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Primary health care research in Saudi Arabia: A quantitative analysis

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ABSTRACT

Objectives: The objective of this study was to analyze the published primary health care (PHC) research conducted in Saudi Arabia quantitatively and to determine the distribution of these research publications according to the topic, time, geographical location, and institution.

Methods: In this descriptive study, we conducted literature search in PubMed and Google Scholar. The Medical Subject Headings terms: "Primary Health" AND "Saudi" and "Primary Care" AND "Saudi" were used for searching relevant journal articles. Relevant information about the journal articles, published till December 2011, was recorded on a coding instrument.

Results: From 1983 to 2011, a total of 655 PHC research articles were found. The publication output showed an increase with time. Original research articles (85.6%) were the main type of publications, and the most common study design was cross-sectional (93.4%). "Chronic diseases" and "health services research" were the main topics addressed. Riyadh province had the highest proportion (46.3%) of publications, and the universities (56.2%), followed by the Saudi Ministry of Health (24.9%), were the main institutions publishing the research.

Conclusion: Despite a well-established PHC setup in Saudi Arabia, the research outputs are low. Most of the published articles are cross-sectional studies and are conducted by the universities. Enhancing the PHC research by creating a supportive environment will lead to an increased evidence base for PHC and its effective translation into service delivery.

Keywords: Journal article, primary health care, PubMed, research, Saudi Arabia

Introduction

Primary health care (PHC) is the cornerstone of health-care system. Globally, the importance of PHC has been recognized,[1] and policymakers strive for the improvement of PHC systems.[2] In accordance with the Alma Ata Declaration, issued by the World Health Organization General Assembly in 1978, Saudi Arabia identified the development of PHC as one of the important strategies for providing optimal health care.[3] In 1983, the country began to promote the concept of PHC and adapted it as the foundation of its health-care system.[4] Since then, the health-care services have advanced in Saudi Arabia with a focus on PHC,[5] leading to an improvement in health-care services.[6] The well-established PHC system of the Ministry of Health (MOH) has 2259 PHC centers located throughout Saudi Arabia. The PHC centers provide comprehensive PHC services, including preventive and curative services.[7]

Research in health care plays an important role in improving the health services.[8] Health-care research contributes in determining and quantifying health problems and in evaluating the outcome of interventions used for various health issues.[9] Quality of clinical care depends on evidence-based guidelines and appropriate prescribing practices.[3] Evidence emerging from published research is important for developing evidence-based guidelines.[10] Moreover, scientific research provides information for guiding policy decisions.[8] Clinical research in the primary care setting is also critical in informing policy development[11] and preparing relevant guidelines. In some developed countries, PHC has a research base.[12,13] However, PHC research in developing countries varies vastly from country to country.[14] In Saudi Arabia, there is a focus to promote evidence-based practice in primary care.[3] However, there are certain issues related to PHC including lack of opportunities for professional development in PHC.[3]

Globally, qualitative and quantitative evaluation of research publications is used to assess the scientific activities of institutions.[15] Analyses of research published in various fields

of health care, such as nursing[16-23] and family medicine,[1,14] have been conducted over the past few decades.

In June 2011, Public Health Administration, Qassim, established Research and Information Unit (RIU). Public Health Administration, Qassim, comprises a well-established PHC system and provides health care through 159 PHC centers in Qassim.[7] The mission of RIU is to promote evidence-based health-care services in Qassim through the analysis of routinely collected data, service-oriented research, and dissemination of credible information to the policymakers and health-care providers. To step forward toward this mission, it is important to be aware of health-care research conducted in Saudi Arabia generally and in PHC specifically. Moreover, a summary of PHC research activities at a national level is helpful in determining available evidence base and gaps in knowledge. On literature search, few studies have focused on evaluating biomedical research in Saudi Arabia;[8,9,15,24] however, we were not able to find any study focusing on PHC research in Saudi Arabia. Thus, we planned to retrieve and record the journal articles focusing on PHC in Saudi Arabia.

The purpose of our study was to analyze quantitatively the PHC research conducted in Saudi Arabia, published in international journals, and documented in PubMed and Google Scholar. Moreover, the purpose of this study was also to determine the distribution of PHC research publications in Saudi Arabia according to time, geographical location, and institutions and to determine the topics taken up by PHC researchers in Saudi Arabia.

