

How To Write The Methods Section: Various Shortcomings And How To Overcome Them

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Abstract: Every research paper includes a method section. It is one of the most easily written section and still accounts for 30% of rejection rate (1). This paper aims to facilitate the writing of the method section by providing three models namely Matrix approach, Pyramid approach, Concept map/brain map and last but with a condensed and comprehensive account into all ten components of method via text and a Master flowchart and a brief illustrative view of methodology. Also to make the nature of writing easy and to facilitate a tailored approach that goes from general to specific, a multiple number of questionnaires have been provided with a special emphasis on biomedical research to tailor the need of a wide number of disciplines and subdisciplines of biomedical sciences and provide a quick checklist.

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I. Introduction

Most scientific papers are divided into following sections Title, Authors and Affiliations, Abstract, Introduction, Methods, Results, Discussions, Acknowledgement and Citations and References. The Abstract explains what was done in a nutshell, the INTRODUCTION emphasizes on what the problem was, the Materials and method section elucidates how the problem was solved. The results section accounts for what was discovered. The discussion section enumerates and interprets what was discovered. The Literature cited takes into account all the authors and all the works/research papers referred to. The extra information takes into account all the appendices used for the purpose of references.

Statistically speaking the chances of rejection of a paper due to method section is about 30% (1). According to Javed Ali "if the methodology of a study is flawed or questionable, the result is bound to be questionable as well" (2). Hence there is a huge significance to this section as it is the most easily written section but irrespective accounts for 30% rejection rate (1).

There are 10 major components of method section. These components of method section are {1} Material and Methods; {2} Participants /subjects; {3} Preparation or prerequisite preparation; {4} Protocol design; {5} Procedure; {6} Design of the experiment/study design; {7} Writing Style of the Methods Section; {8} Ethical Considerations; {9} Measurements and Calculations; {10} Data collection and analysis (3)(1)(4)(5)(6). Optionally, it can include a Summary and Resources used from public domain (permission obtained).

The Goals of a method section should be to chronologically document all the steps of the experiment/procedure for future reference. So that it can be a baseline source of reference and modification if needed. Secondly, the lucidity and a systematic comprehensibility is important so that the experiment can easily be replicated and reproduced elsewhere by another interested reader/scientist. (5)(3). Thirdly, To persuade the reader of the precision of the methodology and hence of the reliability of the results. This is important as it is reflective of the competence and clarity of the researcher and aptness of the research (5). An ideal method should have three main sections/pillars i.e. a systematic scheme of arrangement, details of all methods and the methodology. It is enumerated in the flowchart below. (Fig 1: Masterflowchart)

The **common shortcomings** usually encountered are **Over exaggeration** and over explanation of basic concepts generally distracts the reader from integral information and should be avoided to improve productivity (7). In a similar fashion excessive elaboration of very basic concepts should be avoided (7). Secondly, A well written method section always includes a comprehensive account of **obstacles encountered** and ways used to overcome them. This facilitates better reproductivity and is reflective of a content

rationale(5).Hence ,problem blindness should always be avoided (7).Thirdly, the study should be based on and/or conducted after an intensive **literature review**. Sources should be mentioned completely (8)(9). Other components are an **intensive literature review**(already mentioned/see fig 2) and a detailed step by step account of methods used.(Fig 2)

Conducting an effective literature review that will yield a solid theoretical foundation should also provide a firm foundation to the selection of the methodology for the study (10). The selection of the methodology should not be interpreted as placing more rigor on one type of research such as qualitative, quantitative, exploratory or confirmatory, but rather it should enable the researcher to understand what methodologies were previously validated (11)(9).Therefore, it is necessary for researchers to provide justification for methodology used and state why it is the best suited or the most optimum approach for the study. A strong and extensive literature research provides a firm foundation for laying a solid bedrock for methodology.

Some smart tips to maximize productivity of this section can be as follows. Firstly, **don't fear thy statistical test**.The thought of application of large amounts of data in quantitative research can seem daunting to some. "A divide and rule approach" can really facilitate the analyses of data. Breaking the information into chunks and then processing it and then deciding the most appropriately test to be applied can facilitate the process(7). Secondly,**know the difference between theory and method**.A helpful way to delineate between them is to understand "theories" as representing different ways of characterizing the social world when you research it and "methods" as representing different ways of generating and analyzing data about that social world (12).For best results it is ideal to brainstorm between the interrelationship of application of theories and methods ,this allows you to assess and analyze the outcomes and results and improve on/improvise the methodology and spike up and optimize your results.Thirdly,**don't confuse method and methodology**.Method and methodology are used interchangeably ,but they are not the same.They are synonyms. Methods are the "technical knowhow" or the basic steps for doing research (13). It is illustrated in the figure below(fig 3).(see Fig 3)

Whereas methodology is the discussion of the methods.It has three basic constituting components namely nature of academic work-this constitutes the more of working knowledge and is general in nature eg.if someone is working on a survey based research then the basic methodology or the working knowledge of it. If some research involves biomedical components then the basic or pre requisite knowledge of lab procedures and its underlying principles(14)(15)(16).

