BIBLIOMETRIC ANALYSIS OF RESEARCH OF THE BEHAVIORAL AND SOCIAL DIMENSION OF THE PUBLIC HEALTH SYSTEM OF THE WORLD

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Abstract: The paper emphasizes the importance of human health as the most valuable, most important resource at the individual and national level, affecting the country's socio-economic development and competitiveness. It states that it is necessary for the actors ensuring the public health system to form a new concept for the functioning of the health system, taking into account the current state of public health, the functioning of medical institutions, and the resource support of the healthcare industry. The primary purpose is to conduct a bibliometric analysis of scientific publications dealing with the global behavioral and social dimension of the public health system. The systematization of literary achievements and approaches to solving this problem has been carried out, which indicates the need for proper attention and high-quality, conceptual, international research by world scientists on issues related to the state and level of public health, satisfaction with the healthcare system. The relevance of the analysis of research on the behavioral and social dimension of the public health system of the world implies that the further development of the healthcare industry necessitates research, intensive development, and dissemination of available scientific and methodological international experience in solving this issue of the public health system in different countries worldwide. The research consisted of four stages. A map of the interrelationships of key concepts with other scientific categories has been constructed; a content-contextual study of the constructed blocks of bibliometric analysis has been implemented; an inter-cluster analysis has been carried out. A map of the interrelationships of the key concepts under study with other scientific categories has been constructed, reflecting the dynamics in the form of a contextual-time block; the evolutionary-time prospects of the study have been determined. A geographically extensive map of the scientific bibliography of the categories under study has been constructed; the spatial component of the study has been analyzed. A territorially branched map of the spatio-temporal dimension of the category under the study in dynamics has been constructed. The methodological tools of the research are theoretical (grouping, abstraction, synthesis) and empirical methods (observation, description), research methods, services of the Scopus information platform, and VOSViewers tools.1.6.15. The study was conducted based on the publications indexed by the Scopus database for 2000-2020. The objects of research were the following scientific categories: "health care system, medical services, behavioral aspect, social aspect," the countries United States, Germany, Norway, Greece, United Kingdom, Australia, Canada, India, Netherlands, China, Brazil, Switzerland, Denmark, Belgium, Iran, Japan, Italy, Spain, because these two groups of objects allowed to conduct two-directional analysis of the problem under study. The results of the bibliometric analysis presented in the paper showed that the aspect of the behavioral and social dimension of the public health system was relatively young and insufficiently developed; the attention of the scientific community for a long time on this issue was mainly concentrated in the United States and the United Kingdom. China, Iran, and Japan were less involved in this process at an earlier time interval, but this research became relevant for them in recent years. The study results can be used to identify the most potential priority areas for forming the policy and strategy of the state health system, based on determining the main significant, modern, relevant characteristics of the healthcare industry.

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Introduction

One of the most valuable and essential resources of both individual and national socio-economic levels is human health, the improvement of which contributes to the prosperity of the country, improving its well-being, and increasing its competitiveness on the world stage. The state of public health, the functioning of medical institutions, and the resource support of the healthcare industry in recent years have forced the actors ensuring the public health system to update the search and formation of a new concept for the functioning of the healthcare system.

Moreover, such a health care system should provide for the organization of theoretical and analytical justification, sufficiency and adequacy of regulatory support for health care, the development of the health care system, effective interaction of all subjects and objects of such a system, effective technologies for ensuring public health, the latest technologies for treating patients, the introduction and organization of medical care, training and activities of medical personnel, sufficient economic support, proper material, and technical equipment. These topical issues related to the state and level of health of the population and satisfaction with the health care system require proper attention and high-quality, conceptual, international research by scientists worldwide who reflect the scientific and theoretical, methodological, and practical results of their work in numerous papers published in journals indexed in the international scientific databases Scopus and Web of Science.

