Original Research Article

A Bibliometric Study of Community Pharmacy-Based Research Activity in Middle Eastern Arab Countries: 2003 - 2012

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Abstract

Purpose: To analyze community pharmacy based research in Arab countries.
Methods: Comprehensive review of the literature indexed by Scopus was conducted. Data from Jan 01, 2003 till December 31, 2013 was searched for documents with specific words pertaining to "community pharmacy" in any one of the 13 Middle Eastern Arab countries. The quality of publication was assessed using h-index obtained from Scopus and Impact Factor (IF) obtained from Journal Citation Report (JCR)
Results: A total of 93 documents were retrieved with an h-index of 9. Thirty eight documents (40.9 %) were published in journals not listed in JCR and therefore had no IF. The sum of the IF of the 93 documents was 64.9 with a mean of 1.3 ± 2.01. The total number of citations was 338 with a mean of 3.6 ± 6.4 citations per document. The highest community pharmacy-based research was from Kingdom of Saudi Arabia (KSA) (32.3 %) followed by United Arab Emirates (UAE) (17.2 %), Jordan (16.1 %), Kuwait (11.8 %) and Qatar (10.8 %). International cooperation was highest with Malaysia (9.7 %) followed by Pakistan (7.5 %), United Kingdom (UK) (8.6 %), and Australia (6.5 %).
Conclusion: The quantity and quality of community pharmacy-based research originating from Middle Eastern Arab countries was low. More effort is needed to bridge the gap in community pharmacy-based research and to promote better community pharmacy services in Middle Eastern Arab countries.

Keywords: Community pharmacy, Middle East, Bibliometric review

INTRODUCTION

In the past few years, several publications have described the community pharmacy profession in the Arab world [1,2]. Authors of these publications reached a conclusion that community pharmacy is not a well-established health profession. Despite this, the general public in the Arab world reported positive perception and attitude toward community pharmacy profession and demanded more roles for community pharmacists in the health system [2-7].

Bibliometric analysis is a useful tool to obtain information about the current state of research in particular areas and allows researchers to identify and undertake new lines of research. Analysis of the scientific literature concerning community pharmacies have been published [8,9]. In the Middle East, several studies have been published about pharmacy profession and

education. However, none was published to analyze the quantity and quality of research in the field of pharmacy in general, and community pharmacy in particular. Therefore, this study was conducted to analyze the quantity and quality of community pharmacy based research during the last decade (2003 – 2012). Such study will lead to better understanding of the current and future community pharmacy practice in the Middle East. Furthermore, the results of this study will help people in academia and in pharmaceutical association to shape community pharmacy profession in the next decade. In addition, the momentum for research activity needs to be maintained through continuous analysis of pharmacy publication from researchers in the region to provide feedback to academic institutions and education planners.

EXPERIMENTAL

Comprehensive online search was performed using Scopus which is one of the world's largest abstract, and citation databases of peer-reviewed literature. Scopus contains 41 million records and covers nearly 18,000 titles from 5000 publishers worldwide and provides 100 % Medline coverage [10]. The key words or "medical subject headings (MeSH)" entered in Scopus to accomplish the objective of this study were "Community Pharmacy", "Community Pharmacist", or "Community Pharmacies", or "Community Pharmaceutical Services" or "Community Pharmaceutical Service" as "title, keywords, abstract". Thereafter, all thirteen Arab countries in Middle East were entered as country affiliation (i.e. Egypt, Syria, Lebanon, Jordan, Iraq, King of Saudi Arabia (KSA), Kuwait, Bahrain, State of Palestine, United Arab Emirates (UAE), Yemen, Oman and Qatar). The study period was chosen to be from January 1, 2003 till December 31, 2012.