Methods

This was a descriptive study to explore the salient features of published journal articles addressing PHC in Saudi Arabia. We conducted literature searches in two selected electronic databases; PubMed and Google Scholar. PubMed is the most commonly used database for medical literature. It provides a search interface to MEDLINE, a repository containing approximately 5000 biomedical journals.[25] Similarly, Google Scholar search engine helps to search for scholarly literature. In comparison to PubMed-based searches, the Google Scholar search engine often retrieves a much larger number of scholarly documents on a particular topic.[25] In addition, Google Scholar does not have limitation of years of coverage. It retrieves documents from publishers' websites and institutional repositories, regardless of the year of publication.[26] Therefore, it is recommended to search medical literature on Google Scholar in conjunction with PubMed searches.[25]

We used the following Medical Subject Headings (MeSH) terms: "Primary Health" AND "Saudi" and "Primary Care" AND "Saudi." Broad search terms such as "primary health" and "primary care" were used to include as many relevant articles as possible. To limit for articles published from Saudi Arabia, we used "Saudi" as a keyword. Both databases were searched from their date of inception till December 2011. We conducted the literature search on the two databases from May 2012 to April 2013.

The scientific publications included in this study were original research, reviews, case reports, and case series. Abstracts of meetings, corrections, and book reviews were excluded from the study. Moreover, articles published in languages other than English were also excluded from the study. The title of the articles and the corresponding abstracts were reviewed for identifying researches conducted in Saudi Arabia.

A coding instrument was developed to record relevant information from the articles. The coding instrument consisted of the following variables: Title of the study, name of the first author, name of the first author's institution, institution group, geographical location of institution, publication year, journal name, study design, research setting (PHC, hospital, and others), and MeSH term. Data were taken from article abstracts and, if freely available online, the full text was reviewed.

For the sake of this project, we defined the following variables:

First author's institution group

The information regarding the first author's institution was retrieved from the author's affiliation section of the published article. The institutions were grouped as University, MOH, International Institutions, Military Hospitals, King Faisal Specialist Hospitals, National Guard Hospitals, and "Other" institutions in Saudi Arabia.

Geographical location of institution

We classified institution for each article based on the institutional affiliation of the first author. Geographical locations of institutions within Saudi Arabia were recorded according to their provinces while those located outside Saudi Arabia were recorded as "institutions outside Saudi Arabia."

Study design

We used the classification of clinical study designs utilized for literature reviews, thus categorizing as meta-analysis, review articles, cohort study, case–control study, cross-sectional study, case reports and series, and editorials.[27] Studies comparing outcomes for different techniques or other inputs were categorized as "comparative studies."

Research setting

According to the research setting, the journal articles were classified as: (a) PHC, (b) hospital, and (c) others.

a. PHC: All researches conducted in PHC setting, such as surveys, outbreak investigations, and vaccination campaigns
b. Hospital: Researches conducted on patients in hospitals,

tumor registry as well as those conducted in diabetic clinics

c. Others: Review articles, editorials, laboratory studies, commentaries, and policy papers.

Research topic

To keep the terminology standardized, we used MeSH thesaurus produced by the U.S. National Library of Medicine. It is a controlled vocabulary used for indexing health-related documents.[28] The MeSH vocabulary has a hierarchical structure with different levels of specificity. In the hierarchical structure, the most general level has very broad headings such as "anatomy," and "diseases." However, narrower levels of the hierarchy have more specific headings, such as "ankle," and "hepatitis A" which are the terms corresponding to the above-mentioned broader headings. In the MEDLINE/PubMed database, each bibliographic reference has got a set of MeSH terms that describes the content of the document.[29]

For determining research topic, we entered the abstract of the journal article in the text box provided on "MeSH on demand" webpage.[30] "MeSH on demand" identified MeSH terms in the abstract. Single, most relevant MeSH term was selected for each abstract by developing consensus among the team members. The selected MeSH term was entered in MeSH browser to retrieve the MeSH descriptor data.[31] From the tree number, MeSH terms at the higher three levels of hierarchy were recorded in the coding instrument.

Statistical analysis

The data were analyzed using statistical package Epi Info version 3.5.4. Frequencies and proportion of various variables were calculated.

Results

Our study covered a span of 29 years, beginning from 1983 to 2011. A total of 773 peer-reviewed journal articles were retrieved; however, 118 (15.3%) journal articles belonged to the hospital setting. As the purpose of our study was to focus on PHC research, we excluded these 118 articles from the analysis. Out of the remaining 655 articles, 545 (83.2%) belonged to PHC setting while 110 (16.8%) belonged to the "other" group which included publications such as review articles addressing the topic of PHC.

