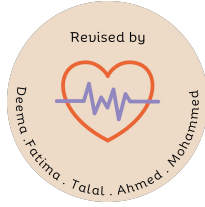


Research
442



Source of evidence and types of published papers

Lecture No. 2

Objectives:

1. Identify sources and levels of evidence
2. Differentiate between the main types of medical research papers
3. Identify and list databases or sources where medical research can be located
4. Define and recognise the impact factor and quartiles

~ First lecture (Course orientation & introduction to research) is not included in the exam.
~ The exams date will be changed, based on the course organizers.
~ This lecture is **new**.
~ This lecture was presented by **Dr. Hani Alghamdi**.
~ It is included in the **Midterm Exam**.
~ We highly recommended reading the **Ayah** in the first page.

Slides

Color code

Original text

Dr. Notes

Important

Golden note

Extra



Editing file

What are Sources of Evidence?

1. Peer-reviewed journal articles
2. Books
3. Conference proceedings
4. Government documents
5. Websites
6. Clinical practice guidelines
7. Experts' opinion



Peer-reviewed articles

- These are articles that have been published in scientific journals after being **reviewed by other experts in the field**.
- **Academic databases** make peer-reviewed literature easy to find and allow users to search across multiple journals.

Peer-reviewed journals articles

- **Benefits:**
 - The peer-review process makes sure that both the **quality** of the research and the **validity** of the results are **high**.
 - Information on very detailed topics and complicated analyses.
 - Online databases make it easy to look through tens of millions of articles.
- **Limitation:**
 - Users who are just looking for **descriptive statistics** and **basic measures of public health** may not need very detailed and complicated analyses.
 - Articles may need a **subscription** to a journal or database to be accessed.

What are sources of evidence? Cont.

- **Books:**

- Books can be a good source of information, but it is important to make sure that the book is **up-to-date** and **written by an expert** in the field.

- **Conference proceedings:**

- Conference proceedings are a record of the presentations that were given at a scientific conference.
- They can be a good source of information on new research, but it is important to note that the presentations **have not been peer-reviewed**.

- **Government documents:**

- Government documents can be a good source of information on public health **policy and guidelines**.

- **Websites:**

- There are many websites that provide information on health research (e.g., Wikipedia)
- It is important to be critical of the information that you find on websites, and to make sure that the website is reputable (حسن السمعة).

- **Clinical practice guidelines:**

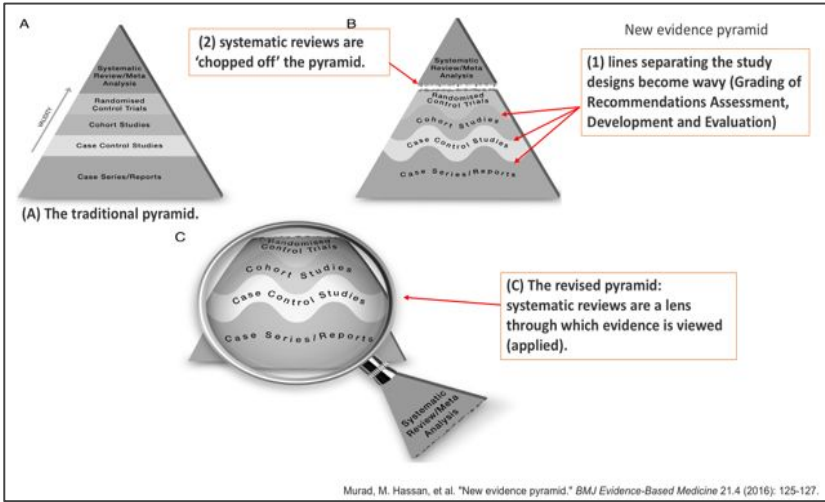
- These are documents that provide recommendations for the best way to diagnose and treat a particular condition.
- Clinical practice guidelines are developed by experts in the field and are based on the best available evidence.

Gray literature

- Information that is not published in traditional academic journals or books.
- It is often not peer-reviewed, which means that it has not been evaluated by experts in the field.
- It has **several limitations** and must be **evaluated carefully**
- Some examples of grey literature:
 - Government reports
 - Technical reports
 - Conference abstracts
 - Newsletters and reports

Question:
What is Gray literature?

