

How to Conduct Scientific Research?

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United Nations Educational, Scientific and Cultural Organization (UNESCO) defines research as systematic and creative actions taken to increase knowledge about humans, culture, and society and to apply it in new areas of interest. Scientific research is the research performed by applying systematic and constructed scientific methods to obtain, analyze, and interpret data.

Scientific research is the neutral, systematic, planned, and multiple-step process that uses previously discovered facts to advance knowledge that does not exist in the literature. It can be classified as observational or experimental with respect to data collection techniques, descriptive or analytical with respect to causality, and prospective, retrospective, or cross-sectional with respect to time (1).

All scientific investigations start with a specific research question and the formulation of a hypothesis to answer this question. Hypothesis should be clear, specific, and directly aim to answer the research question. A strong and testable hypothesis is the fundamental part of the scientific research. The next step is testing the hypothesis using scientific method to approve or disapprove it.

Scientific method should be neutral, objective, rational, and as a result, should be able to approve or disapprove the hypothesis. The research plan should include the procedure to obtain data and evaluate the variables. It should ensure that analyzable data are obtained. It should also include plans on the statistical analysis to be performed. The number of subjects and controls needed to get valid statistical results should be calculated, and data should be obtained in appropriate numbers and methods. The researcher should be continuously observing and recording all data obtained.

Data should be analyzed with the most appropriate statistical methods and be rearranged to make more sense if needed. Unfortunately, results obtained via analyses are not always sufficiently clear. Multiple reevaluations of data, review of the literature, and interpretation of results in light of previous research are required. Only after the completion of these stages can a research be written and presented to the scientific society. A well-conducted and precisely written research should always be open to scientific criticism. It should also be kept in mind that research should be in line with ethical rules all through its stages.

Actually, psychiatric research has been developing rapidly, possibly even more than any other medical field, thus reflecting the utilization of new research methods and advanced treatment technologies. Nevertheless, basic research principles and ethical considerations keep their importance.

Ethics are standards used to differentiate acceptable and unacceptable behavior. Adhering to ethical standards in scientific research is noteworthy because of many different reasons. First, these standards promote the aims of research, such as knowledge, truth, and avoidance of error. For example, prohibitions against fabricating, falsifying, or misrepresenting research data promote truth and minimize error. In addition, ethical standards promote values that are essential to collaborative work, such as trust, accountability, mutual respect, and fairness. Many ethical standards in research, such as guidelines for authorship, copyright and patenting policies, data-sharing policies, and confidentiality rules in peer review, are designed to protect intellectual property interests while encouraging collaboration. Many ethical standards such as policies on research misconduct and conflicts of interest are necessary to ensure that researchers can be held accountable to the public. Last but not the least, ethical standards of research promote a variety of other important moral and social values, such as social responsibility, human rights, animal welfare, compliance with the law, and public health and safety (2). In conclusion, for the good of science and humanity, research has the inevitable responsibility of precisely transferring the knowledge to new generations (3).

In medical research, all clinical investigations are obliged to comply with some ethical principles. These principles could be summarized as respect to humans, respect to the society, benefit, harmlessness, autonomy, and justice. Respect to humans indicates that all humans have



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the right to refuse to participate in an investigation or to withdraw their consent any time without any repercussions. Respect to society indicates that clinical research should seek answers to scientific questions using scientific methods and should benefit the society. Benefit indicates that research outcomes are supposed to provide solutions to a health problem. Harmlessness describes all necessary precautions that are taken to protect volunteers from potential harm. Autonomy indicates that participating in research is voluntary and with freewill. Justice indicates that subject selection is based on justice and special care is taken for special groups that could be easily traumatized (4).

In psychiatric studies, if the patient is not capable of giving consent, the relatives have the right to consent on behalf of the patient. This is based on the idea of providing benefit to the patient with discovery of new treatment methods via research. However, the relatives' consent rights are under debate from an ethical point of view. On the other hand, research on those patients aim to directly get new knowledge about them, and it looks like an inevitable necessity. The only precaution that could be taken to overcome this ambivalence has been the scrupulous audit of the Re-

search Ethic Committees. Still, there are many examples that show that this method is not always able to prevent patient abuse (5). Therefore, it is difficult to claim autonomy when psychiatric patients are studied, and psychiatric patients are considered among patients to require special care.

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