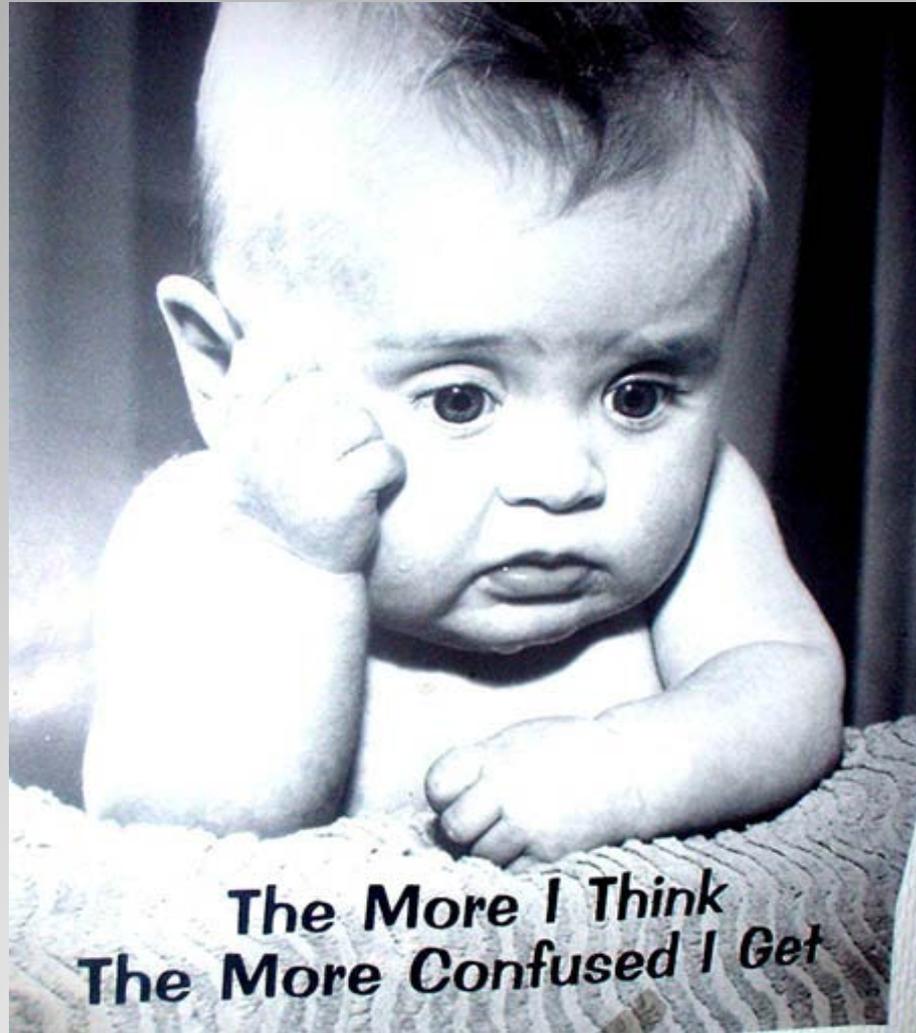


How To Write A Research Article



Faiza Kamal (RDN)
MS CHN, PGD in Dietetics, M.Sc. Food & Nutrition
Registered Clinical Dietitian/ Nutritionist
Shalamar Hospital, Lahore.



Where Do We Begin?

Writing is a critical step in science although scientists are not trained to write.

Even very creative experiments and novel results will have dull impact if the manuscript is not written well.



Writing is nature's way of letting you know how sloppy your thing is..

Guindon, *San Francisco Chronicle*

Art of Writing

There is no form of prose more
difficult to understand and more
tedious to read than the average
scientific paper

Francis Crick

Art of Scientific Writing

Key to Writing Skills

- **The path to writing well is to read excellent writers and write.....and write...and write.**
- **“Free write” your thoughts. Don’t worry about structure initially.**
- **Use the best paper in your field as a template and try to convert your free write-up into a format.**
- **Keep writing concise, dynamic and simple in construction.**
- **Convey enthusiasm in your writing so it attract the audience.**

Attributes of a Good Manuscript

- Concise but powerful
- Story like
- To the point
- Free from grammatical and stylistic errors
- Recognizing contributions of others
- Technically correct

- *Research Articles or Research Papers*
- Review Articles
- Research Reports
- Research Projects for Funding
- Patents
- Dissertation or Thesis
- Book - Chapter (of a book)

Types of Scientific Writings

- Ultimate Product of Intellectual Pursuit
- Report on research findings that are Sound (Valid)
- Previously unknown (Novel and original)
- Add new understanding, observation & proofs
- It has required structure and style IMRaD
(Introduction, Material, Results and Discussion).

Research Articles

When to Write a Draft of Manuscript?

- **Best practice-** Prepare the figures and write the draft as the experiment is progressing
- **Second Best practice-** Write the first draft at a meeting where work is first presented. The experiment will be fresh in mind and free time in the evenings may be sufficient to write a draft.
- Alternatively, the script of a seminar can often be used as a starting draft.
- **The worst practice-** to write a paper after you have left the place (lab.) where the work was performed.

- Divide and work on.....