Hierarchy of Evidence Sources



الترتيب ليس قطعي،
يوجد الكثير من التداخل

1

Canadian Task Force on the Periodic Health Examination's Levels of Evidence*

Level	Type of evidence
I	At least 1 RCT with proper randomization
II.1	Well designed cohort or case-control study
II.2	Time series comparisons or dramatic results from uncontrolled studies
III	Expert opinions

2

Levels of Evidence from Sackett*

Level	Type of evidence
I	Large RCTs with clear cut results
II	Small RCTs with unclear results
III	Cohort and case-control studies
IV	Historical cohort or case-control studies
V	Case series, studies with no controls

3

Levels of Evidence for Prognostic Studies*

Level	Type of evidence
I	High quality prospective cohort study with adequate power or systematic review of these studies
II	Lesser quality prospective cohort, retrospective cohort study, untreated controls from an RCT, or systematic review of these studies
III	Case-control study or systematic review of these studies
IV	Case series
V	Expert opinion; case report or clinical example; or evidence based on physiology, bench research or "first principles"

4

Levels of Evidence for Therapeutic Studies*

Level	Type of evidence
1A	Systematic review (with homogeneity) of RCTs
1B	Individual RCT (with narrow confidence intervals)
1C	All or none study
2A	Systematic review (with homogeneity) of cohort studies
2B	Individual Cohort study (including low quality RCT, e.g. <80% follow-up)
2C	"Outcomes" research; Ecological studies
3A	Systematic review (with homogeneity) of case-control studies
3B	Individual Case-control study
4	Case series (and poor quality cohort and case-control study)
5	Expert opinion without explicit critical appraisal or based on physiology bench research or "first principles"

تجمع دراسات مختلفة

Hierarchy of Evidence Sources Cont.

Systematic Reviews and Meta-analyses

- Systematic reviews involve a rigorous process of identifying, selecting, and critically appraising all relevant studies on a specific research question.
- By **synthesizing the results** of multiple studies, systematic reviews provide a comprehensive overview of the available evidence and can help **identify patterns or inconsistencies**.
- Meta-analysis is a **statistical technique** used within systematic reviews to combine data from multiple studies, providing a **quantitative summary** of the overall effect size or magnitude of an intervention or association.

What is the difference between Systematic Reviews and Meta-analyses?

Meta-analyses has analysis of **numbers**

Systematic reviews need 2 doctor at least , If there is just one it called narrative review.

Randomized Controlled Trials (RCTs)

- RCTs are considered the **gold standard** for evaluating the **effectiveness** of **interventions or treatments**.
- In an RCT, participants are randomly assigned to either the intervention group or the control group, allowing for the comparison of outcomes between the two groups.
- Randomization **minimizes bias** and ensures that any observed differences in outcomes can be attributed to the intervention being studied.
- RCTs often involve blinding, where participants and/or researchers are unaware of the treatment assignment to reduce bias.

Double blind: doctor and patient don't know.

Single blind: only patient does not know

Cohort studies

- Cohort studies follow a group of individuals over time to investigate the association between exposures (such as risk factors) and outcomes (such as disease development).
- Prospective cohort studies start with a group of individuals without the outcome of interest and follow them over time, collecting data on exposures and tracking the occurrence of the outcome.
- **Retrospective** cohort studies use existing data to identify a group with a **specific exposure** and look back in time to determine the outcome status.
- Cohort studies can assess multiple outcomes, examine rare exposures, and calculate incidence rates, but they require long-term follow-up and are susceptible to loss to follow-up.

Cohort:
مجموعة من الناس
بالإغريقي

Case-control Studies

- Case-control studies compare individuals with a **specific outcome (cases)** to a group **without the outcome (controls)** and investigate the potential association with exposures.
- Cases and controls are selected based on the presence or absence of the outcome, and exposure history is assessed **retrospectively**.
- Case-control studies are useful for investigating **rare diseases** or outcomes with long latency periods, but they are prone to recall bias and rely on accurate recall of past exposures.

