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A study the improvement of Primary health care research in Saudi Arabia

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Abstract - Background: ***The foundation of the healthcare system is primary health care (PHC). The significance of PHC has been acknowledged on a global scale, and policymakers work to enhance PHC systems. Developing health services is mostly dependent on research in the field. Research in the healthcare industry helps to recognize and gauge health issues as well as assess the effectiveness of solutions used to address a range of health concerns. Objectives: This study objective analyse Saudi primary health care (PHC) research and determined its distribution by topic, period, region, and institution. Methods: We used PubMed & Google Scholar to search the academic literature for our descriptive investigation. Relevant journal articles were located by using the MeSH phrases "Primary Health" Or "Saudi" & "Primary Care" Or "Saudi." Relevant data from journal papers published up until December 2020 was entered into a coding tool. Results: There was a total of 548 research papers on PHC research published between 1995 - 2020. There was a rising trend in the number of publications throughout time. The majority of publications were primary research papers (88.7%), while the vast majority of studies used a cross-sectional design (93%). Topics such as "health services research" & "chronic diseases" were heavily discussed. The majority of studies were conducted in Riyadh province (48.1%) and were published mostly by universities (56.0%) & Saudi Ministry of Health (24.8%). Conclusion: Although Saudi Arabia has a robust PHC infrastructure, the country's research outputs are inadequate. The majority of published publications are university-based cross-sectional studies. There will be more evidence for PHC and it will be more easily translated into service delivery if the research environment is improved.***

Keywords- Medical, Saudi Arabia, Primary Health Care, Research

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INTRODUCTION

The introduction of PHC research in Saudi Arabia is a crucial step towards improving the overall healthcare system [1], enhancing the quality of care, and addressing the unique health challenges facing the nation. Primary healthcare research [2] involves the systematic study of healthcare delivery at the community and primary care level, with a focus on prevention, early intervention, and holistic patient well-being. With a growing population & wide range of healthcare requirements, Saudi Arabia understands it must invest in its primary healthcare system. Primary healthcare is the bedrock of every effective healthcare system since it is the initial point of contact for patients. Robust primary healthcare research is essential for optimizing the delivery of care, addressing health disparities, and ensuring the health and well-being of the Saudi population.

Health care research is crucial to enhancing health care delivery. Research in the field of health care helps to identify & quantify health problems, as well as assess the effectiveness of treatments for these disorders. Clinical care quality is determined by adherence to evidence-based recommendations and safe prescribing methods. Evidence-based guidelines rely heavily on findings from published research. In addition, research in the scientific community can inform public policy. Important policy & guideline formulation can also be informed by clinical research conducted in the primary care setting [3]. Research infrastructure supporting PHC exists in various developed nations. However, there is a wide range of PHC research being conducted in the underdeveloped world [4]. Evidence-based medicine in primary care is a priority in Saudi Arabia [5]. But there are problems associated with PHC, such as a lack of opportunity for professional advancement in PHC.

Our research aimed to provide a quantitative assessment of PHC studies completed in Saudi Arabia and reported in PubMed & Google Scholar.

Papers on PHC research in Saudi Arabia were analyzed for their geographical, time-based, and institutional diversity.

Healthcare in Saudi Arabia

In the years before 1925, Saudi Arabia suffered from a lack of both medical facilities and trained medical personnel. In the early 20th century, Mecca was home to just three modest private hospitals: Al-Juad, Al-Kaban, & Al-Shareef [6]. After 1925, a rudimentary heath service infrastructure began to emerge, and it picked up steam once the MOH was established in 1950. By 1950, the number of hospital beds in the KSA had expanded to 1000, with 111 physicians, thanks to the presence of hospitals in Mecca, Medina, Taif, Jeddah, Riyadh, & Al-Hasa as well as a sizable number of clinics [7] [8]. Hospitals in both the public & private sectors have received increased funding and personnel to enhance service quality and promote preventative medicine. The KSA additionally endorsed the 1978 Alma Alta Declaration on primary healthcare reforms to increase access to healthcare [9]. Furthermore, one of the primary benefactors of public investment during the oil boom of 2003-2013 was the healthcare sector. Spending on healthcare as a whole climbed by 9.6% annually throughout this time period, reaching an estimated SAR 84.4 billion in 2013 [10].

