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Is there the gap in public health literature in Europe?

Dorota Cianciara[1,2], Maria Piotrowicz[1], Małgorzata Gajewska[1], Ewa Urban[1], Anna Poznańska[3], Barbara Niedźwiedzka[4], Michał Witkowski[4], Mirosław J. Jarosz[5,6]

[1] *Department of Health Promotion and Postgraduate Education, National Institute of Public Health – National Institute of Hygiene, Warsaw, Poland*
[2] *Departament of Epidemiology and Health Promotion, Medical Centre of Postgraduate Education, Warsaw, Poland*
[3] *Department – Centre for Monitoring and Analyses of Population Health, National Institute of Public Health – National Institute of Hygiene, Warsaw, Poland*
[4] *Department of Information Science, Institute of Public Health, Jagiellonian University Medical College, Kraków, Poland*
[5] *Department of Informatics and Health Statistics, Institute of Rural Health, Lublin, Poland*
[6] *Faculty of Pedagogy and Psychology, University of Economics and Innovation, Lublin, Poland*

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Abstract

Introduction and objective: The growing expectations for the effectiveness of public health increase the demand for scientific literature, concerning research, reviews and other forms of information. The bibliographic databases are of crucial importance for researchers and policy makers. The objective of this study is to estimate the supply of scientific literature related to public health in selected European countries, which are available to a wide range of users.

Materials and methods: Analysis of the number of bibliographic records on topics related to public health was based on searches in Ovid MEDLINE (R) in May and June 2011. According to MeSH terms, 11 keywords and names of 13 European countries were used in the search. Publications from the years 2001–2010 were analyzed. A number of publications indexed under 'public health', and related to selected countries were compared with the size of the population of those countries, GDP, total expenditure on health and burden of disease (DALYS's).

Results: The most popular topic was 'health policy', whereas the topics 'occupational health' and 'environmental health' were less prevalent. There were no significant changes in the number of publications in 2001–2010. The number of articles indexed under 'public health' had significant positive correlation with national GDP, expenditure on health and population size, and negative with DALY's.

Conclusions: According to the criteria accepted in this study, the Nordic countries – Finland, Sweden and Norway – were very productive in this respect. Poland and other Central European Countries were less productive.

Key words

public health, publications, MEDLINE, Europe, health policy

INTRODUCTION

Growing expectations of the effectiveness of public health and attempts to increase its capacity can be seen globally. This trend is also observed in the European Region of the World Health Organization (WHO) [1, 2]. This draws attention to the need to develop a national health policy, as well as plans that result from a robust analysis of the situation [3, 4]. This action is largely conditioned by the use of evidence from scientific studies and information from subject literature. Striving to use sound data and analysis results increases the demand for research and scientific literature [5, 6].

In this context, the supply of European publications on public health becomes important, especially those which are relatively easily accessible to researchers, analysts and policy makers, such as bibliographic databases. The availability of publications, the simplicity of their recovery, in other words their 'visibility' for researchers and practitioners, largely determines health policy and decision making [7].

Address for correspondence: Małgorzata Gajewska, Department of Health Promotion and Postgraduate Education, National Institute of Public Health – National Institute of Hygiene, Chocimska 24, 00-791 Warsaw, Poland
e-mail: mgajewska@pzh.gov.pl

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Quantitative evaluation of the literature of a given field, including that of public health, can be achieved through bibliometric methods. Bibliometric studies show primarily quantitative relationships in the scientific literature in the field, rather than the absolute value of science and innovation of publications. Bibliometrics is used not only in assessing the writing activity of individual researchers or institutions, it is also used in scientometrics, which mirrors the trends in the development of the field, its thematic scope, internal differentiation and growth. However, the picture obtained by such refined methods may be different from the depiction perceived by a wide audience.

