2016. The list of generated results in WOS was reviewed and an itemized list was generated by M.K. and S.N., who had expertise and prior experience in conducting bibliometric analyses. Eligibility of articles for inclusion was assessed by M.K., S.N. independently and any differences were resolved through consensus among all authors. All peer-reviewed scientific research journal articles pertaining to refugee populations across the globe were included in this study. Microsoft Excel 2016 was used to create a list of one hundred approved articles that were rearranged from highest to lowest citation counts.

Data presentation
Two academic databases included in WOS were utilized to generate data related to top 100 cited articles: i) Web of Science (all databases) and ii) Web of science (core collection). The Web of Science Core Collection consists of ten indexes comprising 20 thousand scholarly journals, books, book series, reports, and conferences across sciences, social sciences, and humanities disciplines. Whereas WOS (all databases) expands upon core-database collection by including information from more databases including SciELO, Medline and Russian citation index among others. This cascading list recorded the following particulars of each article: i) complete citation; ii) citation counts in WOS “All Databases;” iii) citation counts in the WOS Core Collection; iv) name of journal; v) year of publication; vi) author(s); vii) total number of authors; viii) study design; ix) sample size; x) number of institutional affiliations; xi) fields of affiliations; xii) usage of statistical analyses; xiii) research areas; xiv) disciplines; and xv) places of origin. All particulars were stratified and analyzed separately. No ethical approval was sought from any institution because of the bibliometric study design and lack of human participants in the study.

While the research areas were provided by WOS, the disciplines were formulated in this study as broader categories accommodating analogous research areas. For example, the research areas of adult psychiatry, child and adolescent psychiatry, psychology, behavioral sciences, addiction medicine and substance abuse were incorporated into the single discipline of “Mental health and Behavioral and Addiction Medicine.” Further details of the research areas contained within each discipline is given in Table 1.

Statistical analysis
Statistical analyses of data were performed using continuous variables via SPSS v23.0 (SPSS, Inc., Chicago, IL). Quantitative variables were presented as median (IQR) and categorical variables as frequencies (percentages). Categorical variables were presented as bar graphs and pie charts. Association between number of citations and year of publication of articles was presented as a line graph.
### Table 1. Breakup of disciplines into research areas.

<table>
<thead>
<tr>
<th>Discipline/research area</th>
<th>Article number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mental Health &amp; Behavioral &amp; Addiction Medicine</strong></td>
<td>57</td>
</tr>
<tr>
<td>Psychiatry and Behavioral Sciences</td>
<td>32</td>
</tr>
<tr>
<td>Psychology</td>
<td>25</td>
</tr>
<tr>
<td><strong>Natural Sciences &amp; Biomedicine</strong></td>
<td>7</td>
</tr>
<tr>
<td>Natural Sciences &amp; Biomedicine</td>
<td>5</td>
</tr>
<tr>
<td>Biology</td>
<td>1</td>
</tr>
<tr>
<td>Biomedical Social Sciences</td>
<td>1</td>
</tr>
<tr>
<td><strong>Government Law, &amp; Public Policy</strong></td>
<td>7</td>
</tr>
<tr>
<td>Government and Law</td>
<td>2</td>
</tr>
<tr>
<td>Public Administration</td>
<td>2</td>
</tr>
<tr>
<td>Political Science</td>
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</tr>
<tr>
<td>International Relations</td>
<td>1</td>
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<tr>
<td><strong>Public, Environmental &amp; Occupational Health</strong></td>
<td>15</td>
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<tr>
<td>Public, Environmental &amp; Occupational Health</td>
<td>9</td>
</tr>
<tr>
<td>Health Care Sciences &amp; Services</td>
<td>1</td>
</tr>
<tr>
<td>Demography</td>
<td>5</td>
</tr>
<tr>
<td><strong>Humanities and Social Sciences</strong></td>
<td>20</td>
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<tr>
<td>Social Science</td>
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<tr>
<td>Sociology</td>
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<td>Communication</td>
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<tr>
<td>Anthropology</td>
<td>4</td>
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<tr>
<td>Business &amp; Economics</td>
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<tr>
<td>Geography</td>
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<tr>
<td><strong>Medical Sciences</strong></td>
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<tr>
<td>General &amp; Internal Medicine</td>
<td>26</td>
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<tr>
<td>Pediatrics</td>
<td>5</td>
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<tr>
<td>Neurosciences &amp; Neurology</td>
<td>5</td>
</tr>
<tr>
<td>Immunology</td>
<td>2</td>
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<tr>
<td>Infectious Diseases</td>
<td>2</td>
</tr>
<tr>
<td>Cardiac &amp; Cardiovascular Systems</td>
<td>1</td>
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<tr>
<td>Peripheral Vascular Disease</td>
<td>1</td>
</tr>
<tr>
<td>Microbiology</td>
<td>1</td>
</tr>
<tr>
<td>Clinical Neurology</td>
<td>1</td>
</tr>
<tr>
<td>Tropical Medicine</td>
<td>1</td>
</tr>
</tbody>
</table>

#### Results

Dataset 1 displays the finalized catalog of the 100-most cited articles on refugees.