While there may be only a handful of distinct models for public healthcare systems, there is great variation in how these models are implemented. Despite these differences, the question of how to improve healthcare without overwhelming the tax or insurance-paying public remains a pressing concern. One strategy is to improve private healthcare to the point where the financially able choose it over public healthcare [11]. A similar situation may exist in the KSA, where the public healthcare system is extensive but the private system is still, to some extent, very tiny and underutilized. Collaboration between the public & private sectors is encouraged by the newly established Vision 2030. Accepting a failing public system so that individuals with means are more likely to pay for private healthcare is not a viable option, though. That's why, once again, productivity and efficiency are crucial. Producing a model of maximum possibilities & measuring the gaps in the current state is a common and seems sensible strategy. However, this raises the question of what constitutes an ideal or maximal result. Do you care more about how long you live or how well you live? What sort of medicine does it emphasize, prevention or treatment? Measuring individual indicators that contribute to the (health) outcome is an alternate method that is gaining popularity around the world [12]. Lengths of stay, labor hours per unit of treatment, and typical expenditures associated with treating various diseases & disorders are all examples. The elimination of monopolies & vested interests within the healthcare system is one general feature that may significantly contribute to increasing the productivity & efficacy of the healthcare system [13].

METHODS

The goal of this descriptive study was to recognize commonalities amongst PHC-related articles published in peer-reviewed journals in Saudi Arabia. We searched for relevant articles in the scientific literature using PubMed & Google Scholar. If you're looking for research in the medical field, your first stop should be PubMed. MEDLINE, a database of over 3000 biomedical periodicals [14], is searchable through this interface. Google Scholar is another tool for finding academic papers. Google Scholar searches typically return more relevant scholarly articles than PubMed searches for a given topic. Furthermore, Google Scholar does not have a cap on the number of years of archived content. Regardless of when a document was published, it can be retrieved from a publisher's website or an institutional repository [15]. Thus, in addition to searching PubMed, it is suggested that you also search Google Scholar for medical literature.

We searched for "Primary Health" and "Saudi" in the MeSH database, as well as "Primary Care" and "Saudi." Primary health" and "primary care" were chosen as broad search phrases to get as many relevant publications as feasible. We used the keyword "Saudi" to narrow our results to pieces written by Saudi authors. Both datasets were searched from the time they were created until December of 2020. Between May 2021 and April 2022, we combed through the two databases to find relevant articles.

This analysis comprised both primary research & reviews, as well as individual case reports and series. The research did not include errata, revisions, or book reviews. Additionally, the study did not include any papers that were originally published in a language except English. Articles were searched for research conducted in Saudi Arabia based on their titles & abstracts.

In order to properly document the data extracted from the articles, a coding instrument was created. Title, first author, institution, group, location, year published, paper name, design of study, research setting (PHC, hospital, etc), & MeSH phrases were all components of the coding instrument. Information was gathered from abstracts of articles and, if the complete texts were publicly available online, read in their entirety. The following terms have been established for the duration of this project:

Writer's first institution

The initial author's affiliation was taken directly from the published article's author's affiliation section. University, Ministry of Health, International, KSA, and "Other" in Saudi Arabia were the categories used to classify the institutions.

Institution's geographical location

According to the first author's affiliation, we categorized each article's institution. In the case of Saudi Arabian institutions, their provinces' names were recorded alongside their locations, while the locations of foreign institutions were simply categorized "institutions outside Saudi Arabia."

Design of Study

We utilized the same categorization of medical designs of study applied in literatures evaluations, dividing them into meta-analyses, review papers, unit studies, case-control studies, cross-section studies, & editorial. Studies that compared results obtained with various approaches or resources were labeled as "comparative studies."