In addition to a basic understanding of methods,its components and methodology a researcher should also understand the **two groups/approaches of research methods** as It amplifies the understanding of the nature of your approach. Hence promotes logistic thinking and clarity. The first one being the **Empirical Analytic Group Approach**(17). This type of research is based on deductive logic and uses it to form hypothesis that needs testing. .Deductive logic in very simple terms can be defined as the logic that goes from general to specific (18) .This approach comprises of yes or no questions .It's an explanation centric approach (17). The second one is the **Interpretative method** (14). It is a subjective approach. It allows a deeper understanding of the phenomenon under observation. Inductive logic is the logic that goes from specific to general or coming on conclusion based on similar observations/phenomenon (18). This type of approach can be used to obtain observable outcomes. Also this type of research should include careful observation of variables because of its subjective nature. This increases scope for this type of research while making sure of its elaborative nature(19)(14).

In addition to the above mentioned concepts and approaches certain **quick pointers** can be used to maximize the output of your method section. These are as follows. Always explain the basic plan/approach to analysis your result. Additionally, explain how it fits the overall research design. Be cohesive, In case of qualitative research it is advisable to provide a detailed account of methodology. Lastly, It is advisable to use past tense throughout as the work being done was in the past and not in the future (20). Besides these quick pointers while preparing a research manuscript certain points should be kept in mind for writing for **figures, tables and legends**(21).

A legend is a miniature table of correspondence between the patterns and symbols and their meaning. For legends always remember to include a complete legend to identify symbols, lines, and patterns. Preferably, put the legend inside the figure box, preferably above it or to the right. As a rule of thumb, remember to put the legend inside the figure box, preferably above it or to the right (22). A few other things that one should remember are both figures and table legends should match the table or graph.Table legends go above the body of the table and are left justified.Tables are read from the top down.Figure legends go below the graph and are left justified.They are usually read from bottom up. Preferably, same font used for the body should be used (22).

II. Understanding The Components

1.Method section

This section explores the basis for the application of certain procedures or techniques to facilitate identification, selection, processing and analysis to critically evaluate a study's soundness and reliability (3). Due to the nature of scientific enquiry there is a need for the method section to be comprehensible and systematic hence avoiding confusion and inappropriateness/inexactness. It should describe in chronological order what was done in the experiment. Enough information should be provided so that the experiment can be repeated by the interested reader/scientist. Also the audience can judge the validity of the results and conclusions (3). In totality the method section should take into account, the materials that were used in the study, how the materials were used in the study, how the measurements were made, how the calculations were performed and how the data was analyzed (3)(23)(5)(24)(25)(26).

2.Participants/Subjects

To determine the soundness of the study a detailed description of the subjects /participants should be provided. The subjects used can be human beings, plants or animals. In case of **human subjects** a detailed n through description should be there i.e. whether the human subjects recruited for the study are singular (as in case of clinical studies), or a sample of population (with a detailed account of ethnicity, age, gender and its racial composition). In case a **sample** of population is included which sampling type it is should be mentioned with a sample size justification (5)(16)(27).

Also details like how many participants/subjects were exposed to the intervention and the inclusion and exclusion criterion for the same should be mentioned. Also if any incentives were received by the human subjects for participating in the research should be mentioned.

In case of animals a detailed description of species, weight, strain, sex, age should be mentioned. The recruitment of all the participants/subjects should be met with the **approval of ethics committee** (16).

Certain common things should be kept in mind by the researcher while mentioning the details of participants and subjects in the methodology:-

1. The term subject is only useful for human participants.
 2. In case of a population the demographics should always be mentioned with great detail.
 3. In case the organism studied (animal, bacteria, other microorganism or other lower animals) it is important to mention their pre experiment handling and care, and when and where the study was carried out.
- For more details refer to the ethical consideration section of the paper.