Public health, understood as interpreted by C. E. A. Winslow, is a area of multi- and interdisciplinary character. Therefore, making a full bibliometric measurement of this field would require tracking multiple disciplines, which is not easy. The choice of a database to be analyzed is also important, and depending on its thematic scope, geographical coverage, and how many journals are indexed in it, the results may vary. Another difficulty is the variety of terminologies used to index publications in databases, and their own specific classifications and hierarchies of topics. With all these limitations, when the detailed criteria and search terms are given, it is possible to show the number of articles exposed

to a wide range of users and certain proportions, trends or changes in the professional literature on public health. Examples of such analyses in the field of public health are the works of Clarke et al. [8], Soteriades et al. [9], Przyłuska [10], McCarthy [11], Kållestål and Swanberg [12], and Gulis et al. [13].

The aim of the presented study is to estimate the literature supply (available to a wide range of users) related to public health in selected European countries. It was expressed in terms of publishing activity and productivity of chosen countries. The study was based on analysis of the MEDLINE database, the largest database of literature in medicine and related sciences, created by the National Library of Medicine (NLM) in the USA. Personal communication with Polish public health professionals indicate that it is one of the most popular databases. Publications indexed in MEDLINE amount to about 5,500 journals that meet the quality criteria established by the NLM [14]. Documenting a publication in MEDLINE makes it accessible to international forums and allows it to be seen and shared by a wide audience.

MATERIAL AND METHODS

Analysis of bibliographic records on specific topics related to public health was based on the results of searches in MEDLINE – Ovid in May and June 2011 accessible by the Central Medical Library in Warsaw. MeSH terms were used in the search process. The search strategy assumed that:

a. Public health, according to the MeSH dictionary, is defined as the 'branch of medicine concerned with the prevention and control of disease and disability, and the promotion of physical and mental health of the population on the international, national, State, or municipal level'.
b. Public health is understood in terms of strategies and methods (horizontal approach, e.g. health policy), but also as specific areas of action (vertical approach, e.g. environmental health). Searches included topics chosen from a list of services (functions) of public health identified by the WHO Regional Office for Europe, and consistent with the MeSH terminology [15].
c. Searching for references does not serve the purposes of scientometrics in the presented study. It serves the analysis of easily 'visible' bibliographic resources, and is based on simple searches, commonly used by non-specialist (not specially trained in searching) users in collecting material for their studies, papers or work.
d. The analysis encompassed all types of articles published in scientific journals, not only research articles. This approach allows the observation of the incidence of public health issues in a broader discourse and science communication.
e. The analysis covers a period of 10 years, to observe the dynamics of change.
f. The analysis applies to a number of randomly chosen (through direct method) 13 out of 35 European countries (37.1%), with a population of at least two-million.

These led to three selection criteria.

Thematic keywords. Based on the accepted definition and list of public health functions, 11 MeSH terms related to public health were arbitrarily selected. These were: master heading – 'public health'; headings describing strategies and methods (horizontal approach) – 'health education', 'health planning', 'health policy', 'health promotion', 'health services', 'primary prevention', 'public policy', the headings corresponding to the selected areas of work (vertical approach) – 'environmental health', 'occupational health' and 'preventive medicine'. The search was carried out to find publications whose main issue corresponded to the listed headings. In consistence with this criterion, articles on a minimum of one of the topics expressed in the headings were retrieved. When interpreting the results it should be remembered that the same articles can be attributed to several subject headings.

Name of the country related to the publication. According to this criterion, articles referred to a minimum of one out of 13 selected European countries, namely: Czech Republic, Finland, Spain, Netherlands, Lithuania, Germany, Norway, Poland, Slovak Republic, Slovenia, Sweden, Ukraine, United Kingdom (for the latter country searches were conducted using the MeSH terms: Great Britain, England, Scotland, Wales, Northern Ireland.). This method allowed finding publications regardless of the country of origin, location, author or journal, and reflects the interest of public health issues in the context of the given country.

Publication date. In accordance to this criterion, the search included only articles published in 2001–2010.

The analysis included articles indexed in the database that simultaneously fulfilled the three above criteria. For example, searching for the subject heading 'health policy' and 'Czech Republic', the following search sentence was used (Health Policy AND Czech Republic) sh. limit to yr = '2001 – 2010'. Similar search sentences were used for other subject headings and countries.

