Public health research in Latin America and the Caribbean: A bibliometric analysis of the literature.

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Abstract

The purpose of the study was to establish a quantitative analysis of the literature production on public health research in the Latin American and Caribbean regions for the period 1980-2002. A *free-text* literature search was conducted in LILACS-SP (The Pan American Health Organisation' Latin American and Caribbean Health Literature Database on Public Health) to identify the literature distribution by country. Microsoft Excel (2000) and Bibexcel (2001) were used to analyse the following: (a) production distribution throughout the period of study; (b) distribution by type of documents; and (c) subject content of documents. Twelve countries out of 38, producing from one to five thousand documents each, were selected. This approach excluded Brazil, with over 11,000 (27.30%) records. Selected countries were Mexico, Chile, Argentina, Colombia, Venezuela, Peru, Costa Rica, Bolivia, Panama; Ecuador, Cuba, and Nicaragua. These countries produced 24,737 (59.46%) documents for the period of study. Results indicated a consolidation of the literature production in the late 1990s. Main documents corresponded to journal articles (44.48%); books or technical reports (27.07%); and conference papers (14.67%). *Salud Publica Mex* was the leading journal in the field, with 935 (08.50%) records. A broad pattern of the content of public health research in the regions was found. This was characterized by studies related mainly to health services, mortality, and health policy issues. Such studies involved mainly adult females and males. Most of these studies were conducted in and related to Mexico, Chile, Colombia and Argentina. Further lines of research are described by the author.

Introduction

Health research is best viewed as a broad and robust concept that includes not only biomedical and clinical research but also epidemiological and related community health research, health systems research, health services research, operational research and so on. Research is also implicit within other functions such as planning, evaluation, surveillance, investigation, problem analysis, and external audit. In this holistic context, research is as basic to effective and efficient health care as financing (White, 2002). This worldview of health research has important implications for developing countries, where health care

César A. Macías-Chapula, *Public health research in Latin America and the Caribbean: a bibliometric analysis of the literature*, In: Guohua Jiang, Ronald Rousseau, Yishan Wu (Eds), Proceedings of the 9th International Conference on Scientometrics and Informetrics – ISSI 2003, Dalian University of Technology, Dalian, China, 2003, 172-179.

reforms are being implemented and epidemiological transitions are emerging in the middle of budget cuts and scarce resources.

The challenge of promoting health research in developing countries was recently addressed by the Global Forum on Health Research (World Health Organisation, 1999). While policy driven, this approach contrasts with that of the research manager, who must build capacity from the ground-up within a given context. Data and information on health research is therefore needed to establish an initial analysis of the existing health research situation in a given country or region. Information regarding main health research lines; local or international collaboration; visibility and use of research results are but only few of the indicators needed to support decision making and policy action. This approach has been recently reported in the fields of tuberculosis and diabetes research in India and China (Arunachalam & Gunasekaran, 2002, 2002a); and in the field of mental health research, in 15 OECD countries (Lewison, et al, 2002).

Previous bibliometric analysis of the health literature production in the Latin American and Caribbean (LAC) regions have addressed issues related to medical education (Macías-Chapula, 1992); primary health care (Macías-Chapula, 1995); and more recently, AIDS (Macías-Chapula, et al, 1998; Macías-Chapula, et al, 1999) and health care reforms (Macías-Chapula, 2002). No integrated studies however have been reported regarding the analysis of the literature, as derived from public health research in these regions. The analysis of this productivity can help both (a) construct the basis of a model of public health communication in science; and (b) improve capacity-building for decision making and action in public health policy issues in these regions.

Purpose

The purpose of this work is to present the preliminary results of a bibliometric study of the literature production on public health in the Latin American and Caribbean regions. The purpose of the study is to establish a quantitative analysis of the literature production situation so as to support decision process mechanisms and action taking in science policy, accordingly.

Method

A literature search was conducted in LILACS-SP (The Pan American Health Organization' Latin American and Caribbean Health Literature Database on Public Health) to identify the distribution of publications by country, for the period 1980-2002. Two approaches were used to retrieve the literature from this database; the first one considered a *free-text* literature search of each Latin American and Caribbean country; the other considered a *controlled* literature search, selecting the countries according to the US National Library of Medicine's Medical Subject Headings (MeSH) and BIREME's translation into the Spanish version: *Descriptores en Ciencias de la Salud* (DeCS). The use of this thesaurus allows for the search of geographic regions and countries as a subject of content within published documents. This procedure leads to the elimination of overlaps and the identification of documents where more than one region or country are described. No limitations to language, check tags, nor type of documents was applied to either search strategy. This paper presents the results derived from the first literature search approach mentioned above.