Literature Review

Analyzing the scientific research of the world scientific community on the issues of the health care system, we note that in recent years, scientists have studied the following aspects: Hajebi A., Sharifi V., Abbasinejad M., Asadi A., Jafari N., Ziadlou T., Damari B. (Hajebi et al., 2021) suggest integrating mental health services into the primary health care system on the example of Iran; Carminati L. (Carminati, 2020) describe behavioral economics and human decision making: instances from the health care system; Cosci F., & Guidi J. (Cosci et al., 2021) define the role of illness behavior in the COVID-19 pandemic; and others. The works of healthcare scientists of the last decade dealt with solving the following issues: features of implementation and functioning of eHealth platform is the official federal network in Belgium, a new "secure" federal network: Role of patients, health professions and social security services - France F. R. (France, 2011); the implications of the increasing role of informal as well as formal markets in the health systems of many low and middle-income countries - Bloom G., Standing H., & Lloyd R. (Bloom et al., 2008).

Concerning medical services, modern scientists have covered the following features of the medical industry: Shiferaw K. B., Mengiste S. A., Gullslett M. K., Zeleke A. A., Tilahun B., Tebeje T., Mehari E. A. (Shiferaw et al., 2021) suggests healthcare providers' acceptance of telemedicine and preference of modalities during COVID-19 pandemics in a low-resource setting: an extended UTAUT model; Arena C., Morshedzadeh E., Robertson J. L., Muelenaer A. A., Hendershot B. D., O'Leary J. L., VandeVord P. J. (Arena et al., 2020) describe the features of biomedical engineering; Liu G., Xue Y., Qian Z., Yang L., Yang Y., Geng Q., & Wang X. (Liu et al., 2019) reveal healthcare-seeking behavior among pregnant women in the Chinese hierarchical medical system in the form of a cross-sectional study. Scientists of previous decades have investigated slightly different issues: planning emergency medical services for children in Bolivia concerning the results of a rapid assessment procedure - Goepp

J. G., Chin N. P., Malia T., & Poordabbagh A. (Goepp et al., 2004); on acceptance of a web-based medical record system - Ma, Q., & Liu, L.. (Ma et al., 2002).

Considerable attention in the modern study of healthcare is paid to the behavioral and social aspect of this area. Thus, Kelly J. D., Bravata D. M., Bent S., Wray C. M., Leonard S. J., Boscardin W. J., Keyhani S. (Kelly et al., 2021) reveal the association of social and behavioral risk factors with mortality in the US with COVID-19; behavioral, social, economic and legal dimension of the public health system of Ukraine describe Lyeonov, S. V., Kuzmenko, O., Koibichuk, V. V., Rubanov, P. M., & Smiianov, V. A. (Lyeonov et al., 2021); Heppell P. J., & Rao S. (Heppell et al., 2018) analyze social services and behavioral emergencies and perform trauma-informed evaluation, diagnosis, and disposition. Moreover, the research of previous decades focused on the study of such issues: drivers of health care costs: technology vs. social, legal, and behavioral factors - Thrall J. H. (Thrall, 2009); research in the behavioral and social sciences to improve cancer control and care: a strategy for development - Evered D. (Evered, 2004).

Herewith, the behavioral aspect is described separately in the works of such scientists as Wright B., Broffman L., McMenamin K. A., Jones K., Weller M., Brown K., Kenton N. R. (Wright et al., 2020) describe behavioral health integration and outcomes that matter to patients concerning a longitudinal mixed-methods observational study; Boat T. F., & Kelleher K. J. (Boat et al., 2020) emphasize fostering healthy mental, emotional, and behavioral development in child health care; Bowen D. J., Bao Y., Sirey,J. A., & Ratzlif A. D. H. (Bowen et al., 2020) identify the need for integrated behavioral health treatments and suggest innovations to achieve population impact. It is also worth noting aspects studied at the early stages of scientific research: surveillance of health indicators in behavioral risk factor surveillance system - Xaverius P. K., & Salas J. (Xaverius et al., 2013); integration of behavioral and physical health care for a medicaid population through a public-public partnership - Grazier K. L., Hegedus A. M., Carli T., Neal D., & Reynolds K. (Grazier et al., 2003).

