Refugee health in Europe: mapping review of research literature (2015–2019)

Ibragimova, Irina; Žužak, Martina

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Irina Ibragimova

Health Connect International, Zadar, Croatia, and

Martina Žužak

University Hospital Centre Zagreb, Zagreb, Croatia

Aim and background

Strategic documents of the WHO and other international agencies state the need for relevant information and research data to support effective decision-making concerning refugee health in Europe at all levels of health care systems (Promoting the Health of Refugees and Migrants: Draft Global Action Plan 2019-2023, 2019). This includes strengthening health monitoring and health information system, supporting measures to improve evidence-based health communication, and countering misperceptions about migrant and refugee health. There is an understanding that "the complexity and diversity of modern displacement and migration will demand that any empirical approach to address refugee and migrant health issues in the future is founded on accurate and reliable information" (Report on the Health of Refugees and Migrants in the WHO European Region, 2018). Still "there remain critical gaps in the knowledge base on a wide range of determinants of health service delivery and access for refugees and migrants in the WHO European Region" (Delivery of immunization services for refugees and migrants. Technical guidance, 2019).

In the last two decades knowledge translation (KT) research has provided theoretical basis for evidence-based policy-making in health care (Straus, 2008), and practical tools, including different types of evidence synthesis to support it were developed (rapid reviews, evidence briefs, health technology assessments, evidence maps, etc.) (Moat et al, 2013; Bornstein et al, 2017; Fox, 2017). Still recent scoping review stated that "although the use of research evidence by policy- and decision-makers can strengthen health system performance and improve individual health outcomes, there are many barriers to its use including poor access to relevant, timely, context-sensitive and understandable research" (Lawrence et al, 2019).

The following publications give an estimate of global literature in refugee health and related issues: "Bibliometric analysis of global migration health research in peer-reviewed literature (2000–2016)" (Sweileh et al., 2018) concluded that 5451 (25.4%) of retrieved documents were about refugees and asylum seekers, and that approximately one third of the retrieved documents were published in the last three years of the study period; "Bibliometric analysis of medicine–related publications on refugees, asylum-seekers, and internally displaced people: 2000 – 2015" (Sweileh, 2017) revealed that "research publications on refugees have been increasing in a dramatic way and articles are being published in journals with high impact factor and international reputation, not only in general medicine and public health, but also mental health and psychology journals" and predicted further growth of research output in this domain.

Recently there were several important review publications (scoping and systematic reviews, bibliometric analyses, evidence maps) with the aim to present actual state of refugee health research and to reveal knowledge gaps. However, they either covered research from other regions of the world and other migrant groups as well (Sweileh, 2017; Sweileh et al., 2018; Sweileh, 2018), or only for separate European countries (Villarroel et al., 2019; Bozorgmehr et al, 2016), or were devoted to specific aspects of refugee health in Europe, e.g. mental health (Satinsky et al., 2019), access to health care (Chiarenza et al, 2019). Most of them included research literature through 2016. As an answer to the demand for reliable information, the Health Evidence Network in the last 5 years produced a series of evidence reports covering several important aspects of refugee and migrant health in Europe (health status, maternal care, immunization services, communication barriers in health care settings, etc.). Still to our knowledge there is no review (with systematic approach) covering recent research on all aspects of refugee health in all European countries. So though there is presumably a wealth of research in the field and also high quality evidence syntheses on some important aspects, there is still no broad yet detailed picture of published research.

The aim of this review is to map research literature on all aspects of refugee health in Europe (2015-2019): by research domains, study design, targeted population, type of research setting, host-country, journal title. 2015 was chosen as the starting point as that year has seen a dramatically increasing number of people seeking refuge in Europe. We formulated two research questions: 1. What are the specific characteristics of published research on refugee health in Europe? 2.What are the research gaps in this field? Answers to these questions will help to identify recent research trends in the field and potential knowledge clusters (sub-sets if evidence suitable for secondary research), provide policy- and decision-makers with useful source of information, and help researches to target important gaps in evidence

Method

From a great variety of literature review types used in health care and related fields for synthesizing research (48 types) (Sutton et al, 2019), mapping review design was chosen to answer our questions as it "maps out and categorizes existing literature from which to commission further reviews and/or primary research by identifying gaps in research literature." (Booth et al, 2016). It is best used when there is a critical mass of literature and requires much shorter period to complete than a systematic or scoping review. Mapping review does not provide literature appraisal as a systematic or scoping review, but characterizes quantity and quality of literature (by study design and other key features). Mapping studies "are based on the concept that published articles not only represent findings, but, indirectly, represent activity related to the finding" (Cooper, 2016). Specific features of mapping review that distinguish it from scoping review are that the research question is generic and it relates to research trends, and that the outcome (established need for additional primary research or systematic reviews) is not known beforehand (Grant and Booth, 2009). Data synthesis is usually presented in tabular and graphical formats. Another important characteristic is that " it is a review that seeks to identify not results, but linkages. Mapping focuses on characteristics such as where the activity took place, where the funding came from, and in what journal or other medium it was presented" (Cooper, 2016).

Though there is still no established standard for the format and process for conducting a mapping review, there are methodology recommendations on systematic evidence mapping, based on the analysis of its practical applications in health, social and environmental sciences (Bates et al, 2007; James, 2016; Cooper, 2016; Miake-Lye et al, 2016; Bradbury-Jones et al, 2019; Soaita et al, 2019).

This mapping review followed those recommendations both in the review content and format (broad open-framed question; study quality is not appraised or graded; screening and coding often is based on study full-text; literature is classified by many domains; main findings are presented in cross-tabular and visual format rather than analyzed and fully synthesized), and in a 5–stage process (setting scope and question; systematic search for evidence; systematic screening of evidence; systematic data extraction and coding; describing and visualizing findings).

Stage 1. Setting scope and question, developing review protocol. To confirm potential interest of stakeholders and develop research questions, we contacted specialists in relevant international organizations (UN Refugee Agency; WHO Regional Office for Europe, Migration and Health Programme; Swiss Forum for Population and Migration Studies), scoped the literature and informally reviewed evidence base (2000 records from PubMed). This also helped to develop approach to study identification, pilot inclusion criteria and data extraction. The Review protocol was consulted with international experts (see Acknowledgement).

Stage 2. Searching for evidence. For this review we have adapted a search strategy from a recent systematic review (Bozorgmehr et al, 2016) and executed searches in 6 data bases: PubMed Medline; Scopus; ProQuest (Thesis and Dissertations Global: Health & Medicine); Cochrane Library (Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews); BASE (Bielefeld Academic Search Engine); eLibrary (Russian journal articles). The detailed search strategy is presented in Appendix 1. Searches were executed on Nov 27th, 2019. Additional searches in only three of the selected data bases (PubMed, BASE, eLibrary) were executed on Jan 1st, 2020.

Stage 3 and 4. Studies screening, selection and coding. For screening of retrieved studies inclusion and exclusion criteria were established (Table 1). For coding a detailed taxonomy of refugee health research domains (25 items), as well as target populations (9 types) and research settings (10 types) was developed. That was different from retrieved systematic and scoping reviews, which usually distinguish only two types of settings (clinical and non-clinical, or primary and secondary care). All search results were imported into Zotero reference management software (which supports many import and export formats, duplicate detection, and have sorting and search options). After removal of duplicates, titles and abstracts were initially screened by one author, excluding articles that clearly did not meet the criteria (about non-European countries). Then the selected items were exported to Abstrackr software (Wallace et al, 2012), that allows simultaneous screening and coding, and has decision reconciliation mode. Where possible, that was done based on title/abstract, but in many cases abstracts were insufficient to define research setting, study design and host-country, which required retrieving full-text.

