Exploring Researchers' Contributions to the Study of Deaths from All Causes in Russia

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Abstract

Societal changes have had effects on deaths from all causes in Russia. Up until now, deaths from all causes have been well researched, although several inconsistencies persist on the contributions of researchers. This study assessed research output, trends and topics that shaped deaths from all causes studies in Russia. Using bibliometric and topic modelling approaches, deaths from all causes in Russia published from 1914 to date was analysed using data on publications, citations, journals, keywords co-occurrence, year of publication, institutional affiliations, and country of origin from Scopus. Overall results indicate a steady growth of publications in Russia was documented after 1985. The h-index of some top 10 authors did not surpass single digits. A network visualisation map showed that 'Russia', 'male', 'mortality' and 'human' were the most commonly encountered vital terms. Of the ten most prolific authors, McKee M, Shkolnikov VM, Bobak M, Samorodskaya IV and Andreev E were the first five. Although the top 10 journals researching on death causes in Russia were Russian, these journals were not included in the most cited journals. The most prolific institutions studying deaths in Russia included; Tehran University of Medical Sciences, London School of Hygiene and Tropical Medicine, University College

London, Max Planck Institute for Demographic Research and National Research University-Higher School of Economics. Findings suggest that deaths from all causes research attention in Russia increased in recent years, but the number of publications and research related engagements (e.g., networking and/ collaboration) does not match-up to other countries (e.g., UK, US, Germany). This research lag calls for more collaborative research between public health disciplines and networking among researchers (i.e., both national and international).

Keywords: Articles, bibliometric, causes, death, diseases, journals, Russia

1. Introduction

The burden of mortality is a global challenge with varying degrees across different population groups and countries [1]. However, this trend builds on systematic recording and analysis of mortality from all causes [2]. These efforts are the foundation of a global mortality reporting system that serves as the basis for scientific research, investments prioritization and progress towards global development goals assessment [3,4]. Outcomes of recorded data on mortality and its subsequent estimates from the Global burden of diseases indicate that in 2017, non-communicable diseases (NCDs) constituted the highest fraction (~73·4%) of deaths. Within this broad disease category, neoplasm and cardiovascular diseases were the leading causes of death. Communicable, maternal, neonatal, and nutritional (CMNN) as well as injuries accounted for about 18·6% and 8·0%, respectively. Nonetheless, these estimates were disproportionately higher among men than women and in some geographical regions [5].

The mortality experiences of countries have stimulated researchers, especially those from high-income countries, to study its causes, dynamics and other associated phenomena [6]. Several research studies (e.g., [5,7]) have revealed how changes in societies had impacted substantially on disease outcomes in many higher income countries. Social, environmental and economic changes were found to have had prosperous and perilous effects on population health and wellbeing. Similarly, the changes provide a further explanation for the nexus between the mortality burden and multiple chronic conditions [7]. Russia, a higher-income country, is, however, a unique case because the burden has been attributed to external causes through alcohol consumption as well as multiple chronic conditions [8–12]. These findings of Russia have been through collaborative efforts from different researchers and scholars [13].

Despite these trends, challenges exist about how researchers' activities affect death from all causes in Russia. These challenges range from whether researchers have studied specific areas or share similar ideas or have the same contributions on health indices such as diseases surveillance to researchers' collaborative outcomes. Some authors (e.g., Sweileh et al [14]; Zhang et al [15]; Heo et al [16]) indicate that bibliometric analysis and text mining (topic modelling) are widely accepted valuable methods to assess challenges related to research productivity in countries. The combination of these approaches assists with the identification of the knowledge structure in a particular field of study. These methods provide an evaluative outcome of how existing knowledge influence other researchers and their productivity [25]. These methods have been used to evaluate many epidemiologic, statistical and social studies [14,17]. They may help policy planners and researchers to unearth critical research areas for evidence-based interventions and policy formulation. Given the level of mortality burden across many industrialized nations, including Russia, conducting an investigation using a bibliometric and text mining approaches that seems rare to identify empirical information on mortality from all causes in the country would be crucial. Therefore, the present study aims to map mortality causes research output in Russia, assess the

quality of research and identify which focus areas need urgent attention. The current study would help better inform researchers and the scientific community about the essence of this public health issue (i.e., death from all causes) in Russia on the basis of empirical evidence-based comparisons and descriptions.

2. Materials and Methods

2.1. Data and Data Source

This study is a bibliometric analysis of research published in the field of death from all causes in Russia. Bibliometrics is a widely-used quantitative analytical technique to provide a clearer understanding of research development in terms of its authorship, citations and thematic areas of published journals and other document types [18]. The bibliometric analysis approach used in this study followed those used in previous epidemiologic and demographic related scientometrics research [17,19–21] although the current study used only journal articles. This study included studies devoted to death from all causes in Russia from 1914 to date.

2.2. Search strategy

Several electronic databases exist and may be used to study research output, but the present study accessed data from Scopus. The Scopus database is the richest global source of information on medical and social science research. Also, this electronic database is considered as one of the most reliable and robust scientific literature sources partly because of its advantages over other data sources such as EMBASE, PubMed, Google Scholar and Web of Science [17,22]. Title search queries were performed to derive the needed data. This approach helped to avoid the inclusion of false positive articles and miscellaneous materials [14]. Title search queries were performed to derive the needed data. This approach helped to avoid the inclusion of false-positive articles and miscellaneous materials [14]. A systematic review was, however, used to obtain the keywords used in the query. Of all the documents reviewed to develop the possible queries, the World Health Organisation documented definition of causes of death, “the disease or injury which initiated the train of morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury”, was regarded as keen [23]. It was further used as the standard for defining final queries. Seven categories of queries were defined for this purpose. These categories were title search of keywords and title-abstract-keywords using phrases-“cause of mortality” or “mortality related conditions” or “cause-specific mortality” or “mortality burden”, or “all-cause mortality” or “causes of death” or “death causes”. A total of 898 documents were extracted using these queries (see Figure 1).

2.3. Inclusion and exclusion criteria

Out of the 898 query outputs, only studies either exclusively or in part focusing on Russia were included. Abstracts and titles of all identified articles were screened to ensure the reliability of the search outcomes and adherence to the field of study. All abstracts were reviewed to validate the relevance of the articles selected. For documents without abstracts, the full texts were screened. Apart from peer-reviewed journal articles, all other forms of documents-books, book chapters, book series and others indexed in Scopus were excluded using the "exclude" and "limit to" functions. No language restrictions were, however, made. False-positive results were checked by screening and a manual review of 10% of the retrieved top-cited articles to validate the selection criteria. "Causes of death of caterpillars…", "disease… in Lake Baikal (Siberia, Russia)", "pigs' deaths", “… cattle diseases...”, among others are examples of false-positive documents found in

the data retrieved from the repository. These documents were excluded. Furthermore, the number of publications obtained by the top 10 authors was compared with the number of publications ascribed to the same authors in Scopus. The newly derived number of documents per the outcomes of these two methods were tested for reliability and agreement using the interclass correlation coefficient (ICC) [24]. The ICC coefficient (> 95%) revealed that the observations matched and were also valid at a statistically significant ($p < 0.001$) agreement between the results from the two approaches [25]. The final sample documents used for the analysis were 743.

2.4. Data Analysis

Within the bibliometric analysis, the trends of publications and average article citations, the co-citation among authors and institutions, and the top productive authors (10), journals and institutions (10), and highly cited papers (globally and locally-10 each) were the focus. Line diagrams were used to present publications growth (presented in 10-year intervals) and trends of average citations. Different indices provided by Scopus were used to perform the analysis depending on the outcome of interest. For instance, the number of citations for each document was used to assess article and author citations. The Hirsch index (h-index) was used to measure the productivity and citation impact of authors [26]. The country affiliation index was used to assess intra-country (single country publications) and inter-country or international (multiple country publications) collaborations [14,17]. The frequently used author keywords and all keywords were visualized as network and density map, respectively. The size of a node within this map was an indicator of the frequency of occurrence of a keyword. The international collaboration between active authors, institutions and countries were also visualized with a network map. The thickness of the links between authors, institutions and countries represented the strength of collaboration between the active authors, institutions and countries.

The second analytical approach was topic modelling. The data was used to create a corpus. Each abstract within the subsection of the data became a document within the corpus. The newly generated corpus was tokenized [27]. While there exist many forms of tokens, for our study, we used created word tokens. The data (corpus) was transformed into a unique sparse vector of terms while all the essential information needed for the study was retained [28]. General words, such as background, objective, aim, method, materials and methods, methodology, result, conclusion, recommendations, numerical digits and stop words, were eliminated from the tokens to capture the salient information [17,29,30]. Also, causes, deaths, diseases and Russia were removed from the dataset to increase the validity of the discriminative information since these words were recurrent in almost all abstracts selected for the study [30]. Following this, a document term matrix (DTM) was created to show the frequency of terms that occur from the tokens [31]. A total of 14714 DTM was derived. [31]. A total of 14714 DTM was derived. Latent Dirichlet allocation (LDA) algorithm was applied to the DTM to pursue text mining. The LDA algorithm learned the set of thematic topics from the words that occurred together in the tokens generated from the data. Here, the observed documents and words were used to infer the hidden topic structures by modelling per-document topic distributions, P(topic|document), and per-topic word distributions, P(word|topic) [30,32]. A limit was set to the Dirichlet hyperparameters to obtain the relevant topics and distribution of words. The interpretable topics were estimated using the perplexity-based method. The topic with the least estimate became the base for the selection of the optimal number of topics [33]. Specific estimations, visualization and mapping for the present study were performed using the VOSviewer and the R programme.

3. Results

3.1. Distribution of publications and citations

Until 1985 and beyond, the distribution of publications was stable, but the total number of publications on death from all causes in Russia did not surpass single digits. The lowest number of publications was recorded in these periods. After 1985, there was a steady rise in the number of publications from 2 to about 43 by 2016. The number of published works in this area increased in 2016, but had been declining afterwards. Even though there have been more publications from 1985 to date as compared to the previous years, there seems to be year-on-year differences (see Figure 1).

*****Figure 1*****

Figure 2 shows the average number of citations on death from all causes in Russia. The average number of citations on death from all causes in Russia was relatively low until years after 1994. There was increase in the number citations after 1994 although the rise was characterized by periods of dwindled citations. However, from 2010 to 2016, there was a continuous rise in the number of citations.