The research on the social aspect of the healthcare industry occupies in recent years a special place in the work of the following scientists: Bryant L., Garnham B., Tedmanson D., & Diamandi S. (Bryant et al., 2020) reveal the features of social work and tele-mental health services for rural and remote communities; Calloway E. E., Parks C. A., Bowen D. J., & Yaroch A. L. (Calloway et al., 2019) cover environmental, social, and economic factors related to the intersection of food security, dietary quality, and obesity; Bhate K., Gangal P., Shanbhag S., Solanki M., Sable P., Shinde S. R., Kimbahune S. M. (Bhate et al., 2019) offer the use of a mobile-based application for mothers - ShishuPoshan application: ICT to solve issues of high social importance by scaled behavior change; and others. Earlier studies of the scientific world in this area concerned the following issues: the study of psychological, social and biological determinants of ill health within population groups that differed in socioeconomic status and in their propensity to develop chronic disease - Velupillai Y. N., Packard C. J., Batty G. D., Bezlyak V., Burns H., Cavanagh J., Tannahill C. (Velupillai et al., 2008); interpretation of social inequality in patients' physical and psychological state and participation in rehabilitation in Germany - Altenhoener T., Leppin A., Grande G., & Romppel M. (Altenhoener et al., 2005).

Analysis of research of the behavioral and social dimension of the public health system of the world indicates the scientific achievements of scientists from different countries in specific issues of the chosen area. Therefore, the international experience in solving this issue in the public health system is an essential trigger for future global research in this area.

Methodology and research methods

The methodological tools of the research are theoretical (grouping, abstraction, synthesis) and empirical methods (observation, description) research methods, services of the Scopus information platform and VOSViewerv tools.1.6.15.

Results

Globalization and internationalization of relations in the world over the past decade have made it possible to reduce the distance in exchanging scientific and practical experiences between different countries worldwide. Thus, if medical innovations are introduced in the central division of an international, global organization, it leads

to the indispensable spread of such changes in accountable branches. This causes the activation of both positive and negative phenomena and processes in the sector under study. Therefore, to ensure positive dynamics, it is necessary to intensively develop scientific and methodological developments in the chosen area in parallel with introducing the latest practical tools and mechanisms. Moreover, scientific and practical developments must necessarily have accessible international distribution since modern scientific development is impossible in the conditions of isolation of individual countries. The basis for implementing the international development of scientific thought can be the international scientific database Scopus chosen for analysis, allowing for bibliometric data analysis of scientific publications. Thus, using the Scopus databases, it is possible to identify and analyze the characteristic features of research on the behavioral and social dimensions of the public health system.

The results of the study were obtained using the VOSViewerv toolkit.1.6.15.

The first stage of bibliometric analysis of significant scientific papers for 2000-2020 was to build a map of the relationships of key concepts "health care system, medical services, behavioral aspect, social aspect" with other related scientific categories. Thus, out of 901 categories (most related to the concepts under study) selected by the system, ten main clusters of interrelated scientific categories were identified, the grouping of which is depicted in Figure 1 using different colors: blue (109 items), purple (86 items), blue (86 items), green (119 items), red (157 items), brown (71 items), yellow (105 items), orange (79 items), pink (60 items), and light pink (29 items).