III. Preperation Or Pre-Requisite Preperation

A detailed description must be provided prior to beginning the experimental protocol. In addition all aspects of animal or tissue preparation prior to initiation of protocol must be described in detail. Studies involving animal models or mechanical models enough details should be provided to facilitate replicability (3). Introduction of novel thing requires new discussion. In case a study involves drugs then the generic name of the drug, the name of the manufacturer should be mentioned, other than this the concentration, the dose, the infusion rate should be mentioned (3). In case the procedure/experiment involves use of medical gases, the concentration, rate of flow, storage conditions should be mentioned (3)(21)(28).

3.Procedure

All the steps in the procedure should be mentioned in a chronological order from the perspective of future reference and having the element of reproducibility by another interested scientist/reader (27).

4.Protocol design

A research protocol is basically a meticulous plan of study (3). It can also be defined as a sequence of manipulations and measurement procedures that make up the experiment. Its description should follow the exact sequence of how the procedures were executed (3).

Why is it important

1. It aids clarity and encourages meticulous and methodical thinking.
2. It is an integral part of the research proposal and a conduit for funding.
3. It is a necessary aid to obtain the ethical approval as it showcases the technical know-how and aim of the study. The description should give a meticulous and a descriptive account of the baseline measurements followed by a through descriptions of independent and dependent variables.

A dependent variable is a variable which depends on the consequence of other variable. It is also called as outcome response or a explained variable. It shows the effect of introducing the independent variable. Independent variables are the variables that explain other variables. They are explanatory in nature

.Understanding independent variable is necessary as this is the variable that researcher has control over.Example: Smoking causes cancer. Here cancer is the dependent variable (25).

Certain pointers should be kept in mind by the researcher for protocol development :-

- 1.During development of the protocol opinions and recommendation of experts should be sought after and accommodated, as well as from your peers.
- 2.After the protocol is set and the study has begun it should never be tampered with unless it's really critical as it can disturb the whole purpose and the fundamental ground plan of the study.
- 3.An additional factor that can maximize productivity for large studies or for studies involving a large number of investigators is to develop an operation manual, this will promote a uniformity and facilitate a standardized approach. For a sound protocol three factors should be ensured i.e. Feasibility,Adequacy AndMeticulousness.

Incase of clinical research format all the relevant aspects that are out of the control of the research protocol in the peri experimental period should be mentioned in a detailed and descriptive manner(16).It is generally ideal to follow the APA format (29).

IV. Research Design

Bless, Higson-Smith and Kagee (2006:71) define research design as "... operations to be performed, in order to test a specific hypothesis under a given condition"(30).It is further classified as Observational And Experimental . The observational research design is further classified into Cross Sectional,Survey based,Cohort study and Case control study. The experimental research study design is further classified as RCT(Randomized Controlled trial) and Quasi experimental study design.(31)

V. Measurements And Calculations

A methodical and detailed account of the measurement of variables need to be mentioned to ensure the adeptness of the method section. A complete description of how calculations were done and how measurements were made needs to be explained. THE measurement must be precise, unambiguous, free from errors, valid, reliable and practicable.They are conclusive of findings of the research and facilitate reproducibility (32).

VI. Ethical Considerations

The approval of the ethics committee has to be obtained researches involving human subjects. An ethics committee comprised The composition will be as follows :- **1. Chairperson 2.1-2 basic medical scientists. 3. 1-2 clinicians from various Institutes 4. One legal expert or retired judge 5.One social scientist / representative of non-governmental voluntary agency 6. One philosopher / ethicist / theologian ,7. One lay person from the community 8. Member-Secretary**(33). Also in the committee there should be adequate representation in age,gender and community and where all the members are well versed with the cultural and social norms and sentiments of the community(25) .The approval of the ethics committee is important to ensure that the study protocol/experiment conducted believes in and follows the practice of ethical principles.Without such approval the sanctity of the study is questionable and the study cannot be conducted nor published in any journal of deemed importance (16).

Apart from the intrusive procedures involving hardcore experimentation that most certainly requires ethical approval,certain**non-invasive studies** like Qualitative studies and epidemiological studies also require ethical approval. This is so because even with their non-invasive nature it can be intrusive and in some cases detrimental to the individual's privacy and psych.Another thing that should be kept in mind by a researcher especially in biomedical research is that **ethical approval isn't, enough**. Other than the written approval a consent form (preferably in vernacular language known to the participants) should be included. A **consent form**, where appropriate, must be developed and attached to the protocol(16).A consent form ensures that the nature of decision is informed and consensual.It should be written in the prospective subjects' **mother tongue/ vernacular languageand a non technical and an understandable language by the subject** (34). The consent form has two parts: a) a statement describing the study and the nature of the subject's involvement in it; and b) a certificate of consent attesting to the subject's consent.As per the latest court order dated 21.10.2013 for clinical trials provisions must be made for audio visual recording of informed consent form with proper backup documentation in a way that the confidentiality of the concerned participants is maintained (34).