*****Figure 2*****

3.2. Authors

Top 10 productive authors are shown in Table 1. Shkolnikov, V. M. ranked first with a total of 37 published articles, followed by Mckee, M. and Andreev, E. M. who have published 24 articles each. In terms of Hirsch index (h-index) of these authors, Shkolnikov, V. M. ranked first (h-index = 26), followed by those by McKee, M. (h-index = 18), Andreev, E. M. (h-index = 15) and Bobak, M. (h-index = 11). McKee, M. was the most cited author (citations = 6420), followed by Shkolnikov, V. M. (citations = 2392) and Leon, D. A. (citations = 1510).

*****Table 1*****

Co-authorship among authors who have published articles on death from all causes research in Russia is depicted using a network visualisation map (see Figure 3). These authors were grouped into three clusters; red, blue and green. The names of the authors and nodes were presented as circles. The size of the node and circles with authors' names indicate total link strength. The connecting lines represent collaboration pathways between these authors. The lines connecting the node correspond to the number of co-authorship. The strength of the authors' collaboration is related to the thickness of the connection between authors. Some authors were arbitrarily excluded from the figure. This exclusion helped to maximise legibility.

*****Figure 3*****

Figure 4 is a network showing co-citation among authors who have published articles on death from all causes research in Russia. These authors were grouped into two clusters; red and blue. The names of the authors and nodes were presented as circles. The size of the node and circles with authors' names indicate total link strength. The connecting lines represent co-citation pathways between these authors and their connection to each node correspond to a number of co-

citation between authors. The strength of the authors' co-citation is related to the thickness and closeness of connection. A handful of authors were arbitrarily excluded from the figure to maximize legibility. McKee, M., Shkolnikov, V., Meslè, F., Vallin, J., Andreev, E., and Leon, D. had the strongest co-citation links. However, each of these authors had differing links with others.

*****Figure 4*****

3.3. Journals

The list of the top journals in the field of death from all causes research in Russia is shown in Table 1. Generally, three broad sources of journals were identified: Commonwealth Independent States and Russian-specific and international journals. The top 10 most published journals were Russian-specific journals. Terapevticheskii Arkhiv (Therapeutic archive-n = 27), Kardiologiya (Cardiology-n = 21) and Arkhiv Patologii (Archive of Pathology), Gigiena I Sanitariia (Hygiene and Sanitation), and Sudebno-Meditsinskaia Ekspertiza (Forensic Medical Examination, [n = 18]) were the top five journals. All these journals are within the scope of public health, medicine and epidemiology.

*****Table 2*****

Figure 5 shows a co-citation network visualization of the top journals in the field of death from all causes research in Russia. These top journals were grouped into six clusters (red, yellow, green, blue, violet, and light blue). Each cluster contained nodes (circle) and names of journals. The size of the node indicates the number of times it was cited in other articles. Each journal selected for this portion of the analysis had a minimum of 20 citations. The Lancet was the most co-cited journal (citation = 531, total link strength = 6225). It had significant links to Bulletin of the World Health Organization (citation = 28, total link strength = 419), The Paediatric Infectious Disease Journal (citation = 22, total link strength = 213) and Tobacco Control (citation = 26, link strength, 455). The size of a node (circle-journals) and the thicker the curves, denote the number of citations and strength of association.

*****Figure 5*****

3.4. Highly Cited Articles

The top 10 highly cited articles (globally) on death from all causes research are shown in Table 3. The article by Naghavi et al., (2017), entitled "Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: A systematic analysis for the Global Burden of Disease Study 2013", had the highest number of citations (n = 3800). Six out the top 10 highly cited articles were published in Lancet, while the remaining four were published in Nature, Journal of the American Medical Association, European Heart Journal, and Annals of Oncology. Of the top 10 journals, seven papers were published after the end of the first decade of this century.

*****Table 3*****

The top 10 highly cited articles (locally) devoted to research on deaths from all causes in Russia are shown in Table 4. The article by [35], entitled "Changes in life expectancy in Russia in the mid-1990s", had the highest number of citations locally and globally (n = 27 and n = 237,

respectively). All articles except two ([i.e., Lancet- Changes in life expectancy in Russia in the mid-1990s [35] and Relation between heavy and binge drinking and all-cause and cardiovascular mortality in Novosibirsk, Russia: a prospective cohort study [36]) were locally top-cited articles published in different journals.

*****Table 4*****

3.5. Institutions

The top 10 productive institutions on deaths from all causes research in Russia are shown in Table 5. The Tehran University of Medical Sciences was the most productive institution (n=30). Followed by London School of Hygiene and Tropical Medicine, and University College of London (n = 27 each), Max Planck Institute for Demographic Research, and the National Research University Higher School of Economics (n = 26 each). Three institutions (i.e., National Research University Higher School of Economics, Northern State Medical University, and I. M. Sechenov First Moscow State Medical University) were located in Russia, two (i.e., London School of Hygiene and Tropical Medicine, University College London) were located in the United Kingdom, one in the United States of America (i.e., University Of Washington), Canada (i.e., University Of Toronto), Germany (i.e., Max Planck Institute for Demographic Research), Iran (i.e., Tehran University of Medical Sciences), and Australia (i.e., University of Melbourne).

*****Table 5*****

3.6. Countries

Table 6 shows the top 10 most active countries in publishing documents on deaths from all causes research in Russia. The USA ranked first and contributed 51 documents (22%), had the highest single and multiple country publications, a total of 5945 citations and an overall average citation of 116.57. The United Kingdom (UK) ranked second and contributed to 34 documents (15%), had the higher single country publications, a total of 2470 citations and an overall average citation of 72.65. The Russian federation ranked fourth and contributed to 36 documents (11%), had the six single and 20 multiple country publications, a total of 33 citations and an overall average citation of 1.27.

*****Table 6*****

Figure 6 shows authors publishing on the deaths from all causes in Russia research collaboration networks by countries. Generally, the collaboration pathways were centred among countries in Europe, America and Oceania. Countries parts of the unions like the BRICS and Commonwealth Independent States (CIS) had author collaborations. These groups of countries were sub-divided into four clusters, red, yellow, green, and blue. Russia had the highest number of collaborations (n = 347, total link strength = 374), followed by UK (n = 72, total link strength = 287), the United States (n = 70, total link strength = 208) and Germany (n = 63, total link strength = 244). Other countries had no collaboration networks. The prominent co-authorship by the country network is represented by different colour codes: green- Russia network, USA network; blue, Canada network; red, Switzerland network; yellow.

*****Figure 6*****

3.7. Co-occurrence of keywords

The density visualisation map of co-occurrence of all keywords from research devoted to deaths from all causes in Russia included four clusters of 473 relevant keywords is shown in Figure 7. The number of related keywords in a particular document (article) reflects the density of those keywords. The relatedness of terms or keywords is depicted by the approximate distance between those terms (i.e., is represented by colours on the map) and is further assessed as co-occurrences. The main keywords that were identified from the map include to'Russia', 'male', 'mortality', 'aged, 'human', 'cancer', 'risk factors', and 'prevalence'. The visualisation map indicated that research on 'communicable diseases', 'infectious diseases' and 'the risk factors for infectious diseases' was largely ignored. The map also revealed that prominent keywords such as age factors, life expectancy, new born, demography, survival rate, alcohol consumption as well as abdominal and health survey were primarily the public health and epidemiological entities. These variables clustered and are critical when studying the health of a population at risk of some health challenges.

*****Figure 7*****

The network map of co-occurrence of author keywords is depicted in figure 8. The map included eleven (11) clusters of 79 relevant keywords. The 11 large clusters appear with different colours as follows: red = death, children, yellow = cancer, smoking, pink = coronary heart disease, cardiovascular mortality, brown = Russian federation, icd-10, blue = Russia, suicide, alcohol, green = epidemiology, Chernobyl, violet = cause of death, alcohol consumption, light blue = incidence, tuberculosis, and orange = morbidity, cardiovascular disease, light green = mortality, and salmon = survival, neoplasms. The size of the nodes depicts the co-occurrence between these related terms, and the larger the size, the greater the co-occurrence. The blue cluster is the most central cluster of all and is represented by the word 'Russia'. Several external causes of death and risk factors share a space in this cluster and remain the most co-occurred word among all authors. Non-communicable diseases have an important position in all other clusters.

*****Figure 8*****

Table 7 shows the most 20 probable words for each topic within the 20 selected for the study. Generally, researchers devoted special attention to the categories of causes of death. Specifically, circulatory and infectious diseases likewise deaths from external causes were studied (i.e., Topics 1, 3, 4, 7, 11, 12, 13 and 17) and also researched on various determinants of their causes of death and effects on the health of the population. These include risk factors that were behavioural (e.g., smoking, drinking), social (e.g., relationship status, educational status) and economic (e.g., nature of occupation) and suicides, homicides and alcohol poisoning (i.e., Topics 1, 3, 5, 7, 11, 15, 16 and 18). Besides, various aspects of clinical investigations and prevention, such as clinical examination, diagnostic tests for causative agents, treatment and management patients or a certain population of interest were studied (i.e., Topics 1, 3, 4, 7, 8, 9, 11, 15, 16, 19 and 20). Research between Russia and other nations and within Russia was also identified (i.e., Topics 8, 10, 11, 12, and 15). The epidemiological characteristics of these causes of death in the country were researched. Overall, deaths attributed to alcohol, suicides, homicides and circulatory diseases were well researched among researchers.

Table 7

4. Discussion

The current study provided a bibliometric account of the deaths from all causes in Russia. This study is one of the few bibliometric research conducted in epidemiological studies in the country [14,15]. The results revealed a steady quantitative rise in publications (i.e., from 2 to 43) on deaths from all causes, especially after the year 1985 till 2016. Afterwards, there has been a sudden decline in publication numbers (see Figure 1). The high global mortality burden and multiple chronic conditions (e.g., ischaemic heart disease, stroke, self-harm, cirrhosis) noted in many industrialized countries might have attracted interests from researchers [7]. Deaths from all causes have been recognized as a global health issue, where a variety of unmet needs require multidisciplinary cooperation on a global scale [37]. The increase in publications could also be a rise in the number of open access research journals, research networking and other collaborative works in research [14]. The sudden decline after the year 2016 in research activities can be described in the light of what some scholars (e.g., [11,38] termed as the "cardiovascular revolution" in the 2000s in Russian health history. This period was characterized by strategic attempts by the Russian government to improve life expectancy in the country through a recovery plan for life expectancy growth following over two decades of mortality crisis and considerable improvements in health care and risk factors associated with the decrease in cardiovascular mortality. Therefore, these strategic initiatives might have reduced within-country and global research attention of Russia's mortality burden that was improving.