The larger size of the rectangle means a higher frequency of mention in research of such a scientific category, which is placed in it as a key concept associated with the studied categories "health care system, medical services, behavioral aspect, social aspect". Thus, the largest sizes of rectangles describing the highest level of influence of certain phenomena in the study of issues "health care system, medical services, behavioral aspect, social aspect", mean that the fundamental categories in the context of the socially oriented policy of state development of countries worldwide are the following categories (according to the data shown in Figure 1): "human", "health care", "behavioral research", "health care quality", etc.
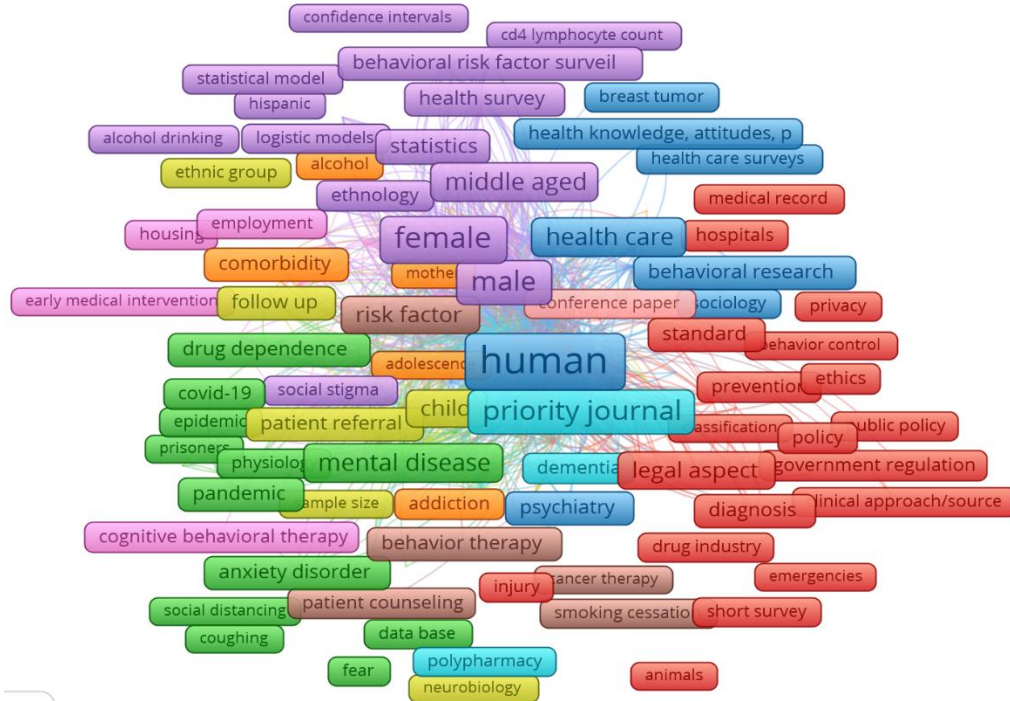

Figure 1. Scientific bibliography of the categories "health care system, medical services, behavioral aspect, social aspect" for 2000-2020 using software tools

Sources: developed/compiled/systematized by the authors based on the Scopus database using the VOSViewerv software toolkit.1.6.15 (Dotsenko, 2022).

Turning to a detailed content-contextual study of the constructed blocks of bibliometric analysis, we emphasize that the main scope of scientific publications is focused on the following areas: research of relationships between generalized categories of the health system – "health care", "health care quality", "health knowledge" (blue cluster), structural-social and behavioral aspect – "behavioral risk factor survey", "male and female dividing", "ethnology", "health insurance" (purple cluster), economic areas – "health care cost", "diffusion of innovation", "medical technology" (blue cluster), study of diseases "mental disease", "pandemic", "covid-19", "epidemic", "drug dependence", "anxiety disorder", "fear" (green cluster), regulatory character – "legal aspect", "medical record", "privacy", "standard", "ethics", "policy", "government regulation" (red cluster), situational features – "patient counseling", "behavior therapy", "clinical trial" (Brown cluster), mental area – "patient referral", "behavior disorder", "mental health service", "neurobiology" (yellow cluster), "comorbidity" (orange cluster), training, research – "cohort analysis", "controlled study", "medical clinical study", "major clinical study", "outcome assessment" (pink cluster), commercial impact – "conference paper", "commerce", "marketing" (light pink cluster).

Conducting an inter-cluster analysis, we note the existence of intersections between certain groups of categories: effective organization of the health system, improvement of the health care quality, development of knowledge in this area improve the trust of the population in the health system and increase population satisfaction with the medical services provided. Feasible economic policy and state financial regulation, financing of innovative projects, and medical technologies contribute to the financially affordable cost of medical services and medical care, but without losing the quality of such services. Research and forecasting current and dangerous diseases, pandemics, epidemics, common chronic, socially dangerous, and mental illnesses is an effective basis for understanding and organizing effective counteraction to the onset of complex irreversible consequences that threaten the population's life. The legal aspect, regulatory framework, and standardization of medical processes contribute to the proper protection of the methodological process of the healthcare system. Continuous controlled research, clinical trials, analysis, and evaluation of various areas and indicators of the health system, including behavioral study of patients, qualitative identification of patient needs and counseling, and systematic patient surveys, serve as a reliable database, as well as a reliable basis for further effective organizational, regulatory and executive policies in the medical field. Health insurance is an essential tool for protecting the population from unpredictable diseases. In turn, the commercial aspect of the medical sector creates conditions for healthy competition and avoiding the emergence of a monopoly among medical service providers in the market.