Cross-Sectional Studies

- Cross-sectional studies collect data on exposures and outcomes at a **single point in time from a representative sample of the population**.
- They provide prevalence estimates of diseases, behaviours, or exposures and can identify associations between variables.
- However, cross-sectional studies cannot establish causality or temporal relationships since they capture data at one specific time point.

What is the difference between retrospective cohort and case control studies?

Case control studies is the comparison between a group without complication and diseased group while in retrospective cohort studies we look for the expur for groups and we use huge amounts of data to determine the patterns.

Case reports and expert opinion

- **Case reports are detailed descriptions of individual patients with unusual or noteworthy presentations or outcomes.**
- Case reports can be valuable for generating hypotheses or identifying rare adverse events, but they do not provide strong evidence for causation due to their anecdotal nature.
- Expert opinions are perspectives or recommendations provided by recognized authorities in the field, based on their expertise and clinical experience.
- While expert opinions are valuable for guiding **clinical decision-making**, they should be considered in **conjunction** with higher levels of evidence.



Even though papers have many different names, most of them fall into one of the following types:

1. Original Research

- The **most common** journal paper for research data reports.
- The journal may name it an Original Article, Research Article, Research, or Article. (different names)
- It has Introduction, Methods, Results, and Discussion sections.

2. Short reports or Letters

- These papers present concise (مختصر) facts from original research that editors believe will interest many researchers and inspire additional investigation.
- The format is ideal for **time-sensitive** scientists in competitive or **fast-changing fields** because it is short.
- This format has length constraints; thus, some experimental details may not be disclosed until the authors create an Original Research publication.
- Sometimes **called brief communications**.

Brief communication

Criteria

Brief Communications should include brief original studies or reports on small case series. They should not exceed 1000 words, 5 illustrations and 10 references. Not structured Abstract.

A Brief communication generally takes one of the following forms:

- A substantial re-analysis of a previously published article in *Journal of Orthopaedics and Traumatology* or in another journal.
- An article that may not cover 'standard research' but that is of general interest to the broad readership of *Journal of Orthopaedics and Traumatology*.
- A brief report of research findings adequate for the journal's scope and of particular interest to the community.

Brief communications may be edited for clarity or length and may be subject to peer review at the editors' discretion. Brief reports of research work will be peer reviewed. To contribute, contact the editors.

3. Narrative review

- Review articles summarise research on a topic and discuss its current condition and future.
- Journal editors regularly **invite experts** to write them.
- It widely read and highly cited.
- Reviews typically cite 100 primary research publications.

Narrative Review

Criteria

Review Articles may be narrative or systematic:

- **Narrative Reviews** are submitted after prior consultation with the editors and are subject to the peer review process.
 - **Systematic Reviews** (and meta-analyses) may be submitted without Editors consultation.
- Narrative Review articles are summaries of recent insights in specific research areas within the scope of *Journal of Orthopaedics and Traumatology*. Key aims of Review articles are to provide systematic and substantial coverage of mature subjects, evaluations of progress in specified areas, and/or critical assessments of emerging technologies.

Please note that authors are not required to include a separate Conclusions section.



4. Case Studies

- Specific instances of interesting phenomena are reported in these articles.
- Case Studies alert other researchers to a **potential phenomenon**.
- This type of study is often utilised in medicine to report the occurrence of previously **unknown** or emerging pathologies.

5. Methodologies or Methods

- New experimental method, **test or procedure**.
- The method described may be entirely **novel**, or it may provide an improved version of an existing method.
- The **article** should describe a demonstrable **improvement** over the current state of knowledge.

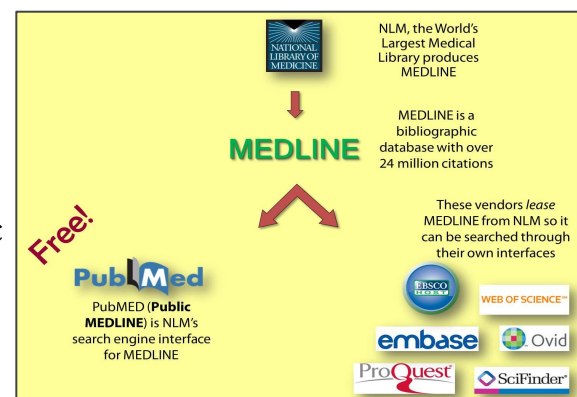
Databases

- A database is a collection of data that is **organized** in a way that makes it easy to find and use. It can be a collection of anything, from customer records to scientific data.
- There are many different types of databases used in medical research. Some of the most common types include:
 - **Bibliographic databases:**
 - These databases contain references to published medical literature, such as research **papers, books, and conference proceedings**. They can be used to find information on a particular topic or to identify relevant research.
 - **Clinical trial databases:**
 - These databases contain information on **clinical trials** that are currently recruiting participants or that have been completed. They can be used to find clinical trials that are relevant to a **particular condition or treatment**.

