

Subject ; Research Methodology

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Q1 ; Explain the factors affecting the study outcomes.

1 ; Bias

Bias is any trend or deviation from the truth in data collection, data analysis, interpretation and publication which can cause false conclusions. Bias can occur either intentionally or unintentionally 'Intention to introduce bias into someone's research is immoral. Nevertheless, considering the possible consequences of a biased research, it is almost equally irresponsible to conduct and publish a biased research unintentionally.

It is worth pointing out that every study has its confounding variables and limitations. Confounding effect cannot be completely avoided. Every scientist should therefore be aware of all potential sources of bias and undertake all possible actions to reduce and minimize the deviation from the truth. If deviation is still present, authors should confess it in their articles by declaring the known limitations of their work.

It is also the responsibility of editors and reviewers to detect any potential bias. If such bias exists, it is up to the editor to decide whether the bias has an important effect on the study conclusions. If that is the case, such articles need to be rejected for publication, because its conclusions are not valid.

2 Confounding

Confounding is often referred to as a "mixing of effects"^{1,2} wherein the effects of the exposure under study on a given outcome are mixed in with the effects of an additional factor (or set of factors) resulting in a distortion of the true relationship. In a clinical trial, this can happen when the distribution of a known prognostic factor differs between groups being compared.

Confounding factors may mask an actual association or, more commonly, falsely demonstrate an apparent association between the treatment and outcome when no real association between them exists.

The existence of confounding variables in studies make it difficult to establish a clear causal link between treatment and outcome unless appropriate methods are used to adjust for the effect of the confounders (more on this below). Confounding variables are those that may compete with the exposure of interest (eg, treatment) in explaining the outcome of a study. The amount of association "above and beyond" that which can be explained by confounding factors provides a more appropriate estimate of the true association which is due to the exposure.

General characteristics of confounders include the following:

A true confounding factor is predictive of the outcome even in the absence of the exposure. Although a potential confounding factor (PCF) may be causative, it might not be. The primary requirements are that an independent relationship between the factor and the outcome exists and that the PCF not be the result of the exposure (or the outcome). In fact, many of the PCFs which often must be evaluated are proxies for variables which are complex and difficult to measure (Fig. 1).

Fig. 1

A confounding factor is also associated with the exposure being studied but is not a proxy or surrogate for the exposure. In clinical trials, confounding is often a result of unequal distribution of the potential confounding factors between treatment groups (

A situation that contains both numbers 1 and 2 sets the stage for potential confounding (

A confounder cannot be an intermediate between the exposure and the outcome. For example, the relationship between diet and coronary heart disease may be explained by measuring serum cholesterol level. Cholesterol is not a confounder because it may be a causal link between diet and coronary heart disease

Q2 ; write down important points in designing a questionnaire

Point 1 Importance of the Problem Under Study or the Formulation of the Problem:

The formulation of problem forms the starting point for developing the questionnaire. If the problem under study is an important one, a higher response is expected, but if it is an ordinary one, and which does not have any social relevance for the respondent's life, the response is likely to be low. The problem formulated for study should be relevant for the respondents. A researcher can expect higher response, if the problem under investigation directly focuses on the respondent's problem.

Point 2 The Type of Information Required:

Very extensive bodies of data cannot often be secured through the use of the questionnaire. The researcher should first find out the extent to which the desired data are already available in published reports and decide whether all or parts of the needed data can be obtained through a formal questionnaire. In brief, the investigator must decide what aspects of the problem are to be dealt with in a particular study through a formal questionnaire.

Point 3# Securing Help from the People who Possess the Experience in the Related Field:

The researcher should secure all the help he can, in planning and constructing his questionnaire. He should study other questionnaires and submit his questionnaire for a critical analysis to other members of his research organisation or his colleagues and especially to those who possess the experience of questionnaire construction.

Point 4# Thorough Knowledge about his Hypothesis:

He should thoroughly explore his hypothesis, experiences, the literature available in the concerned topic and other related field to frame his own questionnaire. It will help him to probe the crucial issues of his research problem in depth.

Point 5# Clear Understanding of the Objective of the Study:

He should attain a thorough knowledge of the field and a clear understanding of the objective of the investigation and of the nature of the data required for the investigation.

Point 6# A Proper Scrutiny:

The questionnaire should be properly scrutinized for technical defect, quite apart from biases and blind spots arising out of personal values.