Research setting

The published studies were sorted into three categories: primary care (PHC), hospital, and other.

a) **Primary Health Care:** All Studies Conducted in a Primary Health Care Context includes Reviews, Outbreak Studies, & Vaccination Drives
b) **Hospital**: Studies involving hospitalized patients, tumor registries, or diabetic clinics
c) **Other**: Revies papers, editorials, laboratory reports, remarks, and policy documents.

Research topic

The U.S National Library of Medicine's MeSH thesaurus was utilized to maintain consistency in terminology use. For the purpose of indexing medical literature, it is a regulated vocabulary [16]. The MeSH (Medical Subject Headings) vocabulary is organized in a hierarchy, with several "levels" representing increasingly specific categories. The top level of the hierarchy has extremely broad subject categories like "anatomy" and "diseases." More particular terms, contain "ankle" & "hepatitis A," correspond to the aforementioned umbrella terms at the next level down the hierarchy. Each citation in the MEDLINE/PubMed database is associated with a group of MeSH terms that collectively characterize the paper's subject matter [17]. We used the "MeSH on demand" website's text box to insert the abstract of the journal articles for topic identification. In the abstract, "MeSH on demand" located MeSH concepts [18]. The team came to a consensus on the one, most pertinent MeSH term for each abstract. In order to obtain the MeSH descriptor information, the chosen MeSH term was entered into MeSH browser [19]. The tree number was used to record MeSH phrases from the following three levels of the hierarchy into the coding tool.

Analysis of Statistics

The data was statistically analysed utilizing Epi Info version 3.5.4. Multiple variables' frequencies & percentages were determined.

RESULTS

Our research included the years 1995 through 2020, a whole quarter century. There were a total of 650 papers collected from scholarly journals; however, only 102 (15.6%) dealt with a healthcare facility. To keep our analysis narrow, we did not include these 102 papers, which did not pertain to PHC research. The remaining 548 articles were broken down as follows: 448 (81.7%) were published in a PHC environment, and 100 (18.2%) were published in the "other" category, which includes review articles and other publications on the topic of PHC.

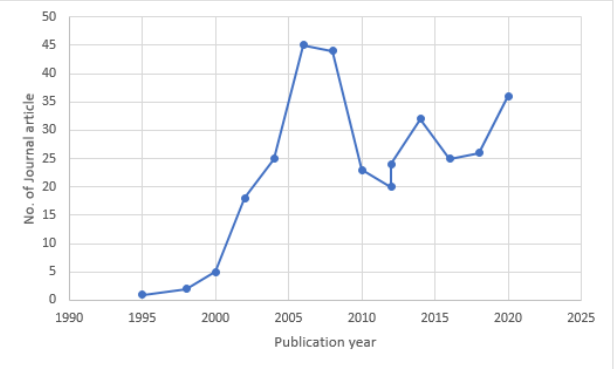

Figure 1: Articles on PHC research published from 1995 to 2020 (N = 548)

Publication production increased from the time of the first PHC journal article in 1995 until 2005, when 47 new publications were published (Figure 1). The number of publications rose throughout time, with the 2000s producing more journal articles than the 1990s & 2000s producing more articles than the 1990s.

Figure 2: Distribution of 1995-2020 PHC research articles by publishing type (N = 533)

15 of the 548 articles' publication types could not be determined. Figure 2 shows that of the remaining

533 papers, the vast majority (n= 473, 88.7 %) were either review articles (n=52, 9.7%) or original research articles (n= 8, 1.5%). Cross-sectional studies were the vast majority (n = 440, 93%), followed by comparison studies (n = 16, 3.3%), case-control studies (n = 9, 1.9%), Unit studies (n = 7, 1.4%), & case reports (n = 1, 0.2%).

Table 1 demonstrates that universities (n=312, 56.9%) published the most, following by MOH institutes (n=136, 24.8%).

Table 1: Institutional affiliation distribution of publications in primary health care research, 1995-2020

Institution	*N* (%) *
University	312 (56.9)
MOH	136 (24.8)
International Institutions	31 (5.6)
Military Hospitals	22 (4.0)
King Faisal Specialist Hospitals	15 (2.7)
National Guard Hospitals	12 (2.2)
Other institutions in Saudi Arabia	12 (2.2)
Unknown	8 (1.4)
Total	548 (~100.0)

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

There were 144 different journals where the investigations were published. Articles were culled from the Saudi Medical Journal, the Journal of Family & Community Medicine, and the Annals of Saudi Medicine, three of the most prestigious medical magazines in Saudi Arabia (Table 2).