A total of 38 countries were identified as producers of public health research literature in both the Latin American and Caribbean regions. For the purpose of this work, only 12 countries were selected. These countries were the following: Mexico, Chile, Argentina, Colombia, Venezuela, Peru, Costa Rica, Bolivia, Panama, Ecuador, Cuba, and Nicaragua. The criteria used for this selection was merely quantitative. Only those countries producing from one to five thousand documents during the period 1980-2002, were selected. This procedure allowed for comparisons among these countries within this range. This selection however, excluded Brazil (with over 11,000 records) and other 25 countries whose productivity was below one thousand records.

Subsets of records by country were then created and analysed using Microsoft Excel (2000) and Bibexcel version 2001 in order to identify the following data from each country file:

- Production distribution throughout the period of study.
- Distribution of type of documents by country.
- Subject content of documents.

Documents were classified according to either journal articles, books/technical reports, book chapters, research projects, or thesis. Here, main journals were also analysed according to journal title and country of publication. When possible, the editorship or publishing institution of books/technical reports were also obtained from the source fields.

The subject content analysis of records was conducted according to the structure of MeSH/DeCS thesaurus; thus analysis of check tags, main headings and subheadings were also considered. Treatment of descriptors and examples of this procedure were the same as those used when analyzing literature on AIDS in a previous work (Macías-Chapula, 1999). Analysis of data allowed for the comparison of distribution ranks, types of documents, subject content, countries, and visibility, accordingly.

Results

A total of 41,618 records were retrieved for all the countries within the Latin American and Caribbean regions for the period 1980-2002. Brazil was head of the list, with 11,365 records, followed by Mexico, Chile, and Argentina. Table 1. provides the distribution of records found by country. Brazil produced 27.30% of the total literature in the field. This country alone requires an in-depth study to explore this high productivity.

An analysis of the distribution of the literature produced by the twelve selected countries and by year of publication, indicated a steady growth of the literature during the early 1980s. This production was sustained during the late 1980s and early 1990s; and consolidated in the late 1990s. The total production for the period 1980-2002 was 24,737 documents. In descending order, Mexico, Chile, Argentina and Colombia, were head of the list. Table 2., provides a distribution of records found by year of publication and country, accordingly.

The type of documents found corresponded mainly to journal articles (44.48%); books or technical reports (27.07%); and conference papers (14.67%). Less significant were book chapters (07.06%); research projects (03.91%); and thesis (02.81%). An analysis of the

journal articles found indicated that 1,146 journals published one or more articles. *Salud Pública Mex* was the leading journal in the field, with 935 (08.50%) records. A group of nine local journals was identified as visible in the region in the field of public health. Table 3 provides a list of these journals in ranking order. Here, it was interesting to find that only two or three of these journals classified under the discipline of public health. The rest corresponded to other disciplines such as paediatrics, orthopaedics, or general medicine.

The books and technical reports found corresponded mainly to publications generated by the Pan American Health Organisation (PAHO) (29.28%) and the ministries of health of the corresponding countries (23.33%). The influence of PAHO in these countries had been reported previously, when analyzing health care reform processes in Latin America and the Caribbean (10).

A rank distribution analysis of the check tags found, indicated a pattern of studies conducted on human females and males for all countries. In general it was found that while more studies were conducted on adults and adolescents, less work was related to the *aged*, *infants*, the *new born* and *pregnancy*. Table 4., provides a rank distribution of check tags by country.

The subject content of the production was dominated by geographical descriptors. Countries like Mexico (3,459 records), Chile (2,790), Colombia (2,661), Argentina (2,591) and Venezuela (1,957) were head of the list. In descending order, the following descriptors indicated the main content of the productivity in the region: Health Services (1,476 records), Mortality (1,307), Health Policy (765), Public Health (755), Research (754), Socioeconomic Factors (654), and Primary Health Care (645). Table 5 provides a rank distribution of the main 30 descriptors found.