- **Patient databases:**
 - These databases contain information on patients, such as their **medical history**, medications, and test results. They can be used to track patient **outcomes** and to identify **patterns of disease**.
- **Genetic databases:**
 - These databases contain information on genes, such as their sequence and location. They can be used to study the **genetic basis** of disease and to develop new treatments.
- **Imaging databases:**
 - These databases contain images of medical scans, such as X-rays, MRIs, and CT scans. They can be used to diagnose and monitor disease.
- **Drug databases:**
 - These databases contain information on drugs, such as their side effects and interactions. They can be **used to safely prescribe** and manage medications.

Bibliographic databases

- **PubMed:**
 - PubMed is a bibliographic database of **medical literature**. It is maintained by the United States National Library of Medicine.
- **Scopus:**
 - Scopus is a bibliographic database of **peer-reviewed literature**. It is maintained by Elsevier.
- **Web of Science:**
 - Web of Science is a bibliographic database of scientific literature. It is maintained by Clarivate Analytics.
- **EBSCOhost:**
 - EBSCOhost is a collection of databases that includes bibliographic databases, full-text databases, and other resources.
- **CINAHL:**
 - CINAHL is a bibliographic database of nursing and allied health literature. It is maintained by EBSCO Publishing.



What does “maintained by” mean

When we say that a database is maintained by a particular organization, it means that the organization is responsible for the following:

- **Acquiring the data:**
 - The organization is responsible for acquiring the data that will be stored in the database. This can be done by collecting data from various sources, such as surveys, experiments, and observations.
- **Organizing the data:**
 - The organization is responsible for organizing the data in a way that makes it **easy to find and use**. This can be done **by** creating a **database schema**, which is a blueprint for the database.
- **Storing the data:**
 - The organization is responsible for storing the data in a **secure** and **reliable** way. This can be done by using a database management system (**DBMS**).
- **Maintaining the data:**
 - The organization is responsible for maintaining the data in the database. This includes tasks such as updating the data, **correcting errors**, and **deleting outdated data**.
- **Making the data available:**
 - The organization is responsible for making the data available to authorized users. This can be done by providing access to the database through a web interface or by providing API access.

Examples

- Web of Science is a bibliographic database of scientific literature. It is maintained by Clarivate Analytics.

In the case of Web of Science, **Clarivate Analytics** is responsible for all of these tasks:

- a. They acquire the data by indexing scientific publications, such as **journal articles**, **conference proceedings**, and patents.
- b. They organize the data in a database schema that is based on the research community's standards.
- c. They store the data in a secure and reliable way using a DBMS.
- d. They maintain the data by updating it regularly, correcting errors, and deleting outdated data.
- e. They make the data available to authorized users through a web interface and API access.

What does it mean for a journal to be indexed?

- A journal is considered to be indexed when it is **included in a database** that catalogues and indexes scholarly publications.
- This means that the journal's articles are **searchable** and can be easily found by researchers and other interested parties.

Missouri medicine

Author(s): Missouri State Medical Association

NLM Title Abbreviation: Mo Med

ISO Abbreviation: Mo Med

Title(s): Missouri medicine.

Other Title(s): MO MED

Missouri M.

Missouri Med

J. Missouri M. Ass.

J. Missouri M. Assoc.

Continues: Missouri State Medical Association. Journal ISSN 0096-7009

Publication Start Year: 1953

Frequency: Bimonthly, Sept/Oct. 2002-

Country of Publication: United States

Publisher: St. Louis.

Latest Publisher: Jefferson City Mo : Missouri State Medical Association

Description: v. illus., ports.