Subject areas selected for this research were: health sciences, life sciences, social sciences and physical sciences. The resultant search was as follows: "TITLE-ABS-KEY("**Community Pharmacy**") or TITLE-ABS-KEY("**Community Pharmacist**") or TITLE-ABS-KEY("**Community Pharmacies**") or TITLE-ABS-KEY("**Community Pharmaceutical Service**") or TITLE-ABS-KEY("**Community Pharmaceutical Services**") and AFFILCOUNTRY(**palestine**) or AFFILCOUNTRY(**jordan**) or AFFILCOUNTRY(**syrian**) or AFFILCOUNTRY(**lebanon**) or AFFILCOUNTRY(**iraq**) or AFFILCOUNTRY(**yemen**) or AFFILCOUNTRY(**egypt**) or

AFFILCOUNTRY(**arabia**) or AFFILCOUNTRY(**bahrain**) or AFFILCOUNTRY(**qatar**) or AFFILCOUNTRY(**united arab**) or AFFILCOUNTRY(**oman**) or AFFILCOUNTRY(**kuwait**) and PUBYEAR > **2002** and PUBYEAR < **2013**"

Data from Scopus were exported to Excel then to IBM® SPSS® Statistics 20 software package (IBM, New York, USA) for analysis and graphics. The h-index for the collected data from Scopus was presented. The h-index represents the number of citations received for each of the articles in descending order and the h-graph measures the impact of a set of documents and displays the number of citations per article. The journal's impact factor (IF) was evaluated using the Journal Citation Report (Web of Knowledge) [11]. For citation and IF, both total and median values were presented.

RESULTS

Using the methodology stated, 93 documents were retrieved; an average of 9.3 documents per year from 13 Arab Middle Eastern countries. Table 1 shows the annual number of documents published during the 2003 – 2012. The table indicates low research productivity during the past decade with a slight increase in the past 2 years.

The total number of authors listed for the 93 documents was 275 with a mean ± SD of 3 ± 1.4 and a median (Q1 - Q3) of 3 (2 – 4). Eighteen documents (19.4 %) were published by a single author. Table 2 shows the frequency of documents stratified by the number of authors.

Eighty six documents were categorized as original research articles; four were categorized as review articles and three as letter to the editor.

The retrieved documents were published in 50 international, regional and local peer reviewed journals (Table 3). Fourteen articles (15 %) were published in the International Journal of Clinical Pharmacy (formerly known as Pharmacy World and Science) whereas 9 (9.7 %) were published in the International Journal of Pharmacy Practice and 7 (7.5 %) were published in Pharmacy Practice Journal.

Thirty eight documents (38/93; 40.9 %) were published in journals that had no official IF (Table 3).

Table 1: Annual number of community pharmacy based publication in 13 Middle Eastern Arab Countries

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Number of publications	3	5	4	5	5	11	11	9	17	23	93