Similarly, the average number of citations on deaths from all causes in Russia was relatively low until 1994. There was an increase in the number citations after 1994 although the growth was characterized by periods of decreased citations. However, from 2010 to 2016, there was a continuous rise in the number of citations. This finding could be attributed partly to more attention being given to the increases in the mortality due to chronic diseases by scholars and partnering institutions like the World Health Organization. Additionally, the increase in science, technology and increased number of researchers worldwide might have influenced the overall upsurge in the number of citations on deaths from all causes for the reported period. An assessment of the top 10 productive authors and their corresponding Hirsch index (h-index) revealed a relatively low contribution of research publications on deaths from all causes, though of high quality. Further analysis showed that the overall strength of collaborative research works on deaths from all causes was low, with relatively few networking. Also, analyses of the top 20 journals and citation index on deaths from all causes in Russia publications showed that the top 10 most published journals were Russian-specific journals. Terapevticheskii Arkhiv (Therapeutic archive-n = 27), Kardiologiya (Cardiology-n = 21) and Arkhiv Patologii (Archive of Pathology); Gigiena I Sanitariia (Hygiene and Sanitation) and Sudebno-Meditsinskaia Ekspertiza (Forensic Medical Examination, [n= 18 each]) were the top five journals (see Table 2). This practical information provides useful insights into the quantity and quality of deaths from all causes and its related research in Russia.

It is established that internationally co-authored research publications generally have higher altmetric and citation scores than publications by within-country authors (e.g., only Russian authors, [39]). From our current analysis, the highest number of citations (i.e., 3800) on deaths from all causes in Russia was the internationally co-authored article ''Global, regional and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013'' published in The Lancet (i.e.,

January, 2015) and co-authored by Naghav et al. [40]. Again, the Lancet was the most co-cited journal for deaths from all causes in Russia (citation= 531, total link strength= 6225). This international journal is classified among the first quartile of journals in the Web of Science Core Collection ‘‘Medicine, General and Internal’’ [39]. Among the 40 international collaborators, three were Russian co-authors, with two affiliated with organizations of the Russia Academy of Sciences and one with the Moscow State University of Medicine and Dentistry. Of the top 10 highly cited articles, six were also published in Lancet whereas the rest were published in Nature, Journal of the American Medical Association, European Heart Journal, and Annals of Oncology. Of the top 10 journals, seven papers were published after the end of the first decade of this century. These trends established in the current study on deaths from all causes research in Russia suggest low research productivity under this theme, emphasizing the need for more research attention. This evidence is also an indication that more Russian researchers are encouraged to engage in more international interdisciplinary collaboration in public health and epidemiological studies.

All the top 10 locally cited articles on deaths from all causes were published in reputable international journals with high impact factor and citation index. One of the top 10 locally cited articles “Estimates of total alcohol consumption in Russia, 1980–1994” published in “Drug and Alcohol Dependence” by Nemtsov [41] had the least impact factor (i.e., 1.08). Out of the top 10 productive institutions on causes of death research in Russia, only three institutions (i.e., National Research University Higher School of Economics, Northern State Medical University, I.M. Sechenov First Moscow State Medical University) were located in Russia. Thus, these findings indicate an inadequate quantity of deaths from all causes research conducted in Russia given the numerous research and academic institutions under the auspices of the Russian Academy of Sciences as well as other analogous institutions in the country. The current scenario calls for immediate research attention through multi-sectoral networking in the field of deaths from all causes and other public health related issues among the scientific community in Russia. Of the most active countries in publishing documents on deaths from all causes in Russia, the Russian federation ranked fourth with a total contribution of 36 documents (11%), had the 6 single and 20 multiple country publications, with a total of 33 citations and an overall average citation of 1.27. Although there are some research attempts on deaths from all causes at the national level and internationally of high impact as evident from the earlier findings in the current study, establishing additional networks to promote research at the national and sub-national levels in Russia is required.

Other findings suggest that research productivity on deaths from all causes in Russia centred on Europe and the Americas. Although Russian had the highest number of collaborations, followed by UK, United States and Germany (see Figure 6), this trend does not reflect on productive research publications on deaths from all causes from Russia. Language barrier may have hindered research publications in the country. Funding (e.g., government and funding organizations usually allocate and highly prioritize research programmes that are in line with their policy relevance) and strict institutional related policies (e.g., research data protection rights) often associated with open science might also restrict the quantity and quality of published scientific articles borne out of networking and collaboration from Russian academic and research institutions [37]. These reasons in general could negatively influence public health research and could also account for the sudden decline in research activities on deaths from all causes after 2016 in Russia. For other countries such as the UK, US and Germany, research budget on public health and other epidemiological studies could be readily available and accessible so might have positive influence on research related engagements.

The density visualisation maps (see Figures 7 and 8) of all relevant keywords revealed that research on 'communicable diseases', 'infectious diseases' and 'the risk factors for infectious diseases' have been largely ignored in Russia. Hence, more networking and realigning future scientific works in public health and epidemiology among the scholarly community are very crucial toward addressing this lag. The visualisation map also showed that prominent keywords such as age factors, life expectancy, new born, demography, survival rate, alcohol consumption, and abdominal as well as health survey, which are primarily public health and epidemiological entities were clustered. These variables are critical when studying the health of a population at risk of a particular health challenge, although priority must be given to non-communicable diseases. Future bibliometric research in public health and epidemiology on Russia should target patterns of regional mortality for disparities that might change over time. Other studies could also investigate behavioural and psychological characteristics related to deaths from all causes in Russia.

Of the twenty reported scientific productivity on research topics related to death from all causes in Russia, deaths attributed to alcohol, suicides, homicides and circulatory diseases were well researched among researchers. Explanations for why the concentration of research activity is on these areas are speculative. When research inputs are examined, decreasing life expectancy due to high mortality trend was primarily a major concern that urgently required thorough in-depth evaluation based on empirical information that could help re-alignment or adjustment of public health goals through varied interventions and/ programmes in Russia. Mortality trends in some industrialized countries (e.g., Russia) have increasingly been recognised by WHO as serious public health issue, where diverse unmet needs require multidisciplinary cooperation on a global scale [55,56]. For example, high consumption in alcohol correlated overall mortality in Russia where alcohol-related deaths were driven principally by deaths from alcohol poisoning and binge drinking. Similarly, available evidence from the current study shows that beside high alcohol consumption, smoking resulted in deaths, with coronary heart disease also playing contributory role in reported mortality cases in Russia. Therefore, more detailed epidemiological studies are required to unearth more death related dynamics in Russia.

4.1. Strengths and limitations

This study provides a useful guide for tracing the progression and quality of research in deaths from all causes in Russia. To date, there are limited publications on country-specific bibliometric analysis to investigate on research productivity of academic institutions, authors, co-authorship, journals and citations on relevant key research fields like public health and other epidemiological studies. The current study offers new openings to identify research areas in deaths from all causes, networking and collaboration opportunities in Russia. Despite these strengths, there are some limitations to the study. Some selection bias may characterize current findings because of the non-inclusion of publications in journals not indexed in the Scopus database. This kind of selection bias is not unusual in published research materials from secondary data sources. The search was also dependent on the indexing operators of Scopus, as with any other bibliometric study; hence it is very likely that all potential keywords associated with deaths from all causes were not exhausted despite the rigorous search strategy used during the analysis. Also, the actual geographical location of the corresponding author and all co-authors could not be identified; hence institutional affiliation was used, implying that authors with multiple affiliations might have influenced the ranking order of top institutions and countries captured in the current study. All the captured publications were written in the English language. However, substantial research publications and academic-related networking or collaborations from Russia are also done in the Russian language.

This language medium might have caused an underestimation in the numbers of research-related activities cited in this study on deaths from all causes.

5. Conclusion

Deaths from all causes research attention in Russia increased in recent years but the amount publications and research related engagements (e.g., networking and/ collaboration) do not commensurate the increasing burden of mortality in the country compared to other countries (e.g., UK, US, Germany). There seems to be a sudden decline in research activities on deaths from all causes in Russia after 2016. This marked research lag associated with deaths from all causes burden in Russia calls for more collaborative research between public health disciplines and networking among researchers (i.e., both national and international). Deaths from all causes within-country empirical information provides a decisive step towards unearthing specific indicators related to mortality trends through academic writing in Russia. Continually addressing deaths from all causes burden in Russia needs research policies (e.g., prioritize funds for deaths from all causes research, multi-sectoral research collaborations) based on empirical evidence from scientific knowledge. Relevant and high-quality research on deaths from all causes would provide the empirical evidence based on current and accurate information required for the prevention of deaths from all causes, clinical and cognitive-behavioural interventions, patient care and policy re-alignment of public health research in Russia.

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References

1. Steel N, Ford JA, Newton JN, Davis ACJ, Vos T, Naghavi M, et al. Changes in health in the countries of the UK and 150 English Local Authority areas 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. The Lancet. 2018 Nov 3;392(10158):1647–61.

2. Mathers C, Boerma T. Mortality Measurement Matters: Improving Data Collection and Estimation Methods for Child and Adult Mortality. PLOS Medicine. 2010 Apr 13;7(4):e1000265.

3. Dixon BE, Siegel JA, Oemig TV, Grannis SJ. Electronic Health Information Quality Challenges and Interventions to Improve Public Health Surveillance Data and Practice. Public Health Rep. 2013;128(6):546–53.

4. Xiao Y, Bochner AF, Makunike B, Holec M, Xaba S, Tshimanga M, et al. Challenges in data quality: the influence of data quality assessments on data availability and completeness in a voluntary medical male circumcision programme in Zimbabwe. BMJ Open. 2017 Jan 1;7(1):e013562.

5. Roth GA, Abate D, Abate KH, Abay SM, Abbafati C, Abbasi N, et al. Global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries and territories, 1980–2017: a systematic analysis for the Global Burden of Disease Study 2017. The Lancet. 2018 Nov 10;392(10159):1736–88.

6. Acharya KP, Pathak S. Applied Research in Low-Income Countries: Why and How? Front Res Metr Anal [Internet]. 2019 [cited 2020 Jun 24];4. Available from: https://www.frontiersin.org/articles/10.3389/frma.2019.00003/full

7. Hajat C, Stein E. The global burden of multiple chronic conditions: A narrative review. Prev Med Rep. 2018 Oct 19;12:284–93.

8. Bhattacharya J, Gathmann C, Miller G. The Gorbachev Anti-Alcohol Campaign and Russia's Mortality Crisis. American Economic Journal: Applied Economics. 2013 Jan;5(2):232–60.