At the second stage of bibliometric analysis, to determine the study's evolutionary-time perspective, a map of the relationships of the key concepts under study with other scientific categories for 2000-2020 was constructed, reflecting the dynamics in the form of a contextual-time block. Thus, the main content determinants of the study of the behavioral and social dimension of the public health system of the world were identified at different time intervals. For example, Figure 2 shows the grouping of scientific categories using different shades of color, from purple, found in earlier publications, to yellow, which reflects modern publications.

Thus, the results of contextual and temporal analysis of scientific research in papers from the Scopus database of the categories "health care system, medical services, behavioral aspect, social aspect" in dynamics for 2000-2020 can be reflected in four stages of changing research areas. In 2000-2006, the attention of scientists was focused on determining the legal aspects of the healthcare system, on state regulation and state policy of the medical industry, structuring the system, forming the economic aspect, geographical distribution of medical services, and forming attitudes to the state of public health. Since at earlier stages of the functioning of the medical system, it was necessary to clearly understand what should be included in the scope of responsibility of the health system. Approximately in 2007-2012, the research vector gradually shifted to the human aspect of the system under study, to ensuring mental health, reviewing health care costs, improving medical education, ensuring proper organization and management in the medical field, and statistical updating of the system. At the turn of 2013-2017, researchers' interest shifted to building and analyzing logistics models for the functioning of the healthcare system, expanding the database, analyzing the costs and benefits of the system, understanding risk factors, as well as receiving feedback from treatment results, high-quality patient counseling. However, the peculiarity of this time lag is that the researchers' attention was focused on the digitalization of data, the use of cloud technologies, as such innovative tools that made it possible to significantly expand the capabilities of users of the medical system. In

2018-2020, the industry's most relevant scientific, social and behavioral aspects, training systems, social research, statistical modeling, and process algorithmization, as the most modern and innovative methods for optimizing the processes under study, are beginning to occupy a central place in research. Important topics of this period are research on pandemics, epidemics, covid-19, risks of infection, mental and anxiety disorders, as a result of which a particular place is given to social distancing and the development of mobile applications. Within this time, the issue of studying patients' attitudes to the healthcare system is emerging to further reform and improve the medical industry depending on the urgent, rapidly changing needs of the population.

Figure 2. Visualization map of contextual and temporal measurement of scientific research in papers from the Scopus database of categories "health care system, medical services, behavioral aspect, social aspect" in dynamics for 2000-2020 using the VOSViewerv software toolkit. 1.6.15

Sources: developed/compiled/systematized by the authors based on the Scopus database using the VOSViewerv software toolkit.1.6.15 (Dotsenko, 2022).

A logical continuation of the contextual-temporal analysis of the categories "health care system, medical services, behavioral aspect, social aspect" is the third stage of bibliometric analysis of the study of the behavioral and social dimension of the public health system of the world. It involves analyzing the spatial component of the study. At this stage, a geographically extensive map of the scientific bibliography of the categories under study was constructed (Figure 3).

Thus, the system selected 18 countries most actively engaged in studying selected interrelated scientific categories. Four main clusters of countries are identified, which can be reasonably identified as the four main world centers of the issue under study. The grouping of countries and relationships between them is shown in Figure 3 using different colors: green (United States, Germany, Norway, Greece), blue (United Kingdom, Australia, Canada), Red (India, Netherlands, China, Brazil, Switzerland, Denmark, Belgium, Iran, Japan), yellow (Italy, Spain).