Table 2: Frequency of articles stratified by the Number of authors

Number of authors per article	1	2	3	4	5	6	7	Total
Frequency	18	18	25	20	7	4	1	93

Table 3: List of journals in which the 93 documents were published

Journal	Frequency	%	IF (2011)*
American Journal of Pharmaceutical Education	2	2.2	1.205
Annals of Pharmacotherapy	1	1.1	2.126
Asian Journal of Pharmaceutical and Clinical Research	1	1.1	NA
Asian Journal of Pharmaceutics	1	1.1	NA
BMC Public Health	1	1.1	1.997
British Journal of Clinical Pharmacology	1	1.1	2.958
Drugs and Aging	1	1.1	2.671
Eastern Mediterranean Health Journal	4	4.3	NA
European Journal of Clinical Pharmacology	1	1.1	2.845
European Journal of General Medicine	1	1.1	NA
European Respiratory Journal	1	1.1	5.895
Family Practice	1	1.1	1.503
HealthMED	1	1.1	0.435
Indian Journal of Pharmaceutical Education and Research	1	1.1	0.106
Indian Journal of Pharmaceutical Sciences	1	1.1	0.626
Informatics in Primary Care	1	1.1	NA
International Journal of Antimicrobial Agents	1	1.1	4.128
International Journal of Clinical Pharmacy	7	7.5	1.215
International Journal of Pharmacy and Pharmaceutical Sciences	1	1.1	NA
International Journal of Pharmacy Practice	9	9.7	NA
International Journal of Risk and Safety in Medicine	1	1.1	NA
Internet Journal of Pharmacology	1	1.1	NA
Jordan Journal of Pharmaceutical Sciences	1	1.1	NA
Journal of Applied Pharmaceutical Science	2	2.2	NA
Journal of Clinical Pharmacy and Therapeutics	1	1.1	1.57
Journal of Infection in Developing Countries	1	1.1	1.191
Journal of Medical Sciences	1	1.1	NA
Journal of Pharmacy Practice and Research	3	3.2	NA
Journal of Pharmacy Technology	3	3.2	NA
Journal of Social and Administrative Pharmacy	1	1.1	NA
Journal of the Pakistan Medical Association	1	1.1	NA
Latin American Journal of Pharmacy	1	1.1	0.288
Libyan Journal of Medicine	1	1.1	0.179
Life Science Journal	1	1.1	NA
Medical Principles and Practice	3	3.2	0.887
Neurosciences	1	1.1	0.094
Oman Medical Journal	1	1.1	NA
Open Drug Safety Journal	1	1.1	NA
Patient Education and Counseling	1	1.1	2.305
Patient Preference and Adherence	1	1.1	1.143
Pharmaceutical Journal	1	1.1	NA
Pharmacy Practice	7	7.5	NA
Pharmacy World and Science	7	7.5	1.215
Research in Social and Administrative Pharmacy	1	1.1	2.35
Research Journal of Medical Sciences	1	1.1	NA
Saudi Medical Journal	1	1.1	0.520
Saudi Pharmaceutical Journal	6	6.5	0.662
Respirator Care	1	1.1	2.01
Substance Use and Misuse	1	1.1	1.104
Tropical Journal of Pharmaceutical Research	1	1.1	0.820

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Total	93	100.0	64.92

Abbreviations: *NA = not available; IF = impact factor; *Impact factor was reported according to Institute for Scientific Information (ISI) journal citation reports (JCR) 2011*

Only 1 paper was published in a journal with an IF > 5. The sum of the IF of the entire documents was 64.9 with a mean of 1.3 ± 2.01 and a median (Q1-Q3) of 0.2 (0 – 2). The total number of citations, at the time of manuscript writing, was 338 with a mean of 3.6 ± 6.4 and median (Q1 – Q3) of 1 (0 – 4.5). Of the 93 documents considered for the h index, 9 have been cited at least 9 times.

When data were analyzed by country, community pharmacy based research was highest from KSA (32.3 %) followed by UAE (17.2 %), Jordan (16.1 %), Kuwait (11.8 %) and Qatar (10.8 %); (Table 4).

International cooperation in community pharmacy research was highest with Malaysia (9.7 %)

Table 4: Bibliometric analysis of the 93 documents by country

Country	Number of articles N = 93	Total citations	Median (Q1-Q3) Citation	Total IF	Median IF	H index	Number (%) of documents with international authors
KSA	30 (32.3%)	45	0 (0 – 2)	7.33	0 (0 – 0.66)	4	20 (66.7)
UAE	16 (17.2%)	21	0 (0 – 1)	4.5	0 (0 – 1)	3	10 (47.6)
Jordan	15 (16.1%)	171	7 (2 – 16)	24.82	1.2 (0.5 – 2.3)	7	10 (66.7)
Kuwait	11 (11.8%)	46	3 (2 – 7)	12.35	1.215 (0.9 – 1.6)	4	8 (72.7)
Qatar	10 (10.8%)	25	0 (0 – 1)	8.4	1.2 (0 – 1.22)	2	5 (50)
Palestine	8 (8.6%)	18	1 (0 – 3.8)	3.5	0 (0 – 0.3)	3	2 (25)
Lebanon	4 (4.3%)	18	3 (0.25 – 10.25)	5.02	1.2 (0 – 2.6)	2	0 (0)
Egypt	3 (3.2%)	3	0	1.2	0	1	2 (66.7)
Oman	1 (1.1%)	0	0	0	0	0	0 (0)
Bahrain	0 (0%)	0	0	0	0	0	0 (0)
Syrian	0 (0%)	0	0	0	0	0	0 (0)