Table 2: Journal-Wise Public Health Care Research Article Distribution, 1995-2020

Journal name	*N* (%) *
Saudi Medical Journal	144 (26.2)
Journal of Family and Community Medicine	71 (12.9)
Annals of Saudi Medicine	65(11.8)
Eastern Mediterranean Health Journal	52 (9.4)
Journal of the Egyptian Public Health Association	12 (2.1)
Journal of Community Health	10 (1.8)
Journal of Tropical Pediatrics	8 (1.4)
African Journal of Medicine and Medical Science	6 (1.1)
Family Practice	6 (1.1)
Saudi Journal for Kidney Diseases and Transplant	4 (0.7)
East African Medical Journal	2 (0.3)
International Journal of Health Sciences (Qassim)	2 (0.3)
Public Health	2 (0.3)
Social Science and Medicine	2 (0.3)
Others	162(29.6)
Total	548 (~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

As specified by the terms at the nodes of the MeSH tree's root, Table 3 shows the distribution of research articles by topic. Nearly 75% of the total retrieved papers are focused on healthcare (n = 229, 41.8%) & diseases (n = 183, 33.4%), as shown in Table 3. We examined the major subtopics as arranged in the second level of the MeSH tree structures. The "health care" area included administration of medical centers, doctors, and other medical staff, as well as administration of health care quality, access, & evaluation. The majority of "Disease" themes were subdivided into the following categories: nutritional & metabolic illnesses; bacterial infections & mycoses; and cardiovascular diseases. We arbitrarily divided the papers into seven categories based on their potential impact on PHC (Table 4). At the top of the list, "Chronic Diseases" racked up 221(40.4%) items. The "Health services research" category came in second with 120 articles (21.9%). Health education received the fewest articles (n = 12, or 2.1% of the total).

Table 3: PHC article distribution by topic, 1995-2020

Top hierarchy in MESH tree structures	*N* (%) *
[N] - Health care	229 (41.8)
[C] - Diseases	183 (33.4)
[F] - Psychiatry and psychology	49 (8.9)
[I] - Anthropology, education, sociology and social phenomena	33 (6.0)
[H] - Disciplines and occupations	26(4.7)
[E] - Analytical, diagnostic and therapeutic techniques and equipment	15 (2.7)
[G] - Phenomena and processes	9 (1.6)
Others	3 (0.5)
Total	547 (~100.0)

Table 4: PHC-topic journal article distribution, 1995–2020

Topic	*N* (%)
Chronic diseases	221 (40.4)
Health services research	120(21.9)
Maternal-child health	77 (14)
Communicable diseases	52 (9.5)
Medical education	31 (5.6)
Health education	12 (2.1)
Miscellaneous	34(6.2)
Total	547 (100.0)

Riyadh, the province with the most publications, accounted for 48.2% of all the research found. Table 5 shows that the Eastern Province accounted for

14.0% of the total papers, following by the Asir Province (11.3%) & Makkah Province (10%).

Table 5: Articles about primary health care and their geographic distribution, 1995-2020

Province	Number of articles (%) *
Riyadh	264 (48.2)
Eastern province	77 (14.0)
Asir	62 (11.3)
Makkah	55 (10)
Qassim	27 (4.9)
Medinah	8 (1.4)
Tabuk	7 (1.2)
Hail	4 (0.7)
Jazan	4 (0.7)
Other provinces	5 (0.9)
Institutions outside Saudi Arabia	26 (4.7)
Unspecified	9 (1.6)
Total	548 (~100.0)

DISCUSSION

Our research shows that although PHC research outputs in Saudi Arabia were modest initially, they have been steadily growing over the past quarter century. From 2015 to 2021, biomedical research in Saudi Arabia is expected to rise, as particularly steep increase expected between 2020 and 2021. From 2017 to 2021 [20], Neeraj Kumar Gupta [21] found an increase in biomedical research publications, with an annual increase of 35% in 2019 and a further increase of 23.6% in 2021. Research in several areas of healthcare [22][23], such as nursing and general practice, has been on the rise in other countries as well [24]. Administrative authorities have likely come to this conclusion because they see the potential in research to enhance healthcare delivery.