Discussion and conclusion

Public health research as conducted in twelve Latin American and Caribbean countries led to the production of 24,737 documents. This represented 59.46% of the total production in these regions. Apart from Brazil, the leadership of Mexico and Chile was identified not only by the amount of documents produced, but also in the journals published and subject content of documents. The identification of the local leading journals in public health provides a valuable source of information for researchers and information scientists working in the field. Indeed, nearly a third of the production can be available in less than fifteen journals. On the other hand, a significant 55.52% of the production was published in other type of documents as conference papers or research projects. Further analysis needs to be made in order to identify the full text availability of these sources of information.

A broad pattern of public health research in the regions was found. This was characterised by studies related mainly to health services, mortality, and health policy issues. Such studies involved mainly adult females and males. Most of these studies were conducted in and related to Mexico, Chile, Colombia and Argentina in descending order. Few studies were related to infants and pregnant women. Further research needs to be conducted in order to identify more specific indicators at a lower level of resolution. For example, to analyse the relationship of main heading – subheading over time. The institutions behind the research as well as the existing collaboration patterns need to be also identified. The

results of this first study however, helped to construct the basis where a model of communication of science in public health research can be proposed. It is expected that a controlled literature search in the field will provide further data to construct this model.

Health systems in Latin America and the Caribbean face a dual challenge. On the one hand they must deal with a backlog of accumulated problems characteristic of underdeveloped societies; on the other hand they are already facing a set of emerging problems characteristic of industrialized countries (Londono & Frenk, 1997; Leyva Flores, 1998; Inter American Development Bank, 1997). The social service delivery system in these countries is severely limited in its ability to respond and adjust to changing circumstances by institutional, organizational and structural factors (Pan American Health Organisation, 1997). It is hoped that further bibliometric and scientometric studies can help understand this situation and contribute to reduce the gap between research results and action taking in public health in these regions.

Acknowledgements
The author wishes to acknowledge the support of BIREME to conduct this work. The technical help provided by Alejandro Gutiérrez is kindly appreciated.

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Table 1. Public health research in Latin America and the Caribbean. Distribution of productivity by country (LILACS-SP, 1980-2002).

Country	No. of records	%
Brazil	11 365	27.30
Mexico	4 068	09.77
Chile	3 315	07.97
Argentina	2 638	06.34
Colombia	2 296	05.52
Venezuela	1 994	04.79
Peru	1 925	04.63
Costa Rica	1 830	04.40
Bolivia	1 683	04.04
Panama	1 502	03.61
Ecuador	1 280	03.08
Cuba	1 176	02.83
Nicaragua	1 030	02.47
Other (25), with less than 800 records each	5 516	13.25
TOTAL	**41 618**	**100**

Table 2. Public health research in twelve Latin American and Caribbean countries. Productivity by country and year of publication (LILACS-SP, 1980-2002).

Year	MEX	CHI	ARG	COL	VEN	PER	CRI	BOL	PAN	ECU	CUB	NIC	Total
1980	1	16	2	25	4	3	7	5		1		2	66
1981	29	17	14	17	20	7	12	1	5	2	2	2	128
1982	27	62	22	37	18	15	15	7	34	3	9	4	253
1983	62	101	33	54	26	29	22	8	24	14	25	2	400
1984	120	76	56	132	46	39	24	24	51	23	37	6	634
1985	105	120	97	107	56	59	52	20	97	32	93	4	842
1986	152	147	109	140	151	122	61	27	58	28	61	17	1073
1987	168	199	91	134	100	119	46	52	105	39	83	16	1152
1988	267	162	147	227	92	122	77	40	108	34	63	12	1351
1989	182	140	196	151	58	122	85	69	113	25	51	30	1222
1990	205	144	88	94	69	79	95	69	149	27	55	62	1136
1991	210	177	93	59	68	100	137	86	86	42	54	53	1165
1992	206	164	97	80	62	93	142	69	111	81	57	54	1216
1993	256	162	98	70	57	98	127	79	101	50	64	53	1215
1994	359	260	167	64	83	81	130	105	94	82	59	74	1558
1995	225	196	157	71	84	84	91	103	99	75	90	61	1336
1996	199	157	143	50	77	136	128	181	65	95	50	109	1390
1997	255	173	151	83	94	190	176	216	49	131	61	51	1630
1998	223	187	191	158	86	123	110	134	43	115	54	100	1524
1999	192	202	209	177	157	113	132	130	53	111	92	107	1675
2000	245	187	168	165	362	85	81	134	32	125	75	101	1760
2001	266	189	199	116	194	48	39	103	4	65	31	61	1315
2002	4	39	51	24	9	18	4	3	1	19	5	20	197
n/a	110	38	59	61	21	40	37	18	20	61	5	29	499
Total	4068	3315	2638	2296	1994	1925	1830	1683	1502	1280	1176	1030	24737

n/a: date not available;