#### Citations

Two categories of citations were recorded: WOS All Databases and WOS Core Collection. Citations in WOS All Databases ranged between 1,493 and 105; with a median value of 203 citations per article (IQR = 77.25). A total of 76 articles (over three-fourths of all articles) were cited between 100 and 199 times. This was followed by 15% (n=15) of all articles being cited from 200 to 299 times. Only 9 articles (less than 10% of all articles) were cited over 300 times. The most cited article, garnering 1,493 citations, was titled, “Immigration, Acculturation, and Adaptation,” and was published in Applied Psychology: An International Review in the year 1997. The least cited article, with 105 citations, was titled, “A 6-year follow-up study of Cambodian refugee adolescents traumatized as children,” and was published in the Journal of the American Academy of Child & Adolescent Psychiatry in the year 1993.

The features that differentiate the findings of the WOS All Databases from those of the WOS Core Collection included: i) citations in the WOS Core Collection ranged between 1,462 and 101; averaging at 200 citations per article (IQR = 76.25); and ii) the least cited article, with 101 citations, is titled, “Environmental concerns and international migration,” and was published in the International Migration Review in the year 1996. Figure 1 compares the citation counts of WOS All Databases and WOS Core Collection.

#### Study design

Out of the 100 articles, there were 46 reviews, 44 cross-sectional study designs and 3 meta-analyses. Both the aforementioned most-cited article (in both WOS All Databases and WOS Core Collection) and the least-cited article in the WOS Core Collection were review articles. Figure 2 depicts the types of study designs used by the articles.

#### Use of statistical analyses

A total of 57 articles employed multiple forms of quantitative analyses, while the remaining 43 articles did not employ quantitative analyses. As review articles, both the aforementioned most-cited article (in both WOS All Databases and WOS Core Collection) and the least-cited article in the WOS Core Collection, did not employ quantitative analyses.

#### Sample size

The majority of the articles (n=52) had defined sample sizes, which ranged between 3 and 60,000,000. The remaining 48 articles had no defined sample sizes, as they either reviewed literature or detailed the conditions and predicaments of refugees – thus lacking clinical study designs. With the largest sample size of 60,000,000, the retrospective study titled, “Ages, life stages, and generational cohorts: Decomposing the immigrant first and second generations in the United States,” was published in International Migration Review in the year 2004. Marking the smallest sample size, 3 individuals were recruited in a cross-sectional study titled, “Unexplained Rabies in Three Immigrants in the United States: A Virologic Investigation.” This study was published in the New England Journal of Medicine in the year 1991. Both the aforementioned most cited article (in WOS All Databases and WOS Core Collection) and the least cited article in the WOS Core Collection, had no defined sample sizes; however, the least cited article in WOS All Databases documented a longitudinal cross-sectional study design with a sample size of 84.
Figure 1. This bar chart compares number of citations received by top 100 articles, identified in WOS all records and core database.

Figure 2. This pie chart presents study designs employed in top 100 articles on refugee health.
Years of publication
These 100 publications spanned the years from 1973 to 2010. The year 2004 marked the year with the highest number of publications (n=8); followed by the years 1995 and 1998 that produced 7 publications, each. The years 1973, 1979, 1984, 2007, and 2009 churned out the least number of publications; yielding 1 article during each year. The period from 2000 to 2010 witnessed the production of 46 articles, while the period from 1990 to 1999 marked the production of 45 articles. Between the years 1973 and 1989, only 9 articles were published. Figure 3 portrays the trend of articles published according to years of publication.

Journals
The 100 articles in the list were published by 45 peer-reviewed academic journals. The Journal of the American Medical Association (JAMA) published a total of 15 articles present on this list; followed by the American Journal of Psychiatry, which published 9 articles. Four journals, the International Migration Review, the Journal of the American Academy of Child & Adolescent Psychiatry, the Lancet, and the Social Science & Medicine, issued 5 articles each. Figure 4 presents each journal with their respective numbers of cited articles.

Authors, fields of affiliations, institutional affiliations, and places of origin
A total of 294 investigators authored these 100 articles. The most cited author is Richard Francis Mollica, with a total of 9 articles credited to his name. A total of 25 articles were authored by only one author; followed by 21 articles and 12 articles that were authored by two authors and four authors, respectively. A total of 38 articles had only one institutional affiliation; followed by 24 articles and 14 articles that had two and three institutional affiliations, respectively. The majority of the articles (n=71) either completely or partly originated within the United States of America, while 23 articles and 14 articles either completely or partly originated from the United Kingdom and Australia, respectively. Furthermore, psychiatry, psychology, and public health constituted the top three fields of affiliation. Figure 5 depicts the association between the most-cited articles and authors’ fields of affiliations.