The first PHC journal article appeared in 1983 and publication output showed an increase, reaching a maximum in the year 2001 with 47 journal articles (Figure 1). Publications showed an increase with time; more journal articles being published in 1990s as compared to those in 1980s while the decade of 2000 had more articles as compared to 1990s.

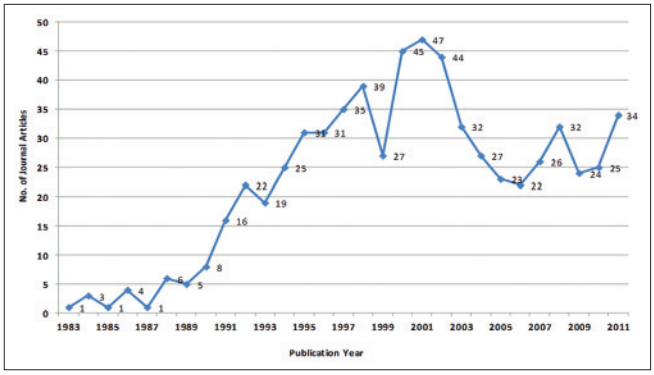

Figure 1: Yearly distribution of primary health-care research articles, 1983-2011 (*N* = 655)

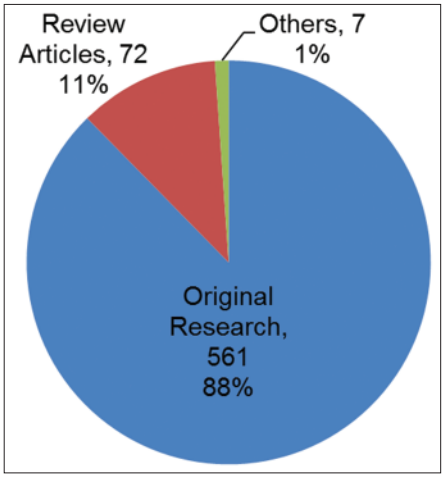

Figure 2: Distribution of primary health-care research articles according to publication type, 1983-2011 (*N* = 640)

Out of the total 655 articles, the publication type could not be figured out in 15 articles. However, among the remaining 640 articles, the main types of publications were original research articles (*n* = 561, 85.6%), review articles (*n* = 72, 11%), and others (*n* = 7, 1.1%) (Figure 2). Among the total 561 original researches, the types of study designs were cross-sectional (*n* = 524, 93.4%), comparative (*n* = 18, 3.2%), case–control (*n* = 10, 1.8%), cohort (*n* = 8, 1.4%), and case report (*n* = 1, 0.2%). Among the cross-sectional studies, 103 (19.7%) were based on health care facility records including audit studies (*n* = 22, 4.2%) and studies based on surveillance records (*n* = 16, 3.1%).

Table 1 shows that the highest proportion of publications were from universities (n=368, 56.2%), followed by the MOH institutions (*n* = 163, 24.9%).

The studies were published in 184 peer-reviewed journals. Journal articles retrieved from three well-known peer-reviewed journals from Saudi Arabia (Saudi Medical Journal; Journal of Family and Community Medicine; and Annals of Saudi Medicine) accounted for 47.4% of the total articles (Table 2).

Table 1: Distribution of PHC research articles according to institution group, 1983-2011

Institution group	*N* (%)*
University	368 (56.2)
MOH	163 (24.9)
International Institutions	37 (5.6)
Military Hospitals	29 (4.4)
King Faisal Specialist Hospitals	17 (2.6)
National Guard Hospitals	16 (2.4)
Other institutions in Saudi Arabia	16 (2.4)
Unknown	9 (1.4)
Total	655 (~100.0)

*The percentage does not add up to 100% due to rounding off. MOH: Ministry of Health, PHC: Primary health care

Table 2: Distribution of PHC research articles according to journals, 1983-2011

Journal name	*N* (%)*
Saudi Medical Journal	154 (23.5)
Journal of Family and Community Medicine	81 (12.4)
Annals of Saudi Medicine	75 (11.5)
Eastern Mediterranean Health Journal	62 (9.5)
Journal of the Egyptian Public Health Association	16 (2.4)
Journal of Community Health	12 (1.8)
Journal of Tropical Pediatrics	10 (1.5)
African Journal of Medicine and Medical Science	7 (1.1)
Family Practice	7 (1.1)
Saudi Journal for Kidney Diseases and Transplant	5 (0.8)
East African Medical Journal	4 (0.6)
International Journal of Health Sciences (Qassim)	4 (0.6)
Public Health	4 (0.6)
Social Science and Medicine	4 (0.6)
Others	210 (32.1)
Total	655 (~100.0)

