Research on Therapeutics at the King Saud bin Abdulaziz University for Health Sciences: A Bibliometric Assessment

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Abstract

Purpose: To carry out the bibliometric assessment of research output on 'Therapeutics' by authors affiliated with King Saud Bin Abdulaziz University for Health Sciences (KSAU-HS), its teaching hospital and research centre.

Design/methodology/approach: Articles having MeSH keyword '*Therapeutics'* were retrieved from PubMed, a database of the United States National Library of Medicine, which produced the list of 161 research documents published in 105 different journals from the inception of KSAU-HS to 20th September 2017. Year-wise distribution of research items, segregation of local and international journals, most productive authors, and major area of research had been calculated. The data were analyzed by using Microsoft-Excel 2010.

Key finding(s): The finding of the study reveals that the majority of articles (90%) is written in collaborative efforts. In 125(77%) publications, the principal author belongs to KSAU-HS, its associated hospital and research Centre. Almost half of the research papers (51.55%) have been produced in collaboration with researchers of other universities / hospitals and organizations. More than half (54.03%) of articles are published during January 2014 to December 2016. Research Articles are preferred type of writing and *Medicine* and *Urology* are the favorite area of research. Ninety-eight (60.86%) articles appeared in 68 journals published from two countries; United States (n=38; 36.19%) and United Kingdom (n=30; 28.57%). Arabi found to be the most prolific author with 37 articles. Most of the research (n=77; 47.82%) is done within KSAU-HS, 57 articles (35.40%) are shaped out with international collaborators and 27 articles are written with researchers affiliated by 16 organizations located in Saudi Arabia.

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Research limitation(s): This study is limited to the bibliography produced by PubMed database on 20th September 2017 with MeSH keyword, Therapeutics. The quantity of articles produced by the researchers of KSAU-HS on "*Therapeutics*" may be more than this number.
Practical implication(s): This case study provides an insight of the publication trends in a selected field of study that may (a) be used to take corrective measures, where needed, and (b) motivate other counterparts to initiate the similar research in their field/institution.
Contribution to knowledge: Research output in a university environment is an important gauge to evaluate the productivity of faculty members. This study fills the gap of bibliometric research in a particular field and institution in Saudi Arabia.

Paper type: Research.
Keywords: Therapeutics; Research productivity; Journal/article publication trends; PubMed; Biomedical publications; Saudi Arabia.

Introduction

Kingdom of Saudi Arabia (KSA) has been progressing in different fields of knowledge rapidly. A number of universities and research organizations and their research activities are increasing. The government is giving special attention to medical education and research in KSA. Qualified teaching staffs have been hired from all around the world to teach the medical students and to collaborate with the local scientists in conducting research (Al-Bishri, 2013; Latif, 2015; Meo, Hassan & Usmani, 2013). King Saud bin Abdulaziz University for Health Sciences (KSAU-HS) came into being in 2005, being the first medical university in the Arab World. KSAU-HS is imparting state of the art medical education in different subjects, i.e., medical, dental, pharmacy, public health, medical education, nursing and applied medical technologies. The researchers are producing research work in journals having high impact factor journals (Haq & Al Fouzan, 2017). KSAU-HS has taken following steps to enhance the research activities:

a. Establishing research excellence and promising research centers (KAIMRC)
b. Arranging research methodology training sessions
c. Implementing criteria of measurement and evaluation of scientific medical research
d. Attracting distinguished faculty members, scholars, and, postgraduate students to conduct and publish their research
e. Providing funds for scientific biomedical research
f. Encouraging distinguished research

g. Creating an academic association on different medical disciplines

KSAU-HS's main campus is in Riyadh with two additional campuses in Jeddah and Al-Ahsa. The main campus in Riyadh hosts seven colleges: College of Medicine, College of Dentistry, College of Pharmacy, College of Public Health and Health Informatics, College of Applied Medial Sciences, College of Nursing and the College of Science & Health Professions. Jeddah Campus hosts College of Medicine, College of Nursing, College of Applied Medical Sciences and College of Sciences and Health Professions. Finally, Al-Ahsa Campus hosts College of Applied Medical Sciences, College of Nursing, and College of Sciences and Health Professions. The advanced medical facilities at the teaching hospitals; King Abdulaziz Medical Cities in Riyadh, Jeddah and Al-Ahsa prove to be critical foundations for the successful inception of the university.

PubMed is one of the authentic and widely used medical databases, managed by the National Center for Biotechnology Information at United States National Library of Medicine. This database has indexed 5,633 journals, and it comprises over 26 million citations for biomedical literature (PubMed).