The results were analyzed according to: 1) subject of the article, 2) national context, 3) dynamics of publishing, meaning the number of articles published in 2001–2010 for the following three topics: 'public health', 'health policy', and 'health promotion'. Variables 1–3 reflect the publishing activity. Additionally, the publishing productivity (4) associated with the selected countries was analyzed. For this purpose, the number of articles indexed under 'public health' was compared with the number of journals published in the country indexed in the database. The current number of national journals indexed in MEDLINE was determined by searching the directory specified by NLM with the quest: Name of a country [Field: Country of Publication] AND Journals currently indexed in MEDLINE. The productivity analysis also included the relationship between the number of articles and socio-economic potential of selected countries, expressed as: population size (in millions), gross domestic product (GDP in billion US $), the total expenditure on health (US $ billion), burden of disease (DALY) and the GDP and expenditure on health *per capita*. Information on the burden of disease in 2004 was collected from the WHO data [16]. Other information came from the World Bank and concerned the year 2009 [17].

The value of Spearman's correlation coefficient and significance level of correlation has been designated. In this way, the formulation of assumptions about the distribution of the analyzed variables was avoided. The calculation was performed using SPSS 12.0 PL. In the description of the results the words 'articles' and 'publications' were used interchangeably.

RESULTS

Subject of the article. In the analyzed pool of articles from the years 2001–2010, most of the works were described by the heading 'health policy' (3,721 articles). The next headings, with decreasing frequency of use were 'health promotion', 'public health', 'health education' and 'occupational health'. The least frequently used headings were 'environmental health' and 'preventive medicine' (Tab. 1).

Table 1. Number of articles from 2001-2010 recorded in MEDLINE database by selected heading and country.

	No. of articles by heading										
Country	**Health policy**	**Health promotion**	**Public health**	**Health education**	**Occupational health**	**Public policy**	**Health services**	**Primary prevention**	**Health planning**	**Environmental health**	**Preventive medicine**
Overall	**3,721**	**3,054**	**2,587**	**1,598**	**1,407**	**1,050**	**740**	**702**	**583**	**266**	**194**
United Kingom (UK)	2,257	1,679	1,317	751	577	634	237	193	462	117	59
Sweden (SE)	398	180	156	90	177	54	70	58	26	19	7
Germany (DE)	306	459	375	232	85	147	183	134	42	31	79
Netherlands (NL)	289	188	145	116	105	70	60	58	14	9	7
Norway (NO)	172	77	64	41	74	25	32	22	11	8	6
Spain (ES)	130	118	294	71	74	65	100	34	0	24	16
Finland (FI)	58	72	51	44	128	18	23	49	7	4	1
Poland (PL)	57	241	82	217	169	11	18	141	6	41	13
Lithuania (LT)	18	8	20	8	4	7	4	3	5	0	0
Ukraine (UA)	12	6	43	5	9	9	5	0	2	2	6
Slovenia (SL)	11	9	22	3	0	4	2	1	2	1	0
Czech Republic (CS)	7	17	13	16	4	5	5	8	6	7	0
Slovakia (SK)	6	0	5	4	1	1	1	1	0	3	0

Country codes in brackets

National context. Papers on 'health policy' issues related mostly to the United Kingdom (60.7% of all papers on the topic), Sweden (10.7%), Germany (8.2%), Netherlands (7.8%) and Norway (4.6%). Issues concerning 'health promotion' were the most frequently raised in the context of: UK (55.0%), Germany (15.0%), Poland (7.9%), Netherlands (6.9%) and Sweden (5.9%). Issues of 'preventive medicine', rarely addressed, mainly occurred in the context of Germany (40.7%) and the UK (30.4%).

It was found that most publications were related to the UK. The percentage of articles associated with this country in specific topics ranged from 26.7% ('primary prevention') to 77.4% ('health planning'). There was also a significant number of publications associated with Germany, Spain, Netherlands and Sweden. It was found that across countries there are differences related to the topics of publications. For example, the UK, Sweden, Netherlands and Norway had publications mainly on 'health policy', Poland on 'health promotion', and Finland on 'occupational health' (Tab.1).

Dynamics of publishing. Throughout the years 2001–2010 under scrutiny, it can be noted that there are variations in the number of articles indexed in the context of the country, under the headings 'health policy' (Fig. 1), 'public health' (Fig. 2) and 'health promotion'. However, there has not been a constant trend of increase or decrease in publishing on specific topics.