Point 7# Numerous Revisions or Pre-Testing:

Constructing a questionnaire calls for numerous revisions, in which variations of the same question should be given for an experimental trial. The same question posed in different ways very frequently may bring out different responses. This trial can be done through a pre-testing or a pilot study. A pre-testing is necessary to find out how the questionnaire works and whether changes are necessary before applying the actual questionnaire.

The pre-testing of elements provides a means for solving unforeseen problems in its administration in the field. It may also indicate the need for addition or deletion of questions. Sometimes a series of revisions and pre testing is needed. After a pre-testing the final editing has to be done to ensure that every element has been scrutinized. Editing is required to make the questionnaire as clear and as easy to use as possible.

Q3 ;what is meant by hypothesis also differentiate between null and alternative hypothesis

A hypothesis is an approximate explanation that relates to the set of facts that can be tested by certain further investigations. There are basically two types, namely, null hypothesis and alternative hypothesis. A research generally starts with a problem. Next, these hypotheses provide the researcher with some specific restatements and clarifications of the research problem.

The criteria of the research problem in the form of null hypothesis and alternative hypothesis should be expressed as a relationship between two or more variables. The criteria is that the statements should be the one that expresses the relationship between the two or more measurable variables. The null hypothesis and alternative hypothesis should carry clear implications for testing and stating relations.

The major differences between the null hypothesis and alternative hypothesis and the research problems are that the research problems are simple questions that cannot be tested. These two hypotheses can be tested, though.

The null hypothesis and alternative hypothesis are required to be fragmented properly before the data collection and interpretation phase in the research. Well fragmented hypotheses indicate that the researcher has adequate knowledge in that particular area and is thus able to take the

investigation further because they can use a much more systematic system. It gives direction to the researcher on his/her collection and interpretation of data.

The null hypothesis and alternative hypothesis are useful only if they state the expected relationship between the variables or if they are consistent with the existing body of knowledge. They should be expressed as simply and concisely as possible. They are useful if they have explanatory power.

The purpose and importance of the null hypothesis and alternative hypothesis are that they provide an approximate description of the phenomena. The purpose is to provide the researcher or an investigator with a relational statement that is directly tested in a research study. The purpose is to provide the framework for reporting the inferences of the study. The purpose is to behave as a working instrument of the theory. The purpose is to prove whether or not the test is supported, which is separated from the investigator's own values and decisions. They also provide direction to the research.

The null hypothesis is generally denoted as H_0 . It states the exact opposite of what an investigator or an experimenter predicts or expects. It basically defines the statement which states that there is no exact or actual relationship between the variables

Q 4 ; what is incidence and prevalence explain in detail

Prevalence

Prevalence measures how much of a disease or condition there is in a population at a particular point in time.

Prevalence gives a figure for a factor (disease, injury, health status etc) at a single point in time (point prevalence) or time period (period prevalence). Period prevalence provides the better measure of the factor since it includes all cases between two dates, whereas point prevalence only counts cases on a particular date. It is a measure of disease that allows us to determine a person's likelihood of having a disease. It is most meaningfully reported as the number of cases as a fraction of the total population at risk and can be further categorised according to different subsets of the population.

An example of prevalence: A recent Scottish study showed that the prevalence of obesity in a group of children aged from 3 to 4 years was 12.8% at the time.

Incidence

Incidence measures the rate of occurrence of new cases of a disease or condition.

Incidence is the number of instances of a factor (disease, injury, health status etc) during a given period (day, month, year, decade) in a specified population (age group, community, country etc). Incidence can tell us how many cases of a particular factor have been suffered by a specified population in a given period of time.] It is a measure of disease that allows us to determine a person's probability of being diagnosed with a disease during a given period of time or it might tell us how patterns of a condition within a population change over time. Incidence is usually

expressed as a rate, something that is measured within a set number of people and in a time period.

An example of incidence: Auckland in New Zealand, often has epidemics of meningococcal disease, with annual incidences of up to 16.9/ 100,000 people

Incidence versus Prevalence

Incidence is often confused with prevalence. The easy way to remember the difference is that prevalence is the proportion of cases in the population at a given time rather than rate of occurrence of new cases. Thus, incidence conveys information about the risk of contracting the disease, whereas prevalence indicates how widespread the disease

Q 1. Write down components of research proposal ?