Abbreviations*: IF = impact factor; UAE= United Arab Emirates; KSA= King of Saudi Arabia; Q1–Q3= lower quartile – upper quartile*

followed by Pakistan (7.5 %), UK (8.6 %), and Australia (6.5 %); (Table 5). When the 13 Middle East countries were compared with regard to quality, papers published by Jordanian researchers had the highest h index followed by those from Saudi Arabia and Kuwait. The same applies to total IF where Jordanian researchers published in journals with higher IF than those from other Arab countries in the Middle East.

Table 5: Countries involved in international cooperation in community pharmacy-based research with Middle Eastern Arab countries

International cooperation	Number (%) of articles
Malaysia	9 (9.7)
Pakistan	7 (7.5)
United Kingdom	8 (8.6)
United States of America	2 (2.2)
Australia	6 (6.5)
Finland	3 (32.2)
New Zealand	3 (32.2)
India	3 (32.2)
Czech Republic	1 (1.1)
Ghana	1(1.1)
Sudan	1(1.1)
Switzerland	1(1.1)
Canada	1(1.1)

DISCUSSION

In the present study, bibliometric indicators were used to describe the scientific activity in community pharmacies in 13 Middle Eastern Arab countries during 2003 - 2012. Based on authors' knowledge, this is the first article that analyzed the quantity and quality of community pharmacy based research from the Arab world. Research indicators showed that research activity in this field is neglected in the Arab world. A total of 93 papers from 13 Middle East countries regarding community pharmacy aspects (9.3 papers per year) represent a low rate of publication. Similar rate of low productivity of scientific articles in community pharmacies from other developing countries have been described as low [9].

Our study showed that scientific output in community pharmacy research has notably increased during the study period. Less than third of the articles were published in the first 5 years, between 2003 and 2007, whereas more than 60 % of the articles were published between 2008 and 2012. The increase in the number of articles published appears to be related to the presence of specialized PhD holders in the field of pharmacy practice and pharmaceutical care particularly in Jordanian and Saudi universities. It was also notable that Malaysia came first in international cooperation regarding community pharmacy research in the Middle East countries. Recently, many PhD students from the Middle East pursued their graduate pharmacy education in Malaysia where the concept of social pharmacy and pharmacy practice is being emphasized at the research and academic levels.

Many of the studies carried out were descriptive studies of community pharmacy practice and there was no study involving controlled randomized experimental designs. The results may, however, serve as an indictment of

pharmacy researchers for failing to carry out research in this discipline. The community pharmacy practice aspects in Arab world is neglected in terms of scientific publication output as compared with the publication of papers in other fields of pharmaceutical other medical sciences. There is a need to undertake research into community pharmacists' activities and to systematically assess their education and training needs.

Limitations of the study

This study is limited by the fact that publications from Middle East countries in journals that are not indexed in Scopus were not included in the analysis. Therefore, it is possible that the number of publications analyzed in this study did not exactly represent all community pharmacy-based research activity.

CONCLUSION

Only a small number of research or review articles on community pharmacy activity were available. This is perhaps indicative of low emphasis on community pharmacy research in the countries studied. Thus, there is need for the countries concerned to focus on areas such as medicine utilization and appropriate use of medicines. The main goal of our study is to direct attention and to open doors for a scientific discussion among professionals and academics about community pharmacy-based research. Academic institutions in the Middle East will need to initiate community pharmacy specialized programs and to strengthen research collaboration with international researchers and institutions in which community pharmacy research has evolved.

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