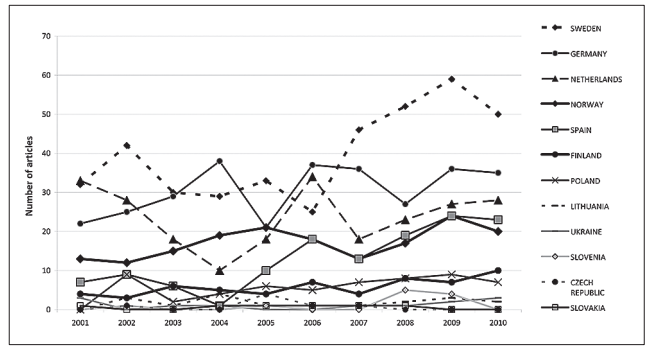

Figure 1. Number of articles from the years 2001–2010 recorded in MEDLINE database by heading "health policy"

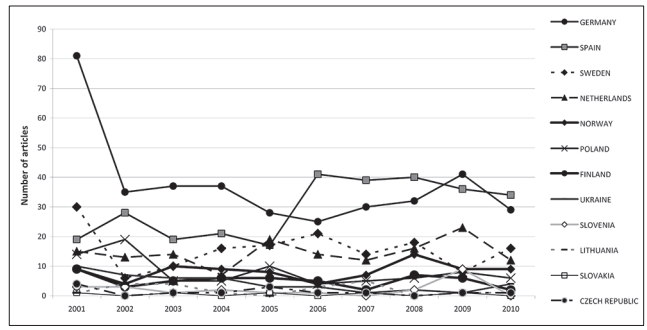

Figure 2. Number of articles from the years 2001–2010 recorded in MEDLINE database by heading "public health"

Publication productivity. Most of the indexed journals came from the UK (altogether 1,292 journals from England, Wales, Scotland and Northern Ireland), Netherlands and Germany. There were almost 60 journals in the database from Poland, a figure that exceeded the total amount of journals from Finland, Norway and Sweden (Tab. 2).

Taking this into account, publication productivity was expressed as the ratio of the number of articles for the heading 'public health' in the context of a particular country and the number of journals (Tab. 2). This ratio was the highest for countries with a small representation of journals (Slovenia, Finland, Lithuania). Countries with a large representation (UK, Netherlands, Germany) had the lowest rates (respectively: 1.02, 0.44, 1.27).

The highest ratio of the number of publications on public health to the size of the population was recorded for the UK, Sweden and Norway. Similarly, the UK had a high ratio of articles to the GDP; the British also had a high ratio of the number of articles for expenditures on health. The highest ratio of articles to the burden of disease was noted for the UK, Germany and Spain.

It was also found that the number of articles is statistically significantly correlated with the population of a given country ($r=0.648$, $p<0.05$), its GDP ($r=0.918$, $p<0.01$) (Fig. 3) and total expenditures on health ($r=0.923$, $p<0.01$). At the same time, a statistically significant negative correlation was revealed

Table 2. Number of articles from 2001-2010 by heading 'public health' recorded in MEDLINE database by country, number of journals, population, GDP*, the total expenditure on health and DALY.**

Country	No. of articles by heading 'public health'	No. of journals recorded in MEDLINE database	No. of articles per journal	No. of articles per 1 million population (2009)	No. of articles per 1 billion USD of GDP* (2009)	No. of articles on total expenditures on health in billion USD (2009)	No. of articles on DALY** per 1,000 population (2004)
United Kingom (UK)	1317	1292	1.02	21.30	0.61	6.52	119.62
Sweden (SE)	156	26	6.00	16.77	0.39	3.91	16.32
Germany (DE)	375	295	1.27	4.58	0.12	1.00	37.20
Netherlands (NL)	145	329	0.44	8.78	0.19	1.69	14.57
Norway (NO)	64	11	5.82	13.26	0.17	1.75	6.18
Spain (ES)	294	66	4.45	6.40	0.20	2.07	31.05
Finland (FI)	51	4	12.57	9.56	0.22	2.21	4.49
Poland (PL)	82	57	1.44	2.15	0.19	2.69	6.21
Lithuania (LT)	20	2	10.00	5.99	0.55	8.28	1.22
Ukraine (UA)	43	7	6.14	0.94	0.37	5.24	2.06
Slovenia (SL)	22	1	22.00	10.77	0.45	4.92	1.89
Czech Republic (CS)	13	22	0.59	1.24	0.07	0.90	1.10
Slovakia (SK)	5	5	1.00	0.93	0.06	0.06	0.37