Journals with <4 relevant articles were grouped as "others". *The percentage does not add up to 100% due to rounding off. PHC: Primary health care

Table 3 displays the distribution of research articles according to topics classified by the terms in top hierarchy of MeSH tree structures. The major areas of research identified include health care (n = 269, 41.1%) and diseases (n = 221, 33.8%), comprising almost 75% of the total retrieved studies (Table 3). The main subtopics, as categorized by the second hierarchy in MeSH tree structures, were analyzed. The "health care" group included various aspects of health-care management including health-care facilities, workforce, and services; health-care quality, access, and evaluation; and health services administration. Nutritional and metabolic diseases; bacterial infections and mycoses; and cardiovascular diseases comprised the majority of the subtopics among the "Disease" group. From PHC perspective, we arbitrarily classified the articles into seven main groups (Table 4). "Chronic diseases" topped the list with 238 (36.4%) articles. "Health services research" group ranked the second highest with 156 (23.9%) articles. Lowest number of articles (n = 14, 2.1%) addressed the topic of health education.

Table 3: Distribution of PHC research articles according to main topics, 1983-2011

Top hierarchy in MESH tree structures	*N* (%)*
[N] - Health care	269 (41.1)
[C] - Diseases	221 (33.8)
[F] - Psychiatry and psychology	59 (9.0)
[I] - Anthropology, education, sociology and social phenomena	43 (6.6)
[H] - Disciplines and occupations	36 (5.5)
[E] - Analytical, diagnostic and therapeutic techniques and equipment	14 (2.1)
[G] - Phenomena and processes	9 (1.4)
Others	3 (0.6)
Total	654 (~100.0)

*The percentage does not add up to 100% due to rounding off. PHC: Primary health care, MESH: Medical Subject Headings

Table 4: Distribution of journal articles according to PHC topics, 1983-2011

Topic	*N* (%)
Chronic diseases	238 (36.4)
Health services research	156 (23.9)
Maternal-child health	97 (14.8)
Communicable diseases	62 (9.5)
Medical education	41 (6.3)
Health education	14 (2.1)
Miscellaneous	46 (7.0)
Total	654 (100.0)

PHC: Primary health care

The province with the highest number of publications was Riyadh, having 46.3% of all the retrieved studies. Eastern province contributed 14.8% of the total articles followed by Asir (12.1%) and Makkah (9.9%) provinces (Table 5).

Discussion

In our study, during the past 29 years, although PHC research outputs were low in Saudi Arabia, there was a steady increase with time. An increase in biomedical research activities in Saudi Arabia is reported from 2006 to 2012, with a sharp rise from 2011 to 2012.[8] Latif[15] reported an increase in biomedical research publications during the years 2008-2012, with a 22.9% increase in 2010 while 23.6% increase in 2012. Other countries have also shown trends of increasing research activities in various health-care fields, such as nursing research and general practice publications.[14,18,21,22] This trend may be attributed to the realization by administrative authorities of the importance of research for improvement of health-care services.

Table 5: Geographical distribution of PHC research articles, 1983-2011

Province	Number of articles (%)*
Riyadh	303 (46.3)
Eastern province	97 (14.8)
Asir	79 (12.1)
Makkah	65 (9.9)
Qassim	37 (5.6)
Medinah	7 (1.1)
Tabuk	6 (0.9)
Hail	5 (0.8)
Jazan	5 (0.8)
Other provinces	6 (0.9)
Institutions outside Saudi Arabia	36 (5.5)
Unspecified	9 (1.4)
Total	655 (~100.0)

The names of the provinces are according to the location of first author's institution,
*The percentage does not add up to 100% due to rounding off. PHC: Primary health care

Globally, universities are considered the center of research activities,[8] and the majority of the biomedical publications are produced from work conducted by universities or medical colleges.[14,15] A study from Turkey reported almost all family medicine publications (99%) from the universities[14] while another study from Saudi Arabia reported 54.6% of all biomedical publications from the universities.[15] Our study also found that universities contributed more than half (56.2%) of the published research studies which can be interpreted by the fact that the universities have family medicine and community medicine departments, and publishing research is mandatory for professional upgradation of the staff members. On the other hand, research is not mandatory at the MOH institutions. Moreover, the number of qualified family physicians and public health consultants is small, and these experts are more likely to be involved in managerial tasks. Thus, there is a lack of expertise in research at PHC level, which underscores the importance of PHC physicians' in-service training in research skills.