Parameter	Inclusion criteria	Exclusion criteria
Population	- refugees and asylum seekers in Europe (adult female; adult male; elderly; adolescent/ children; families; unaccompanied minors); - health care and social work professionals; medical students; other professionals and volunteers working with refugees in Europe; - policy- and decision-makers in Europe.	- other categories of migrants; - refugees and asylum-seekers in non-European countries
Settings	- clinical (outpatient; inpatient; emergency room (ER); general practitioner (GP) or private psychiatrist office; refugee health clinic; NGO-based medical services); - community – based (language school; community center; ethnic organization, etc.); - refugee camps; - refugee/asylum seekers reception centers; - permanently resettled refugees; - households.	
Research domains	Diseases/conditions (health status; mental health; non-communicable diseases; infectious diseases; vaccination; reproductive and maternal health; adolescent/child health; skin diseases; oral health). Other health-related issues (substance misuse; gender-based violence; nutrition; health literacy; health-related quality of life). Organization/governance (health care systems; health care and social work services; access to health care; screening; human resources; ethical and legal issues; economic issues; ICT)	
Study design	Primary research (experimental, quasi-experimental and observational); Secondary research (systematic reviews and meta-analysis; mapping and scoping reviews; overview of reviews; evidence summaries; bibliometric analysis; guidelines) that included research from at least one European country.	Biographic and historic articles. Literature reviews without systematic approach.
Publication types	Journal articles, thesis and dissertations, research/project reports	Books. Editorials, letters, conference abstracts without full-text, commentaries,

		interviews, debates, discussions, study protocols, viewpoints; calls, position statements

Table 1. Inclusion and exclusion criteria

Stage 5. Data analysis and visualization. Coded items from Abstrackr were exported to and analyzed in Excel. Coding variables included: year of publication, publication type, host countries, research domains, study designs, populations, settings, journal title. Data from Excel was visualized using Datawrapper tool, which enables publishing detailed interactive maps and graphics online (see Appendix 2).

Our approach differs from available bibliometric and scoping reviews in several aspects, it:

- covers only European countries (including Turkey);
- includes all types of primary research - quantitative and qualitative, experimental and observational;
- includes secondary research - systematic reviews, meta-analysis, other types of reviews with systematic approach, and guidelines;
- includes certain types of grey literature (thesis, dissertations, research project reports);
- maps results by host-country (of the studied population; not by the country the authors are from);
- provides detailed mapping by research domain, setting and target (studied) population;
- compares results with recent reviews/bibliometric analyses;
- compares results with protocols of planned/ ongoing systematic reviews and clinical trials to find if planned research corresponds with the knowledge gaps.

Results

In total, 7961 references were retrieved. Results from other mapping reviews reveal that "despite targeting searches through Boolean strings, reviewers always get a significant number of references which do not fit thematically" (Soaita et al, 2019), and from our search results 6670 were excluded (research in non- European countries; opinion pieces or historic articles; research on other migrant groups). 1291 references were included in the review: 2015 – 222 (17,2%), 2016 – 257 (19,9%), 2017 – 212 (16,4%), 2018 – 308 (23,9%), 2019 – 292 (22,6%). The majority of included publications were retrieved through PubMed (65%) and Scopus (26%) searches. As it was mentioned above due to the date when searches were executed not all potentially relevant publications from 2019 were retrieved and included in the review.

Publications by refugee host countries

From 50 countries/territories included in our search strategy, the studies took place in 45 (Figure 1).

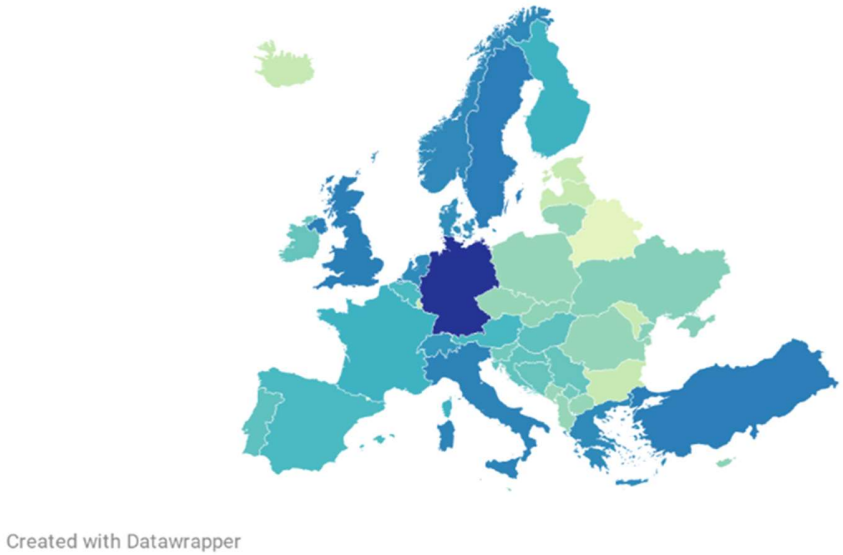

Figure 1. Europe (darker colors indicate countries with higher number of publications)

The top ten host-countries were: Germany – with 290 publications (22,5%), Sweden – 113 (8,75%), Turkey – 111 (8,6%), the UK – 106 (8,2%), Italy – 78 (6%), Norway – 62 (4,8%), Greece – 61 (4,7%), the Netherlands – 60 (4,6%), Denmark – 58 (4,5%), and Switzerland – 48 (3,7%) (Figure 2). 159 (12,3%) publications (mostly reviews and systematic reviews) had global coverage (including Europe), and 65 (5%) publications (also mostly secondary research) – included data from the entire EU or from the majority of the Council of Europe countries (and were coded as European coverage). Due to overlap among several countries in one publication, the total percentage exceeded 100%. Interactive map with publication numbers for each country is available at https://www.datawrapper.de/_/UsXEw/ (Four of included countries are not shown on the map – Russia, Georgia, Azerbaidjan, and Armenia).

	country	number of publications
1	Germany	290
2	Sweden	113
3	Turkey	111
4	United Kingdom	106
5	Italy	78
6	Norway	62
7	Greece	61
8	Netherlands	60
9	Denmark	58
10	Switzerland	48
11	Finland	28
12	France	28
13	Austria	18
14	Belgium	16
15	Spain	16

• Created with Datawrapper

Figure 2. Host-countries with at least 15 publications

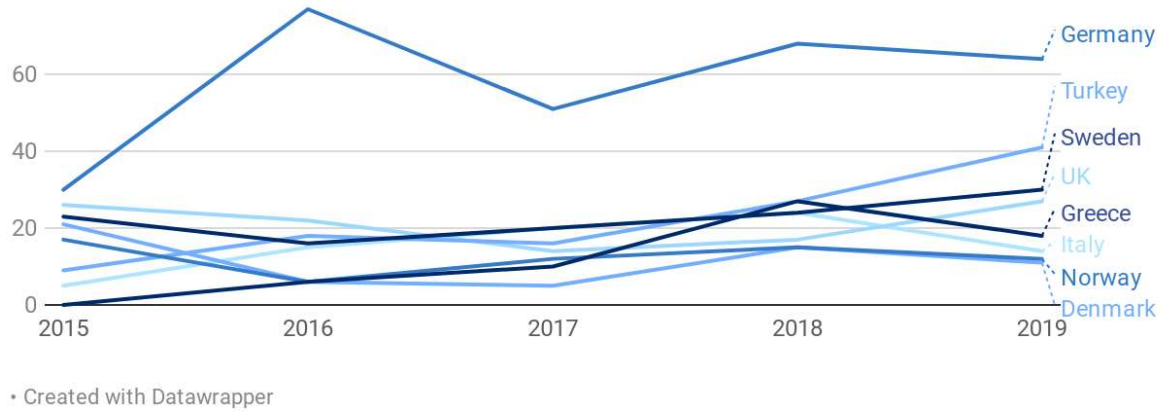

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Figure 3. Publication trends for top 5 countries by year, 2015-2019