The majority of biomedical publications result from studies undertaken at universities or medical schools [25], making them the global epicenters of research. In one study, 87% of family medicine publications in Turkey were attributed to academic institutions [26], whereas in another, 54.6% of all biomedical publications in Saudi Arabia were attributed to academic institutions [27]. More than half (56.0%) of the investigate studies found in our study originated from academic institutions. This finding makes sense when considering that many universities house family medicine or community medicine departments, and that their faculty members are required to publish research as part of their ongoing commitment to professional development. However, research participation at MOH facilities is voluntary. Furthermore, there is a scarcity of general practitioners and public health specialists with the necessary expertise, and those who do exist are often assigned administrative duties. As a result, there is a need for in-service training for PHC physicians in research abilities, as there is a dearth of investigate competence at the PHC level.

Similar to a previous study, we found that the vast majority of papers published in topic of family medication & general practice were the results of original research [28]. New research comprised 82.1% of the papers, according to a separate study from Saudi Arabia, and a survey of Saudi Arabian biomedical publications found that more than three-quarters of the publications were original research [29]. When compared to prior studies from Saudi Arabia, which revealed that review papers made up between 3.4% & 6.4% of published biomedical papers, our analysis finding of 11.25 percent is much higher.

Consistent with previous research, we found that cross-sectional studies comprised the majority of the primary investigations. In PHC research, it is important to encourage a variety of study designs, including cross-sectional studies [30], which provide useful information & aid in decision-making. One method to encourage the use of different study methods is to publish studies utilizing design of study that are both practically related & include quality research data for PHC.

Similar to previous study of general medical papers, the majority of the articles in our analysis also appeared in Saudi Medical Journal (23.5%) [31]. Saudi Medical publication, which has been published monthly since 1999, is the country's old medical publication, dating back to 1979 [32]. Almost half as many articles appear in Journal of Family & Community Medicine as appear in Saudi Medical Journal, despite the former's concentration on PHC and the latter's emphasis on community-based research. Starting in 1994, the publication period of the Journal of Family & Community Health Care increased from six to four months in 2000 [33].

Consistent with previous research, we discovered that the majority of published articles came from the province of Riyadh (48.2%). In terms of biomedical articles, Latif [34] reported 55.3%, whereas Tadmouri & Tadmouri [35] reported 69.9%. Another analysis found that 64.7% of Saudi biomedical articles originated in the capital city of Riyadh [36]. These results can be explained by the fact that the Ministry of Health (MOH) and other important Saudi health & academic institutions are all headquartered in Riyadh, the country's capital.

There are some caveats to our study. In terms of the quality of the studies published on PHC in Saudi

Arabia [37], it solely provides a quantitative analysis. In our research, we used only articles that had been peer-reviewed and were available online in two different databases. Therefore, it is possible that items recorded in a third electronic database will go undiscovered. Variations in the number of publications indexed or the circumstances under which papers are retrieved might also affect the annual total. Since we ended our literature search in April 2022, the overall number of publications for the years we investigated may have modified due to the inclusion or eliminating of journal articles from the two databases. In several cases, we were unable to glean relevant information, such as the study's methodology, from the abstracts provided. Some studies had trouble narrowing their focus because the same article could be classified under two or more MeSH keywords. However, for case studies conducted on occasion, we were unable to locate a suitable MeSH phrase. As a result, errors in the categorization of the articles' subjects of study are to be anticipated. Despite these caveats, we hope this study will serve as a springboard for future comprehensive PHC studies in Saudi Arabia.