MEX = Mexico; CHI = Chile; ARG = Argentina; COL = Colombia; VEN = Venezuela; PER = Peru; CRI = Costa Rica; BOL = Bolivia; PAN = Panama; ECU = Ecuador; CUB = Cuba; NIC = Nicaragua.

Table 3. Public health research in twelve Latin American and Caribbean countries. Leading journals used to publish results (LILACS-SP, 1980-2002).

Rank	Journal title	Country of publication	No. of records	%
1	Salud Pública Mex	Mexico	935	08.50
2	Rev Méd Chile	Chile	370	03.36
3	Bol Epidemiol Antioq	Colombia	184	01.67
4	Rev Chil Pediatr	Chile	156	01.42
5	Gac Méd Méx	México	153	01.39
5	Cuad Méd-Soc (Santiago de Chile)	Chile	153	01.39
6	Rev Asoc Argent Ortop Traumatol	Argentina	144	01.31
7	J&G Rev Epidemiol Comunitaria	Bolivia	143	01.30
8	Gac Méd Caracas	Venezuela	106	0.96
8	Rev Méd IMSS	Mexico	106	0.96
9	Bol Méd Hosp Infant Méx	Mexico	103	0.94
	Other (1137), with less than 100 records each		8450	76.80
	TOTAL		**11003**	**100**

Table 4. Public health research in twelve Latin American and Caribbean countries. Productivity distributed by main check-tags (LILACS-SP 1980-2002).

Check-tag	R	MEX	CHI	ARG	COL	VEN	PER	CRI	BOL	PAN	ECU	CUB	NIC
Human	1	1	1	1	1	1	1	1	1	1	1	1	1
Female	2	2	2	2	2	2	2	2	2	2	2	2	2
Male	3	3	3	3	3	3	3	3	3	3	3	3	3
Adult	4	4	6	6	4	7	5	6	8	10	6	4	7
Adolescence	5	5	5	5	6	8	4	4	6	9	10	5	5
Middle age	6	6	10	9	12	10	9	8	13	14	12	8	11
Child	7	7	4	4	7	5	6	5	5	4	4	6	4
Child, preschool	8	8	8	7	8	9	7	9	7	5	5	9	8
Aged	9	9	11	11	13	12	12	10	15	16	11	11	13
Infant	10	10	7	8	9	11	8	7	10	6	9	7	6
Comparative study	11	11	12	14	15	6	14	15	12	8	13	13	16
New born	12	12	9	10	11	13	10	11	9	7	8	10	10
Animal	13	13	15	12	16	15	15	14	14	11	15	14	15
Pregnancy	14	14	13	15	14	14	11	13	11	12	7	12	9
Case Study	15	15	14	13	5	4	13	12	4	13	16	15	14

R = Rank

MEX = Mexico; CHI = Chile; ARG = Argentina; COL = Colombia; VEN = Venezuela; PER = Peru; CRI = Costa Rica; BOL = Bolivia; PAN = Panama; ECU = Ecuador; CUB = Cuba; NIC = Nicaragua.

Table 5. Public health research in Latin America and the Caribbean. Distribution of main medical subject headings (LILACS-SP, 1980-2002).

Rank	Descriptor	No. of records
1	Mexico	3459
2	Chile	2790
3	Colombia	2661
4	Argentina	2591
5	Venezuela	1957
6	Peru	1929
7	Bolivia	1911
8	Costa Rica	1898
9	Health services	1476
10	Ecuador	1459
11	Mortality	1307
12	Panama	1204
13	Latin America	1050
14	Nicaragua	941
15	Cuba	795
16	Health policy	765
17	Public health	755
18	Research	754
19	Brazil	666
20	Socioeconomic factors	654
21	Primary health care	645
22	Congresses	606
23	Health programmes and plans	591
24	Community participation	444
25	Risk factors	438
26	Delivery of health care	380
27	Epidemiological surveillance	351
28	Legislation	346
29	Health promotion	300
30	National health programmes	290