Secondly,try and include a **special section**preferably in a checklist format to address all possible ethical concerns and consequences. The checklist shouldn'tbe a random collection of questions ,it should include the research design,selection of subjects(inclusion and exclusion criterion),the intervention introduced and their related consequence if any and how will they be managed if encountered and finally the observations

made. In case the study involves use of **human biological materials** the approval should be obtained by the institutional ethics committee as well as by the national ethics committee. Research ethics on experimentation involving **animal** subjects is gaining more attention lately. In studies involving animal subjects the approval should be obtained from the animal welfare committee of the institute or its equivalent. In case no such committee exists, a statement signed by the principal investigator should indicate that the research shall be carried out in accordance with **International Guiding Principles for Biomedical Research involving Animals**.

In case of microbiology research researchers should ensure their research follows CODE OF ETHICS AMERICAN SOCIETY FOR MICROBIOLOGY(35).

VII. Content and Writing Style of the Methods Section

The writing style and content can only be successfully completed if it takes into account these four details:-

1. The language of the manuscript
2. Basic rules of language
3. Some common and classic errors
4. Cross references and figure captions

The nature and complexity of scientific enquiry and writing necessitates the writing be clear and orderly in order to avoid confusion and ambiguity. THIS IS IMPORTANT BECAUSE most reads when encountered with a poor writing style that lead to fatigue and frustration will eventually not be able to read the paper voraciously and the scientific information that is meant to permeate across efficiently will not be able to do so because of the way the paper is written (26)(3).

Secondly, it should be always taken into account that the information presented is never overwhelming in nature, breaking the information into digestible nuggets/ of information by classifying it into distinct sentences, paragraphs, sections, subsection or into figures and derivation as per the requirement of the paper is of utmost importance to facilitate the optimum coherence of the paper (36)(37).

Also the aim should be to present the information in a knowledgeable, compelling and a well written manner. The manuscript language is an important component as poor language quality can result in a delayed or blocked publication. The legibility of writing adds to the nature and the seeping in capacity of the manuscript. The clarity and coherence of writing reflects the clarity of thought. In addition to the coherence of the language a writer should keep in mind to avoid the expression of belief or of personal predijudices or biased opinions and avoid usage of loose statements. Such expressions result in classic errors of opinion, expression and perception. In addition to the writing style focus should also be on an accurate grammatical approach. This includes use of active voice. It is ideal to avoid use of abbreviations and acronyms. One should make sure that all the texts, figures, charts and graphs have headings. Make sure cross references are inserted wherever necessary (36)(37)(3).

10. Data Collection And Analysis(16)(38)(27)(26)(39)

The main data collection techniques used should be mentioned with justification (39). It can be in the form of semi structured interview, participant observation, group discussion, Telephonic or mail survey. It can also be in the form of accessing existing database (41). After data collection the next step is data analysis, it includes.

The last steps include how the data was obtained, what statistical tests were applied and the p value hence obtained and its inference. You should also indicate the statistical procedures used to analyze your results, including the probability level at which you determined significance (usually at 0.05 probability) (16)(26)(27).

VIII. Models

1. The Matrix Method

This method involves the use of classifying the information into four matrices or grids to get a clear preview of how to proceed about things (See Figure 4). This ensures no detail is left out and gives a brief preview of all the pre requisite information that needs to be mentioned. (40)(4)(36)

Advantage :-

It helps to ensure all important sections and all relevant details are dealt with and covered in the paper.

Application tip:-

In the proposed model below if the matrix is applied with “KIPLINGS HELPERS” (14), the results can be maximized in minimum amount of time.

How to use

1. Before starting writing your method section make a four by four grid and answer the following question use the 5 W’S.
2. Once you have all the answers for all the questions in all the four squares, then start writing all of them in paragraph format .
3. During writing try and follow the order of the arrows to write the method section in the most appropriate way.
4. Once you are done, evaluate your work using the checklist provided in Table 1.

Note: This approach is subjective and aims to just give a very basic overview.

Limitation

It is subjective in nature and not highly deterministic.

IX. Pyramid Approach

This Pyramid Model aims to visually represent all the components of method section in a hierarchical order of significance (See Figure 5).

The above mentioned pyramid model is derived from the “Pyramid model of PR research” recommended by Broome and David Dozier (41).