SCOPE AND SUGGESTIONS FOR FUTURE RESEARCH

Health care research is crucial to enhancing health care delivery. Research in the field of health care helps to identify & quantify health problems, as well as assess the effectiveness of treatments for these disorders. Policy formation and the creation of appropriate guidelines are greatly aided by the findings of clinical studies conducted in the primary care setting. PHC has a research foundation in various industrialized nations. By investing more resources into PHC studies, we can build a stronger evidence base for PHC and better incorporate that data into our service offerings. The public health care systems will be strengthened and health outcomes will improve. The availability & utilization of PHC published studies may be improved in this age of data explosion by establishing a central online repository for PHC-related studies conducted in Saudi Arabia and by regularly compiling a literature review on the subject.

CONCLUSION

Saudi Arabia has a well-established PHC setup, yet research outputs are minimal, according to our study. Academic institutions are responsible for the bulk of the research. Most of the publications use a cross-sectional design, and many of them rely on data already collected by hospitals & clinics. Thus, there is a scarcity of study designs that incorporate analysis & experimentation, which would give a stronger evidence basis than cross-sectional studies. Building research capacities and a conducive environment are essential for advancing PHC study. In order to effectively plan and keep tabs on PHC research operations, a centralized regulatory authority is essential. Previous studies have demonstrated that despite the challenges and the physicians' own recognition of their own knowledge and ability deficiencies, PHC physicians are nonetheless motivated to participate in research. This means that PHC doctors can receive on-the-job training to increase their research capacities.

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CONFLICTS OF INTEREST

There are no conflicts of interest.

REFERENCES

1. Bailie R, Si D, Shannon C, Semmens J, Rowley K, Scrimgeour DJ, et al. Study protocol: National research partnership to improve primary health care performance and outcomes for Indigenous peoples. BMC Health Serv Res 2010;10:129

2. Pandve, H. T., & Pandve, T. K. (2013). Primary healthcare system in India: Evolution and challenges. International Journal of Health System and Disaster Management, 1(3), 125.

3. Latif R. Medical and biomedical research productivity from the Kingdom of Saudi Arabia (2008-2012). J Family Community Med 2015;22:25-30

4. Tadmouri GO, Tadmouri NB. Biomedical research in the Kingdom of Saudi Arabia (1982-2000). Saudi Med J 2002;23:20-4.

5. Meo SA, Hassan A, Usmani AM. Research progress and prospects of Saudi Arabia in global medical sciences. Eur Rev Med Pharmacol Sci 2013;17:3265-71.

6. Al-Borie MH, Abdullah MT. A “DIRE” needs orientation to Saudi health services leadership. Leadersh Health Serv. 2013;26(1):50–62.

7. Sajjad R, Qureshi M. An assessment of the healthcare services in the Kingdom of Saudi Arabia: an analysis of the old, current, and future systems. Int J Healthc Manag. 2018:1–9.

8. Al Yousuf M, Akerele T, Al MY. Organization of the Saudi health system. East Mediterr Health J. 2002;8:645–53

9. Sebai ZA, Milaat WA, Al-Zulaibani AA. Health care services in Saudi Arabia: past, present and future. J family Community med. 2001;8:19–23.

10. McKinsey Global Institute Report. Saudi Arabia beyond oil: the investment and

productivity transformation: McKinsey global institute; 2015

11. Bronfman J. Health insurance choice, moral hazard and adverse selection: a study of the Chilean case using panel data. 2011. [Cited 2018 Aug 5]. Available from: https://www.american.edu/spa/publicpurpose/upload/Fixed-Submission.pdf

12. Smith PC. What is the scope for health system efficiency gains and how can they be achieved? Eurohealth. 2012;18(3):4–6

13. Mosca I. Evaluating reforms in the Netherlands' competitive health insurance system. Eurohealth. 2012;18(3):7–9.

14. Devi, A., Ravindra, K., Kaur, M., & Kumar, R. (2019). Evaluation of biomedical waste management practices in public and private sector of health care facilities in India. Environmental Science and Pollution Research, 26, 26082-26089.

15. Casas, L. C., Álvarez, J. J., Vivaldi, L. V., Montero, A. R., Bozo, N., & Babul, J. (2022). Primary health care, access to legal abortion and the notion of ideal victim among medical practitioners: The case of Chile. Frontiers in psychology, 13, 1007126.