Language: English

ISSN: 0026-6620 (Print)

0026-6620 (Linking)

Code: MIMIA2

Electronic Links: <http://www.msma.org/missouri-medicine-library.html>

<https://www.ncbi.nlm.nih.gov/pmc/journals/2501/>

In: MEDLINE. v63n1,Jan. 1966-

PubMed v63n1,Jan. 1966-

Index medicus

PMC

OLDMEDLINE

Current Indexing Status: Currently indexed for MEDLINE

TABLE 1 Definitions of access terms

Topic	Open access	Free access	Subscription only	Subscription hybrid
Who pays for article publication?	Authors, readers, countries, or institutions pay an article publication charge (APC)	No charge to authors for article publication. The journal publisher or society covers the cost.	No charge to authors for article publication. The journal publisher or society covers the cost. The journal may also publish some free access content.	The journal publishes both subscription and open access articles and may publish some free access articles as well. Article publications are paid in subscription or open access.
Who pays for access?	No charge to readers for global access with no restrictions.	No charge to readers for global access with no restrictions.	Libraries, other institutions, companies, individuals.	Open or subscription access depends on what license the author chooses: Open Access: Authors, readers, countries, or institutions pay an APC. Subscription: Libraries, other institutions, companies, individuals.
Who holds the copyright?	The authors via a Creative Commons license. There are different license with various options. Some license types are mandated by countries, readers, publishers and/or societies.	Copyright held by journal, publisher, or society through a standard copyright transfer license.	Copyright held by journal, publisher, or society through a standard copyright transfer license.	Depends on what license the author chooses: Open Access: The authors via a Creative Commons license. There are different license types are mandated by countries, readers, publishers and/or societies. Subscription: Copyright held by journal, publisher, or society through a standard copyright transfer license.
What is included?	All the articles are open access.	All the articles are free to access.	The journal does not publish any open access articles but may publish some free access articles.	The journal publishes subscription and open access content and may include some free access content.

Open access:

- 1- The author pays for his/her research to be published.
- 2- Anyone who wants to take anything (such as a figure) should take the permission from the author.

Free access:

- 1- Authors don't have to pay for their researches to be published.
- 2- Anyone can take anything from the research such as figures without taking the permission of the author

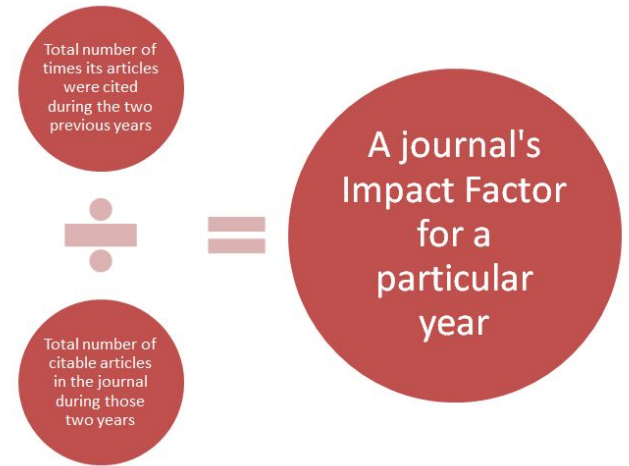
Both free access and open access are available to read for anyone.

Subscription: The author doesn't pay the journal to publish his research, but anyone who wants to read the article must pay for the subscription

Journal	Advantages	Disadvantages
Open access	<ul style="list-style-type: none"> • More accessible to everyone, regardless of their financial resources. • They can help to increase the visibility and impact of research. • They can help to reduce the "publish or perish" mentality that can lead to unethical research practices. 	<ul style="list-style-type: none"> • The cost of publishing in open access journals can be prohibitive for some authors. • There is some concern that open access journals may not be as rigorous as traditional subscription journals.
Subscription	<ul style="list-style-type: none"> • Subscription journals are typically more rigorous than open access journals. • They have a longer history and are more established. • They are more likely to be indexed in major databases. 	<ul style="list-style-type: none"> • Subscription journals can be expensive for readers. • They can be less accessible to people in developing countries. • They can discourage authors from publishing their research.