The top five publication host-countries (Figure 3) changed from year to year with one exception – Germany. Although we have retrieved more publications for the Netherlands than for Denmark, the former has never reached position in the top five. Studies conducted in top 5 countries together constituted from 52% to 61% of publications for the corresponding year (Table 2).

year	N of publications	1st	2nd	3d	4th	5th
2015	N=222	Germany - 30 (13,5%)	UK - 26 (11,7%)	Sweden - 23 (10,3%)	Denmark - 21 (9,5%)	Norway - 17 (7,6%)
2016	N=257	Germany - 77 (30%)	UK - 22 (8,6%)	Turkey - 18 (7%)	Sweden - 16 (6,2%)	Italy - 15 (5,8%)
2017	N=212	Germany - 51 (24%)	Sweden - 20 (9,4%);	Italy - 20 (9,4%)	Turkey - 16 (7,5%)	UK - 14 (6,6%)
2018	N=308	Germany - 68 (22%)	Turkey - 27 (8,8%)	Greece - 27 (8,8%)	Sweden - 24 (7,8%)	Italy - 24 (7,8%)
2019	N=292	Germany -64 (21,9%)	Turkey - 41 (14%)	Sweden - 30 (10,3%)	UK - 27 (9,2%)	Greece - 18 (6,2%)

Table 2. Number and percentage of publications for top 5 countries by year, 2015-2019

The authors of bibliometric analysis (Sweileh et al. 2018) predicted further linear growth of global migration health research output. That proved partly correct for research output related to refugee health in Europe: for some years and for some countries (Germany, Turkey, Sweden, and Greece). Among countries publishing the most studies in our review were countries of first entrance for refugees (Turkey, Italy and Greece), as well as countries of final destination (Germany, the UK, Sweden, Norway and Denmark).

Study design

Research on refugee health in Europe applied a variety of study designs (observational and experimental), and research methods (focus groups, surveys, Delphi method, in-depth interviews, content analysis, modelling, meta-ethnography, latent class analysis, grounded theory approach, economic evaluations, psycholinguistic, multi-method approach, etc.)

The majority of retrieved publications belonged to observational and quasi-experimental studies – 969 (75%), followed by reviews (mapping, scoping, overviews of reviews, evidence summaries) and guidelines – 207 (16%). Systematic reviews and meta-analyses (SR/M-A) were used in 105 studies (8,1%), followed by experimental studies – 23 (1,8%) and other types of research – 21 (1,6%). Due to overlap among different study designs in one publication, the total percentage exceeded 100%. The proportions remained generally the same through all five years (Figure 4), with some differences between systematic and "other types" of reviews. In 2016 the number of "other types of reviews" was four and a half times as much as systematic reviews – 61 (24%) and 13 (5%) respectively, while in 2019 the numbers were generally the same - 30 and 31 respectively (10% each), see Figure 4.

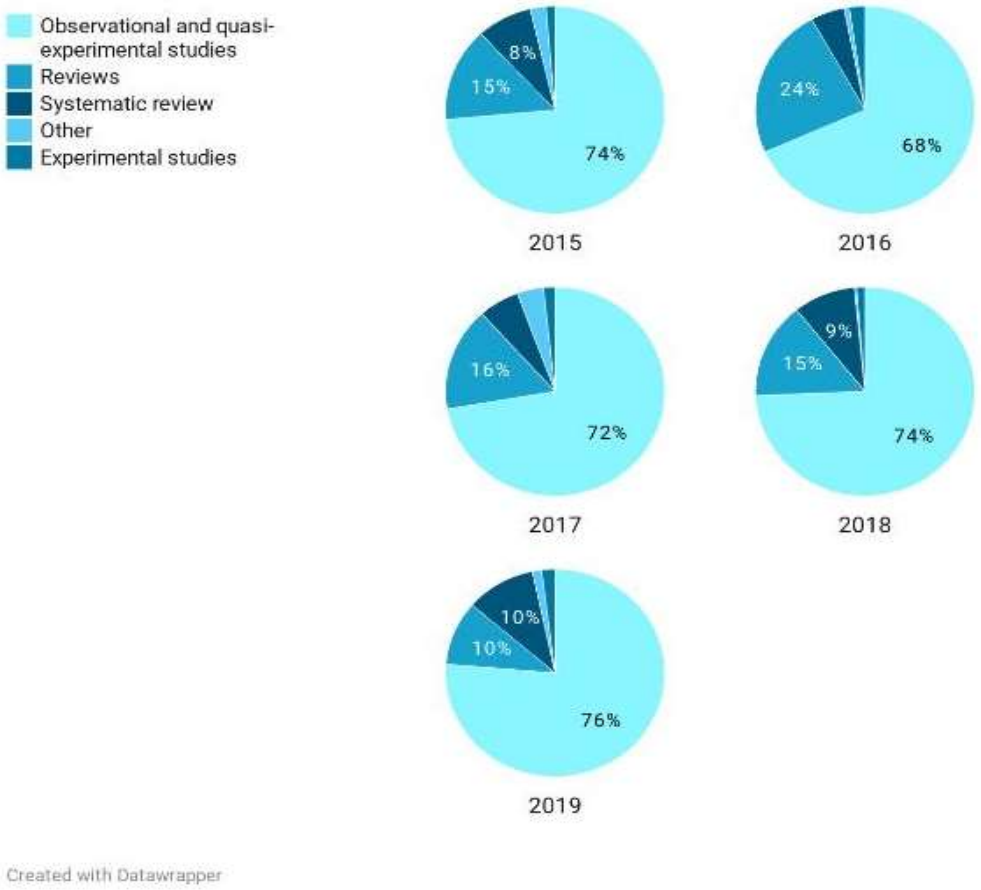

Figure 4. Percentage of publications by study design by year, 2015-2019

The largest group of observational/quasi-experimental included cross-sectional prevalence studies - 317 (24,5%). Cross-sectional validation studies were presented in 32 publications (2,5%).

Case reports, case series and case studies together yielded 151 publications (11,7%), while longitudinal studies - 144 (11,2%). The majority of longitudinal studies used cohort design - 83 (6,4%), followed by before-after – 36 (2,8%) and case-control studies – 25 (1,9%).

Geographical distribution of longitudinal studies:

- cohort studies were conducted in 15 countries, however the majority were in three Scandinavian countries (Sweden -20, Denmark – 19, Norway – 16) and in Germany (8);
- before-after studies were conducted in 18 countries; the largest numbers in Germany (13), Denmark (5) and the UK (5);
- case-control studies were conducted in 11 countries, the largest number also in Germany (7), and 3 studies in the Netherlands, as well as in Denmark and in Italy.

Experimental studies (23) were conducted in nine countries: Germany (8); Denmark (5); Turkey (4); in the Netherlands, Sweden, Finland, Switzerland, Austria, and Norway – one in each.

From 105 retrieved SR/M-A, the majority had global (71) or European coverage (19). Four reviews analyzed research only from Germany, three covered research from the UK, and two included research from 3 or 4 Scandinavian countries. There was also one SR/M-A for each of the following countries: Finland, Ireland, the Netherlands, Turkey, Sweden, and Switzerland.