The data on Medical Subject Heading (MeSH) keyword "*Therapeutics*" was collected from PubMed for this paper. Jain (2008, p.1) defines Therapeutics "*the application of knowledge of pharmacology in the prevention and treatment of diseases*". Online version of Encyclopedia Britannica (Rakel, 2017) delineated that "Therapeutic, treatment and care of a patient for the purpose of preventing as well as combating disease or relieving pain or injury. The term originates from the Greek therapeutikos, which means 'inclined to serve.'Therapeutics means serving and caring for the patient, preventing disease as well as managing specific problems, to treat specific symptoms includes the use of medication to relieve pain or treat infection, surgery to remove diseased tissue or replace poorly functioning or nonfunctioning organs, and counseling or psychotherapy to relieve emotional distress.

Studies on bibliometric analysis have been very popular among the Library and Information Science researchers to examine and assess the scientific growth of publications on any particular subject for a specific period by using citation indicators. Its results help the policy makers to identify the weak and strong areas of research, most productive author, and ratio of collaboration etc. The scientific development of any country,

organization or specific subject can be measured through their published research and its impact (Ullah el at, 2016; Baladi & Umedani, 2017). Alan Prichard (1969) originated this expression, earlier known as *statistical bibliography*. He defined it as "*the application of mathematics and statistical methods to books and other media of communication.*"

The aim of this study is to examine the research growth on the subject of "*Therapeutics*" produced by the researchers affiliated with KSAU-HS based upon the data retrieved from PubMed-Index.

Objectives of the study

Following were the objectives of the study:

1. To assess the growth of literature on *Therapeutics* in term of chronological distribution, basis on research design, study the universe and segregation of subjects.
2. To evaluate the journal wise distribution, authorship pattern and most productive authors.
3. To calculate the ratio of local and international collaborative research activities.

Research Methodology and Limitations

This observational, retrospective and quantitative analysis was carried out at College of Dentistry, KSAU-HS during September to November 2017. Research items on the subject of "*Therapeutics*" with the affiliated address "King Saud bin Abdulaziz University for Health Sciences" were searched by using PubMed/Medline database on 20th September 2017. This query produced the citations of 161 research items, all citations were downloaded in comma-separated values (CSV) file format. CSV file allows data to be saved in table structured format. Further, each and every article had been analyzed to accomplish the objectives of the study. The data were analyzed on Spreadsheet of Microsoft Excel -10. The data used in this study were limited to the result of PubMed/Medline database downloaded on 20th September 2017. Research created by KSAU-HS's authors, that didn't publish in PubMed-Index journals, had not been included in this report. There was a probability of getting some papers omitted or missed by this database/report.

Literature Review

Conducting and publishing high quality scientific research is an authoritative module of success, assessment of the research productivity

and a significant scale of the extent of their contributions to updating existing theories and creating new knowledge. Ware and Mabe (2015) revealed in their report that there were 28,100 active scholarly peer-reviewed English-language journals, plus 6450 non-English-language journals which were publishing about 2.5 million articles a year. The number of articles published each year and the number of journals have both grown steadily by about 3.5% (7 and 9 million articles) per year. The largest subject area covered in scientific journals is biomedical related to *Clinical, Pre-Clinical and Health* representing 30% of all journals. An important subset is the 10,900 journals included in Thomson Reuter's Journal Citation Reports database, these collectively publish about 1.5 million articles annually. According to SCImagojr Journal and Country Rank, Saudi Arabia stood on a 50th number with 2402 published documents in 2005. It stands on 32nd position with 19918 published documents in all subjects in 2016 (Saudi Arabia, 2017).

Various bibliometrics studies had been conducted on the published research literature from KSA. A Scientometrics analysis of the pharmaceutical research in KSA during 2001-2010 was carried out on Scopus database results by Alhaider et al. (2015). Total 1386 papers were retrieved for analysis. Most of the research was performed on pharmacology in relation with Cancer, Cardiology and Diabetes. King Saud University discovered to be the most productive organization with 505 papers and Aboul-Enein was the most productive researcher with 85 papers. The international collaboration consisted in 562 papers (40.55%), among them Egypt was on the top followed by USA and India.

Saquib et al (2017) conducted a bibliometric analysis of cardiovascular disease (CVD) research in Saudi Arabia, based on the data retrieved from PubMed database. It produced 548 citations; 295 studies were selected for analysis covering the period of 1986-2015. More than half of the work (54.6%) published during 2006-2015. Selected studies on CVD were sub-divided into 19 types of diseases including the most common types as coronary artery disease (18%), hypertension (16%) and stroke (14%).