The model mentioned by them mentions the scientific management of public relations.

This model is the application of the same and can be applied to maximize the output of methodology.

There are three components that the above proposed model derives from the pyramid model proposed by Glenn Bloom et al. and i.e. Inputs, output and outcome.

The input is in the form of the basic research question .

The output in the form of things required and data collected.

And the output in the form of limitation and publication.

Advantages

1. It allows the approach of the scientist to go from general to specific.
2. It allows the researcher to think in the format of
CONTEXTUALISING- It is putting the problem into context.
CONCEPTUALISING- this constitutes of pointing out the gap in the knowledge.
RESOLVING- this constitutes of addressing the problem.

HOW TO USE:-

1. Classify the contents of method section into the subheadings mentioned in the pyramid model.
2. Rethink it.
3. Use the adjoined /provided table and mark the various components.
4. Calculate the score using Table 2.
5. Note the total score.
TOTAL SCORE=.....

SCORE RANGE AND INTERPRETATION

1. 17-34= poorly written method section
2. 51=the section is written moderately well but there is room for improvement.
(A revision of the section is required and a second draft is recommended)
3. 68-85= well written method section

BRAINMAP/CONCEPT MAP

The brainmap provides a continuous thought process by facilitating the linking of ideas. It allows a constant flow of thoughts from one idea to another (7).

It facilitates the thinking process in three components:-

1. SIGNPOSTS- they tell the reader where you are going with the argument that it follows.
2. FLOW- it comes when the writer makes connections between end to end of each sentence , paragraph and the next section.
3. SPECIFICITY- Brainmaps facilitate specificity. It means only using words with precise meaning.

Stuffy writing is only used to disguise intellectual fuzziness so by facilitating clarity brainmaps ease the process (42)(43).

Advantages

1. Structured Brainstorming-
Brainstorming promotes a structured flow of thoughts and not merely a chaotic flow of ideas.
2. It allows an in depth analysis and furthermore facilitates it by visual means.

HOW TO USE

1. See figure 6 .
2. On a piece of paper answer all questions of the image provided making sure it is in sync with the basic research question.
3. After answering arrange them in chronological order and write it in paragraph format.