9. Boitsov SA, Samorodskaya IV. Determinants of mortality. Herald of the Russian Academy of Sciences. 2016 Nov;86(6):473–80.

10. Grigoriev P, Andreev EM. The Huge Reduction in Adult Male Mortality in Belarus and Russia: Is It Attributable to Anti-Alcohol Measures? Bayer A, editor. PLOS ONE. 2015 Sep 16;10(9):e0138021.

11. Shkolnikov VM, Andreev EM, McKee M, Leon DA. Components and possible determinants of decrease in Russian mortality in 2004-2010. Demographic Research. 2013 Apr 24;28:917–50.

12. Starodubov VI, Marczak LB, Varavikova E, Bikbov B, Ermakov SP, Gall J, et al. The burden of disease in Russia from 1980 to 2016: a systematic analysis for the Global Burden of Disease Study 2016. The Lancet. 2018 Sep;392(10153):1138–46.

13. Sauermann H, Haeussler C. Authorship and contribution disclosures. Sci Adv. 2017 Nov;3(11):e1700404.

14. Sweileh WM, Al-Jabi SW, Zyoud SH, Shraim NY, Anayah FMA, Sawalha AF, et al. Bibliometric analysis of global publications in medication adherence (1900–2017). International Journal of Pharmacy Practice. 2019;27(2):112–20.

15. Zhang X, Estoque RC, Xie H, Murayama Y, Ranagalage M. Bibliometric analysis of highly cited articles on ecosystem services. PLOS ONE. 2019 Feb 11;14(2):e0210707.

16. Heo GE, Kang KY, Song M, Lee J-H. Analyzing the field of bioinformatics with the multi-faceted topic modeling technique. BMC Bioinformatics. 2017 May 31;18(7):251.

17. Sharma N, Bairwa M, Gowthamghosh B, Gupta SD, Mangal DK. A bibliometric analysis of the published road traffic injuries research in India, post-1990. Health Res Policy Sys. 2018 Dec;16(1):18.

18. Matcharashvili T, Tsveraidze Z, Sborshchikovi A, Matcharashvili T. THE IMPORTANCE OF BIBLIOMETRIC INDICATORS FOR THE ANALYSIS OF RESEARCH PERFORMANCE IN GEORGIA. Trames. 2014;18(4):345.

19. Merigó JM, Núñez A. Influential journals in health research: a bibliometric study. Global Health. 2016 Aug 22;12(1):46.

20. Nafade V, Nash M, Huddart S, Pande T, Gebreselassie N, Lienhardt C, et al. A bibliometric analysis of tuberculosis research, 2007–2016. PLOS ONE. 2018 Jun 25;13(6):e0199706.

21. Wingerter DG, Azevedo UN de, Marcaccini AM, Alves M do SCF, Ferreira MÂF, Moura LKB. Scientific production on falls and deaths among elderly persons: a bibliometric analysis. Rev bras geriatr gerontol. 2018 Jun;21(3):320–9.

22. Falagas ME, Pitsouni EI, Malietzis GA, Pappas G. Comparison of PubMed, Scopus, Web of Science, and Google Scholar: strengths and weaknesses. FASEB J. 2008 Feb;22(2):338–42.

23. Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJL, editors. Global Burden of Disease and Risk Factors [Internet]. The World Bank; 2006 [cited 2020 Jun 21]. Available from: http://elibrary.worldbank.org/doi/book/10.1596/978-0-8213-6262-4

24. Liljequist D, Elfving B, Roaldsen KS. Intraclass correlation – A discussion and demonstration of basic features. PLOS ONE. 2019 Jul 22;14(7):e0219854.

25. Koo TK, Li MY. A Guideline of Selecting and Reporting Intraclass Correlation Coefficients for Reliability Research. J Chiropr Med. 2016 Jun;15(2):155–63.

26. van Raan AFJ. Comparison of the Hirsch-index with standard bibliometric indicators and with peer judgment for 147 chemistry research groups. Scientometrics. 2006 Jun;67(3):491–502.

27. Ray SK, Ahmad A, Kumar CA. Review and Implementation of Topic Modeling in Hindi. Applied Artificial Intelligence. 2019 Sep 19;33(11):979–1007.

28. Tao D, Yang P, Feng H. Utilization of text mining as a big data analysis tool for food science and nutrition. Comprehensive Reviews in Food Science and Food Safety. 2020;19(2):875–94.

29. Salloum SA, Al-Emran M, Monem AA, Shaalan K. Using Text Mining Techniques for Extracting Information from Research Articles. In: Shaalan K, Hassanien AE, Tolba F, editors. Intelligent Natural Language Processing: Trends and Applications [Internet]. Cham: Springer International Publishing; 2018 [cited 2019 Nov 23]. p. 373–97. Available from: http://link.springer.com/10.1007/978-3-319-67056-0_18

30. Wang S-H, Ding Y, Zhao W, Huang Y-H, Perkins R, Zou W, et al. Text mining for identifying topics in the literatures about adolescent substance use and depression. BMC Public Health. 2016 Dec;16(1):279.

31. MS APV, PhD MC-T, Linda Tickle-Degnen PhD F OTR/L, BS AWB, PhD MJS. Using topic modeling to infer the emotional state of people living with Parkinson's disease. Assistive Technology. 2019 Jun 13;0(0):1–10.

32. Jelodar H, Wang Y, Yuan C, Feng X, Jiang X, Li Y, et al. Latent Dirichlet allocation (LDA) and topic modeling: models, applications, a survey. Multimed Tools Appl. 2019 Jun 1;78(11):15169–211.

33. Zhao W, Chen JJ, Perkins R, Liu Z, Ge W, Ding Y, et al. A heuristic approach to determine an appropriate number of topics in topic modeling. BMC Bioinformatics. 2015 Dec 1;16(13):S8.

34. Naghavi M, Abajobir AA, Abbafati C, Abbas KM, Abd-Allah F, Abera SF, et al. Global, regional, and national age-sex specific mortality for 264 causes of death, 1980–2016: a systematic analysis for the Global Burden of Disease Study 2016. The Lancet. 2017 Sep;390(10100):1151–210.

35. Shkolnikov V, McKee M, Leon DA. Changes in life expectancy in Russia in the mid-1990s. The Lancet. 2001 Mar 24;357(9260):917–21.

36. Malyutina S, Bobak M, Kurilovitch S, Gafarov V, Simonova G, Nikitin Y, et al. Relation between heavy and binge drinking and all-cause and cardiovascular mortality in Novosibirsk, Russia: a prospective cohort study. The Lancet. 2002 Nov 9;360(9344):1448–54.

37. Lin R-T, Soeberg MJ, Chien L-C, Fisher S, Takala J, Lemen R, et al. Bibliometric analysis of gaps in research on asbestos-related diseases: declining emphasis on public health over 26 years. BMJ Open. 2018 25;8(7):e022806.

38. Grigoriev P, Meslé F, Shkolnikov VM, Andreev E, Fihel A, Pechholdova M, et al. The Recent Mortality Decline in Russia: Beginning of the Cardiovascular Revolution? Population and Development Review. 2014 Mar;40(1):107–29.

39. Markusova V, Bogorov V, Libkind A. Usage metrics vs classical metrics: analysis of Russia's research output. Scientometrics. 2018;114(2):593–603.

40. Naghav et al. M. Global, regional, and national age–sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. The Lancet. 2015 Jan;385(9963):117–71.

41. Nemtsov AV. Estimates of total alcohol consumption in Russia, 1980–1994. Drug and Alcohol Dependence. 2000 Feb 1;58(1):133–42.

42. Lelieveld J, Evans JS, Fnais M, Giannadaki D, Pozzer A. The contribution of outdoor air pollution sources to premature mortality on a global scale. Nature. 2015 Sep;525(7569):367–71.

43. Leon DA, Chenet L, Shkolnikov VM, Zakharov S, Shapiro J, Rakhmanova G, et al. Huge variation in Russian mortality rates 1984–94: artefact, alcohol, or what? The Lancet. 1997 Aug 9;350(9075):383–8.

44. Bolla M, Van Tienhoven G, Warde P, Dubois JB, Mirimanoff R-O, Storme G, et al. External irradiation with or without long-term androgen suppression for prostate cancer with high metastatic risk: 10-year results of an EORTC randomised study. Lancet Oncol. 2010 Nov;11(11):1066–73.

45. Forouzanfar MH, Liu P, Roth GA, Ng M, Biryukov S, Marczak L, et al. Global Burden of Hypertension and Systolic Blood Pressure of at Least 110 to 115 mm Hg, 1990-2015. JAMA. 2017 10;317(2):165–82.

46. Nichols M, Townsend N, Scarborough P, Rayner M. Cardiovascular disease in Europe 2014: epidemiological update. Eur Heart J. 2014 Nov 7;35(42):2929.

47. Reitsma MB, Fullman N, Ng M, Salama JS, Abajobir A, Abate KH, et al. Smoking prevalence and attributable disease burden in 195 countries and territories, 1990–2015: a systematic analysis from the Global Burden of Disease Study 2015. The Lancet. 2017 May;389(10082):1885–906.

48. La Vecchia C, Bosetti C, Lucchini F, Bertuccio P, Negri E, Boyle P, et al. Cancer mortality in Europe, 2000-2004, and an overview of trends since 1975. Ann Oncol. 2010 Jun;21(6):1323–60.

49. Zaridze D, Maximovitch D, Lazarev A, Igitov V, Boroda A, Boreham J, et al. Alcohol poisoning is a main determinant of recent mortality trends in Russia: evidence from a detailed analysis of mortality statistics and autopsies. Int J Epidemiol. 2009 Feb 1;38(1):143–53.

50. Fc N, Ym K, Sp E, Ct S, Js M, Ev S. Causes of declining life expectancy in Russia. JAMA. 1998 Mar 1;279(10):793–800.

51. Walberg P, McKee M, Shkolnikov V, Chenet L, Leon DA. Economic change, crime, and mortality crisis in Russia: regional analysis. BMJ. 1998 Aug 1;317(7154):312–8.

52. Wasserman D, Värnik A. Reliability of statistics on violent death and suicide in the former USSR, 1970–1990. Acta Psychiatrica Scandinavica. 1998;98(S394):34–41.

53. Shkolnikov Vm, Leon Da, Adamets S., Andreev Eugeniy, Deev A. Educational level and adult mortality in Russia: An analysis of routine data 1979 to 1994. 1998 [cited 2020 Jun 29]; Available from: https://elibrary.ru/item.asp?id=13285016

54. Gavrilova NS, Semyonova VG, Evdokushkina GN, Gavrilov LA. The response of violent mortality to economic crisis in Russia. Population Research and Policy Review. 2000 Oct 1;19(5):397–419.