Jamjoom (2017) identified the scientific productivity in medical specialties by KSA researchers covering the period from 1996 to 2014, based upon the data retrieved from SCImago Journal and Country Rank (SCR). The paper analyzed 35,406 KSA documents extracted from 6,450 journals. Relative specialization Index of 46 medical specialties was calculated; ophthalmology, medicine (miscellaneous), and pediatrics were found to be three most productive in KSA. Author suggested that KSA researchers should publish their papers in quality journals.

Haq and Al Fouzan (2017) examined 45 research items on oncology produced by the researchers of KSAU-HS, SA during 2007 to 2015. List of articles was obtained from Web of Science database. The majority (91%) of articles was written in joint-authorship, more than half of the research (55%) was created with the collaboration of other universities / hospitals, and Abdul Rahman Jaziah was found to be the most productive author with 20 articles.

Haq and Al Fouzan (2017) calculated the research productivity of KSAU-HS based upon the results browsed from Web of Science database. Analysis of 775 articles published in 346 different journals had been evaluated, 61% work was appearing during 2013 to 2015. Medicine (n=119; 15.35%) was found to be the most preferred area of research followed by Community Medicine (n=68; 8.77%). The author's assessment revealed that in 475 (61.29%) publications, principal investigators belonged to KSAU-HS. The bulk of research (65%) had been created with the collaboration of 194 organizations belonged to 40 countries of the world. The USA was on the top followed by Canada and Pakistan.

Shehatta and Mahmood (2016) measured 88,506 items produced by Saudi Arabian authors from 1980 to 2014, 28% papers were written on medical and health sciences and King Saud University researchers' created 31% articles. Research collaboration with the United States scientists was high (23.31%) followed by Egypt (22.95%). The majority of articles published in two local journals indexed in web of science, *Saudi Medical Journal* and *Annals of Saudi Medicine*.

Latif (2015) reviewed the 1562 biomedical research articles generated by the authors affiliated to Saudi Arabia published during 2008 to 2012. Citations of articles were downloaded from PubMed database. City-wise distribution of articles based on the first author's affiliation revealed that 54.30% articles were published from Riyadh, followed by Jeddah (15.20%). The 41% publications were created by King Saud University's researchers, with 76% as original research articles. However, only one-fourth (25%) of the articles were published in the journals with high impact factor (≥1).

Al-Bishri (2013) evaluated the 1905 articles published during 2010 and 2011 by the Saudi authors in PubMed index journals, 65.3% works created at Riyadh, the majority of articles (n=216; 15.5%) were written on the subject of Community Medicine, followed by Pathology and Medicine, and King Saud University (n=398; 20.89%) found to be the most productive organization. The paper concluded that Saudi Arabia was lagging behind in medical research due to lack of funds, research

skills, publications, issues and suggested practicable recommendations to boost the research culture in KSA.

Meo et al (2013) investigated the extent of research publications of KSA in medical sciences during 1996-2012. The data were collected from Web of Science, Institute of Scientific Information (ISI), Thomson Reuters and SCI-mago/Scopus. A total of 27,246 documents divided into 9 specialties were analyzed, with medicine (16,196 documents) having h-Index 92 was on the top, followed by biochemistry, genetics and molecular biology (5399 documents) and pharmacology, toxicology, pharmaceutics (2210 documents). Review of relevant literature elucidated that *medicine* was the most favorite area of research among medical scientists and King Saud University, being oldest and biggest university in KSA, played a leading role in research activities.

Review of literature revealed that some studies on bibliometric assessment of biomedical literature had been carried out in Saudi Arabia, but no bibliometric study was found on *Therapeutics*. This study is tending to meet this gap.

Findings

Chronological distribution

Table 1 shows that 161 research items retrieved from PubMed comprise this report. Year-wise distribution showed that 2015 was the most productive year (n=33; 20.49%) and during 2006, only two research items were appeared. The Majority of work (n=87; 54.03%) was published during 2014 to 2016. No item related to *therapeutics* was identified during 2007.

Paper type categorization

There were four types of research designs used by the researchers affiliated to KSAU-HS on the targeted subject. Most of the researchers preferred to write *Research Articles* (n=126; 79.04%) followed by *Case Report* (n=16; 9.93%), *Review Article* (n=10; 6.21%) and *Editorial / Comments* and *Letters* (n=9; 5.59%).