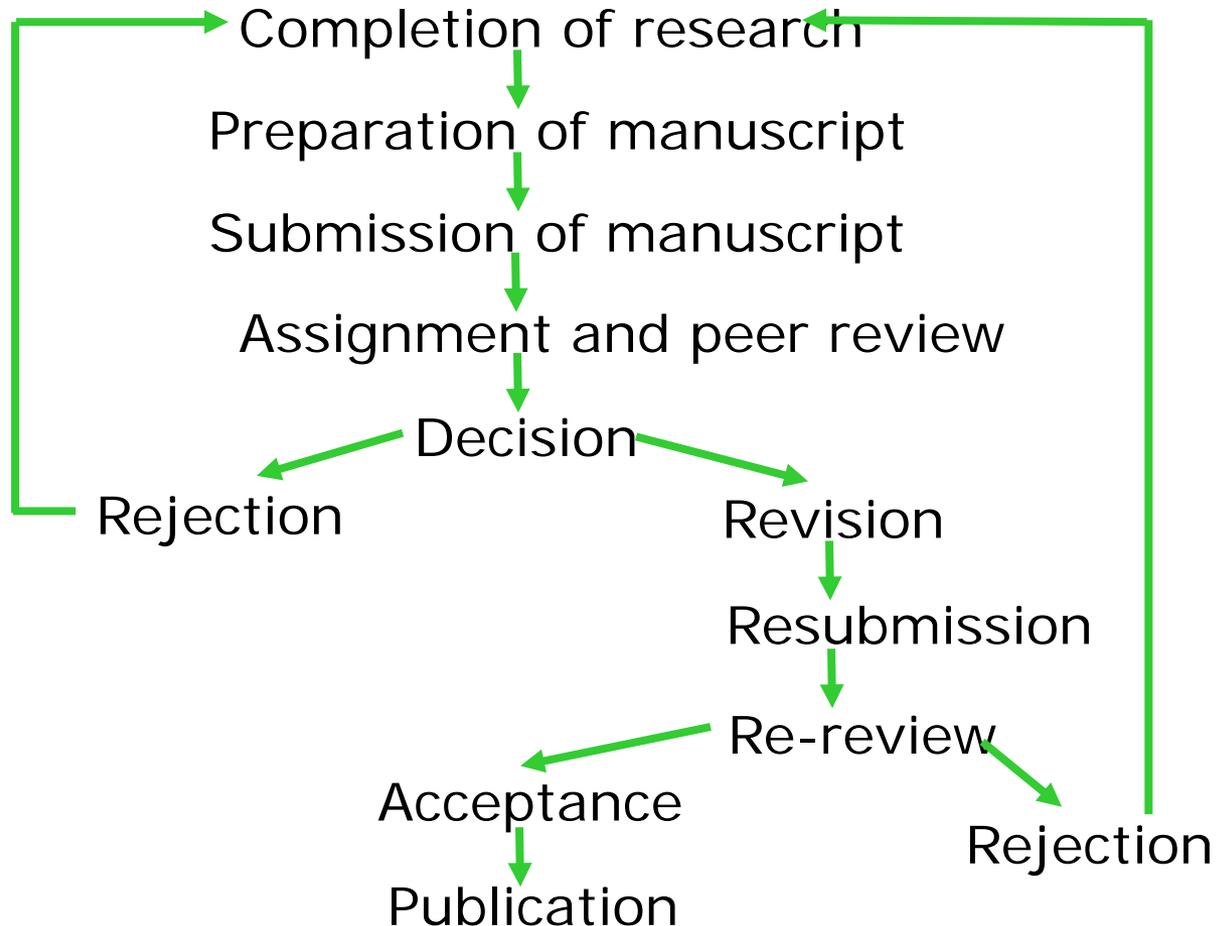
Eat an elephant bit by bit

- If you get stuck on a particular section, just skip to a different section that is easiest to write.

It means the easiest first and the most difficult latter.

Divide and Conquer!!!!!!!

Process of Research and its Publication



Responsibilities of Authors from Preparation of Manuscript to Submission

- New and original research
- Manuscript have been checked by all the listed authors.
- Obtain copyright permission if figures/tables need to be reproduced
- Proper affiliation
- Acknowledgement

Four Questions of Manuscript Writing

What is the?

INTRODUCTION

What did you do?

METHODS

What did you find?

RESULTS

What does that mean?

DISCUSSION

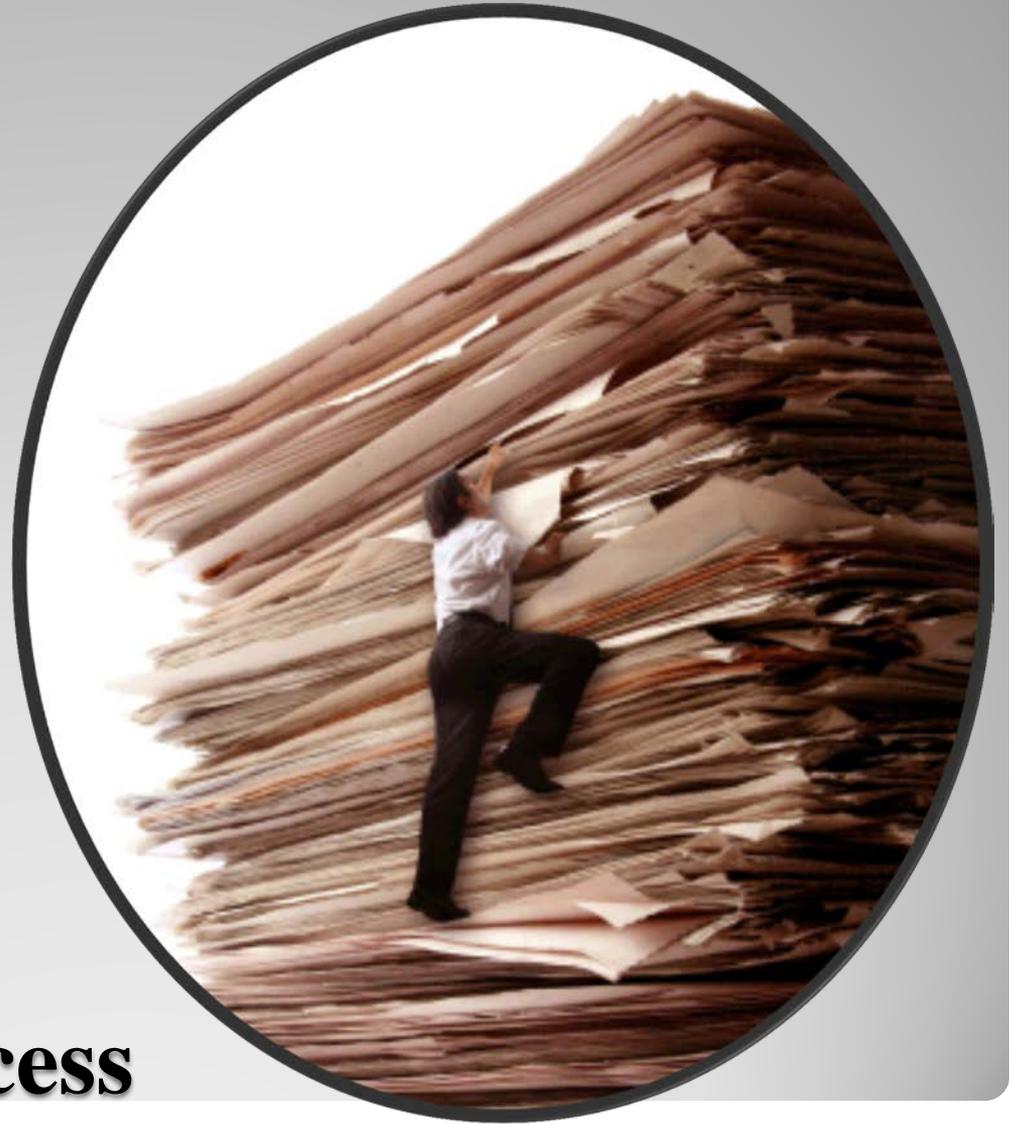


Choosing Your Topic

- **Breadth.** You may need to start broad and let your research take you narrower.
- **Originality.** Choose a topic that will allow you to contribute to the field, rather than just regurgitate facts.
- **Sources.** On the other hand, also choose a topic that has scholarly grounding.