As there were about five times more SR/M-A (105) than experimental studies (23), the majority of these reviews were based on observational studies.

From 192 (14,9%) reviews of "other types" the majority had global – 77 (6%) and European – 34 (2,6%) coverage. Research only from Germany was analyzed in 27 reviews, and 11 reviews included research from several (2-10) European countries. 15 (1,2%) of retrieved publications included reviews of guidelines or their detailed analysis.

Search in ProQuest (Thesis and Dissertations Global: Health & Medicine) and in Bielefeld Academic Search Engine (BASE) yielded 66 master theses and doctoral dissertations that were based on research from 14 countries. The biggest numbers were about Norway (15), Sweden (14), the UK (9) and Germany (9). 40 of those theses and dissertations applied cross-sectional design; 11 were written in a form of a systematic or other type of review; 10 were based on longitudinal studies. (It was not possible to define study design used in some thesis/dissertation that were not in open access). 21 theses/dissertations were based on qualitative data.

Target populations

While participants in most studies were refugees or asylum seekers, some studies assessed either health services and health workers, or other providers (professionals and volunteers) working with/for refugees and asylum seekers (Figure 5). Due to overlap among target populations the total percentage exceeded 100%.

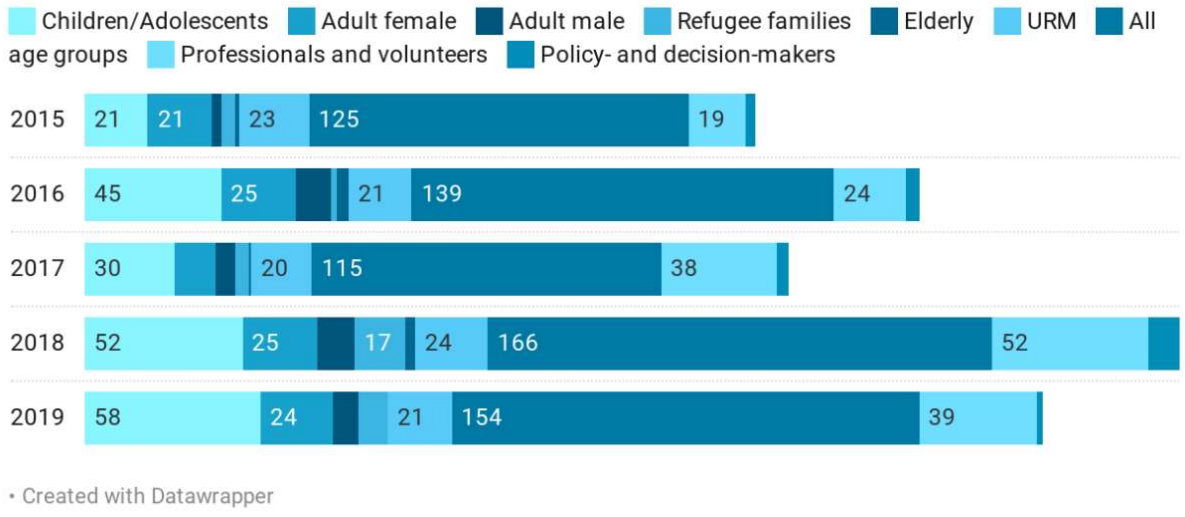

Figure 5. Number of publications by target populations by year, 2015-2019

The majority of studies – 699 (54,1%) included participants (refugees and asylum seekers) of all age and gender groups. The next largest studied populations were:

- children/adolescents – 206 (15,9%);

- professionals and volunteers (physicians, nurses, midwives, medical and nurse students, social workers, policemen, etc.) – 172 (13,3%);

- unaccompanied refugee minors (URM) – 109 (8,4%);

- adult females – 108 (8,4%).

Much less research was devoted to other groups of refugee and asylum seekers: adult male - 41 (3,2%); families – 38 (2,9%); elderly – 9 (0,7%). Policy- and decision-makers participated in 23 (1,8%) studies.

Research settings

Analysis showed that research was conducted in a variety of clinical (outpatient clinics, hospitals, emergency services(ER), general practitioner (GP) and private psychotherapist offices, special refugee health clinics, and NGO-based medical services), as well as non-clinical settings (refugee camps, refugee centers, language schools, households, etc.) (Figure 6).

For a great number of publications – 558 (43,2%) it was either not applicable to define research setting (mostly secondary research) or not possible to retrieve such data (even from full-text articles) (all shown as N/A in Figure 6). And 55 (4,3%) publications were labeled as a registry-based research. Due to overlap among research settings (could be several in one publication) the total percentage exceeded 100%.

Reception and other refugee centers were a research setting in 169 (13%) publications; followed by outpatient clinics – 148 (11,5%), hospitals – 101 (7,8%), permanently resettled refugees/households – 92 (7,1%), and refugee camps – 69 (6,3%).

Less research was conducted in community settings (language schools, community centers, ethnic and humanitarian organizations) - 41 (3,2%), refugee health clinics – 35 (2,7%), in emergency services – 27 (2%), GP/private therapist offices – 17 (1,3%), NGO-based medical services (mobile clinics, rescue ships, etc.) – 13 (1%).

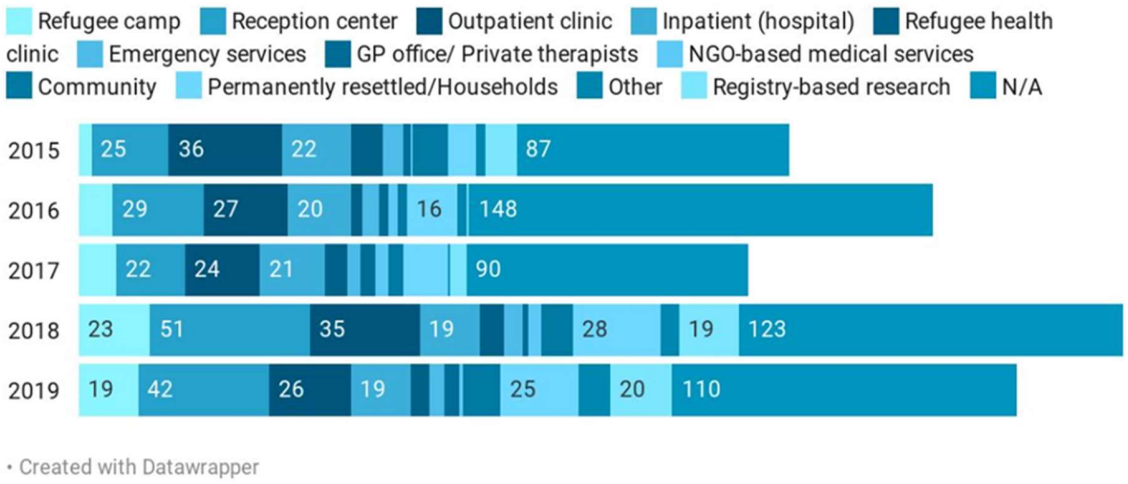

Figure 6. Number of publications by research setting by year, 2015-2019

The absolute numbers while compared by year of publication (Figure 6) show growth of research conducted in reception and other refugee centers, refugee camps, among permanently resettled refugees/ households, and also registry-based research. Number of research in most clinical settings (outpatient and inpatient) was not changing significantly through the years.

Research domains

Based on a developed taxonomy of refugee health issues we divided all results into three groups of research domains: diseases/conditions (Figure 7), other health-related issues, and organization/governance issues. Due to overlap among research domains (could be several in one publication) the total percentage exceeded 100%.