Study universe

Study universe of the research was explored. In most of the publications (n=109; 67.70%), the study setting or universe was the institutions/hospitals located in Saudi Arabia. There were 21 (13.04%) studies in which the study universe was named, *multicentre*. Our researchers collaborated in the study universe of the eight countries in

which Canada was on top with 6 publications followed by USA with three publications.

Table 1. Chronological Distribution of Research Items (n = 161)

Year	Number of publications	Percentage	Cumulative percentage
2006	2	1.24%	1.24%
2007	0	0%	1.24%
2008	8	4.96%	6.21%
2009	8	4.96%	11.18%
2010	15	9.31%	20.49%
2011	9	5.59%	26.8%
2012	11	6.83%	32.91%
2013	13	8.07%	40.99%
2014	28	17.39%	58.96%
2015	33	20.49%	78.88%
2016	26	16.14%	95.03%
Sep 2017	8	4.96%	100%

Table 2. Paper Type Categorization (n = 161)

Type of writing	Number of publications	Percentage
Research articles; including 14 clinical trails and 13 comparative studies	126	78.26
Case report	16	9.94
Review articles	10	6.21
Editorial / comments / letters	9	5.59

Table 3. Country Name of Study Universe

Rank	Country name	# of articles	Percentage
1	Saudi Arabia	109	67.70
2	Not mentioned	21	13.04
3	Multicentre	16	9.93
4	Canada	6	3.72
5	USA	3	1.86
6	China; Egypt; Ethiopia; Jordan; Pakistan; Qatar	1 article with each country	

Subject distribution of published items

The research items were divided under 21 subject headings, most of the articles (n=38; 23.60%) were related to Medicine, followed by Urology/Nephrology (n=22; 13.66%) and Oncology (n=16; 9.93%). Sufficient numbers of articles were found on Pharmacology, Dermatology, Health Informatics, Public Health, Anesthesia, Cardiology and Pediatrics. Researchers showed less interest in *Therapeutics* related to Medical Ethics, Nursing, Blood Transfusion, Genetics, Health Policy and Medical Education.

Table 4. Subject Distribution of Published Items

Rank	Subject	Articles	Percentage
1	Medicine	38	23.60
2	Urology / Nephrology	22	13.66
3	Oncology	16	9.93
4	Pharmacology	14	8.69
5	Dermatology	10	6.21
5	Health Informatics	10	6.21
6	Public Health	8	4.96
7	Anesthesia	6	3.72
7	Cardiology	6	3.72
8	Pediatrics	5	3.10
9	Neurology	4	2.48
9	Orthopedic	4	2.48
9	Pathology	4	2.48
10	Biochemistry	3	1.86
10	Gynecology	3	1.86
11	Medical Ethics	2	1.24
11	Nursing	2	1.24
13	Blood Transfusion	1	0.62
13	Genetics	1	0.62
13	Health Policy	1	0.62
13	Medical Education	1	0.62

Journal-wise distribution

Total 161 research items were published in 105 different journals, 24 (14.90%) items published in 5 (4.76%) local journals, whereas 137 (85.10%) items published in 100 international journals. Nine articles published in each, *Saudi Journal of Kidney Diseases and Transplant* (KSA) and *Critical Care Medicine* (USA), followed by eight articles in

each, *Saudi Medical Journal* (KSA) and *Studies in Health Technology and Informatics* (Netherland), 5 articles appeared in *Journal of Infections and Public Health* (USA). There were 85 journals where only one article published by KSAU-HS researchers.

Table 5. List of Most Preferred Journals

S#	Name of journal with country	# of articles published
1	Saudi Journal of Kidney Diseases and Transplant (KSA)	9
2	Critical Care Medicine (USA)	9
3	Saudi Medical Journal (KSA)	8
4	Health Technology and Informatics (Netherland)	8
5	Journal of Infections and Public Health (USA)	5
6	Annals of Saudi Medicine	4
7	Journal of the National Comprehensive Cancer Network (USA)	4

Authorship patterns

Authorship pattern revealed that the majority of the work (n=145; 90.06%) produced by the collaborative efforts, only 16 papers were written by a single author. Minor difference had been recorded in two authors to six authors' contribution. Five authors pattern recorded 19 items (11.80%) followed by two authors and six authors pattern with 18 (11.18%) research items each. In 31 (19.25%) articles, the numbers of authors were more than 10.