55. World Health Organization. WHO Mortality Database – 1st May 2013 update. http://www.who.int/healthinfo/statistics/mortality_rawdata/en/index.html (02 June 2014). World Health Organization, Department of Health Statistics and Information Systems, Geneva, Switzerland; 2013.

56. World Health Organization Regional Office for Europe. European Health for All Database (HFA-DB). http://data.euro.who.int/hfadb/ (08 June 2014). WHO Regional Office for Europe, Copenhagen, Denmark; 2013.

Figure Legend

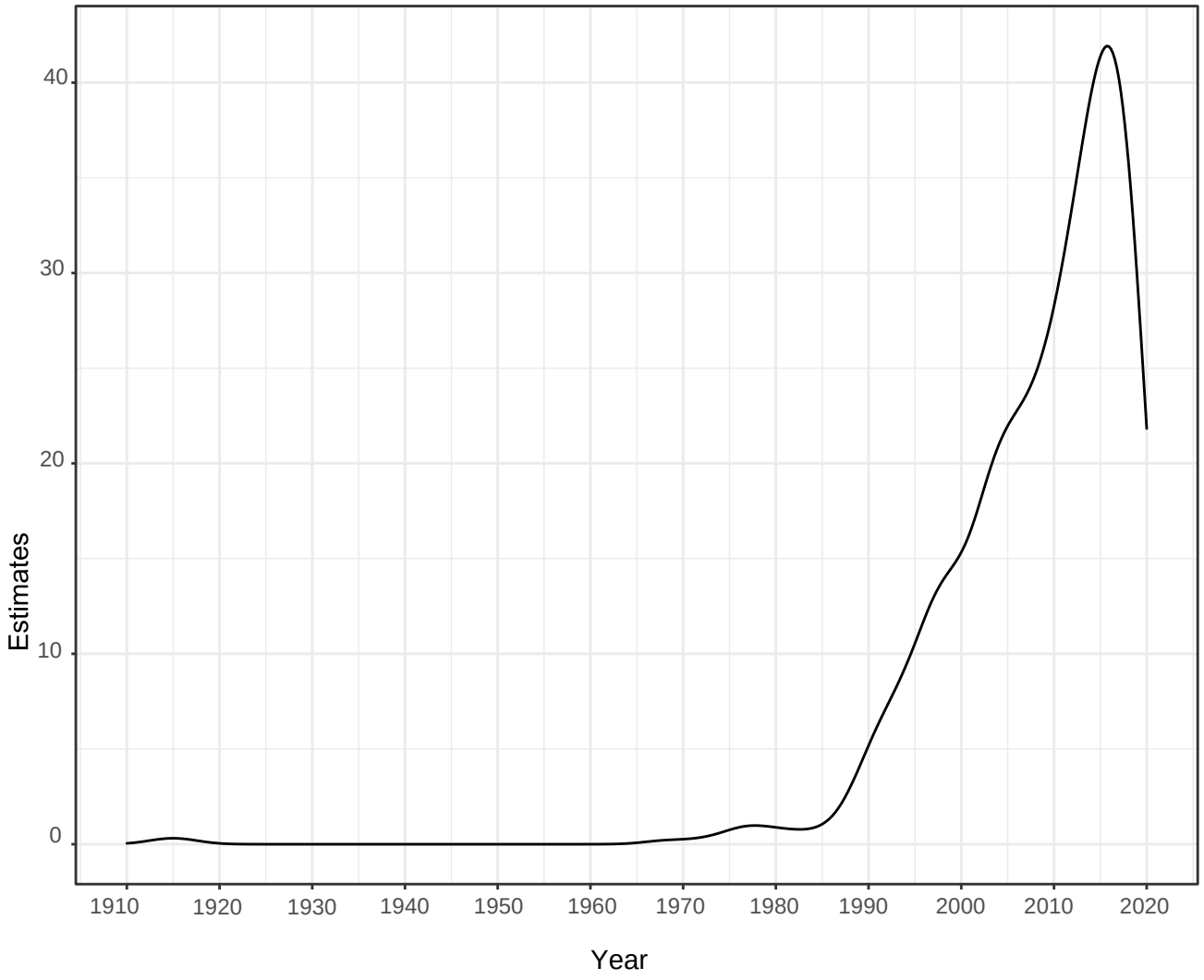


Figure 1. Trends in Death from All Causes in Russia Publications
Source: Computed from Scopus, 2020

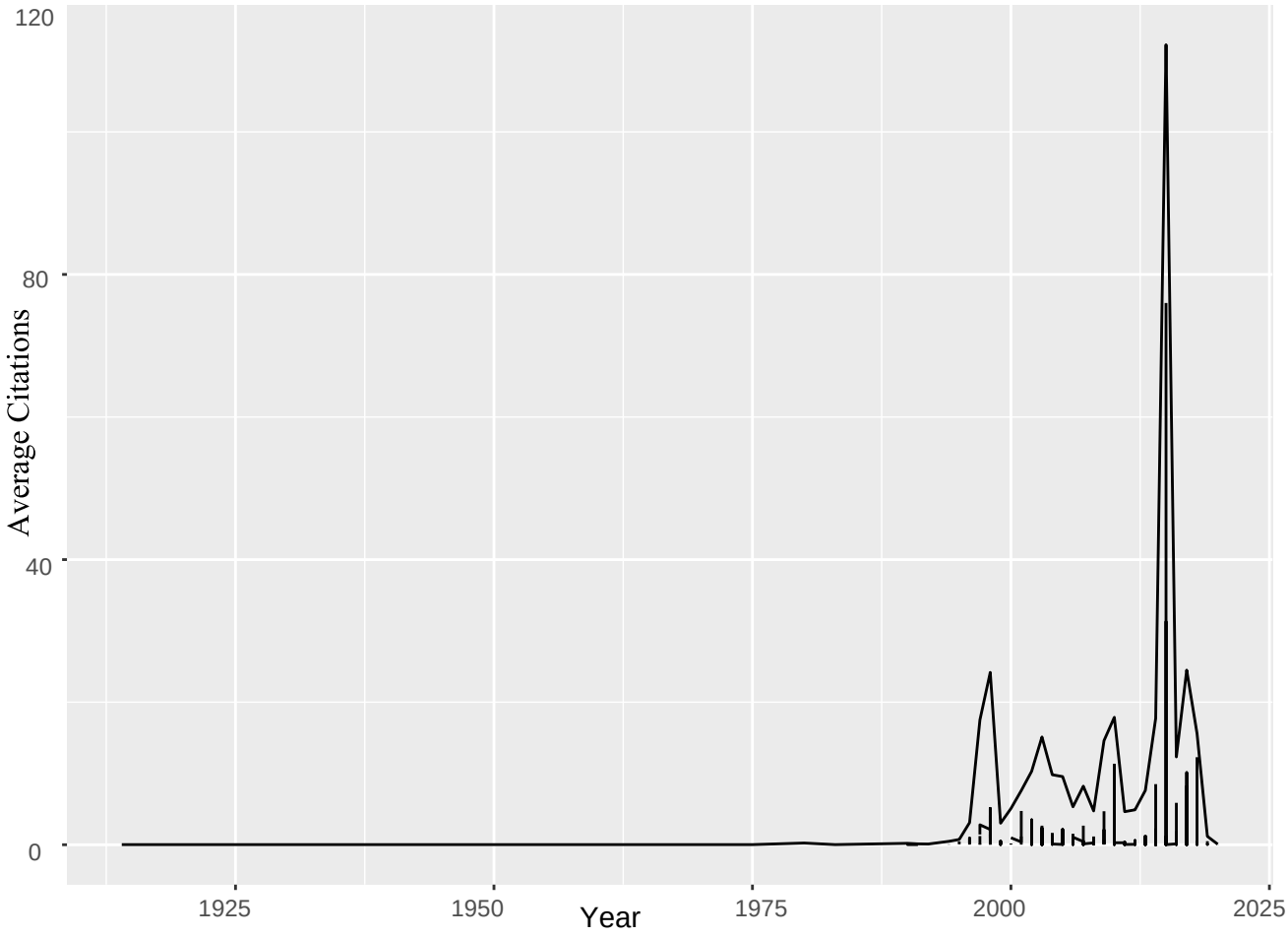


Figure 2. The Average number of citations of articles related to death from all causes
Source: Computed from Scopus, 2020

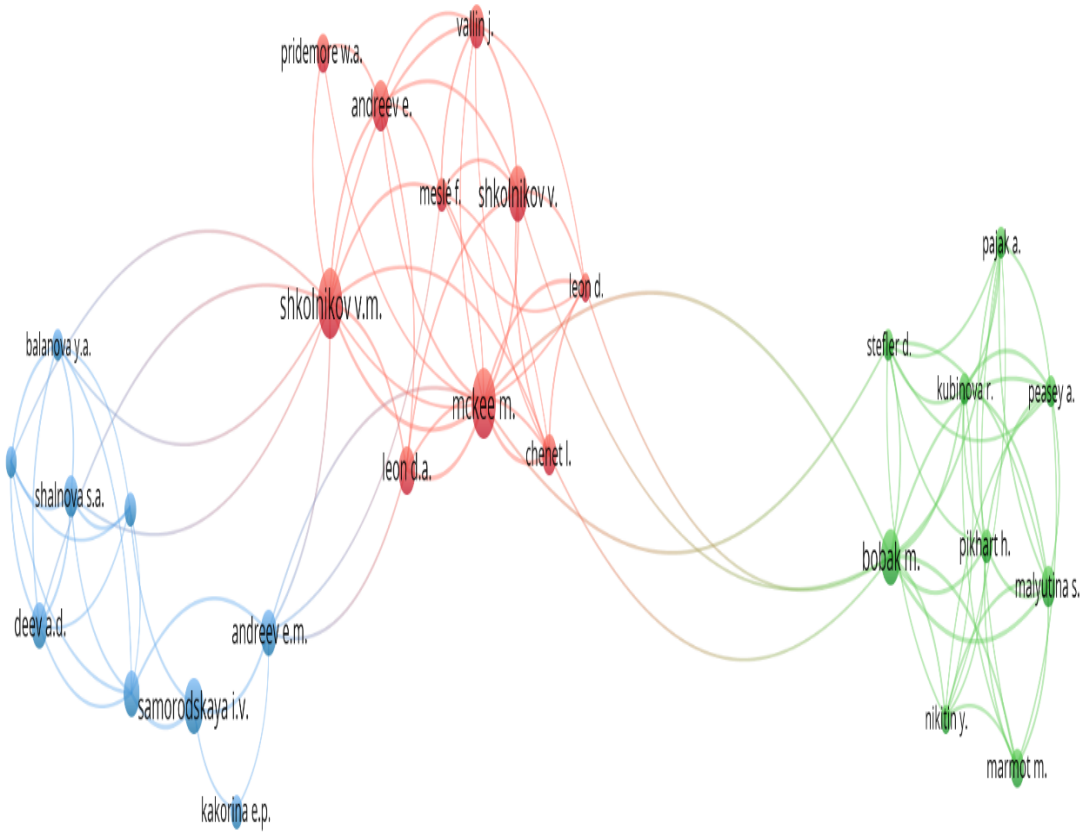


Figure 3. Co-authorship among researchers publishing death from all causes.
Source: Computed from Scopus, 2020