Research in mental health domain yielded the greatest research output – 597 publications (46,2%). 237 publications (18,4%) were in the domain of infectious diseases, and 4% (54 items) were about vaccination. Health status of refugees and asylum seekers was studied in 116 (9%) items. Publications relating to maternal and reproductive health constituted 5% and 2,5% (66 and 32 items) respectfully. Only 4% (54 items) related to non-communicable diseases (NCD). The absolute numbers while compared by year of publication (Figure 7) show steady growth of research in mental health domain, on NCD, and on children/adolescent health (the latter meant as the research on general health issues of this population, while studies on specific issues were coded under mental health, vaccination, etc.)

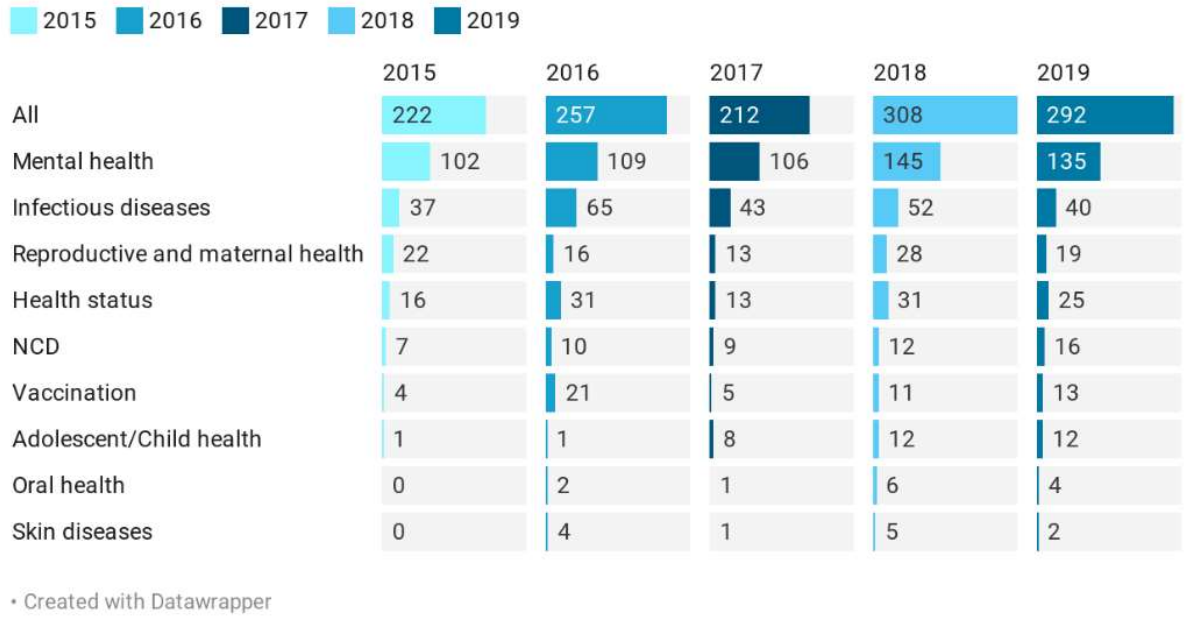

Figure 7. Number of publications by diseases/conditions by year, 2015-2019

We compared our results to those reported in a recent systematic review (Bozorgmehr et al, 2016) and a bibliometric analysis (Sweileh et al, 2018) (Table 3). This comparison reveals that in all three sources the majority of research was on mental health, followed by research on infectious

diseases. The percentage of publications on mental health was generally the same in the cited bibliometric analysis and in our review (46% – 47%). In a systematic review published in Germany, the percentage of mental health publications was even greater (about 59%). However, for infectious diseases, the percentage in a German systematic review (23,5%) was very similar to our review (if counted together with research on vaccination) – 22,4%. The research output on maternal/reproductive health and on NCD in our review was twice smaller than in the bibliometric analysis.

Research domain	2000-2016 (Sweileh et al, 2018)	1990-2014 (Bozorgmehr et al, 2016)	2015-2019 This mapping review
Mental health	47%	58,9%	46,2%
Infectious diseases	13,7%	23,5%	18,4%
Maternal/Reproductive health	12,8%	0	7,5%
Non-communicable diseases	8,9%	5,8%	4%
Vaccination			4%

Table 3. Percentage of publications by research domain "diseases/conditions"

As research in the mental health domain yielded the greatest research output – 597 publications (46,2%), it was useful to analyze it in more detail by target (studied) populations (Figure 8) and research settings (Figure 9). The analysis showed that in 312 publications (24,2%) all age and gender groups were included in the research, while in 117 (9%) children/adolescents mental health was studied, in 81 (6,3%) – mental health of unaccompanied refugee minors, 69 (5,3%) included professionals and volunteers, and 33 (2,5%) – adult females.

When these results are compared with all research by target populations, the following could be concluded about mental health research:

- for all age/gender groups (24,2%) it is less than half of all research on these populations (54,1%);
- for children/adolescents (9%) it is more than a half of all research (15,9%);
- for URM (6,3%) it is three quarters of all research (8,4%);
- for professionals/volunteers (5,3%) it is less than half of research that included these populations (13,3%);
- for adult females (2,5%) – it is about a quarter of all research on this population (8,4%).

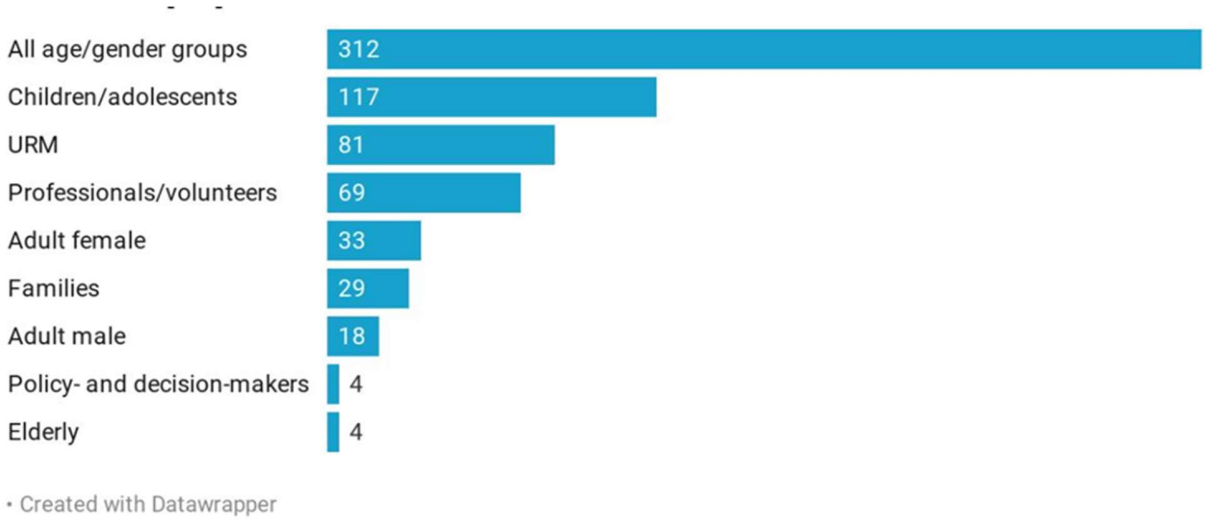

Figure 8. Number of publications on mental health by studied populations (N=597)

Analysis of mental health publications by research setting (Figure 9) showed that it was conducted in all described settings. Although it was not possible to define setting for nearly a half of mental health publications (259), the three settings with the highest numbers were: outpatient clinics – 89 publications (6,9%); permanently resettled refugees/households – 59 (4,6%); reception and other refugee centers – 51 (3,9%).

