Abstract

A brief summary of a research study, including its purpose, methods, and key findings, usually found at the beginning of a paper.

Adverse Event

An unexpected or harmful outcome that occurs during a clinical trial, possibly related to the treatment being tested. This is different from a side effect, which is not intended but more predictable.

(Ex: Severe unexpected allergic reaction from a blood pressure medication)

Attrition

The loss of participants during a study, which can affect the validity of the findings if the dropout rate is high or uneven.

Baseline

The initial set of data collected from participants before any intervention is applied, used as a comparison point.

Blinding (Single, Double, or Triple)

Methods used in research to conceal knowledge of group assignments (e.g., treatment or placebo) to reduce bias. Single blinding hides information from participants, double from participants and researchers, and triple from participants, researchers, and analysts.

Bias

A tendency or influence that can distort or affect the validity of research results, often unintentionally.

Causation

A relationship where one event or variable directly causes another to occur.

Cohort Study

A study that follows a group of people (cohort) over time to examine how certain exposures (e.g., lifestyle factors) affect outcomes (e.g., disease development).

Confidentiality

The ethical principle of keeping personal information and data collected during a study private and secure.

Confounding Variable

An outside factor that influences both the independent and dependent variables, potentially skewing the results of a study.

(Ex: In a study where one group is working out and another is not to see if working out causes weight loss, diet would be a confounding variable)

Control Group

The group in an experiment that does not receive the treatment being tested, used for comparison with the experimental group.

Correlation

A measure showing how two variables are related to each other, without proving that one causes the other, usually indicated with the p value.

Cross-Sectional Study

A study that collects data at a single point in time to assess the prevalence or relationships of variables in a population. (Not repeated over time like a longitudinal study)

Data

Information collected during research, which can be qualitative (non-numerical) or quantitative (numerical).

Double-Blind Study

A study in which neither the participants nor the researchers know who is receiving the treatment and who is receiving a placebo, reducing bias.

Efficacy

The ability of a treatment or intervention to produce the desired result under ideal, controlled conditions.

Effect Size

A quantitative measure of the strength or magnitude of a relationship or difference observed in a study, helping to interpret the practical significance of results.

Ethics

The principles and guidelines researchers follow to ensure their work is conducted responsibly and respectfully, especially when involving human or animal participants.

External Validity

The degree to which research findings can be generalized to other settings, populations, or times.

Generalizability

The extent to which findings from a study can be applied to or are relevant for a broader population.

Hypothesis

A testable statement predicting the relationship between two or more variables in a study.

(Ex: Walking daily reduces the risk of developing heart disease in adults.)

Incidence

The number of new cases of a disease or condition in a specific population over a certain period of time.

Informed Consent

The process by which participants are given comprehensive information about a study, including risks and benefits, and voluntarily agree to participate.

Intervention

A treatment or action introduced in a study to observe its effects, such as a drug, therapy, or educational program.

Internal Validity

The extent to which a study accurately establishes cause-and-effect relationships, free from confounding variables.

Literature Review

A comprehensive overview of all existing research on a specific topic, summarizing and analyzing previous studies.

Longitudinal Study

A study that collects data from the same subjects repeatedly over an extended period to observe changes over time.

(Ex: Observing the health of smokers over decades)

Meta-Analysis

A study that combines and analyzes data from multiple studies on the same topic to draw broader conclusions. (Top of the research pyramid, most reliable study type)

Methodology

The systematic plan or approach used to conduct a research study, including how data is collected and analyzed.

Null Hypothesis

A default assumption that there is no effect or relationship between variables in a study, which researchers test against.

(Ex: Walking daily has no effect on the risk of developing heart disease in adults.)

Operational Definition

A clear and specific explanation of how a variable will be measured or manipulated in a study.

P-Value

A statistical measure that indicates the likelihood of obtaining the observed results by chance; a

smaller p-value suggests stronger evidence against the null hypothesis. (0.05 and 0.01 are common)

Placebo

An inactive substance or treatment given to a control group to compare its effects against the actual treatment.

Placebo Effect

A phenomenon where participants experience changes simply because they believe they are receiving a treatment, even if the treatment is inactive.

(Ex: Participants feel pain relief even though they were just given a sugar pill.)

Power

The likelihood that a study will detect an effect if there is one, often depicted as a percentage; higher power reduces the risk of Type II error (failing to detect a true effect).

Prevalence

The total number of cases of a disease or condition in a population at a specific point in time.

Randomized Controlled Trial (RCT)

A study design where participants are randomly assigned to either an experimental group (receiving the treatment) or a control group (not receiving the treatment), allowing researchers to assess the treatment's effectiveness.

Randomization

Assigning participants or subjects to different groups in a study by chance to reduce bias and improve validity.

Reliability

The consistency or repeatability of a research study's results or measurement tools.

Replication

Repeating a research study to confirm its findings and ensure its reliability.

Research Pyramid: Way to organize different types of research studies based on their strength or reliability. The higher up the pyramid, the more reliable and trustworthy the evidence is considered to be. (Meta-Analysis \leftarrow Systemic Reviews \leftarrow Randomized Control Trials \leftarrow Pilot Studies \leftarrow Case Series \leftarrow Case Reports \leftarrow Anecdotes)

Sample

A group of individuals or items selected from a larger population for study purposes.

Sensitivity Analysis

A method to test how robust the results of a study are by examining how changes in assumptions or variables affect outcomes.

Statistical Significance

A measure indicating that the results of a study are unlikely to have occurred by chance. Usually determined by a low p-value (under 0.05 or 0.01 depending on the study).

Stratification

Dividing participants into subgroups based on characteristics like age, gender, or disease severity to analyze differences within these groups.

Surrogate Endpoint

A substitute measure used in clinical trials to predict the actual clinical outcome, such as blood pressure as a predictor for heart disease.

Type I Error (False Positive)

When a study incorrectly rejects the null hypothesis, concluding there is an effect or relationship when none exists. (You think something is true but it is actually not)

(Ex: A covid test indicates the patient has covid when they actually do not.)

Type II Error (False Negative)

When a study incorrectly fails to reject the null hypothesis, concluding there is no effect or relationship when one actually exists. (You think something is not true, when it actually is)

(Ex: A covid test indicates the patient does not have covid, when they actually do.)

Validity

The extent to which a research study measures what it claims to measure or accurately reflects reality.

Variable

Any factor or characteristic in a study that can change or vary, such as age, income, or temperature.

References

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