Choosing Your Topic

- 1. Outline
- 2. Draft
- 3. Revise
- 4. Edit



The Writing Process

Benefits of an Outline

- Aids in the process of writing
- Helps you organize your ideas
- Presents your material in a logical form
- Shows the relationships among ideas in your writing
- Constructs an ordered overview of your writing
- Defines boundaries and groups
- Prevents you from “straying” from the topic

Parts of a Manuscript

Section	Purpose
Title	Clearly describes contents
Authors	Ensures recognition for the writer(s)
Abstract	Describes what was done
Key Words (some journals)	Ensures the article is correctly identified in abstracting and indexing services
Introduction	Explains the problem
Methods	Explains how the data were collected
Results	Describes what was discovered
Discussion	Discusses the implications of the findings
Acknowledgements	Ensures those who helped in the research are recognised
References	Ensures previously published work is recognised
Appendices (some journals)	Provides supplemental data for the expert reader

Title

The Backbone of an Article

It indicates content and main discoveries and attracts the readers attention.

It decides whether article is worth reading or will get attention of the readers.

- Describes the paper's content clearly and precisely including keywords
- Is the advertisement for the article
- Do not use abbreviations and jargon
- Search engines/indexing databases depend on the accuracy of the title - since they use the keywords to identify relevant articles

The Impact of Article Titles on Citation Hits

- Most published articles are not cited- the title play a vital role
- Construction of an article title has a significant impact on citation frequency.
- Electronic searches are now preferred over other means, which includes PubMed, Google Scholar, etc.
- These searches are based on the title or key word .
- Longer, comprehensive titles are more likely to contain given search terms.
- Therefore the title should provide clear description, finding of study

Titles

Nature's style -Manuscript Formatting Guide

- Titles do not exceed two lines in print.
- Titles do not normally include numbers, acronyms, abbreviations or punctuation.
- They should include sufficient detail for indexing purposes but be general enough for readers outside the field to appreciate what the paper is about.

Abstract

Most Critical Part of Paper

- Should be informative, indicative and reflects the main 'story' of the article.
- The only chance you have to get the reader's attention.
- Should be crisp, concise and accurate.
- Gives the quick idea of the contents (**Stand alone**).
- What and how was done
- Provide a brief conclusions
- write abstract at the end

*The detailed information must be present in the body text,
not in abstract.*

Abstract

- **Briefly** summarize (often 150 words) - the problem, the method, the results, and the conclusions so that
 - The reader can decide whether or not to read the whole article
- Together, the title and the abstract should stand on their own
- Many authors write the abstract last so that it accurately reflects the content of the paper

Skeleton of an Article

- **Structured**
 - IMRaD formula (will discuss more on next slide)
- **Unstructured**
 - Paragraphs- few sentences summarizing each section

Skeleton of an Article (Continued)

IMRaD structure- Writing a draft

Introduction--- What is the?

Materials and methods/experimental procedures-- What did you do?

Results-- What did you find?

and

Discussion-- What does it mean?

- *Setting the Scene*
- < 2% readers actually cite your article
- And among these < 2% approximately 98% reader just read the introduction
- Ask question to yourself that why anyone should read your paper amongst the 1000's appearing that month?
- *Create-A-Research-Space*
- Brief background information of the current study
- Focused- Should not be too long
- It should introduce the topic and relates to the existing research.
- Integrated review of pertinent work
- Updated literature citation
- Significance of your research - Importance of current study/advancement needed/summary of new findings



Introduction

- Capture your audience. Why is your experiment important?
- Avoid comprehensive review, self citations, etc
- Clearly state the:
 - Problem being investigated
 - Background that explains the problem
 - Reasons for conducting the research
- Summarize relevant research to provide context
- State how your work differs from published work
- Identify the questions you are answering
- Explain what other findings, if any, you are challenging or extending
- Briefly describe the experiment, hypothesis(es), research question(s); general experimental design or method

Introduction



Gerald had begun to think that his methodology was too detailed.

Methodology

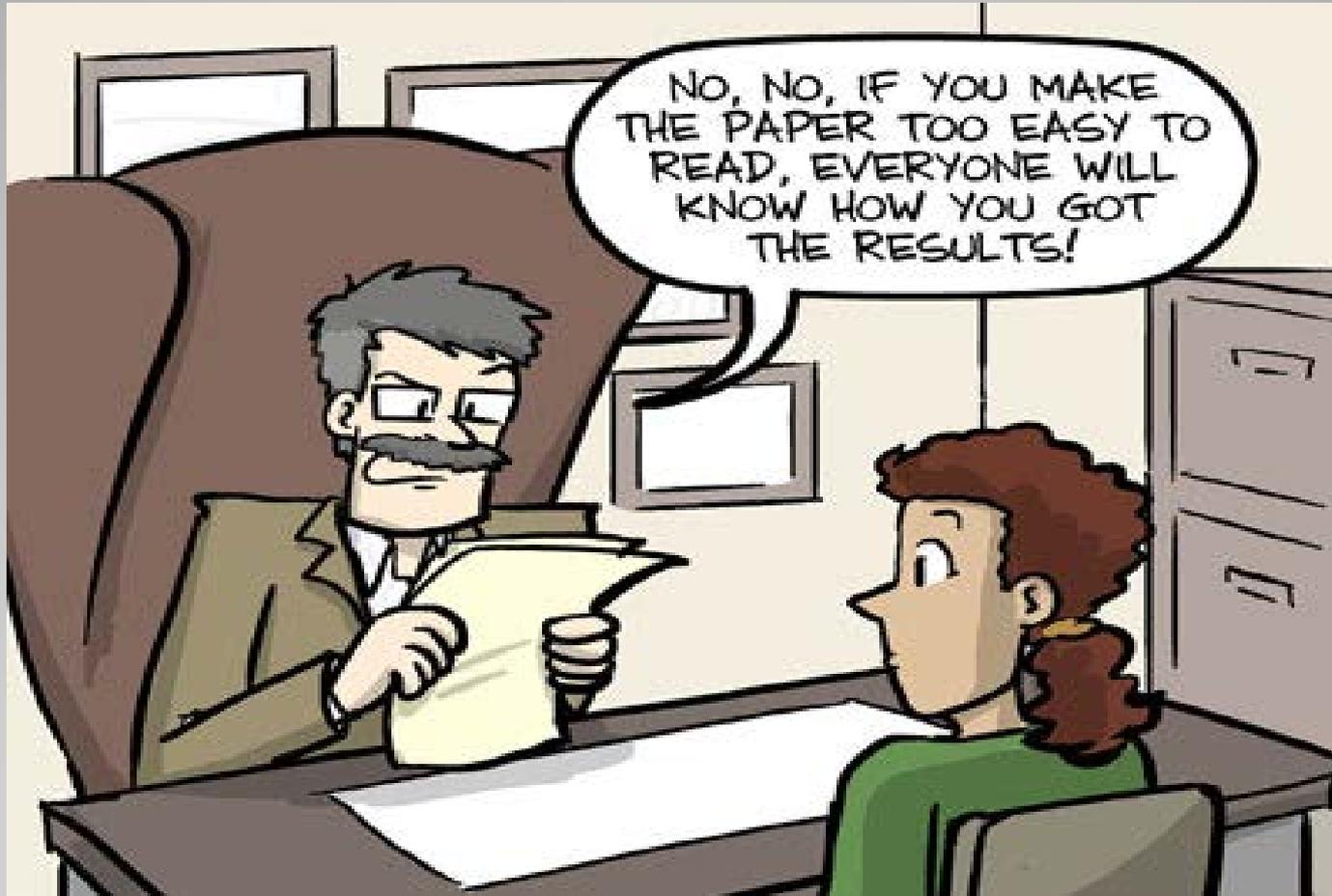
- Write the methods section first because it is the easiest to write.
- Provide enough details for competent researchers to repeat the experiment (Who, What, When, Where, How, and Why?)
- Start writing when experiments still in progress
- Sufficient information must be provided for reproducibility
- Study design must be described in detail
- Supplies, manufacturer, country needs to be added
- Animal, human, protections details
- Measurements/ instruments
- Statistical analysis and data collection
- Descriptive subheadings– general experimental methods, animals, spectral data, etc