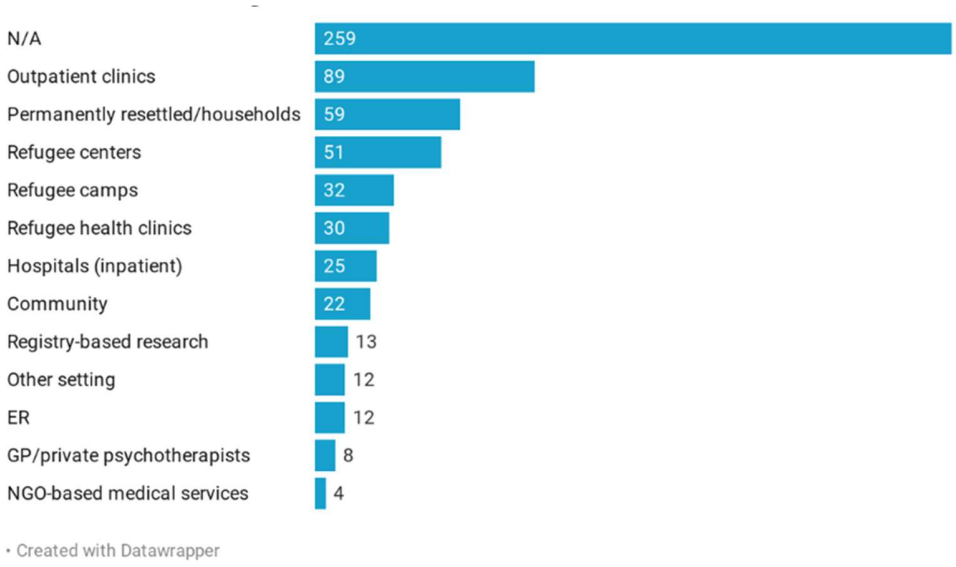

Figure 9. Number of publications on mental health by research setting (N=597)

In our second group of research domains – other health-related issues (Figure 10) – the majority of retrieved publications included research on "health-related quality of life" – 62 (4,8%), and on health literacy – 36 (2,8%). Fewer publications were on gender-based violence – 32 (2,5%), nutrition - 16 (1,2%), and substance misuse -12 (0,9%).

We wanted to explore whether there were any specific characteristics in geographic distribution of research on the topics with relatively small amount of publications, such as health literacy or gender-based violence. Although research on health literacy was conducted in 13 countries, the majority was in three countries: Sweden – 11, Germany – 5, and Turkey – 4. Additionally, 3 publications had global and 1 European coverage. Research on gender-based violence was conducted in 16 countries, (also 4 publications with each global or European coverage). In this domain the distribution was more even – with Greece leading with 7 publications, while Germany, Malta, the Netherlands had 4 publications each. Many publications presented research done in two or more countries.

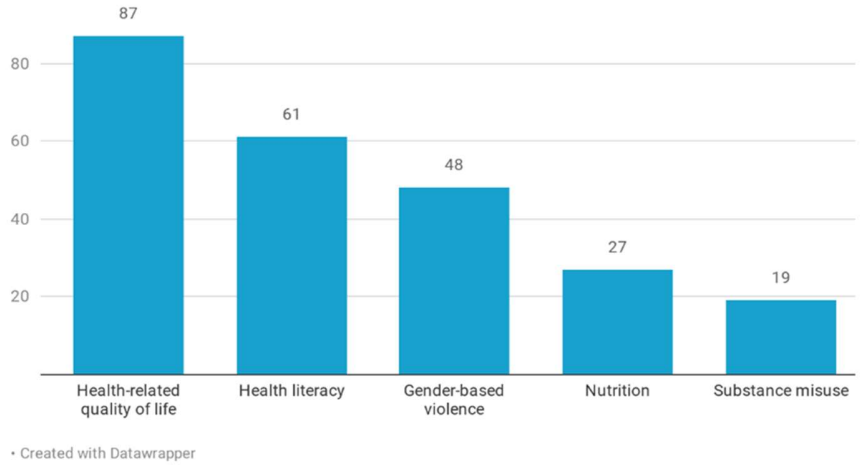

Figure 10. Number of publications on other health-related issues (2015-2019)

The third group of research domains covered organizational and governance issues (Figure 11). The majority of studies were on health services – 210 (16,2%), access to health care – 170 (13,1%), screening – 136 (10,5%), human resources – 111 (8,6%). Less research was done on legal and ethical issues – 91 (7%), and on health care systems – 48 (3,7%). Other governance issues were researched in 186 (14,4%) publications (these included organization of research, international cooperation, role of non-governmental organizations and other non-medical institutions).

The smallest number of studies in this group were about application of information and communication technologies in health care – 33 (3,2%), social work services as part of health care – 25 (2,1%), and economic issues (cost-effectiveness of screening and other health services; financial burden on health systems, etc.) – 24 (2%). Analysis of geographical distribution of research on ICT revealed that the striking majority of it – 19 publications - was from Germany, 6 studies had global coverage, and for the Netherlands and Sweden – 4 from each. Research on economic issues of refugee health was conducted in 11 countries, the largest numbers were from Germany (9 publications) or had European coverage (5 publications). Other 10 countries had 1-2 publications each in this research domain.

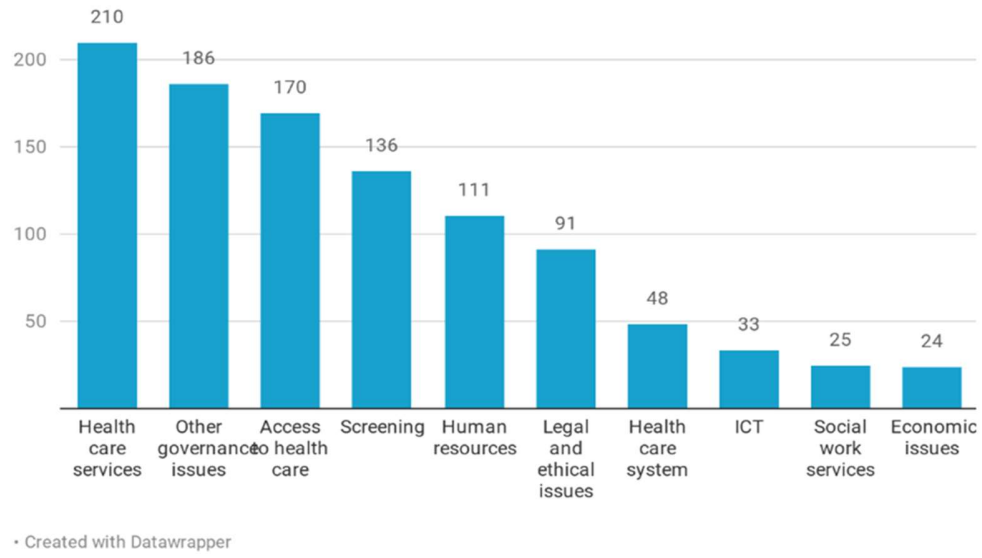

Figure 11. Number of publications on organization/governance (2015-2019)

Comparison of results for all three groups of research domains showed that the largest research output was on two "diseases/conditions" domains – mental health and infectious diseases, followed by research in the group of "organization/governance" - health services, other governance issues, and access to health care (Figure 12).