X. Tables And Figures

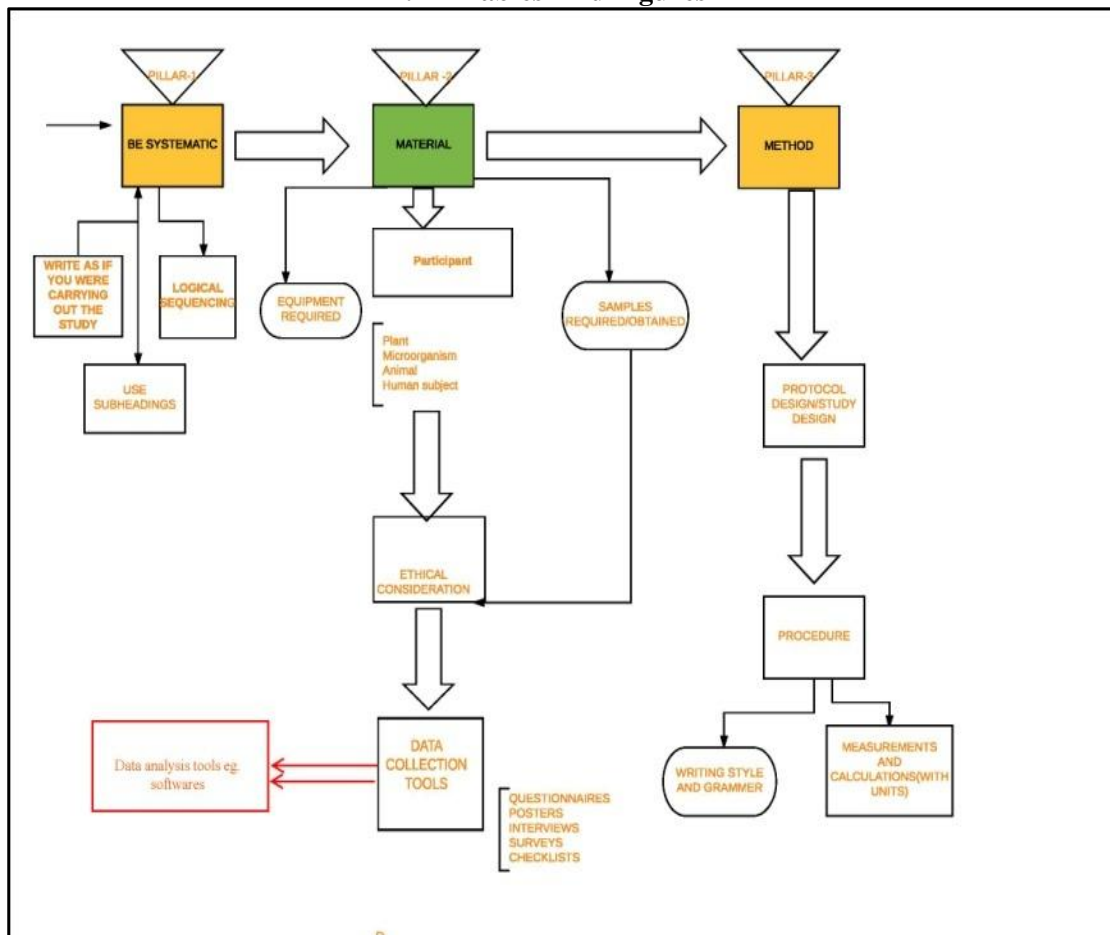


Figure 1 :Masterflowchart

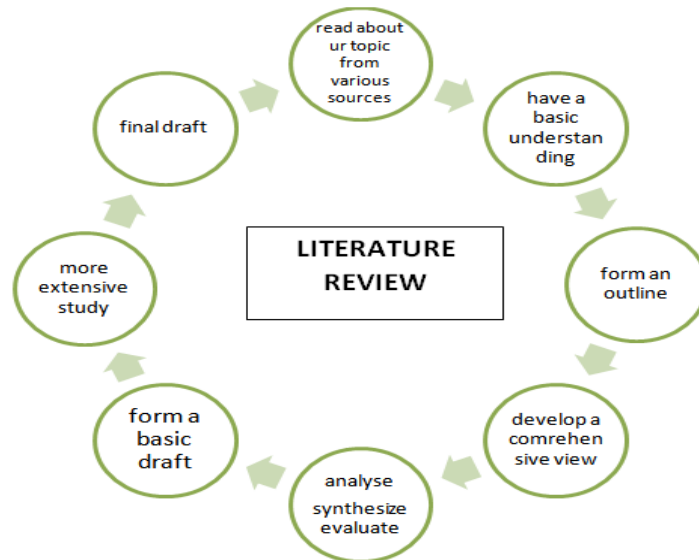


Figure 2 :Process of literature review

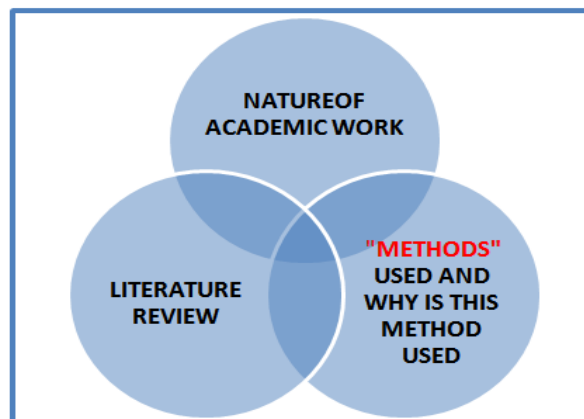


Figure 3: Methodology diagram

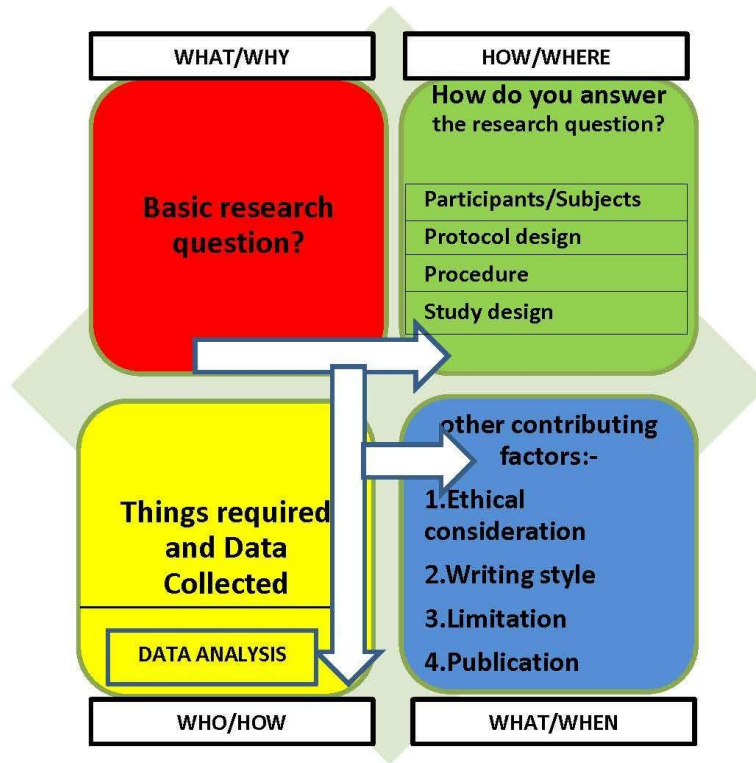


Figure 4: The Matrix Approach Diagram

Grid question	Answered	Not answered	reason
1. What is the basic research question?			
2. How do you answer it?			
3. Who are the participants?			
4. What is the protocol design?			
5. Is the protocol standardized?			
6. What is the procedure? Is it mentioned systematically?			
7. Is it the best approach/way to answer the question?			
8. What are the things required?			
9. How was the data collected?			
10. What data collection tools were used?			
11. How was the data analyzed?			
12. What data analysis tools were used? What tests were applied?			
13. Ethical consideration obtained			
14. Is the writing style appropriate?			
15. What are the limitations?			
16. Has it been published previously (mention sources)			

Table 1: The Matrix Approach Evaluation Table

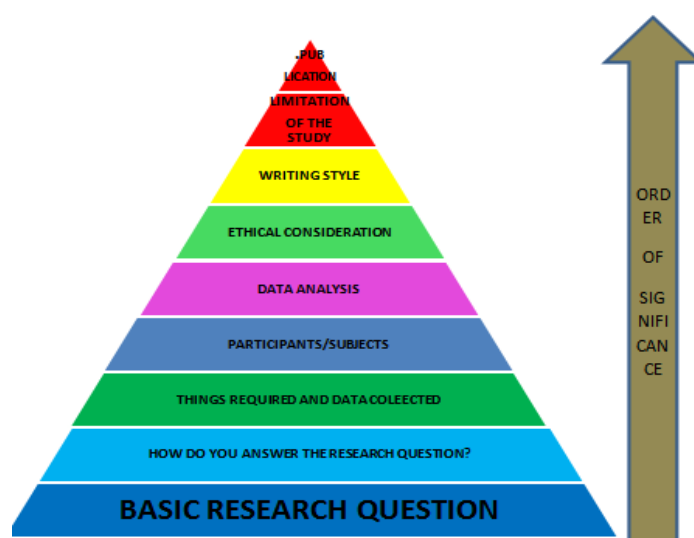


Figure 5: The Pyramid Approach Evaluation Diagram

Question	Poorly{1-2}	Appropriately{3}	Completely{4-5}
1. What Is The Basic Research Question?			
2. How Is The Basic Research Question Answered?			
3. Are The Things Required Mentioned Properly?			
4. Are participant details specified?			
5. How was the population type decided? How was the sample size calculated?			
6. Is the sample size justification provided ?			
5. Has the protocol design been set and standardized ?			