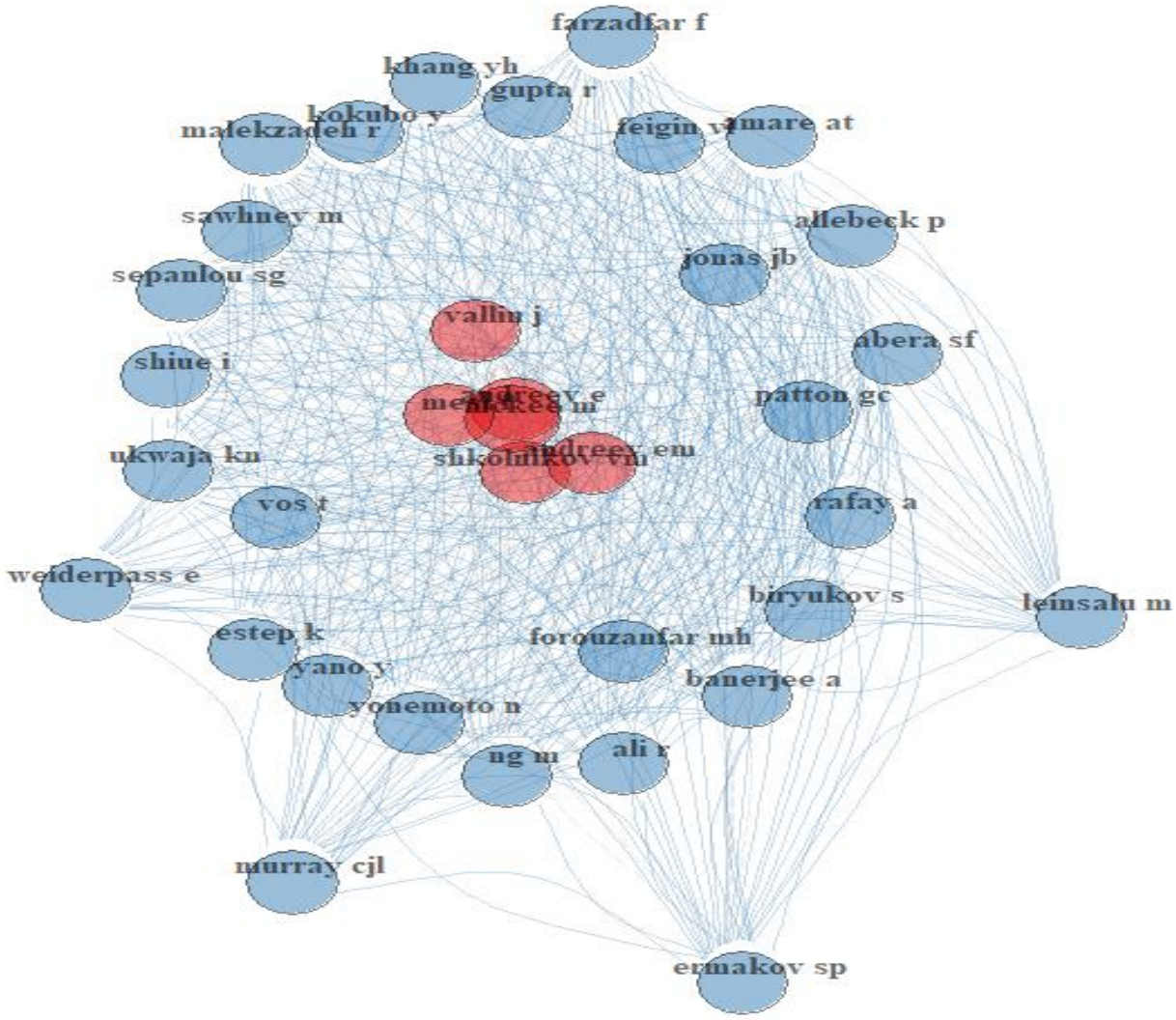


Figure 4. Co-citation network among researchers publishing death from all causes.
Source: Computed from Scopus, 2020

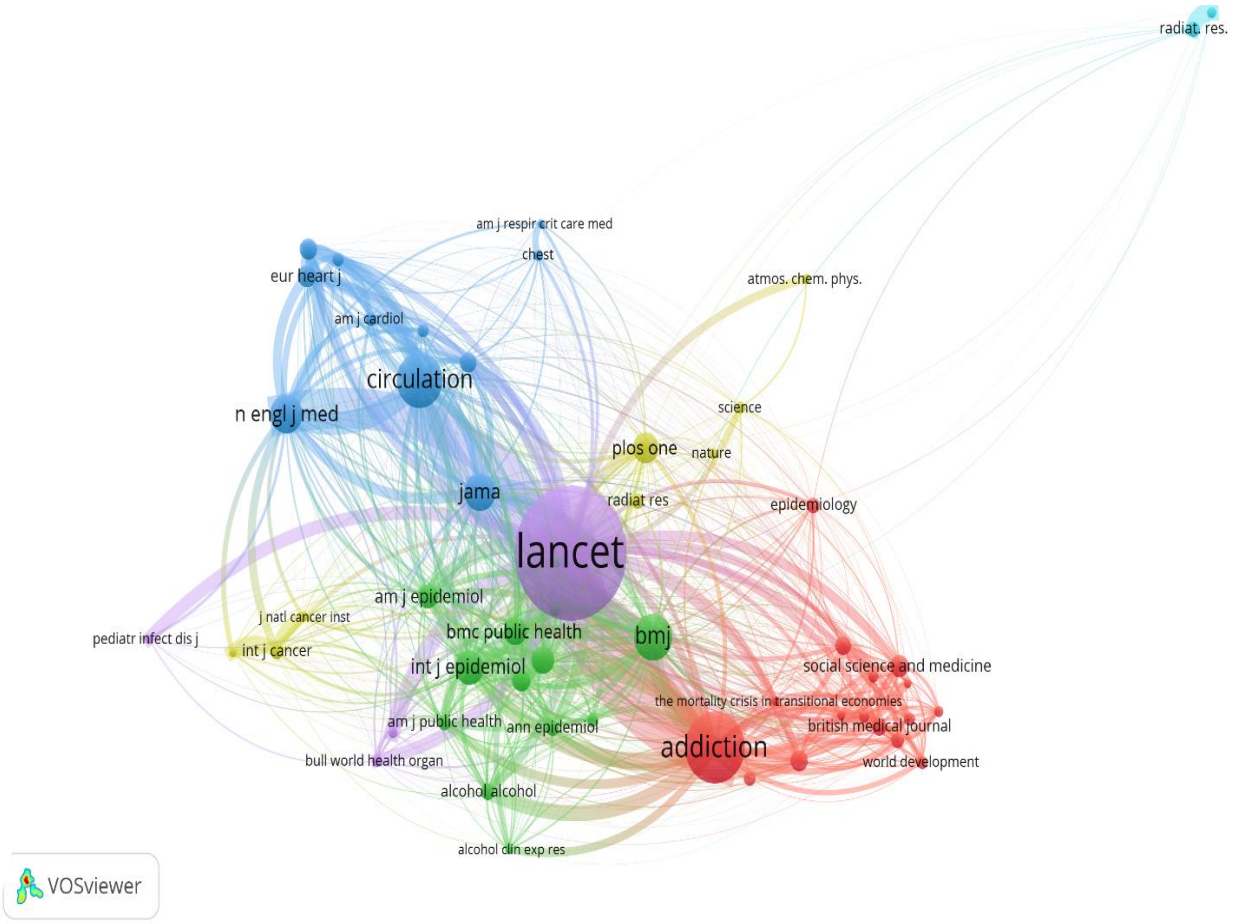
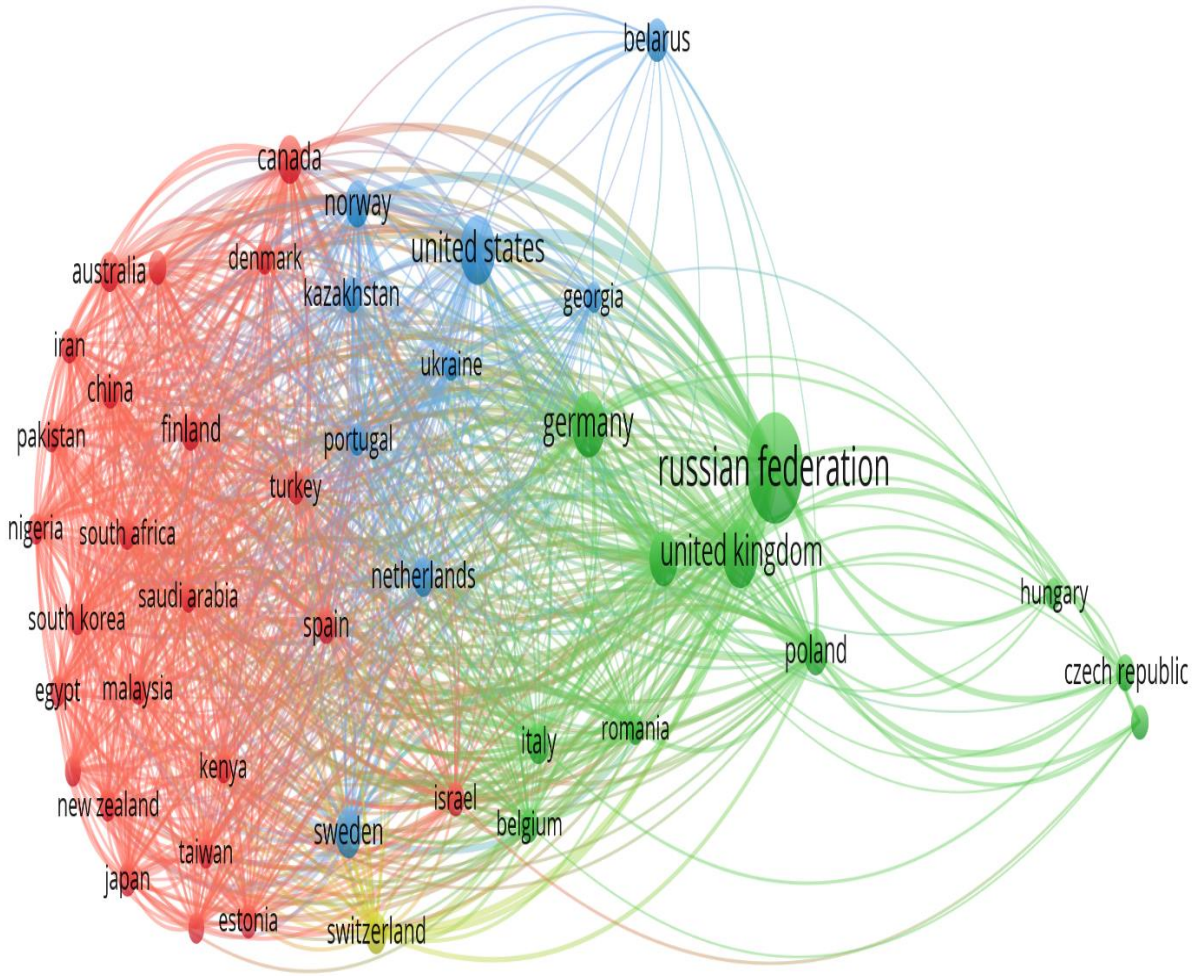