Material and Methods

- Provide the reader enough details so they can understand and replicate your research
- Explain how you studied the problem, identify the procedures you followed, and order these chronologically where possible
- Explain new methodology in detail; otherwise name the method and cite the previously published work
- Include the frequency of observations, what types of data were recorded, etc.
- Be precise in describing measurements and include errors of measurement or research design limits

Methods

You are not expected to do it.....



Results

- Use descriptive headings that concisely state the results.
- Data representation-concise and accurate.
- Short and easy to understand
- Consistent with the abstract and introduction
- Give tables and figures where needed
 - With sufficient information so that minimum text is required.
 - Don't repeat information in graphics and text.
- Appropriate numbering of figures and table mentioned in the text.

- Avoid speculations and over discussion.
- Avoid using words such as **proves, confirmed, removed all doubts**, etc. Remember science is dynamic and ever changing.
- Objectively present your findings, and explain what was found
- Show that your new results are contributing to the body of scientific knowledge
- Follow a logical sequence based on the tables and figures presenting the findings to answer the question or hypothesis
- Figures should have a brief description (a legend), providing the reader sufficient information to know how the data were produced

Results

Hardest section to write, but it is also the most important.

- Use descriptive headings that concisely summarize the interpretation of the results.
- Answer the question posed in introduction
- Correlation of your finding with the existing knowledge
- Discrepancies between new results and previously reported results.
- What is new without exaggerating.
- Conclusion/summary, perspectives, implications.
- Research limitations and need for future research.
- Theoretical implications and possible practical applications.

Discussion

Conclusion

- Identify key findings and application
- Should not be a summary of the work done- abstract is doing fine with that.
- Consistent with experimental and introduction

Jane suddenly realised that her reference list had too many self citations...



References

- Whenever you draw upon previously published work - **must** acknowledge the source
- Any information not from your experiment and not 'common knowledge' should be recognized by a citation
- How references are presented varies considerably - refer to notes for authors for the specific journal
- Avoid references that are difficult to find
- Avoid listing related references that were not important to the study
- Cite current and key pertinent references
- Reference citations must be accurate and complete
- Read the references
- Use correct style for journal

References

Vancouver Reference Style

Uses a number series to indicate references; bibliographies list these in numerical order as they appear in the text

1. Adams, A.B. (1983) Article title: subtitle. Journal Title 46 (Suppl. 2), 617-619.
2. Lessells, D.E. (1989) Chapter title. In: Arnold, J.R. & Davies, G.H.B. (eds.) Book Title , 3rd edn. Blackwell Scientific Publications, Oxford, pp. 32-68.
3. Bennett, W.P., Hoskins, M.A., Brady, F.P. et al. (1993) Article title. Journal Title 334 , 31-35.

Modern electronic tools for writing manuscripts

Use **EndNote** for references
...Bibliographies Made Easy™

The screenshot displays the EndNote X4 software interface. The main window, titled "My EndNote Library.enl", shows a list of references in a table format. The table has columns for Author, Year, Title, Journal, Ref Type, and URL. Two references are visible:

Author	Year	Title	Journal	Ref Type	URL
Atta Ur, Rah...	2004	New cholinesterase inhibiting bisben...	Chemical &...	Journal Arti ...	http://www.ncbi.nlm...
Choudhary, I,...	2004	Review mortality trends to reveal em...	AIDS alert	Journal Arti ...	http://www.ncbi.nlm...

Below the main window, a search window titled "Online Search - PubMed MEDLINE at PubMed (NLM)" is open. It features a search bar and several criteria fields:

- Search: [Search] [Options]
- Search Remote Library: [Dropdown]
- Match Case:
- Match Words:
- Criteria 1: Author (Smith, A.B.) [Dropdown] Contains [Dropdown] Iqbal choudhary [Text]
- Criteria 2: And [Dropdown] Year [Dropdown] Contains [Dropdown] [Text]
- Criteria 3: And [Dropdown] Title [Dropdown] Contains [Dropdown] [Text]

The status bar at the bottom indicates "Showing 2 of 2 references in Group. (All References: 2)". The Windows taskbar at the very bottom shows the system tray with the time 10:43 AM and several open applications including "endnote_x4 - M..." and "EndNote X4 - M..."

Acknowledgments

- Funding agencies
- Intellectual contributions
- Dedications
- Notes

Final Step is - Revision and Proofreading



Revision, Revision, Revision

- After writing the first draft, at least a dozen revision are usually needed to improve to the text.
- Make sure that all authors read the first draft. Give them timeline...

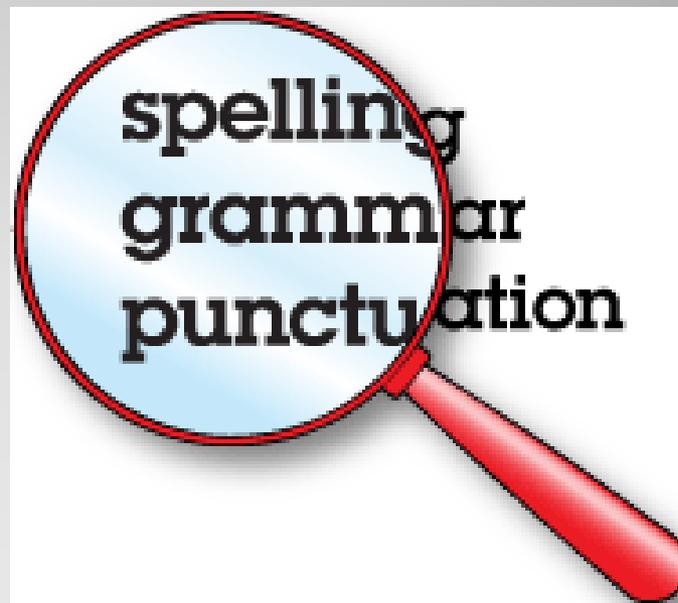
Revision and Proofreading

- Effectiveness of the study
- Supporting information
- Order and flow of the article
- Must be leaving reader with a new question



Revision and Proofreading

- Proofreading- *All authors should participate*
- Grammar and spelling errors
 - Consistent verb tense
 - Vocabulary
 - Tighten the sentences
 - spell-check
 - Punctuation
 - typos
- Technical terms
 - Scientific symbols
 - Reaction scheme
 - Chemical structures/names
 - references



The most important factors that influence whether your manuscript will be considered/reviewed for publication are the title, abstract, cover letter, and your reputation based on your previous work.