● Impact Factor (IF):

- A measure of the frequency with which the journal's articles are **cited in other research articles**.
- It is a widely used measure of the **quality** of a journal.
- It is **calculated by dividing the number of citations to the journal's articles in the past two years by the number of articles** published in the journal in the past two years.



Impact Factor limitations

● It is based on citations:

- The impact factor is based on the number of citations that a journal's articles receive. However, **not all citations are created equal**. Some citations are more meaningful than others. For example, a citation from a **highly respected journal** is more meaningful than a citation from a less respected journal.

● It is a measure of recent impact:

- The impact factor is calculated based on the number of citations that a journal's articles receive in the past two years. This means that the impact factor **does not** take into account the **long-term impact** of a journal's articles.

● It is a measure of average impact:

- The impact factor is an average of the number of citations that a journal's articles receive. This means that the impact factor can be **misleading** if a **journal publishes a few highly cited articles** and a lot of less cited articles.

- **Despite** its limitations, the impact factor is a **useful tool** for comparing the relative importance of journals within a particular field. However, it should not be used as the sole measure of the quality of a journal. Other factors, such as the **peer-review process** and the **reputation (سمعة) of the publisher**, should also be considered.

S.No.	Journal Title	ISSN	Category, Journal Quartile	Journal Impact 2022
1	CA-A CANCER JOURNAL FOR CLINICIANS	1542-4863	ONCOLOGY - SCIE(Q1)	286.130
2	LANCET	1474-547X	MEDICINE, GENERAL & INTERNAL - SCIE(Q1)	202.731
3	NEW ENGLAND JOURNAL OF MEDICINE	1539-4496	MEDICINE, GENERAL & INTERNAL - SCIE(Q1)	176.079
4	JAMA JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION	1538-3598	MEDICINE, GENERAL & INTERNAL - SCIE(Q1)	157.335
5	NATURE REVIEWS MOLECULAR CELL BIOLOGY	1471-0080	CELL BIOLOGY - SCIE(Q1)	113.915
6	NATURE REVIEWS DRUG DISCOVERY	1474-1784	PHARMACOLOGY & PHARMACY - SCIE(Q1), BIOTECHNOLOGY & APPLIED MICROBIOLOGY - SCIE(Q1)	112.288
7	NATURE REVIEWS IMMUNOLOGY	1474-1741	IMMUNOLOGY - SCIE(Q1)	108.555
8	Lancet Respiratory Medicine	N/A	RESPIRATORY SYSTEM - SCIE(Q1), CRITICAL CARE MEDICINE - SCIE(Q1)	102.642
9	BMJ British Medical Journal	1756-1833	MEDICINE, GENERAL & INTERNAL - SCIE(Q1)	93.333
10	NATURE MEDICINE	1546-170X	MEDICINE, RESEARCH & EXPERIMENTAL - SCIE(Q1), CELL BIOLOGY - SCIE(Q1), BIOCHEMISTRY & MOLECULAR BIOLOGY - SCIE(Q1)	87.241

Impact factor & quartiles Cont.

● Quartals

- Journals are often ranked into quartiles **based** on their **impact factor** or other bibliometric measures.
- Quartiles help in understanding how a **journal ranks within its field**. The quartiles are:
 - Q1: Top 25% of the journals in the subject category
 - Q2: 25th to 50th percentile
 - Q3: 50th to 75th percentile
 - Q4: Bottom 25% of the journals in the subject category
- A journal being in Q1 means it's among the top 25% of journals in its category, often indicating high impact or quality.

Journal Citation Reports: Quartile rankings and other metrics

🕒 May 24, 2022 · Knowledge

Article
 In *Journal Citation Reports*, we provide quartile rankings based on rank for the Journal Impact Factor. In *Journal Citation Reports*, quartiles are defined as the following:

Q1	0.0 < Z ≤ 0.25	Highest ranked journals in a category
Q2	0.25 < Z ≤ 0.5	
Q3	0.5 < Z ≤ 0.75	
Q4	0.75 < Z	Lowest ranked journals in a category

Q Important

Z is defined as:
 $Z = (X/Y)$

Where X is the journal rank in category and Y is the number of journals in the category.