The leading country in studying the behavioral and social dimension of the public health system is the United States. The group also includes significant countries in this matter: Germany and Norway. A less significant state in the issue under study is the United Kingdom, with Australia and Canada being in this group of countries. Other significant groups of countries, but less involved in the research process of the problem under consideration, are India, Netherlands, China, Brazil, Switzerland, Denmark, Belgium, Iran, Japan, Italy, and Spain.
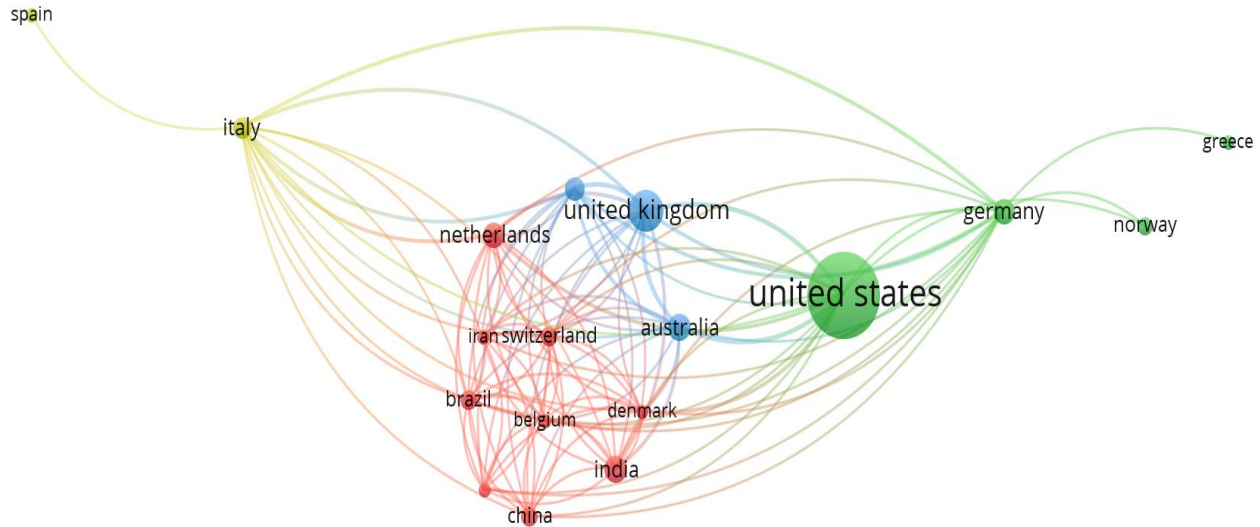
Figure 3. A geographically extensive map of the scientific bibliography of the categories "health care system, medical services, behavioral aspect, social aspect" for 2012-2020 using the VOSViewerv software toolkit. 1.6.15

Sources: developed/compiled/systematized by the authors based on the Scopus database using the VOSViewerv software toolkit.1.6.15 (Dotsenko, 2022).

However, the distribution of countries by cluster does not mean that countries are separated in their research within the established groups. Different states, in turn, actively intertwine with other countries in scientific research within the framework of specific issues. Thus, the influential countries within the framework of the study United States, United Kingdom, Germany, Australia, Canada, India, Netherlands, China, Brazil, and Italy are widely connected with almost all other countries included in the sample; in contrast, less influential countries are quite close in the issues under study – Greece, Spain.

The evolutionary-time extension of the third research stage is the fourth stage of bibliometric analysis. A visualization of an extensive geographic map of spatial and temporal measurement of studies of the categories "health care system, medical services, behavioral aspect, social aspect" was constructed in dynamics for 2012-2020. Within this stage, the evolution of the studied categories in the spatial aspect was determined. Based on the data shown in Figure 4, depending on the change in color saturation from purple (countries with earlier publications) to yellow (countries with recent publications).

According to Figure 4, there are three stages of changing the priorities of the states in studying the topic under consideration. In particular, in 2012-2015, scientists actively studied the area of the behavioral and social dimension of the public health system in countries such as the United States, the United Kingdom, India, Brazil, Canada, Denmark, Spain, Germany, and Greece. In 2016-2018, they were joined by scientists from Switzerland and Belgium, and a little later by scientists from Netherlands, Norway, Italy, and Australia. The last countries to join the study of these scientific categories in 2019-2020 were China, Iran, and Japan, which have the highest relevance to the problem in this period.