Criteria for Acceptance

- Originality
 - Novel or creative research methodology
 - New and important research findings
- Scientific Quality (It is impossible to write a good paper on the basis of lousy science!!!!)
- Experimental design and methodology
- Research data representation
- Depth of the investigation
- Thorough and logical discussion of results

Criteria for Acceptance

- Clarity of Presentation
 - Organization/ presentation
 - Readability/ clarity of writing/ grammar
 - *Paper is much more likely to be rejected based on inadequate analysis than lack of originality*
- Importance in the scientific world

Major Reasons for Rejection

- The study is just confirmation of previous research i.e. not novel
- Poor experimental design
- Targeted journal is not suitable
- Weakly written/presentation and language

- Be factual
- Be honourable
- Be legal
- Be truthful
- Be objectives
- Be accurate
- Don't deceive
- Don't falsify
- Don't plagiarize

Do's and Don't in Scientific Writings

Ethics in Scientific Writings

- Authorship issues
- Informed consent/ **institutional review board/ ethical review board** approval
- Acknowledging past and present contributions of others
- Registered Clinical Trials
- Acknowledge Grants/funding
- Avoid Fragmentary or duplicate publications

Ethics in Scientific Writings

1. **Falsification and Data alteration**
2. **Plagiarism:** Intentional use of another persons work with reference to your name without proper citation of the original source
 1. www.turnitin.com and
 2. www.plagiarism.com
3. **Duplicate manuscripts**
4. **Unnecessary self citation**
5. **Redundant publication**
6. **Author conflicts of interest**
7. **Animal use concerns**
8. **Human use concerns**

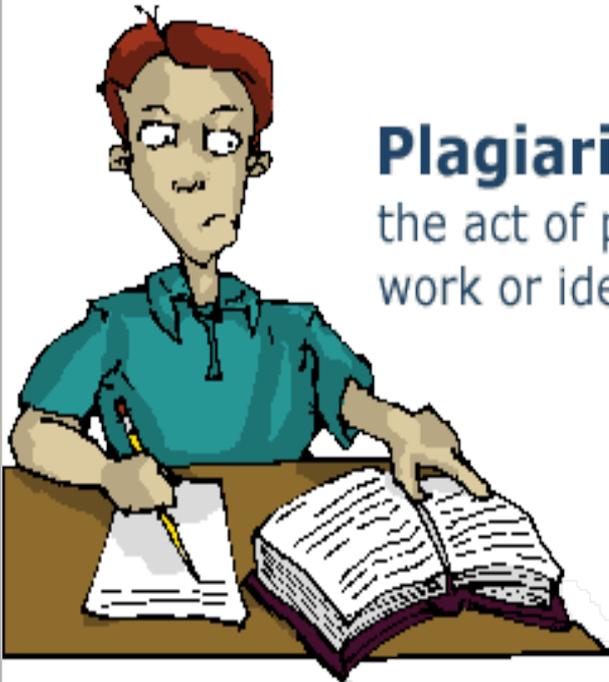
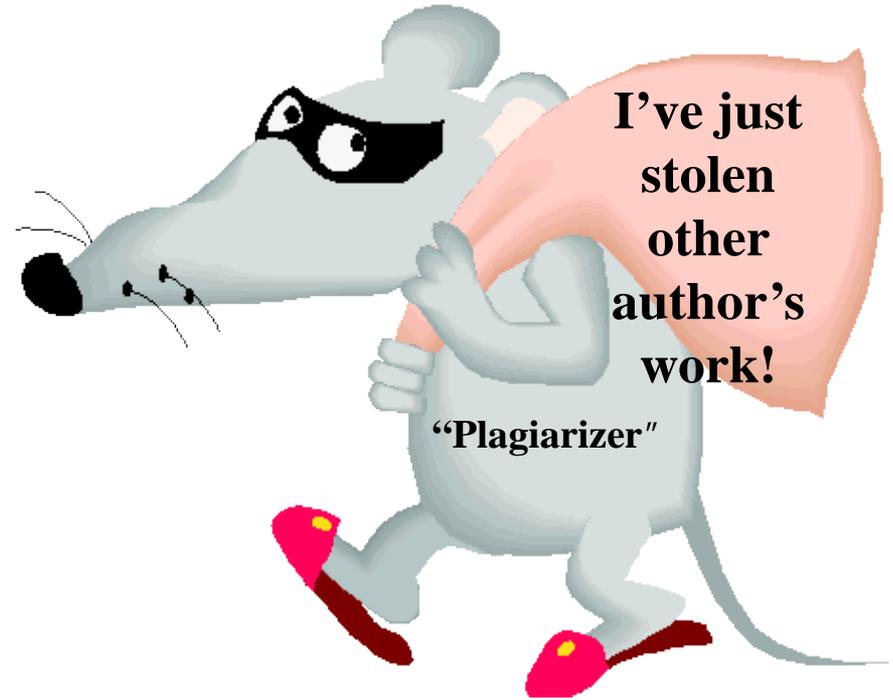


"Welcome to the co-author's party!
You're number twenty-one!"

Authors Listing

- ONLY include those who have made an intellectual contribution to the research
- OR those who will publicly defend the data and conclusions, and who have approved the final version
- Order of the names of the authors can vary from discipline to discipline
 - In some fields, the corresponding author's name appears first

Plagiarism



Plagiarism:

the act of presenting another's work or ideas as your own.



Paraphrase!!!

Direct quote from research:

“Japan’s beautiful Mount Fuji last erupted in 1707 and is now classified as dormant. Dormant volcanoes show no signs of activity, but they may erupt in the future.”

Non-plagiarized paraphrase:

Mount Fuji, the highest mountain in Japan, is actually a dormant volcano. Dormant means that it is not active. The last time Mount Fuji erupted was in 1707, and there is always the possibility of a future eruption.