*GDP – Gross Domestic Product
**DALY – disability adjusted life-years
Country codes in brackets

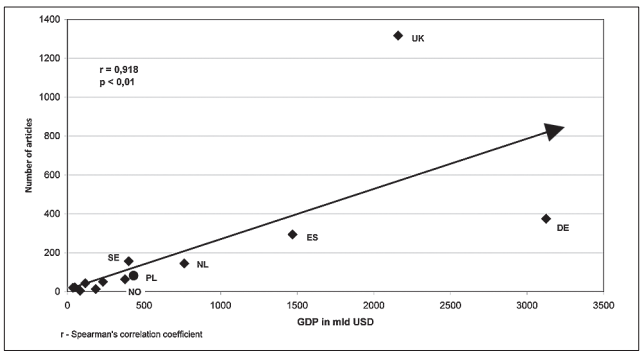

Figure 3. Number of articles recorded in MEDLINE database by GDP

between the number of articles and the burden of disease in the country (r=-0.736, p<0.01). There was no significant correlation between the number of articles and GDP *per capita*, and expenditure on health *per capita*.

DISCUSSION

The analysis of publishing activity and productivity carried out in the presented study was not limited to original articles (research papers), but also included other types of articles, such as: overviews, reviews, commentaries and letters to the editor. It was assumed that they may contain valuable information for the practice of public health [18]. Taken together, they form a scientific and social discourse around public health. This approach is different from the search strategy used in the project SPHERE (Strengthening Public Health Research in Europe), which focused exclusively on peer reviewed articles [7]. The strategy accepted in the presented study takes into account the fact that the public health professionals sometimes take action without strong evidence, but only on the basis of opinion [19].

In the last decade in the analyzed literature, the most popular topic was 'health policy'. This proves that nowadays this area of public health is of great interest and importance. Another reason could be the very broad scope of this concept. In MeSH, 'health policy' is described as: 'Decisions, usually developed by government policymakers, for determining present and future objectives pertaining to the health care system'. Most of these publications were related to the UK and Sweden. Articles about the Polish context rarely touched on this topic. This indicates the low visibility of Polish works in the international exchange of knowledge and views on health policy, and supposed a low activity and productivity in this domain.

The small number of all articles indexed under 'environmental health' is probably caused by the limitation of search refinement to a heading that does not cover many aspects of this multidisciplinary area [20]. Nevertheless, it is a multifaceted challenge.

The collected material does not indicate that there has been an increase in the number of articles on specific areas of publichealth in scientific journals indexed in MEDLINE. It cannot be said, therefore, that public health as a discipline has become more visible in scientific literature in the decade of 2001–2010.

Most articles relate to the UK, and in absolute terms (number of publications), that country is therefore the most visible in international forums. However, the UK has the most significant number of its own journals in the database. Thus, in relative terms (due to the ratio of the number of publications to the number of journals), the UK's position is much weaker. An average journal published in the UK in the span of 10 years has published only one article under the heading 'public health'.

The second group of countries were Germany and the Netherlands, which had several hundred journals indexed in MEDLINE. These journals also posted relatively few articles on public health in their countries, i.e., about one or half an article, respectively. Another group of countries included Finland, Sweden, Norway and Spain, which had from 4–66 journal titles indexed in the database. These journals posted (respectively) approximately: 13, 6, 6 and

4 articles on public health in their countries. The likely reasons for the increased productivity of the Scandinavian countries and Spain may include: a greater representation of journals devoted to public health, focusing on national issues, or a smaller share of articles written by authors from other countries. The discussed ratio reached a very low value for Poland.