Answer ; Research Proposal

A research proposal is a document written by a researcher that provides a detailed description of the proposed program. It is like an outline of the entire research process that gives a reader a summary of the information discussed in a project. Preparation of research proposal is needed because it facilitates the smooth sailing of the various research operations, thereby making research as efficient as possible yielding maximal information with minimal expenditure of effort, time and money. In fact the research proposal is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data. As such the proposal includes an outline of what the researcher will do from writing the hypothesis and its operational implications to the final analysis of data., the research proposal concentrates on the following issues-

- What is the study about?
- Why is the study being made?
- Where will the study be carried out?
- What type of data is required?
- Where can be the required data found?
- What periods of time will the study include?
- What will be the sample design?
- What techniques of data collection will be used?
- How will the data be analyzed?

- In what style will the report be prepared?

Most agencies provide detailed instructions or guidelines concerning the preparation of proposals (and, in some cases, forms on which proposals are to be typed); obviously, such guidelines should be studied carefully before you begin writing the draft. Most proposals are between ten and fifteen pages in length. The proposal should be no longer than 1500

Components of research proposal;

Following are the main components of a research proposal

- 1) **Title of the Research:** After identifying a research problem a suitable title of the research should be given. The research title should be specific, direct, concise, meaningful and easily understandable, not more than one or two lines and must accurately represent the objective and indicate the purpose of the study

2 Abstract ;

It's the summary of your research proposal which is composed of the objectives ,hypothesis and also the questions that needs to be solved during the research .it also contain the experimental designs and funding required for the research shortly

3) Table of contents ;

It contain the major parts of the research proposal and activities, table of contents is mostly needed in the long and lengthy proposals

It also contain list of illustrations ,graphs and tables used in the proposal

4) Introduction :

Get the reader's attention and introduce your topic.

Statement of the problem; Present your research question.

- What do you want to address?
- What is your position?
- Background information of the issue with literature review

- Indication of the unexplored character of the issue or knowledge gap or research question Reasons for undertaking the study.

5) Background / Literature review:

Background must contain the following points ;

- Relevance and importance of the study.
- Practical application of the study output.
- How the new knowledge gained through the study will contribute to the solution of practical problems?
- How the study findings will be useful in policy formulation?

A review of existing literature on the proposed research should be done by the researcher to find out the past research done on the subject. It will help identify what was done in the past and the knowledge gap on a particular subject. To help frame your proposal's literature review, here are the five C's of writing a literature review

- 1) **Cite**: keep the primary focus on the literature pertinent to your research problem.
- 2) **Compare** the various arguments, theories, methodologies, and findings expressed in the literature: what do the authors agree on? Who applies similar approaches to analyzing the research problem?
- 3) **Contrast** the various arguments, themes, methodologies, approaches and controversies expressed in the literature: what are the major areas of disagreement, controversy, or debate?
- 4) **Critique** the literature: Which arguments are more persuasive, and why? Which approaches, findings, methodologies seem most reliable, valid, or appropriate, and why? Pay attention to the verbs you use to describe what an author says/does [e.g., asserts, demonstrates, etc.].
- 5) **Connect** the literature to your own area of research and investigation: how does your own work draw upon, depart from, or synthesize what has been said in the literature?

6) Methodology;

Methods of a research depend on the hypothesis/hypotheses and objectives of the research project. Generally the following issues are covered under research methods.

- Where the study will be conducted and how the study location has been selected?

What methods and tools will be used in collecting information?

- How the quality of data will be ensured?
- How data will be processed?
- How data will be analyzed and what statistical tools will be used?

7) Description of relevant institutional resources ;

Generally this section details the resources available to the proposed project and, if possible, shows why the sponsor should select this University and this investigator for this particular research

It also includes the availability of the resources that is present in the institution

8) List of references ;

The sources or the details that is s being mentioned d in the proposals must conatain some citations and those citations are mentioned here

It also contain the relevant work materials

9) Personnel;

This section usually consists of two parts:

- (1) an explanation of the proposed personnel arrangements
- (2) the biographical data sheets for each of the main contributors to the project.

The explanation should specify how many persons at what percentage of time and in what academic categories will be participating in the project.

Any student participation, paid or unpaid, should be mentioned, and the nature of the proposed contribution detailed.

If any persons must be hired for the project, say so, and explain why, unless the need for persons not already available within the University is self-evident.

10) Financial Budget:

Financial budget will include money that will be needed to conduct and complete the study. Total amount of money should be broken up into different heads and sub-heads.