Figure 5. Co-citation analysis of the top journals publishing on death from all causes research
Source: Computed from Scopus, 2020



Source: Computed from Scopus, 2020

Figure 6. Co-authorship by countries network

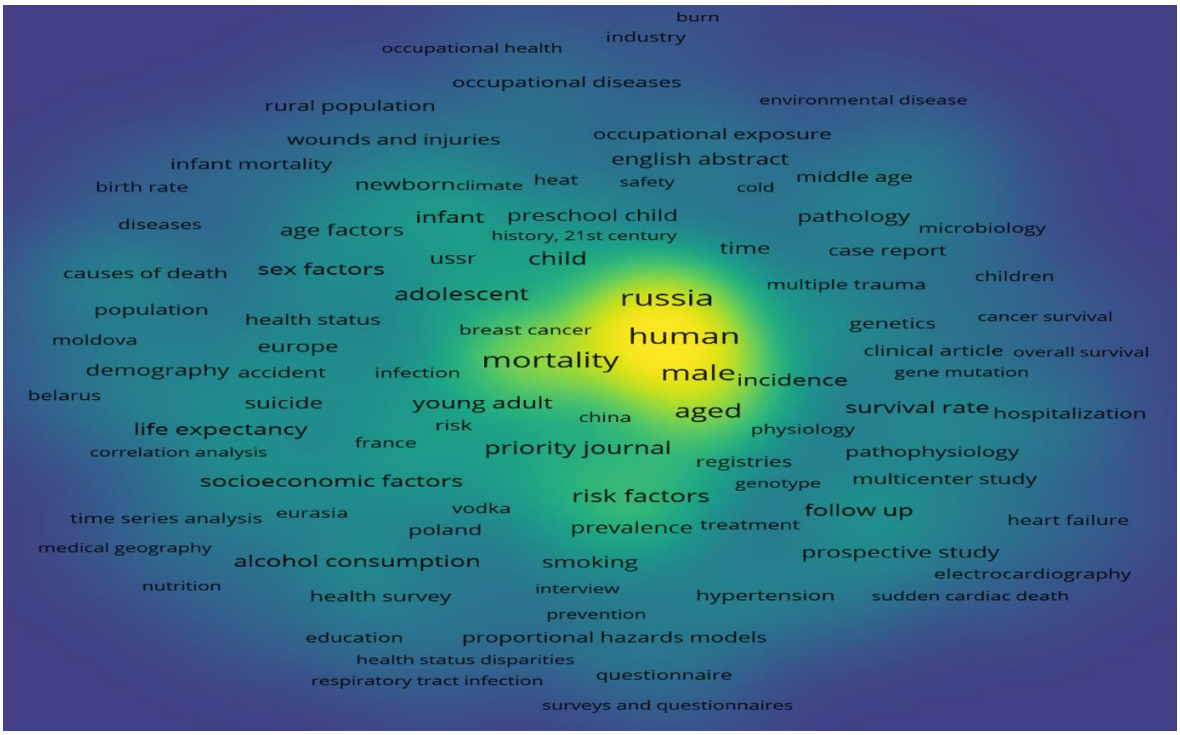


Figure 7. Density visualisation map of co-occurrence of all keywords
Source: Computed from Scopus, 2020

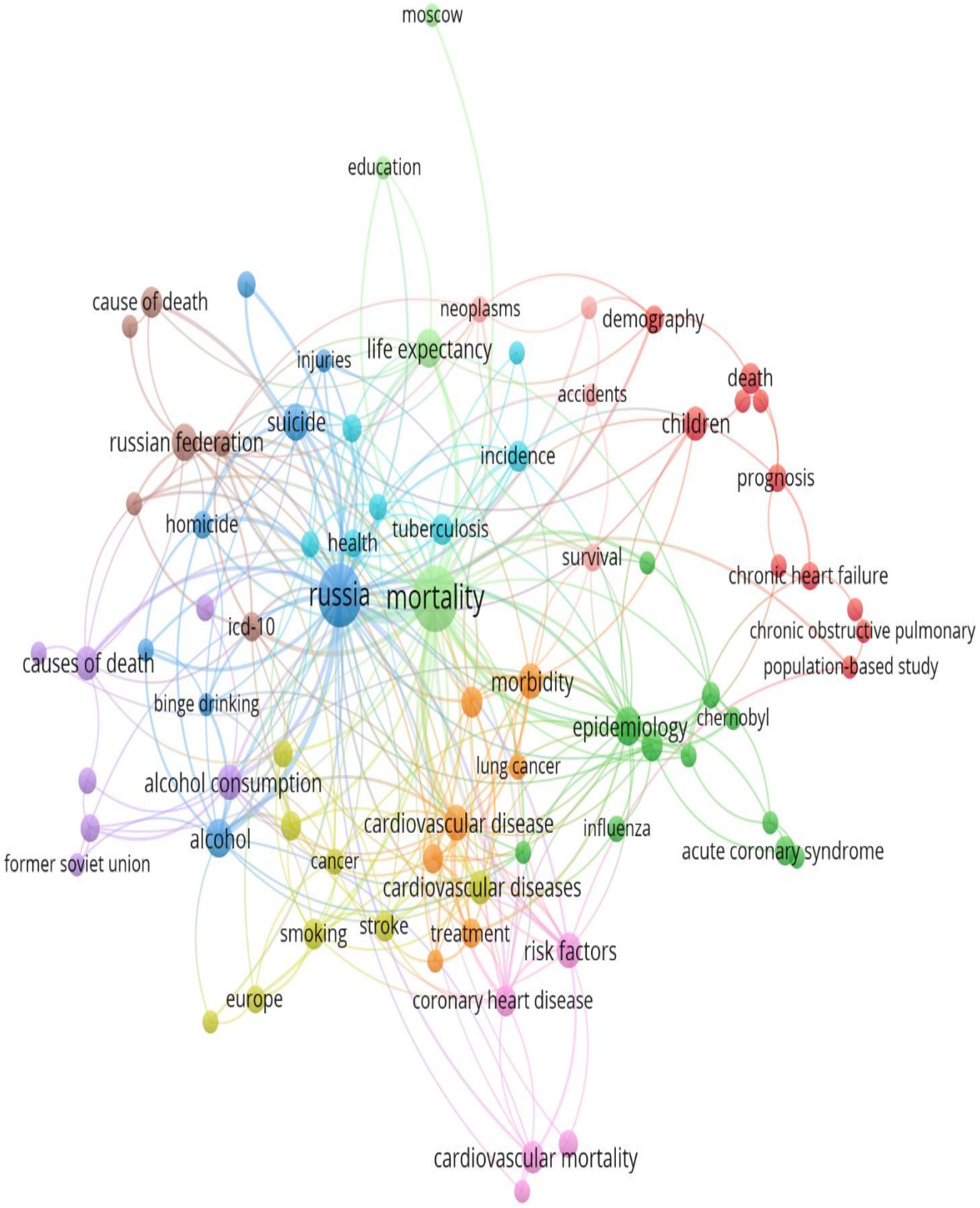


Figure 8. Network map of co-occurrence of authors' keywords
Source: Computed from Scopus, 2020

Tables

Table 1. Top 10 researchers publishing death from all causes

Rank[a]	Author	Articles	h-index (SCR[a])	Total Citations	Number of Publications	Publication Year
First	Shkolnikov VM	37	26 (1)	2392	22	1995
Second	Mckee M	24	18 (2)	6420	24	1997
Third	Andreev EM	24	15 (3)	621	13	2003
Fourth	Bobak M	15	11 (4)	584	15	1998
Fifth	Samorodskaya IV	15	4 (7)	51	15	2014
Sixth	Leon DA	12	9 (5)	1510	12	1997
Seventh	Boytsov SA	11	4 (7)	34	11	2014
Eighth	Deev AD	11	4 (7)	60	11	2004
Ninth	Tikhonova GI	10	2 (10)	19	10	1995
Tenth	Vallin J	10	8 (6)	205	10	1995

Source: Computed from Scopus, 2020

Note: [a]: represents authors with equal research output were given the same rank but gaps were left in the rankings.

SCR[a]: standard competition ranking (in parentheses).