Plagiarism v. Paraphrasing Samples

Points to be Considered before Publishing

- Targeted audience
- Prestige of journal and your own institution
- Access (open access/ subscribed)
 - availability free of charge on the World Wide Web
 - On payment
- Impact factor of the journal
- Probability of acceptance
- Publication time

Article Submission

- Select your journal carefully
- Read the aims and scope
- Think about your target audience and the level of your work – do you have a realistic chance of being accepted?
- **Follow the guidelines** in the notes for authors and include everything they ask – it makes the editor's job easier...
- Articles should **not** be submitted to more than one journal at a time

See: Instructions to Authors in Health Sciences

<http://mulford.mco.edu/instr/>

- Many publishers now offer a completely electronic submission process
- Article is submitted online and all of the review procedure also happens online
- Speeds up the editorial process
- Is invaluable for authors in low-income countries

Online Submission

Author Priorities for Journal Selection (Elsevier)

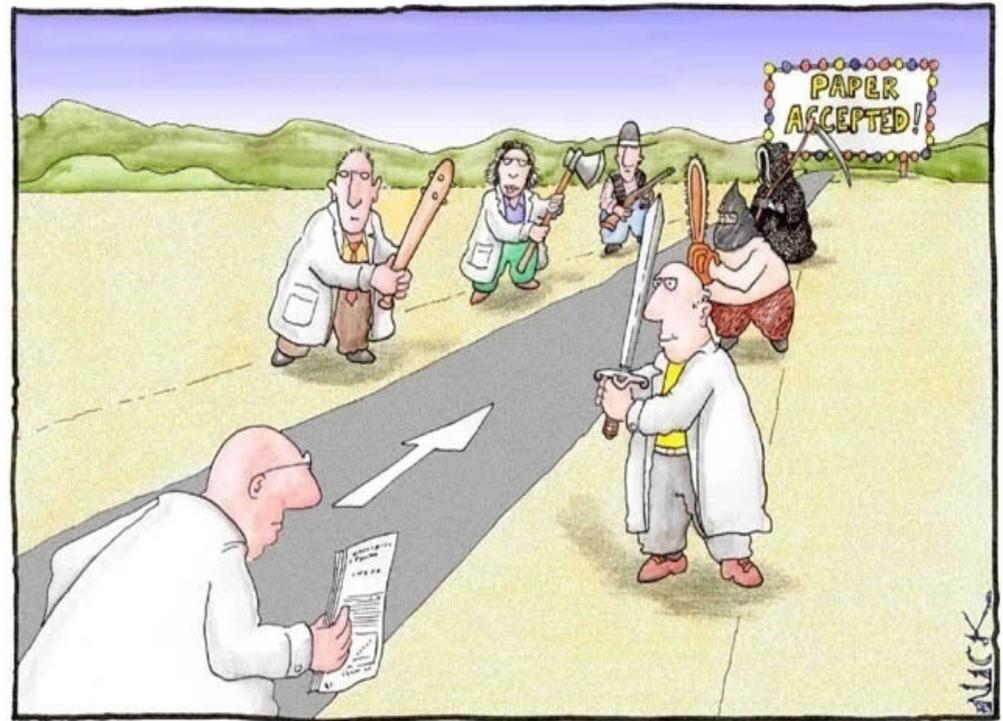
- Key (Determining) factors
 - Impact Factor
 - Reputation
 - Access to the target audience
 - Overall editorial standard
 - Publication speed
 - International coverage
 - Open Access
- Marginal (Qualifying) factors
 - Experience as a referee
 - Track record
 - Quality and colour illustrations
 - Service elements

- Most journal editors will make an initial decision on a paper - to review or to reject
- Most editors appoint two referees
- Refereeing speed varies tremendously between journals
- Authors should receive a decision of Accept, Accept with Revision (Minor or Major), or Reject
- If a paper is rejected, most editors will write to you explaining their decision
- After rejection, authors have the option of submitting the paper to another journal - editor's suggestions should be addressed

After Submission

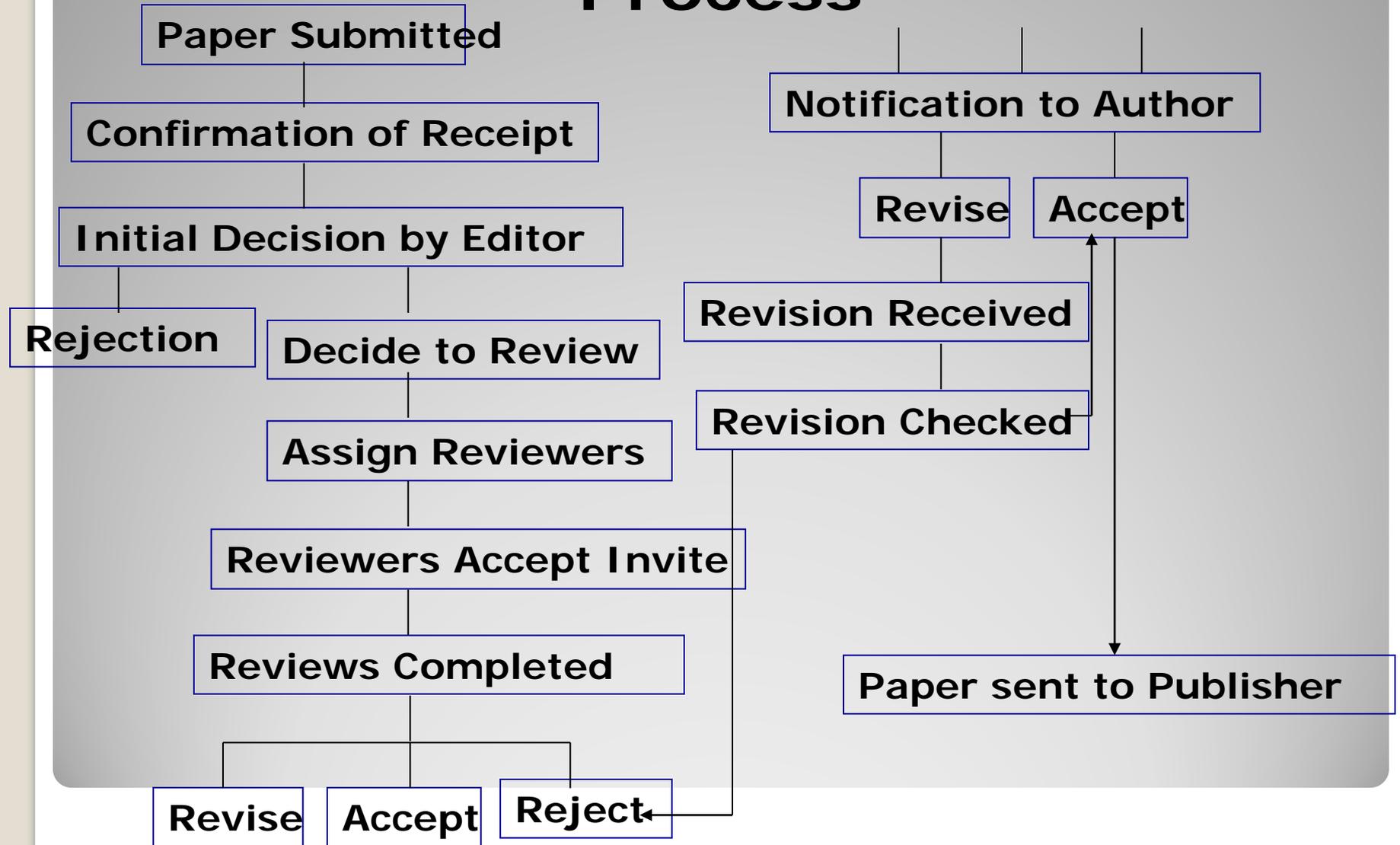
What is Peer Review Process?

