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ABC of Research 4

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Towards an informed society

Research Design

The second phase of research is concerned with research design and researchers must decide on the research variables (year 1, number 3), what study type to use (this issue), what tools or instruments to use, how they will be used, and how the results will be analyzed.

The end of this phase is marked by the producing of the research protocol.

PHASES OF RESEARCH

1 Research question

2 Research design

3 Implementation

4 Analysis

5 Dissemination

Research design is expected to be covered over several issues of the newsletter and will include important areas such as research design validity and reliability.

In this issue we are going to present three research classifications and describe the most common study types used in medical research and how research objectives determine the study type that should be used.

ABC of RESEARCH

AIMS AT

creating an awarness of issues related to research

providing a core of knowledge that is practice-based.

encouraging communication between researchers

Research types

Introduction
There are several approaches towards research classification and these are based on their objectives and nature. All are right in their own context and it is vital to be aware of them.

Basic versus Applied Research
This classification is based on the degree of utility of the research findings.

Basic research is performed to obtain data (knowledge) to develop, test, or refine theory. In other words, basic research is directed towards the acquisition of new knowledge for its own sake without reference to the potential practical use of its results. In the long term, basic research should lead to numerous practical applications.

Applied research, on the other hand, is directed to solve practical problems with immediate functional applications. Applied research is derived from practice and to a large extent performed within its boundaries.

Qualitative versus Quantitative Research
This classification is based on the nature of data collected and its eligibility for statistical analysis.

Qualitative research is related to subjective information which is obtained under variable conditions. In qualitative research, the data is obtained in response to questions (usually open-ended), interviews and observations. Qualitative research is usually observational in nature (see below).

Quantitative research, on the other hand, involves measurement of numerical data under strict constant conditions. Data from such research is open to statistical analysis. Quantitative research can cover most research types and objectives (see below).

Observational versus Experimental Research
This classification is based on whether the researcher affects the natural course of events during the research process.

Observational research refers to research that aims at describing phenomena or finding relations between them.

Experimental research, on the other hand, refers to research where the researcher manipulates and controls the research variables and observes the resultant effect. The main objective of experimental research is to evaluate interventions and to find cause-and-effect relations.

Comment
As seen, these classifications reflect the different purposes of research and within each one various types of studies can be used as described on the back page.

Punch holes for easy filing

Research Ethics...

It is the duty of every researcher to protect humans and preserve their dignity when involved in research. There are three basic principles that govern the relation between researchers and human research subjects.

Autonomy refers to self-determination and the capacity of individuals to make decisions regarding their wellbeing without bearing any negative consequences. It is essential that all researchers demonstrate all due respect for autonomy by obtaining informed consent from all research subjects before entry into any study. When dealing with individuals with limited understanding such as children, the mentally handicapped, or the very old, special permission should be obtained from parents, guardians or appropriate authorities. It is also important not to encourage nor threaten individuals to join any research project.

Beneficence refers to the obligation to attend to the wellbeing of all individuals joining research. In doing so, all researchers should maximize possible benefits and minimize possible harm from their research. The balance between risks and benefits must be considered as part of the decision to go forward with a specific research. The amount of risk that could be considered ethical depends on the anticipated benefit from joining the research and the individual's current wellbeing or suffering.

Justice refers to fairness in the research process through equal distribution of the benefits and burdens. It means fair selection of individuals in joining research, regardless of their socioeconomic background and guaranteed access to the research benefits when available whether in the short or long term.

Study types

Selection of study type

There is a direct relation between the study objective and the study type. The study objective which is determined during phase one of the research process directs the researcher to the appropriate study type. The appropriate study type has to achieve the determined objective, otherwise the researcher will not be able to answer the research question at the end of the research process.

Study objectives that are descriptive or exploratory in nature require observational studies while study objectives that are evaluative in nature require experimental studies. This is very important to remember when designing any research.

Study Types

Study types are best presented within the classification that divides research into observational and experimental. Observational research can be further divided into descriptive and exploratory.

Descriptive Research

In this type of research the researcher attempts to describe a group of subjects or objects based on a set of defined variables. Descriptive research may involve the use of questionnaire, interviews, or direct observations. Descriptive data allow researchers to classify and understand phenomena and provide basis for further research. **Related study types:** case study, case series, surveys.

Exploratory Research

In this type of research the researcher examines a phenomenon of interest and explores its dimensions, including how it relates to other factors. In doing so, the researcher can create predictive models based on the proved associations between the studied variables that will help in decision-making and defining prognosis. **Related study types:** case control studies, cohort studies.

Experimental Research

This is the most rigorous type of research where the researcher evaluates certain interventions or conditions (independent variable) through group comparison in a controlled environment in order to reach a right conclusion free of external effects on its results (dependent / outcome variables). To be considered a true experiment, a study must have three essential elements: The independent variable must be manipulated by the researcher, the subjects must be randomly assigned to groups, and a control group(s) must be included in the study. If one of these three elements is not present, the research is better classified as quasi-experimental research. **Related study types:** randomized controlled study, cross-over studies.

Special Study Types

Meta-analysis

Meta-analysis seeks to combine the results of several studies on the same topic to reach a definitive conclusion from the varied, and sometimes contradictory, results of these studies. Similar to a review article, a meta-analysis begins with a literature review identifying studies of similar research questions. However, a meta-analysis attempts to analyze statistically the aggregate results to reach a single integrated conclusion.