Table 2. Top journals publishing death from all causes research

Rank[a]	Journal	Documents
First	Terapevticheskii Arkhiv (Therapeutic archive)	27
Second	Kardiologiya (Cardiology)	21
Third	Arkhiv Patologii (Archive of Pathology)	18
Fourth	Gigiena I Sanitariia (Hygiene and Sanitation)	18
Fifth	Sudebno-Meditsinskaia Ekspertiza (Forensic Medical Examination)	18
Sixth	Problemy Sotsial'noi Gigieny Zdravookhraneniia I Istorii Meditsiny (Social Health Hygiene Problems And Medical History)	12
Seventh	Meditsina Truda I Promyshlennaia Ekologiia (Labour Medicine And Industrial Ecology)	11
Eighth	Problemy Sotsialnoi Gigieny Zdravookhraneniia I Istorii Meditsiny / Nii Sotsialnoi Gigieny Konomiki I Upravleniia Zdravookhraneniem Im. N.A. Semashko Ramn Ao "Assotsiatsiia 'Meditsinskaia Literatura'." (Social Health Hygiene Problems And Medical History/ and Social Hygiene Economics And Health Management. in. Semashko Ramn JSC "Association of Medical Literature.")	11
Ninth	Problemy Tuberkuleza (Tuberculosis problems)	11
Tenth	Vestnik Rossiiskoi Akademii Meditsinskikh Nauk (Bulletin of the Russian Academy of Medical Sciences)	11
Eleventh	International Journal Of Epidemiology	10
Twelveth	Khirurgiia (Surgery)	10
Thirteenth	Klinicheskaia Meditsina (Clinical Medicine)	10

Fourteenth	Profilakticheskaya Meditsina (Preventive Medicine)	10
Fiveteenth	BMC Public Health	8
Sixteenth	The Lancet	8
Seventeenth	Voenno-Meditsinskii Zhurnal (Military Medical Journal)	7
Eighteenth	British Medical Journal	6
Nineteenth	European Journal Of Public Health	6
Twentieth	Journal Of Epidemiology And Community Health	6

Source: Computed from Scopus, 2020
Note: [a]: represents journals with equal research output were given the different ranks

Table 3. Top 10 cited articles (globally) on death from all causes research

Rank	Paper	Year	Journal	Title	Total Citations
First	Naghavi M [40]	2015	Lancet	Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: A systematic analysis for the Global Burden of Disease Study 2013	3800
Second	Lelieveld J [42]	2015	Nature	The contribution of outdoor air pollution sources to premature mortality on a global scale	1565
Third	GBD 2017 Causes Of Death Collaborators (GBDCDC) [5]	2018	Lancet	Global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries and territories, 1980–2017: a systematic analysis for the Global Burden of Disease Study 2017	614
Fourth	Leon DA [43]	1997	Lancet	Huge variation in Russian mortality rates 1984-94: Artefact, alcohol, or what?	594
Fifth	Bolla M [44]	2010	Lancet Oncology	External irradiation with or without long-term androgen suppression for prostate cancer with high metastatic risk: 10-year results of an EORTC randomised study	559

Sixth	Forouzanfar MH [45]	2017	Journal of the American Medical Association (JAMA)	Global burden of hypertension and systolic blood pressure of at least 110 to 115mmHg, 1990-2015	506
Seventh	Nichols M [46]	2014	European Heart Journal	Cardiovascular disease in Europe 2014: Epidemiological update	425
Eighth	Reitsma MB [47]	2017	Lancet	Smoking prevalence and attributable disease burden in 195 countries and territories, 1990-2015: a systematic analysis from the Global Burden of Disease Study 2015	407
Ninth	La Vecchia C, [48]	2009	Annals of Oncology	Cancer mortality in Europe, 2000-2004, and an overview of trends since 1975	297
Tenth	Mokdad AH (Ah et al., 2016)	2016	Lancet	Global burden of diseases, injuries, and risk factors for young people's health during 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013	294

Source: Computed from Scopus, 2020

Table 4. Top 10 cited articles (Locally) on deaths from all causes research

Rank[a]	Authors	Year	Journal	Title	Local Citations	Global Citations
First	Shkolnikov V M [35]	2001	Lancet	Changes in life expectancy in Russia in the mid-1990s	27	237
Second	Nemtsov AV (Nemtsov, 2002)	2002	Addiction	Alcohol-related human losses in Russia in the 1980s and 1990s	19	128

Third	Zaridze D [49]	2009	International Journal of Epidemiology	Alcohol poisoning is a main determinant of recent mortality trends in Russia: evidence from a detailed analysis of mortality statistics and autopsies	19	104
Fourth	Notzon FC [50]	1998	Journal of the American Medical Association (JAMA)	Causes of declining life expectancy in Russia	18	207
Fifth	Walberg P [51]	1998	British Medical Journal	Economic change, crime, and mortality crisis in Russia: regional analysis	15	255
Sixth	Malyutina S [36]	2002	Lancet	Relation between heavy and binge drinking and all-cause and cardiovascular mortality in Novosibirsk, Russia: a prospective cohort study	14	175
Seventh	Wasserrnan D[52]	1998	Acta Psychiatrica Scandinavica	Reliability of statistics on violent death and suicide in the former USSR, 1970–1990	11	107
Eighth	Shkolnikov VM [53]	1998	Social Science & Medicine	Educational level and adult mortality in Russia: an analysis of routine data 1979 to 1994.	11	151
Ninth	Gavrilova NS[54]	2000	Population Research and Policy Review	The response of violent mortality to	11	99

				economic crisis in Russia		
Tenth	Nemtsov AV [41]	2000	Drug and Alcohol Dependence	Estimates of total alcohol consumption in Russia, 1980–1994	11	96

Source: Computed from Scopus, 2020
Note: [a]: represents authors with equal research output were given the different ranks based on other metrics above
Cits: represents Citations

Table 5. Top 10 productive institutions publishing research on deaths from all causes

Rank	Institutions	Articles
First	Tehran University Of Medical Sciences	30
Second	London School Of Hygiene And Tropical Medicine	27
Third	University College London	27
Fourth	Max Planck Institute For Demographic Research	26
Fourth	National Research University Higher School Of Economics	26
Sixth	Northern State Medical University	17
Seventh	I.M. Sechenov First Moscow State Medical University	15
Eighth	University Of Washington	14
Ninth	University Of Toronto	13
Tenth	University Of Melbourne	11

Source: Computed from Scopus, 2020

Table 6. Top 10 Productive Countries Publishing Research on Causes of Death in Russia

Rank[a]	Country	Articles	Freq	SCP	MCP	MCP Ratio	T.Cit	Av Art. Cit
First	USA	51	0.21888	33	18	0.353	5945	116.57
Second	UK	34	0.14592	18	16	0.471	2470	72.65
Third	Germany	26	0.11159	13	13	0.500	731	28.12
Fourth	Russia	26	0.11159	6	20	0.769	33	1.27
Fourth	France	14	0.06009	8	6	0.429	957	68.36
Sixth	Sweden	13	0.05579	8	5	0.385	643	49.46
Seventh	Belarus	8	0.03433	8	0	0.000	58	7.25
Eighth	Norway	7	0.03004	5	2	0.286	210	30.00

Ninth	Canada	6	0.02575	1	5	0.833	284	47.33
Tenth	China	4	0.01717	1	3	0.750	16	4.00

Source: Computed from Scopus, 2020
Note: SCP: Single Country Publication
MCP: Multiple Country Publication
Freq: Frequency
T.Cit: Total Citations
Av. Art. Cit: Average Article Citations
Rank[a]: represents authors given the ranked by their number of documents, SCP and MCPs

Table 7. The Most 20 Probable Words in the Topics of LDA with 20 Topics

Topic	Content	Terms
1	Circulatory diseases, population at risk, risk factors, countries	cvd men women chd cardiovascular smoking risk cholesterol ihd usa coronary disease stroke heart factors aged rf psychosocial trigers cdv
2	Periodic estimations, medications, alcohol and magnetics	months activity median rate higher phenazepam mets anastrozole 0.0001 femara correlated monthly sa gma cra solar geomagnetic cosmic alcohol duration
3	External causes of death, effects of alcohol consumption, mitigating alcohol consumption	alcohol consumption suicide drinking alcohol-related trends male violent poisoning homicide anti-alcohol patterns evidence series fluctuations period aboriginal 1994 belarus people
4	Non-Communicable diseases, medications, diagnostics, anatomy	cancer hepatic cardiac cirrhosis mutation alcohol incidence cases lsd alcoholic forensic lung waves breast ap blood aps virus deletion cells
5	Economy, disease, environment,	pp london 1976 economic press patients rubles dm university embryos 1975 care diabetes buffalo asa federal air gdp pollution tnf

	institutional involvement	
6	Study	expectancy life population health trends rates regions decline indicators years gap statistics 1990 age women state republics demographic economic working
7	Population of interest, risk factors, economic status, estimations	population spring region tuberculosis losses smokers smoking water stop children weather river conditions climatic lake economic sacred characteristics tobacco ypll
8	Health and Body	cell tuberculosis body molecular activity protein resistance cart progression children stress cancer neonatal early embryonic immune copd glutathione brics oxidative
9	Clinical and laboratory examinations, medicine and treatment apparatus	patients coronary myocardial sanguinarine group complications liposomal renal months infarction survival acute therapy stent artery revascularization higher surgery acs outcomes
10	Maternal and infant health	maternal infant birth demographic perinatal pregnancy bd system abortion women 1000 sepsis road care malformations rural physical neonatal traffic child
11	External causes of death, population at risk, causative agents, estimates	coding renal undetermined evil intent resistance suicides superfluous population murder homicides quality man rt regions incidence rates ohca fungi external
12	Circulatory diseases, population of interest, methods	females males cardiovascular immigrants heart among model population standardized age higher groups standard cancer suicide diseases cervical risk ischemic fertility

13	Children and adolescent health and diseases	influenza temperature weather daily mi ml adolescents values cerebrovascular heat viruses admission children tlc rate cold respiratory disability epidemic diseases
14	Global burden of diseases and methodology	ui global dalys burden countries sbp 2017 gbd rheumatic lost estimated across aids estimates ihd million rd age-standardised injury diseases
15	Soviet Union, population of interest,	education men soviet military educational union sp mogilev cholera inequalities heavy 1980 belarus status rates social socio-economic health trees sep
16	Population of interest, alcohol consumption and study area	hr alcohol drinking cohort men consumption cvd all-cause risk binge smoking eastern intake prospective associations vodka adjusted drinkers populations smokers
17	Infectious and parasitic diseases transmission	tuberculosis virus hiv infection fever swine dwv viral viruses african epidemic symptoms transmission products medical pork cases pulmonary diagnostic hepatitis
18	Health challenges of nuclear radiation workers	cancer radiation workers cohort exposed dose cosmonauts plutonium internal external smr exposure river nuclear mayak prostate estimates techa gy doses
19	Clinical and laboratory studies	patients complications surgical pp smrs tuberculosis operations lethality surgery hospital coefficient gini postoperative bleeding biafra treatment counts csds nsclc cases
20	Alcohol and other drug (AOD) abuse and medication	sd alcohol students tb schools children type sudden acm mt aod selfie-related risk bb shs immigrant tobacco trauma ivabradine uruguay