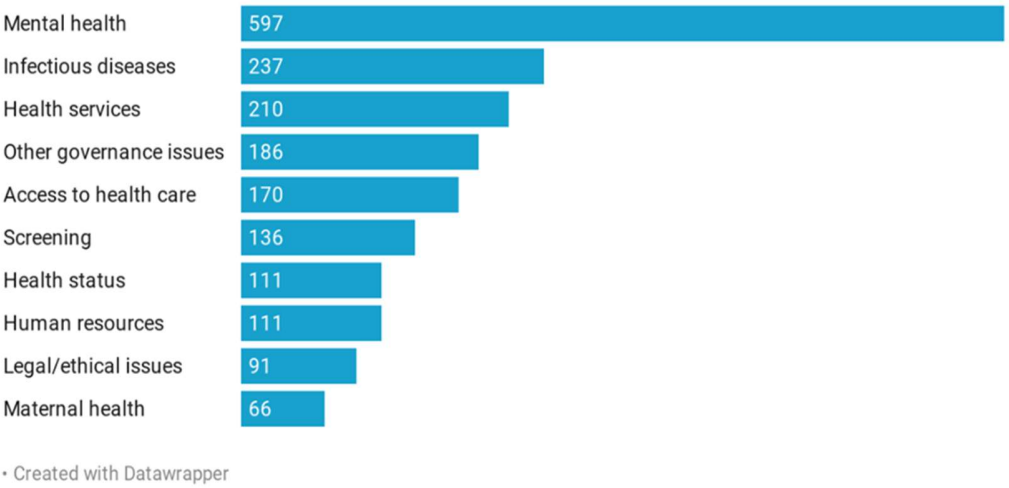

Figure 12. Number of publications for top 10 research domains (2015-2019)

Analysis of experimental studies (23 publications) by research domain showed that the majority was in the domain of mental health – 16. Experimental studies were also devoted to the application of ICT (3); health care services (3) and social work services (3); health literacy (2); NCD (2); screening (1). Search in the Cochrane CENTRAL data base (of registered clinical trials) from January 2019 through March 2020 revealed 22 trials in European countries – with 20 being in the domain if mental health. The largest number of registered trials are from Germany (8), Turkey (4),

Sweden (3), and Norway (2). This is a promising trend – with a number of registered trials in fifteen months being equal to a number of trials conducted in five years.

In order to identify gaps in secondary research we also analyzed the retrieved SR/M-A by research domains and compared it to search results of ongoing systematic reviews from PROSPERO (an international database of prospectively registered systematic reviews in health and social care, welfare, public health, education, crime, justice, and international development, where there is a health related outcome). 105 SR/M-A included in our review covered a great number of research domains from our taxonomy, with more than a half (56) being on mental health (Figure 13).

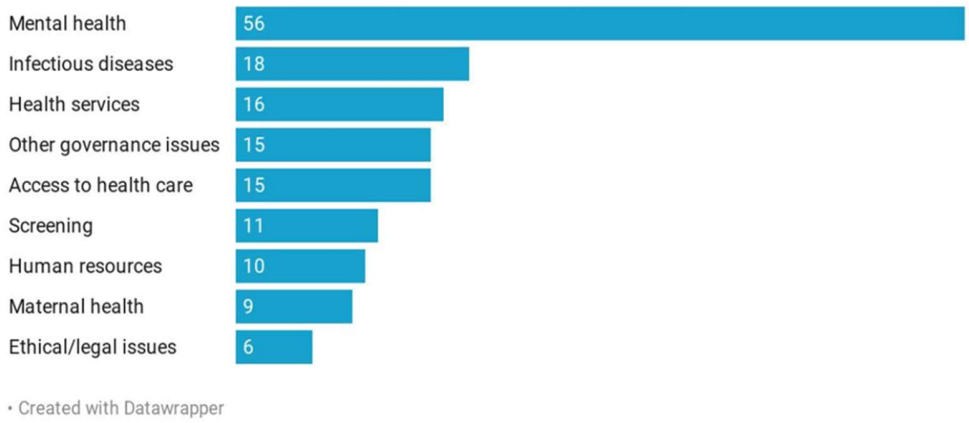

Figure 13. Number of systematic reviews/meta-analyses by research domains (N=105)

On the other hand, our search retrieved very few SR/M-A on the following research domains: vaccination (4), reproductive health (3), gender-based violence (3), NCD (2), nutrition (2), oral health (1). From 25 SR/M-A that summarized research on children/adolescents or URM, 23 were devoted to mental health. Analysis of ongoing systematic reviews (registered in PROSPERO from January 2018 through March 2020) showed that from 71 review protocols with global or European coverage, more than a half (37) were in the domain of mental health; health services - 7, and access to health care – 6 protocols. 5 SR/M-A were planned in the domain of infectious diseases; 4 – on maternal and 3 – on reproductive health. Similar to the results of our review, very few SR/M-A were planned in the areas of NCD (2), nutrition (2), vaccination (2), oral health (1), economic issues (1). One new theme that was not present in our review – palliative care (2 protocols).

Analysis of publications by research domains and comparison with other published or planned reviews show that there are many important issues of refugee health that are underrepresented both in primary and in secondary research.

Journals

Our review revealed that research on refugee health was published in more than 540 journals – which is much less than the results of bibliometric analysis (which had global coverage and included all groups of migrants and all publication types) with 4228 journals (Sweileh et al, 2018). The top ten preferred journals for publication from our review (Figure 14) are also different from the cited bibliometric analysis: only three journals are on both lists.

Journals

journal	number of publications	OA	SJR subject area and category	SJR quartile 2018.	language
International journal of environmental research and public health	36	OA	Medicine: Public health, Environmental and Occupational Health	Q2	English
			Environmental Sciences: Health, Toxicology and Mutagenesis	Q2	
Euro surveillance: bulletin Européen sur les maladies transmissibles = European communicable disease bulletin	31	OA	Medicine: Epidemiology, Medicine (miscellaneous), Public health, Environmental and Occupational Health	Q1	English, French
			Immunology and Microbiology: Virology	Q1	
BMC Public Health	22	OA	Medicine: Public health, Environmental and Occupational Health	Q1	English
Conflict and Health	21	OA	Social science : Health (social science)	Q1	English
			Medicine: Public health, Environmental and Occupational Health	Q1	
PloS ONE	20	OA	Agricultural and Biological Sciences : Agricultural and Biological Sciences (miscellaneous)	Q1	English
			Biochemistry, Genetics and Molecular Biology: Biochemistry, Genetics and Molecular Biology (miscellaneous)	Q1	
			Medicine: Medicine (miscellaneous)	Q1	
BMC health services research	17	OA	Medicine: Health Policy	Q1	English
Bundesgesundheitsblatt, Gesundheitsforschung, Gesundheitsschutz	16	/	Medicine: Public health, Environmental and Occupational Health	Q3	German
BMJ Open	15	OA	Medicine: Medicine (miscellaneous)	Q1	English
Journal of Immigrant and Minority Health	14	/	Medicine: Epidemiology	Q3	English
			Medicine: Public health, Environmental and Occupational Health	Q2	
Transcultural psychiatry	13	/	Medicine: Psychiatry and Mental Health	Q2	English
			Social Sciences: Health (social science)	Q2	
Public Health	11	/	Medicine: Medicine (miscellaneous)	Q2	English
			Medicine: Public health, Environmental and Occupational Health	Q2	
BMC psychiatry	10	OA	Medicine: Psychiatry and Mental Health	Q1	English
Health Policy	10	/	Medicine: Health policy	Q1	English
Public Health Reviews	10	OA	Medicine: Public Health, Environmental and Occupational Health	Q2	English
			Nursing: Community and Home Care	Q1	

Figure 14. Journals with at least 10 citations (2015-2019)

For this analysis, a Scientific Journal Rankings (SJR) was used as a relevant tool for analyzing scientific domains (those indicators are developed from the information contained in the Scopus database), the corresponding subject area and categories were assigned to each of 14 journals (with at least 10 citations). Some of them are placed in two or more categories, considering wide range of themes they represent. Consequently, quartiles for each category were assigned to them, which can vary for the same journal but for a different category. If the journal is ranked in the top 25%, it has a badge as a Q1 journal, between top 25% and top 50% - Q2, etc. The quartiles for 2018 were the basis for the analysis, as it is the last available for calculated quartiles, and also a year included in our research range. Most journals in the table are Q1 journals. Analysis by journal language revealed that the majority of journals were in English, there was one in German, and one bilingual (English/French). 9 journals support open access policy. Still it is important to note that 246 studies published in those 14 journals (Figure 14) account only for 19% of all publications included in the review.