In our study, most (85.6%) of the published articles were original research studies, which corresponds to the finding of another study in which majority (69%) of the Family Medicine/General Practitioner publications were mostly original researches.[14] Furthermore, in a review of biomedical publications in Saudi Arabia, more than three-fourths of the publications were original researches,[15] while another study from Saudi Arabia reported 82.1% of original articles.[8] Our study found the proportion of review articles as 11.25% which is higher than other studies from Saudi Arabia reporting review articles comprising 3.4%[8] and 6.4%[24] of the published biomedical research papers.

In our study, cross-sectional studies had the highest proportion among the original researches, corresponding to the findings of other studies.[14,18] Although cross-sectional studies are informative and helpful in decision-making; for better evidence base, other study designs also need to be promoted in PHC research. One of the steps to promote the use of other study designs can be the encouragement of peer-reviewed journals for the publication of studies with study designs that are practice relevant and have quality research evidence for PHC.[10]

In our study, the highest proportion (23.5%) of articles was published in Saudi Medical Journal, corresponding to another study in which 34.9% of the general medical articles were published in Saudi Medical Journal.[15] One of the reasons for this finding is that Saudi Medical Journal, founded in 1979, is the oldest medical journal in Saudi Arabia, and it is published monthly since 1999.[32] Although Journal of Family and Community Medicine focuses more on the PHC and community-based researches, in our study, it has almost half of the articles as compared to Saudi Medical Journal. The reason being that the Journal of Family and Community Medicine was established in 1994 and was published once in 6 months till the year 2000, after which it increased its publication to once in every 4 months.[33]

Our study found that majority (46.3%) of the published articles were from Riyadh province, corresponding with other studies reporting the majority of publications from Riyadh. Latif[15] stated 54.3% and Tadmouri and Tadmouri[24] reported 69.9% of the total biomedical publications from Riyadh. Another study reported 65.3% of all Saudi biomedical publications from Riyadh.[9] These findings can be attributed to the fact that Riyadh, being the capital city of Saudi Arabia, has the central offices of MOH and prestigious academic and health-care institutions providing PHC services.

Our study has certain limitations. It provides only a quantitative analysis of studies published on PHC in Saudi Arabia and does not explore their quality. Our study included electronically available online peer-reviewed articles in two selected databases. Consequently, articles not included in either database but recorded in another electronic database might not be found. Moreover, because of changes in listed journals or indexing conditions, the number of retrieved publications for any particular year may change.[1] As we stopped literature search in April 2013, the number of articles might have been changed for the years searched because of addition or deletion of journal articles in the two databases. From some abstracts, we were not able to find variables such as study design for published studies. Deciding research topic was challenging for some studies because in some articles two or more MeSH terms seemed appropriate. On the other hand, we were unable to find an appropriate MeSH term for occasional studies. Thus, it is expected to have misclassification in research topics of the articles. However, despite the limitations of our study, we consider this study as the first step for further in-depth analyses of PHC research in Saudi Arabia.

Conclusion and Recommendations

Our study results suggest that despite a well-established PHC setup in Saudi Arabia, the research outputs are low. Most of the studies are conducted by the academic institutions. The study design for most of the published articles is cross-sectional, and many of them are based on the available records at health-care facilities. Thus, there is a dearth of analytical and experimental study designs, which provide a better evidence base as compared to cross-sectional studies.

For promoting PHC research, developing research skills and a supportive infrastructure is required.[14,34] It is important to have a central regulatory authority for PHC research to plan properly and monitor the research activities in PHC. Previous research has shown that although PHC physicians are aware of the obstacles and realize their gaps in knowledge and skills, they are motivated to participate in research.[35] Thus, on-job training can be provided to PHC physicians for capacity building in research.

By enhancing the PHC research, there will be an increased evidence base for PHC leading to effective translation of research evidence into service delivery. This will strengthen the PHC systems and will improve health outcomes.[36] In this era of information explosion, establishing an electronic database for PHC research in Saudi Arabia and preparing a periodic PHC literature summary may improve accessibility and utilization of PHC published research.

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