6. Has the procedure been mentioned chronologically?			
7. What is the study design? Has it been specified?			
8. Are all the measurement and calculations accurately specified ?			
9. Are The Ways And Tools Used Mentioned In The Methods Section?			
10. Name Of Brands/Companies Whose Products /Machines Are Used?			
11. Are the details and tools of data collection specified appropriately?			
12. How was the data analyzed ? are all the data analysis tools mentioned?			
13. What tests were applied?			
14. Is The Ethical Permission Obtained?			
15. Is The Writing Style Appropriate?			
16. What is the limitation of the study ?			
17. Publication Value			
Total Score			

Table 2: Pyramid Approach Evaluation Table

Note: The colors in the table are for the purpose of matching with the corresponding component in the pyramid. Also in case of a low score for any component refer to the text for more discussion.

TOTAL SCORE=.....



Figure 6: Brainmap image

XI. Conclusion

To conclude by understanding the commonly encountered shortcomings and using the above provided models the productivity of the method section can be **maximized**. Also to suit the needs of a wide number of research in a better way, the master flowchart and the models provided can be used for a **generalized overview** and the questionnaires (see **appendices**) can be used for a more **specific overview**. Hence, collectively they can maximize the productivity of **methods section** for a wide array of disciplines in biomedical sciences and **boost the output** in the minimum possible time in an **easy and an efficient way**.

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[1].