Conclusions

As an answer to our first research question this mapping review revealed the following specific characteristics of research literature on refugee health in Europe:

- It is dispersed among a great number of journals (mostly in general medicine, public health, mental health, psychiatry and psychology) published in 16 languages;
- The studies were conducted in the majority of countries/territories included in our search strategy (in 45 of 50), with top ten countries providing about 76% of all research;
- Among countries where the most studies were conducted are countries of first entrance for refugees, as well as countries of final destination;
- A great diversity of study designs and research methods;
- High proportion of secondary research - systematic reviews and meta-analyses (8,1%) and other reviews with systematic approach (16%) - which are mostly based on observational and quasi-experimental studies. This can be explained by the urgent need of practice and policy in summarized research evidence, while there is a very y low number of experimental studies (1,8%) and high prevalence of observational (75%);
- Combination of several study designs in one publication (review and guideline; review and case report; review and systematic review; RCT and case-study; cross-sectional prevalence study and either before-after, or case study, or systematic review, or cohort study, or review);
- Uneven geographical distribution of certain study designs/publication types. The majority of cohort studies were conducted in three Scandinavian countries and in Germany (63 of 83). This can be explained by a long history of accepting refugees (since mid-1990s) and the availability of a great number of national health registries. The majority of theses and dissertations were also from two Scandinavian countries, the UK and Germany (47 of 66);
- Research was conducted in a variety of clinical and non-clinical settings, and is distributed evenly among those two groups of settings (26,4% and 28,7% respectfully), often with a combination of different settings on one study;

- The majority of research included refugee and asylum seekers of all age and gender groups (54,1%), or children/adolescents (15,9%). Other stakeholders were also targeted by research - professionals and volunteers (13,3%), policy- and decision-makers (1,8%);
- Leading research domains: mental health (46,2%), infectious diseases (18,4%), health services (16,2%), and access to health care (13.1%). More than a half of all research on children/adolescents and on unaccompanied refugee minors (URM) is in the domain of mental health.

As an answer to our second research question the mapping review has identified the evidence gaps in types of study design, research domains and target populations:

- Low proportion of experimental studies (1,8%) and economic evaluations (2%);

- Low numbers of research targeted specifically adult male refugees, refugee families, and elderly;

- Gaps in evidence (primary research) in many domains: maternal and reproductive health, NCD, oral health, economic issues, gender-based violence; nutrition, health-related quality of life, health literacy, substance misuse, legal and ethical issues, health systems, application of information and communication technologies, social work services as part of health care;

- Gaps in secondary research. Low numbers of systematic reviews on vaccination, reproductive health, gender-based violence, NCD, nutrition, ICT, health literacy, social work services. health systems and oral health. No systematic reviews were found on skin diseases and substance misuse. Still planned clinical trials and systematic reviews are predominantly in the domain of mental health

Although the majority of research was on mental health, many authors state that there is still not enough evidence on certain aspects. For example, the recent systematic review on health needs of refugee children (Kadir et al., 2019) concluded that main health risks and the main challenge in health services for refugee minors in Europe are in the domain of mental health, but the authors were not able to find much relevant research from the European countries. And the Delphi study of expert panelists from 23 countries with respect to top research priorities in the interdisciplinary field of torture rehabilitation and prevention showed "a dissociation between what we know, what we would like to know and what we research. Most of the research published in medical and psychological journals is around local experiences, epidemiological data, case reports and mixed outcome studies, which were not among experts' priorities. This points to the fact that existing research can be repetitive and that there is ample scope for other research topics in the future, particularly interdisciplinary research." (Pérez-Sales et al., 2017). Our detailed mapping of mental health research by study design, research setting and target populations can provide guidance on planning primary and secondary research in this domain.

Concerning gaps in studied populations one of the problems could be that the majority of research was conducted on all gender or age groups without revealing specific health-related characteristics

of those groups. While research on children/adolescents was constantly growing, number of studies on URM and adult females did not change through all the period.

Our review has several limitations. Screening and coding of all retrieved publications was done by one author. We were not able to identify research setting for a great number of publications (43,2%). Searches in Scopus, BASE, ProQuest and eLibrary were limited by domain (health sciences, medicine, psychology), therefore relevant studies published in economy, IT, social science journals could have been missed. And due to search date (November 27th, 2019) not all potentially relevant publications from 2019 were included in the analysis.

Implications. This review can inform practitioners and policy-makers on the availability of evidence, on the other hand the established evidence gaps can guide planning future primary and secondary research.

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Appendix 1. Search strategy

(refugee* OR asylum*) AND (health* OR access OR utilization) AND (Europe OR EU OR "European Union" OR Albania OR Armenia OR Azerbaijan OR Austria OR Belgium OR Belarus OR Bosnia OR Herzegovina OR Bulgaria OR Croatia OR Cyprus OR "Czech Republic" OR Denmark OR Estonia OR Finland OR France OR Germany OR Greece OR Hungary OR Iceland OR Ireland OR Italy OR Kosovo OR Latvia OR Lithuania OR Moldova OR Benelux OR Luxembourg OR Malta OR Montenegro OR Netherlands OR Macedonia OR Norway OR Poland OR Portugal OR Romania OR Russia OR "Russian Federation" OR Serbia OR Slovakia OR Slovenia OR Spain OR Sweden OR Switzerland OR Turkey OR Ukraine OR "United Kingdom" OR UK OR "Republic of Georgia" OR Andorra OR "San Marino" OR Liechtenstein OR Vatican OR Monaco OR "Faroe Islands")

Appendix 2. Interactive Datawrapper graphics online

European countries *https://datawrapper.dwcdn.net/UsXEw/3/*

5 top countries *https://www.datawrapper.de/_/zCcMn/*

Host-countries with at least 15 publications *https://www.datawrapper.de/_/2NKMw/*

Percentage of publications by study design *https://datawrapper.dwcdn.net/BnNGq/2/*

Number of publications by target populations by year *https://datawrapper.dwcdn.net/UbtwX/1/*

Number of publications by research setting by year *https://www.datawrapper.de/_/Ay9Dk/*

Number of publications on diseases/conditions by year *https://www.datawrapper.de/_/uCRop/*

Number of publications on mental health by studied populations
https://www.datawrapper.de/_/6g7gF/

Number of publications on mental health by research setting
https://www.datawrapper.de/_/kZWWZ/

Number of publications on other health-related issues *https://www.datawrapper.de/_/tpR9z/*

Number of publications on organizational/governance issues
https://www.datawrapper.de/_/OYxgi/

Number of publications for top 10 research domains *https://www.datawrapper.de/_/2FXAm*/

Number of systematic reviews/meta-analyses by research domains
https://www.datawrapper.de/_/N3ni0/

Journals with at least 10 publications *https://www.datawrapper.de/_/YNK8l/*

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