Table 7. Authorship Patterns

Authorship pattern	Number of articles	Percentage
Single Author	16	9.93
Two Authors	18	11.18
Three Authors	17	10.55
Four Authors	14	8.69
Five Authors	19	11.80
Six Authors	18	11.18
Seven Authors	8	4.96
Eight Authors	8	4.96
Nine Authors	9	5.59
Ten Authors	3	3.72
More than Ten	31	19.25

Country of journals publication

Publications affiliated country of the journals depicted that 61 (37.88%) research items published in 38 (36.19%) journals that published from USA, 37 (22.98%) items were appearing in 30 United Kingdom's journals. Twenty-four research items were appeared in five journals published from Saudi Arabia which stood on 3rd position, followed by Netherland with 14 publications in 10 journals. It is evident that the researchers are more inclined to submit their research in those journals that published from USA and UK.

Table 6. Publication Country of the Journals

S#	Journal's publication country	Number of journals	Number of articles
1	United States	38	61
2	United Kingdom	30	37
3	Saudi Arabia	5	24
4	Netherland	10	14
5	Germany	6	6
6	Australia	2	3
7	India	3	3
8	Canada	2	2
9	Pakistan	2	2
10	Sudan	1	2
11	Turkey	1	2
12	China	1	1
13	Iran	1	1
14	Italy	1	1
15	Kuwait	1	1
16	New Zealand	1	1
	Total	**105**	**161**

Authors' affiliation

Total 1650 authors (including multiple counts) produced 161 research items, with the average of 10.24 authors per articles, 582 (35.27%) authors belonged to KSAU-HS. Principal authors' affiliation exposed that in 125 (77.63%) items principal author belonged to KSAU-HS, whereas in 36 (22.37%) items the principal authors affiliated with other organizations of the world, Canada was on the top with 13 papers followed by USA with 7 papers. Almost in half of research items, (n=77;

47.82%) all the contributors belonged to KSAU-HS. Eighty-four papers were written with the collaboration of other organizations.

Table 8. Author Affiliation

Description	# of papers
Total Authors	1650
Authors affiliated with KSAU-HS	582
All authors belonged to KSAU-HS	77
Collaborations with other organizations	84
Principals authors affiliated with KSAU-HS	125
Principal authors belonged to the organizations other than KSAU-HS	36

Table 9. First Author's Affiliated Country with Number of Articles

Rank	Country name	# of articles
1	Saudi Arabia	127
2	Canada	13
3	USA	7
4	Pakistan, Germany	2 Articles with each country
5	Australia; Belgium; China; Egypt; Ethiopia; Hungary; Jordan; Lebanon; Qatar; UK	1 Article with each country

Table 10. Most Productive Authors

Rank	Researcher / contributor name	# of published articles
1	Arabi, Y. M.	37 Articles
2	Tamim, H M.	23 Articles
3	Al-Dorzi, H M.	15 Articles
4	Al Sayyari, A A.	11 Articles
5	Hejaili, F. F.	8 Articles
6	Haddad, S.H.; Balkhy, H.H.; Al-Sayyari, A. A.; Al-Khenaizan, S.	7 Articles each
7	Rishu, A.H.; Baharoon, S. A.	6 Articles each
8	Sakkijha, M.H.; Alsaad, K.O.; Al-Jahdali, H.H.; Aldawood, A.S.	5 Articles each
9	7 authors contributed	Four Articles each
10	18 authors contributed	Three Articles each
11	46 authors contributed	Two Articles each
12	234 authors contributed	One Article each

Most productive authors

In the category of the most productive authors, researchers affiliated to KSAU-HS were included for analysis. Arabi found to be the most productive contributor with 37 articles followed by Tamim with 23 and Al-Dorzi with 15. The number of research articles created by these authors could be even more, for this report analyzed PubMed-Index research items with the keyword '*Therapeutics'* only.

Table 11. Collaboration with Local (KSA) Universities / Hospitals

S#	Name of universities/hospitals	Quantity of articles
1	King Faisal Specialist Hospital & Research Centre	06
2	King Abdulaziz University;	03
3	King Saud University	03
4	Drug Policy and Economic Center, Riyadh,	02
5	King Fahad Armed Forces Hospital, Jeddah,	02
6	Al-Faisal University School of Medicine	01
7	Armed Forces Hospitals Southern Region	01
8	Gulf Cooperation Council (GCC) States and WHO Collaborating Center for Infection Prevention and Control, Riyadh,	01
9	Hail University,	01
10	Kanoo Kidney Center, Dammam,	01
11	King Abdulaziz Specialist Hospital, Taif	01
12	King Khalid University	01
13	King Saud Chest Spec Hospital	01
14	Riyadh Military Hospital	01
15	Saudi Food and Drug Authority,	01
16	Um Al-Qura University	01

Collaboration with local universities / hospitals

KSAU-HS authors collaborated in 27 research items with 16 local universities/hospitals; King Faisal Specialist Hospital & Research Centre was on the top with 6 papers, followed by King Abdulaziz University and King Saud University with 3 articles each, Drug Policy and Economic Centre, Riyadh and King Fahad Armed Forces Hospital

Jeddah with two publications each. There were ten organizations, where KSAU-HS researcher collaborated only in one paper each.