Examples:
 When sorted by Impact Factor, if a journal is rank 78 out of 314 in a category, $Z = (78/314) = 0.248$ which is a Q1 journal.
 When sorted by Impact Factor, if a journal is rank 102 out of 204 in a category, $Z = (102/204) = 0.5$ which is a Q2 journal.

This equation will not common in exam

Rank	Journal Title	Type	Impact Factor	Cites	Docs	Refs	Index	Score	Score	
11	Saudi Dental Journal	journal	0.446	33	100	300	627	295	1.92	38.95
12	Health Professions Education	journal	0.430	19	6	120	134	223	1.62	22.33
13	Annals of Saudi Medicine	journal	0.400	52	53	184	1371	312	1.43	25.87
14	Saudi Medical Journal	journal	0.361	59	218	622	3745	854	1.25	17.18
15	Journal of the Saudi Heart Association	journal	0.247	21	33	182	983	145	0.71	29.79
16	Neurosciences	journal	0.247	26	50	192	1007	158	0.66	20.14
17	Journal of King Abdulaziz University, Islamic Economics	journal	0.156	12	23	110	822	31	0.22	35.74
18	Scientific Journal of King Faisal University Basic and Applied Sciences	journal	0.137	8	22	243	700	53	0.22	31.82
19	Arab Journal of Forensic Sciences and Forensic Medicine	journal	0.117	2	17	88	471	12	0.14	27.71
20	Journal of King Abdulaziz University, Marine Science	journal	0.111	10	5	27	244	4	0.15	48.80

Title	Type	SJR	H index	Total Docs. (2022)	Total Docs. (Years)	Total Refs. (2022)	Total Cites (Years)	Citable Docs. (Years)	Cites / Doc. (Years)	Ref. / Doc. (2022)
1 Applied Computing and Informatics	journal	0.932	35	48	64	1984	383	64	3.13	41.33
2 Journal of King Saud University - Computer and Information Sciences	journal	0.924	48	813	295	41939	1836	287	6.05	51.59
3 Arabian Journal of Chemistry	journal	0.850	100	785	1683	47153	11740	1682	6.72	60.07
4 Journal of the Saudi Society of Agricultural Sciences	journal	0.833	49	73	202	3669	1224	202	4.47	50.26
5 Journal of King Saud University, Engineering Sciences	journal	0.763	48	117	240	3997	1149	236	4.88	34.16
6 Journal of Saudi Chemical Society	journal	0.742	67	124	327	7254	1827	327	5.84	58.50
7 Saudi Journal of Biological Sciences	journal	0.695	73	605	1695	32852	8241	1695	4.61	54.30
8 Saudi Pharmaceutical Journal	journal	0.629	66	191	527	9579	2635	525	4.42	50.15
9 Hematology/ Oncology and Stem Cell Therapy	journal	0.538	27	7	196	49	379	193	1.87	7.00
10 International Journal of Pediatrics and Adolescent Medicine	journal	0.447	11	44	127	984	253	126	2.04	22.36

القارة:
عبدالله الشهري
وهي التحمي

نواف التركي
ريان الفنامي

الأعضاء:

رغد النظيف
ريما الجريبة
شهد البخاري
نوف الضلعان
أمير الاحمري
وعد ابونخاع
نراء الهويش
في الدوسري
منار الزهراني

عبدالله التركي
محمد الزير
عثمان الدريهم
عبدالعزیز القططاني
ناصر الفيت
سعد السهلي
رائد الماضي
سعود الشعلان
عبدالله المياح
عبدالله النجريس
تركي العتيبي
عبدالله القرني
عامر الفامري
سعد الاحمري
معاذ آل سلام
محمد الحصيني

MCQ:

Q1: Information that is not published in traditional academic journals or books.

What are they called?

- A. Grey literature
- B. Databases
- C. Case control study
- D. Pubmed

Q2: Which one of the following is a limitation for IF?

- A. It is increase the prophecy
- B. It is hard to aplay
- C. It affect the ozone layer
- D. It is based on citations

MCQ:

Q3: Which of the following is correct about the cross sectional study?

- A. It uses a representative sample for population
- B. It is done in long period of time
- C. It is the strongest type of study
- D. It is called brief communication

Q4: Which of the following is easier for readers from developing countries?

- A. Subscription journals
- B. Novels
- C. Open access journals
- D. Books