Animals(APPENDIX-1)

	MENTIONED	NOT MENTIONED
1.Strain of species	<input type="checkbox"/>	<input type="checkbox"/>
If mentioned		
Specify details.....		
3.Age of species	<input type="checkbox"/>	<input type="checkbox"/>

4. Gender

5. Weight of the organism

**6. Physiological /Pathological detail
of the organism**

if mentioned please specify (catastrated/pregnant etc.).....

7. What rearing methods were used?

If mentioned

Specify details.....

8. Nutritional state of the organism

If mentioned please mention (feeding schedule/type of crop/any special diet).....

8(a) diet administered during maintenance period.....

8(b) diet administered during treatment period.....

8(c) Constituent of diet.....

8(d) Sources of diet.....

9. Housing cages.....

(9a) Housing temperature.....

(9b) Air quality and ventilation.....

(9c) Sound and vibrations.....

(9d) Monitoring of environmental variables.....

10. Breeding Records If mentioned

Specify details.....

11. Knockout: yes/No

If mentioned

Specify details.....

13. Number and selection

of the organism studied

14. Approval by the institute for animal use(with an attached report for approval)

<input type="checkbox"/>	<input type="checkbox"/>
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(1)(2)

DRUGS(APPENDIX-2)

MENTIONED NOT MENTIONED

1.Generic names of drugs	<input type="checkbox"/>	<input type="checkbox"/>
2.Trade names of drugs	<input type="checkbox"/>	<input type="checkbox"/>
3. Suppliers name	<input type="checkbox"/>	<input type="checkbox"/>
4.Schedule for drug administration		
5.forms of drug administration	<input type="checkbox"/>	<input type="checkbox"/>
If mentioned please specify(intravenous/intramuscular/oral/snuff/other).....		
6.doses of drug administration	<input type="checkbox"/>	<input type="checkbox"/>
If mentioned please specify (0.D/B.D/T.D.S).....		

(3)

CULTURES(Appendix-3)

A.TISSUE OR TISSUE CULTURE

MENTIONED NOT MENTIONED

1.Sources	<input type="checkbox"/>	<input type="checkbox"/>
2.Prior treatment	<input type="checkbox"/>	<input type="checkbox"/>
If mentioned please specify.....		

3.Procedure administered

to tissue

4.Culture

5.Suppliers name

If mentioned please specify.....

B.CELL LINES,DNA

MENTIONED

NOT MENTIONED

1.Details and sources used

If yes specify details.....

2.Suppliers name

3.Nomenclature of Cell Lines

If yes specify details.....

4.Species of origin

If yes specify details.....

5.Tissues of origin

6.Types: Finite/Continuous

7.Cell type

If yes specify details.....

8.Morphology: Fibroblast/Epithelial/Endothelial/Suspension

9.Passage no.

10.Generation no.

C.IMMUNE SERA

MENTIONED

NOT MENTIONED

1.Details and sources used

If yes specify details.....

2.Suppliers name

D.BACTERIAL CULTURES AND VIRUSES

MENTIONED

NOT MENTIONED

1.Standard taxonomic

Nomenclature

2.Sources

3.Strain used

4.No. of passage

5.Types of cultures Suspension/Adherent.....

6.Optical density of suspension culture.....

7.No. of bacteria (CFU).....

8.Revived/subcultured on.....

E.CULTURE MEDIA AND BUFFER

	MENTIONED	NOT MENTIONED
1.Components	<input type="checkbox"/>	<input type="checkbox"/>
2.Concentrations	<input type="checkbox"/>	<input type="checkbox"/>
3. pH of media	<input type="checkbox"/>	<input type="checkbox"/>

F.REAGENTS

	MENTIONED	NOT MENTIONED
1.Chemical identification of reaction used	<input type="checkbox"/>	<input type="checkbox"/>
2.Suppliers name	<input type="checkbox"/>	<input type="checkbox"/>

G.CLINICAL PROCEDURE

	MENTIONED	NOT MENTIONED
1.Pre operative conditions	<input type="checkbox"/>	<input type="checkbox"/>
2.Equipment used	<input type="checkbox"/>	<input type="checkbox"/>
3.Standard procedure	<input type="checkbox"/>	<input type="checkbox"/>
4.Non standard procedure	<input type="checkbox"/>	<input type="checkbox"/>
5.Details of procedure used	<input type="checkbox"/>	<input type="checkbox"/>

H.EQUIPMENTS

	MENTIONED	NOT MENTIONED
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**1. Identification
of equipment used**

2. Name of equipment

**3. Location
of equipment**

(4)

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