Table 12. Collaboration with International Universities / Hospitals

Name of universities / hospitals	**Country**	**#articles**
McMaster University, Hamilton (4), University of British Columbia (4), University of Toronto (4), University of Calgary (2), Laurentian University (1) McGill University (1), Ottawa Hospital Research Institute (1), University of Ottawa (1),University of Western Ontario (1)	Canada	19
Harvard Medical School, Boston (2), Albany Medical College (1), Columbia University Medical Center (1), Georgia State University Atlanta (1), The University of Southern California (1), UCSF San Francisco CA (1), University of Colorado (1), University of Iowa Carver College of Medicine (1), University of Missouri (1), University of Virginia School of Medicine (1), Vanderbilt University (1),	USA	12
American University of Beirut	Lebanon	06
Bahria University Medical and Dental College (1), University of Karachi (1), University of the Punjab (1)	Pakistan	03
Hashemite University (1), Jordan University of Science and Technology, Irbid (1), The University of Jordan, Amman (1)	Jordan	03
The George Institute for Global Health, Sydney (1) University of New England (1)	Australia	02
University Children's Hospital (1) University Medical Center Ulm (1)	Germany	02
Imperial College London	UK	01
Ankara University, Cebeci Hastaneleri, Ankara	Turkey	01
National University Health System	Singapore	01
Hamad Medical Corporation, Doha	Qatar	01
University of Ibadan	Nigeria	01
Eötvös Loránd University, Budapest,	Hungary	01
University of South Africa	Ethiopia	01
Cairo University	Egypt	01
Wenzhou Medical University	China	01
Erasme University Hospital, Université Libre de Bruxelles,	Belgium	01

Collaboration with international universities / hospitals

KSAU-HS authors' collaboration with international researchers had been recorded with higher score than to local universities / hospitals. The result of overseas collaboration showed that KSAU-HS collaborated with the researchers of 40 universities / hospitals who belonged to 17 countries and produced 57 research items on target subject. Half of the collaboration was done with two countries, Canada and USA; 19 research papers were carried out in the joint authorship with the nine organizations in Canada followed by 12 papers with the 11 organizations of the USA. Six publications had been appearing with the American University of Beirut, Lebanon. There were eleven countries, where one research item was created in a joint venture.

Discussion

Bibliometric assessment is significant activity to reveal various features of scholarly communication and scientific publications (Baladi, 2017). Analysis of bibliometric indicators used to highlight the strong and weak areas of publications. The Present study revealed that 161 articles were created by KSAU-HS researchers on *Therapeutics* during the targeted period with almost 13.14 publications per year. Total 1650 authors contributed 161 papers with an average of 10.24 authors per article. Number of publications was increased during last three years. More than half of the papers were produced in collaboration with 16 local and 40 international universities /organizations. It is interesting to note that in 109 articles (67.70%) the study universe was various hospitals, laboratories and organization of Saudi Arabia.

Recommendations

1. Researchers should submit their research in local PubMed-Indexed journals. In the present study, only 24 (14.90%) articles have been published in local journals.
2. Future researchers can replicate this study on the data retrieved from other database e.g., Web of Science, Scopus and Google Scholar.
3. There is a need to conduct more bibliometric studies on different areas of medical sciences to find out the merits and shortcomings at Saudi Arabia.
4. There is need to carry out more research on *therapeutics* in relation to *Pediatrics, Neurology, Orthopedics* and *Gynecology*.

Conclusion

The present study shows that research activities on *Therapeutics* are growing with remarkable pace at KSAU-HS, Saudi Arabia. This kind of bibliometric analysis not only illustrates the encouraging situation, but also motivates the young scientists to conduct innovative and productive research through local and international collaboration. Wellbeing and quality health of the population is the prime objective of medical education, practice and research. This objective cannot be achieved without addressing the current medical problems through problem solving research.

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