This section presents the basic material of the research with the full justification of the obtained scientific results. The submitted material must be logically linked, clearly stated, and have the appropriate structure (if necessary, each part may have a name). During the presentation of the material, the scientific style should be followed.
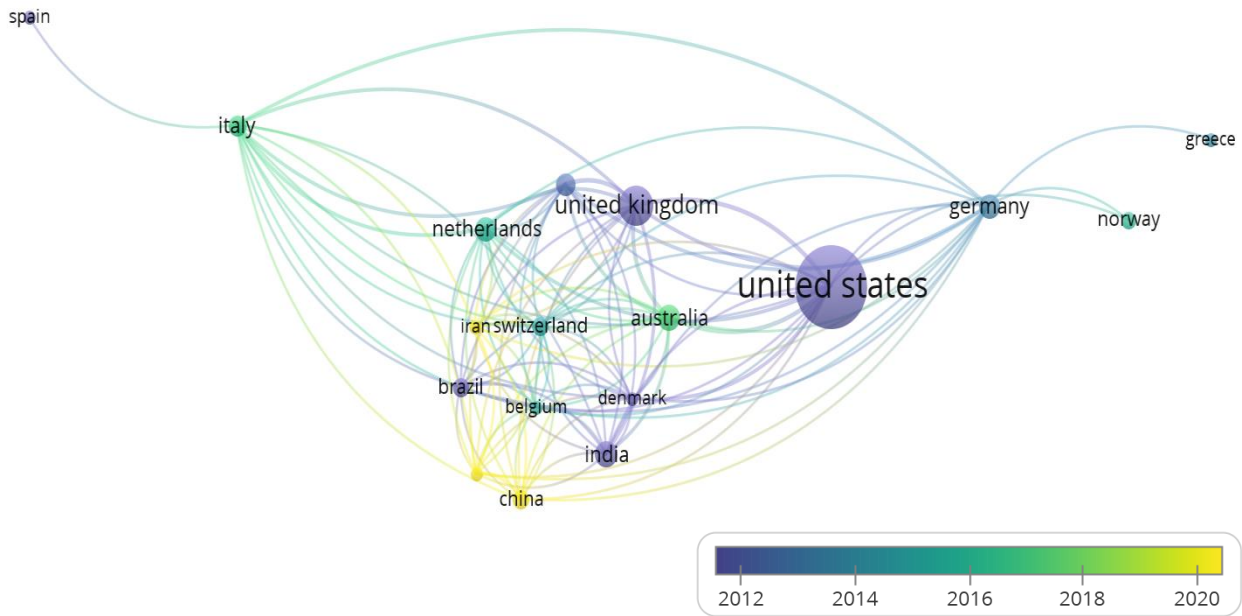
Figure 4. Visualization of an extensive geographic map of the spatiotemporal dimension of research on the behavioral and social dimension of the public health system for 2012-2020 using the VOSViewerv software toolkit. 1.6.15 in papers from the Scopus database

Sources: developed/compiled/systematized by the authors based on the Scopus database using the VOSViewerv software toolkit.1.6.15 (Dotsenko, 2022).

Conclusions. Thus, given the growing prevalence of diseases in the world and the increasing need for medical care for the population, the issue of in-depth research in the healthcare industry is relevant. Moreover, it is fair to note that within the framework of this area, it is essential to analyze such components of this process as the health care system, medical services, behavioral aspect, and social aspect.

Summing up the results of the study, we note that this scientific paper allowed formalizing theoretical achievements in the area of the behavioral and social dimension of the public health system in terms of content-contextual, evolutionary-dynamic, spatial, territorial-time analysis. It has been determined that the processes of the public health system have been studied for an extended period. Still, the aspect of the behavioral and social dimension of the public health system is relatively new and understudied. Thus, it requires further thorough, effective, and professional consideration. Moreover, the attention of the scientific community for a long time was focused on this issue in countries of high socio-economic development: the United States and the United Kingdom. China, Iran, and Japan were less involved in this process at an earlier time period, but this issue became relevant for them in recent years.

The study results can serve as an information basis for identifying priority areas of policy formation and strategy for the state health system, based on determining the main significant, modern, priority characteristics of the healthcare industry. Further scientific research and development will be aimed at concretizing theoretical developments, i.e. methodological aspects of the behavioral and social dimension of the public health system of the world.

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