The significant positive correlation of the number of publications and GDP, the total expenditure on health and a slightly smaller of population size, confirms earlier findings [8, 21]. This may be either an indication of the lower productivity of economically weaker countries, or that the achievements of these countries are less publicized in the international forums. The latter interpretation must take into account two issues. First, it is usually a low representation of journals from economically weaker countries in MEDLINE; journals from these countries often do not meet the criteria which would allow them access to international databases, such as a long presence in the local market (this especially pertains to the 'young' journals of public health). A smaller number of journals from economically weaker countries is consistent with a higher representation of journals from English-speaking countries in the MEDLINE database [22, 23, 24]. Secondly, the availability of reputable international journals for issues related to less developed countries. There is, in fact, an apparent gap in publishing in prestigious journals of original articles on the subject of developed (old democracies) as opposed to less developed (new democracies) countries. Almerie et al. [25], for example, showed that 40% of publications on randomized clinical trials indexed in the Polish Medical Bibliography database in the years 1996–2006, did not appear in the MEDLINE or the Embase databases. Under-representation of health issues of developing countries in specialized journals on an international scale is a phenomenon which, according to Lown and Banerjee [26], is not directly linked to research expenditures. This can result from many factors, including: the absence of representatives of these countries on the editorial boards of international journals, marginalization of problems of weaker countries in the mainstream discourse, the language barrier, errors and technical difficulties in forwarding papers, and the lack of access to these journals in less developed countries [27, 28]. Anyway, in MEDLINE there is a gap related to public health literature in Europe.

Quite a strong negative correlation between the number of publications and the burden of disease (as health needs indicator), shows that countries where the health of the population is better are also more frequently represented in the analyzed literature. This inverse relationship between health needs and publishing activity has been indicated previously [21]. This relationship is probably very complex, an important mediating variable may be a higher national income in these countries. The interpretation of this relationship in the case of strictly bibliometric studies would require conducting multivariate analyses (multiple linear model).

The number of articles on public health in the MEDLINE database is a derivative of a number of factors, including the prevailing biomedical and clinical nature of the database. The criteria and methods of indexing articles in the database also affect the search results. The overall picture of the issue may also be distorted by the above-mentioned incomplete representation of European journals of public health domain in the MEDLINE database. However, it has been observed that a high social and economic potential of the country and good health of the nation had a close relationship with the numerous articles on public health in the given country. Thus, closing the health gap [29, 30] should be accompanied by closing the gap in health literature.

CONCLUSIONS

1. Analysis of the MEDLINE database content does not indicate that there has been an increase, in the last decade in the number of publications on selected topics of public health concerning the analyzed 13 European countries. Although it is likely that there are, in fact, more publications, in the international circulation of information they are hard to find. This situation is not conducive to the development of public health in the European context.
2. There has been considerable activity concerning publications on 'health policy' and the relatively small activity on the issue of 'environmental health' and 'preventive medicine'. This may indicate the difference in interests regarding these areas. The rather small proportion of articles devoted to 'environmental health' can be worrying, but this requires further analysis.
3. European publications on public health are dominated by works connected to the UK. At the same time, the UK has the richest representation of its own journals in the MEDLINE database. The British, therefore, have a significant impact on the European and global discourse on public health, especially in the key area of health policy.
4. Considerable publication activity and high productivity has been noted in the context of Finland, Sweden and Norway, which seems to confirm the established reputation of these countries in the field of public health.
5. Public health literature in the context Poland is scarce, focused on health promotion and health education. Polish journals indexed in MEDLINE devote little attention to public health.
6. On the European scale, a higher national income and higher total expenditures for health are strongly associated with a greater number of articles indexed when using the subject heading 'public health' in the context of a given country. To clarify this relationship, further studies are needed on the mechanisms occurring here. However, it should not be assumed that the lack of funds is the main obstacle in the development of public health and the literature in this field.
7. In Europe, a smaller national burden of disease (smaller health care needs) is strongly associated with a greater number of articles on public health. This relationship may be seen as indirect evidence of a link between the health of the society and the potential of public health. Undertakings intended to strengthen the public health in the national health systems should include information about the existence of such a relationship.
8. Determining the actual publishing activity associated with individual countries and public health would require carrying out a fuller bibliometric analysis, as well as an analysis of scientific literature at the national level.

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