16. Lipscomb, C. E. (2000). Medical subject headings (MeSH). Bulletin of the Medical Library Association, 88(3), 265.

17. U.S. National Library of Medicine. Medical Subject Heading: Fact Sheet; 2015. Available from: http://www.nlm.nih.gov/pubs/factsheets/mesh.html. [Last accessed on 2016 Feb 20].

18. U.S. National Library of Medicine. MeSH on Demand; 2015. Available from: https://www.nlm.nih.gov/mesh/MeSHonDemand.html. [Last accessed on 2016 Feb 20].

19. U.S. National Library of Medicine. MeSH Browser; 2015. Available from: https://www.nlm.nih.gov/mesh/2015/mesh_browser/DCMS/ MBrowser.html. [Last accessed on 2016 Feb 20].

20. Liu, Y. H., & Wacholder, N. (2017). Evaluating the impact of MeSH (Medical Subject Headings) terms on different types of searchers. Information Processing & Management, 53(4), 851-870.

21. Gupta, N. K., Shukla, M., & Tyagi, S. (2019). Knowledge, attitude and practices of biomedical health care personnel in selected primary health care centres in Lucknow. Int J Community Med Public Health, 4(1), 209-213.

22. van Weel, C., Kassai, R., Qidwai, W., Kumar, R., Bala, K., Gupta, P. P., ... & Howe, A. (2016). Primary healthcare policy implementation in South Asia. BMJ global health, 1(2), e000057.

23. Doshmangir, L., Moshiri, E., & Farzadfar, F. (2020). Seven decades of primary healthcare during various development plans in Iran: a historical review. Archives of Iranian medicine, 23(5), 338-352.

24. Li, X., Lu, J., Hu, S., Cheng, K. K., De Maeseneer, J., Meng, Q., ... & Hu, S. (2017). The primary health-care system in China. The Lancet, 390(10112), 2584-2594.

25. Latif R. Medical and biomedical research productivity from the Kingdom of Saudi Arabia (2008-2012). J Family Community Med 2015;22:25-30

26. Bodur, S., & Filiz, E. (2009). A survey on patient safety culture in primary healthcare services in Turkey. International Journal for Quality in Health Care, 21(5), 348-355.

27. Al-Ahmadi, H., & Roland, M. (2005). Quality of primary health care in Saudi Arabia: a comprehensive review. International Journal for Quality in Health Care, 17(4), 331-346.

28. Latif, R. (2015). Medical and biomedical research productivity from the Kingdom of Saudi Arabia (2008-2012). Journal of family & community medicine, 22(1), 25.

29. Al-Bishri, J. (2013). Evaluation of biomedical research in Saudi Arabia. Saudi medical journal, 34(9), 954-959.

30. Yaman H, Kara IH. An evaluation of articles in international peerreviewed publications in Turkish family medicine. Med Sci Monit 2007;13:SR24-27

31. Latif, R. (2015). Medical and biomedical research productivity from the Kingdom of Saudi Arabia (2008-2012). Journal of family & community medicine, 22(1), 25.

32. Yaqub BA, Al-Deeb SM. Acollege by itself! Saudi Med J 2003;24:4-10.

33. Mantzoukas S. The research evidence published in high impact nursing journals between 2000 and 2006: A quantitative content analysis. Int J Nurs Stud 2009;46:479-89.

34. Latif, R. (2015). Medical and biomedical research productivity from the Kingdom of

Saudi Arabia (2008-2012). Journal of family & community medicine, 22(1), 25.

35. Tadmouri GO, Tadmouri NB. Biomedical research in the Kingdom of Saudi Arabia (1982-2000). Saudi Med J 2002;23:20-4.

36. Al-Bishri J. Evaluation of biomedical research in Saudi Arabia. Saudi Med J 2013;34:954-9

37. Hazazi, A., & Wilson, A. (2022). Improving management of non-communicable chronic diseases in primary healthcare centres in the saudi health care system. Health Services Insights, 15, 11786329221088694.

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