- Exciting the reviewer's mind is far more important than exciting the reader's mind.
- It is likely that no one will ever read your paper more thoroughly than the reviewer.
- Suggest referees that appreciate your work



Most scientists regarded the new streamlined peer-review process as 'quite an improvement.'

Overview of Peer Review Process



Publishing Tips

Editors and reviewers are looking for original and innovative research that will add to the field of study; keys are:

- For research-based papers, ensure that you have enough numbers to justify sound statistical conclusions
- For a larger study, it may be better to produce one important research paper, rather than a number of average incremental papers

How Important Citations are???



"I was published a couple of years ago in a crap journal and nobody is citing me"



"I was published a couple of years ago in a mid-tier journal. I've got slightly more citations than expected"



"I was published recently in a good journal. Citations are as expected."



"I was published recently in a good journal and I'm getting lots of citations."

Call for Papers – Elsevier (example)

ELSEVIER: BUILDING INSIGHTS; BREAKING BOUNDARIES/MANUSCRIPTS SUBMISSION

On behalf of all the Editors-in-chief of Elsevier journals, we wish to Communicate to you that we are currently accepting manuscripts in all fields of human endeavour. Authors are invited to submit manuscripts reporting recent developments in their fields. Papers submitted will be sorted out and published in any of our numerous journals that best fits...

The submitted papers must be written in English and describe original research not published nor currently under review by other journals. Parallel submissions will not be accepted.

Call for Papers – Elsevier (example)

Our goal is to inform authors about their paper(s) within one week of receipt. All submitted papers, if relevant, will go through an external peer-review process. Submissions should include an abstract, 5-10 key words, the e-mail address of the corresponding author. The paper length should not exceed 30 double-spaced pages including figures and references on 8.5 by 11 inch paper using at least 11 point font. Authors should select a category designation for their manuscripts (article, short communication, review, etc.).

Papers should be submitted electronically via email in Microsoft Word or PDF attachments and should include a cover sheet containing corresponding Author's name, Paper Title, affiliation, mailing address, phone, fax number, email address etc. Would-be authors should send their manuscript to: elsevierpublications@live.co.uk

Kind Regards, Philip McGregor (Prof.)

- Read the instructions for authors carefully
- Format manuscript in line with the journal style
- Send the manuscript to the journal editor and await for the acknowledgement
- Wait for reviewers comments
- Address all the comments of the reviewers

How To Submit a Journal Article

How To Submit a Journal Article

- Keep to deadline for submission of revised manuscript
- Return the revised manuscript to the editor with a point-by-point response to the reviewers' comments
- Read the proof sent by the editor and ensure that everything is okay
- Return the proof back to the editor before the deadline
- Complete and return copyright form to the editor (some journals need this before publication)
- Wait to see the article in print or online
- If the manuscript is rejected at the peer review level, revise it using the reviewers comments and send to another journal

Global View of Publication in Science

- Approximately 35,000 journals published regularly
- Total number of papers published annually exceeds 2.5 million

Over 50% are never cited by any one

- *Google Scholar has almost to taken over the world bibliometry*

Number of Journal Published

(Thomson Reuters-Web of Science –Master Journal List)

Field*	Number of Journals
Arts & Humanities Citation Index	1632
Biochemistry and Biophysics	473
Life Sciences	1408
Engineering, Computing & Technology	1329
Clinical Medicine	1519
Arts & Humanities	1338
Agriculture, Biology & Environmental Sciences	1261

<http://science.thomsonreuters.com/mjl/>

* These are only selected fields

Global View of Publications in Science- Hard Facts

- Over 50% of research papers receive no citation
- 90% readers glance through the content list only
- Only 5% open the journal to review through the titles
- Less than 2% scientists read the abstract and introduction
- Less than 1% read rest of the paper!!!!!!!!!!!!!!

What are High Impact Factor Journals?

- Impact factor of journal is the frequency of its citations.
- High impact factor journals are the ones which have high frequency of citations by others
- It is a superficial, but internationally accepted, measure of quality of journals
- Journals with high impact factors considered to be more scientifically important and more prestigious.

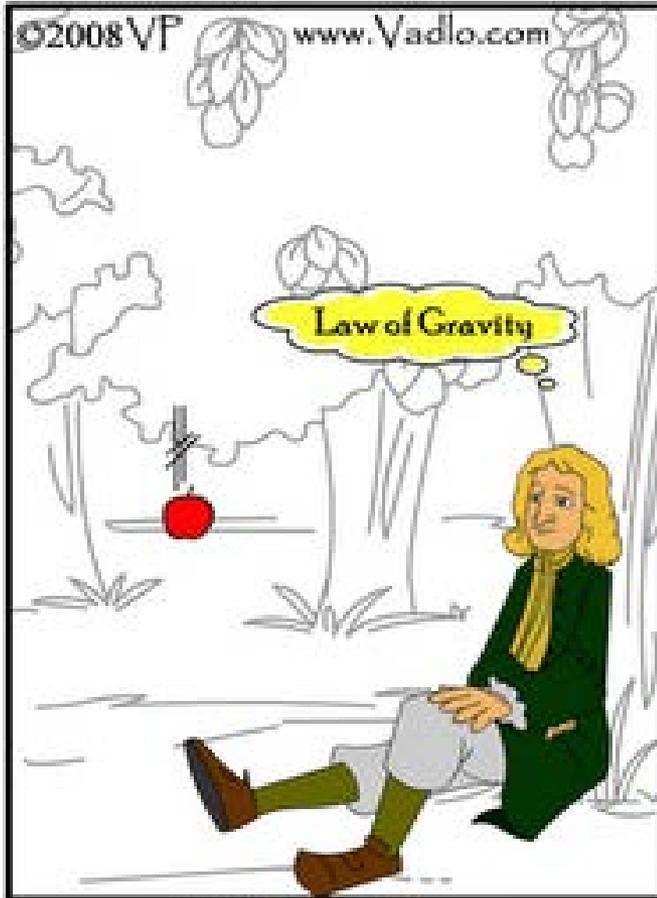
A good high impact journal may publish a paper which have low to zero citations.