Research areas and disciplines
The top three research areas include: i) Psychiatry; ii) General and Internal Medicine; and iii) Psychology. Similarly, the discipline, Mental Health and Behavioral and Addiction Medicine was the most frequent, followed by Medical Sciences, and Humanities and Social Sciences. Figure 6 illustrates the number of cited articles and research areas. Figure 7 presents the the number of cited articles according to their academic disciplines.

Dataset 1. Bibliometric of the 100-most-cited articles on refugees
http://dx.doi.org/10.5256/f1000research.15106.d207394
Figure 4. This bar chart presents the journals contributing top 100 articles on health of refugees.

Discussion

This bibliometric evaluation allowed a multi-dimensional outlook on the conditions of refugee populations across the globe through the collation of relevant peer-reviewed research journal articles. This specialized form of assessment has resulted in a multi-disciplinary compendium of publications on the subject. Along with studying the various components of this compendium, it was also essential to craft the category of “discipline” by aggre-
process, this study revealed that the most thoroughly referenced feature of this process pertains to its mental health implications.

Contrary to our initial expectations, the discipline of Public, Environmental and Occupational Health and its subsection of refugee and immigrant health did not rank amongst the top three explored disciplines. Aside from this discipline, the least researched disciplines were the following: i) government, law, and public policy; and ii) natural and biomedical sciences. Thenceforth, it is incumbent on researchers to redirect the focus of research and materialize more publications on these least surveyed disciplines.

As far as the prevailing trends in the current literature are concerned, it is essential to understand the turnover of research publications over successive time periods. While only 9 articles out of this list were published between the years 1973 and 1989, the two decades 1990–1999; and 2000–2010 produced 45 articles and 46 articles, respectively. Along with denoting a surge in the turnover of publications, these time periods also characterized two decades of stagnancy and lack of turnover growth. Similarly, the most cited article in this study was published in 1997, almost two decades ago. The most recent well-cited article was published in the year 2009. As the ninth most cited article on the list, with over 300 citations, it was titled, “Association of torture and other potentially traumatic events with mental health outcomes among populations exposed to mass conflict and displacement: a systematic review and meta-analysis,” and was published in the Journal of the American Medical Association (JAMA). Two of the most overall recent articles were published in 2010. No articles published between 2011 and 2016 appeared on this list.

Although most articles (n=57) were empirical evidence-based investigations that employed quantitative analyses, 43 articles did not utilize any form of statistical analyses and 48 articles had no defined sample sizes. The most well-cited academic review article is also the most-cited article of the entire list. As academic review articles (n=46) represented a large fraction of all most-cited
articles, it can be concluded that the refugee populations were examined and inspected through multiple perspectives. The sizable volume of the constituent review articles uncovered recent advances and discoveries, highlighted emerging debates, and identified lacunae in the current literature. Thus, it can be ascertained that prior publications on refugees had been appropriately outlined and contextualized by these review studies.

Psychiatry dominated the fields of affiliations of authors in the most-cited list. The most cited author, with nine publications, is a psychiatrist, Richard Francis Mollica—the Director of the Harvard Program in Refugee Trauma (HPRT) at the Massachusetts General Hospital and Harvard Medical School.

Limitations
The primary limitation is associated with the word, “refugee” (the keyword used in the search bar of WOS), since the keyword entered into any search engine determines the validity of the generated list of results. This study’s exclusive focus on refugee populations (rather than immigrants, foreigners, expatriates, or aliens) might not be comprehensive or inclusive enough—it is possible that these distinct terms may or may not have been used to define refugee populations in certain studies. For instance, certain studies may not have specifically studied refugee populations, but rather may have examined them as an aggregate of various populations. Secondly, the inclusivity of the generated list of results is contingent on the proficiency of WOS as a searchable database and citation index.

Conclusion
This bibliometric evaluation allowed a multi-dimensional outlook on the conditions of refugee populations across the globe, through collation of relevant peer-reviewed research journal articles. This specialized form of assessment has resulted
in a multi-disciplinary compendium of publications on the subject. The top cited articles were published from the developed countries than the low and middle income countries where a high percentage of refugee population has settled.

**Data availability**

**Dataset 1. Bibliometric of 100-most-cited articles on refugees.**

DOI: http://doi.org/10.5256/f1000research.15106.d207394

**Competing interests**

No competing interests were disclosed.

**Grant information**

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## References


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