Journal Impact Factor 2017

<u>Journal</u>	<u>Impact Factor</u>
<i>Nature</i>	40.137
Biomed Pharmacotherapy	2.625
<i>LANCET</i>	47.831
JCPSP	2.625



Publishing in High Impact Journals-It's the idea which matters



High Impact Paper



Low Impact Paper

E-Journals Vs Print Journal

E-Journals

Merits	Demerits
Easily accessible	Non-availability of full text (Sometime)
Online submission	Subscription only for a fixed duration
Online editing	Poor quality of Portable Document File
Time Savings	No perpetual access
On spot access	Can not read at your leisure
Can download any article with/without payment	Continuity of content is disturbed
	Problems in downloading

Print-Journals

Merits	Demerits
Easily accessible	Increased time spent in searching information
Personified copy	Non-availability of Indexes in some journals
Legibility	Expensive according to number of copies
No dependency on computer/electricity	Require more space
Can read at your leisure	
No need of link/continuity	
Can keep all printed versions to eyesight at a glance	

Why it is Important to Publish in High Impact Factor Journals

- Publish or perish
- Greater visibility of research findings
- Increase chances of citations
- Greater recognition among peers
- Associated benefits such as promotions, productivity allowances, etc

Which Manuscript are Published in High Impact Factor Journals

- Work of established scientists
- Results of general interest
- Novelty of findings
- Concise and well written

Criteria of a Good Research Publication

- Novel idea (out of the box thinking)
- Quality science/research
- Good writing and attractive presentation
- Published in high impact journal

Remember a good article is the one that is read and cited!

From Good Research to Good Writing

- Quality is state of mind
- Good science lead to great findings, and
- Great findings need to be reported in the best possible way to the world

Why Publishing Research Articles is Important?

Ideally it is

- to communicate and share the new discoveries in science to improve the quality of life and for providing better healthcare.
- Make contributions to society

More often is

- to be advance in the field
- to get the research funding/grants
- to get the tenure
- to improve the scientific impact of institute/individual
- recognition by peers

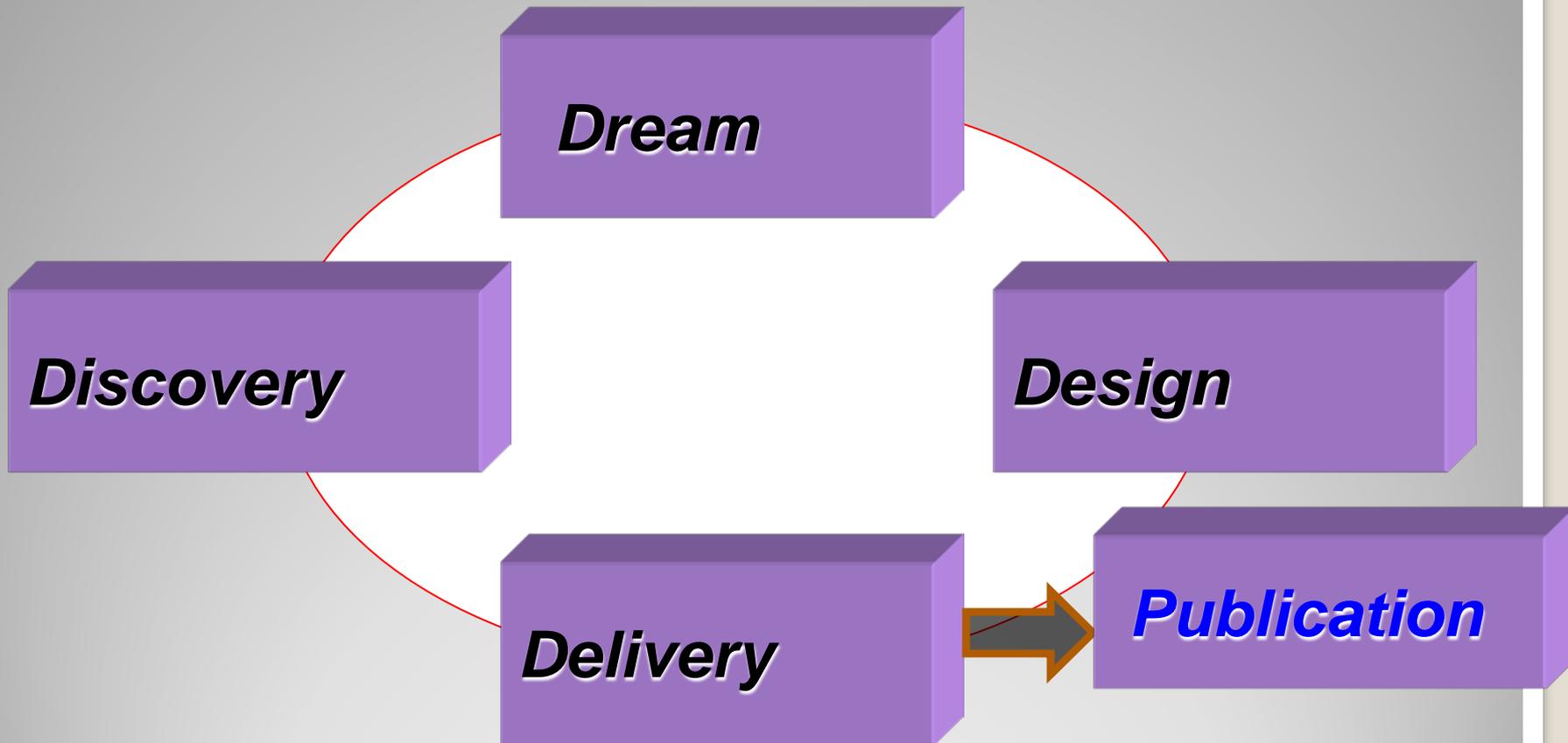
When to Publish or Not to Publish?

- Quality of the scientific study
- Invention and innovation
- Depth of the study
- Interest of scientific community and layman
- Audience
- Message in the publication
- Time of publication

- **Aim high-** Go for first tier journals if you have time and temperament to write a good manuscript.
- Decide the target journal before writing or drafting the article.
- Prefer those journals which publish similar work or the journal articles you are citing for your work.
- If you think that your competitor is ahead of you, go for second tier rapid publication journal, because it is important to first

Deciding the Journal for Publishing

Research Paradigm



*“Creativity is fundamental attribute of science,
which is driven by curiosity”*

Hands On Activities

Any Questions?

We now will proceed to the 'Hands On Activities' for 'How to Write a Scientific Paper'

- Structured Abstract
- Bibliographic citations
- Journal selection
- Other?



