After a research question, a hypothesis should be formulated. Null hypothesis states that there is a difference which can be one tailed or two tailed i.e. One is either more or less effective than the other or interpretation of result in favour of NA can be in either direction better or worse.

Depending on the hypothesis, a study design is chosen. Study can be quantitative or qualitative. Quantitative studies are intended to quantify attitudes, opinions, behaviours and other defined variables using statistical methods. It is classified as observational and experimental designs. Descriptive study describes a particular condition in terms of time, place and person and analytical study is used to find the association between factor and condition. Descriptive study includes case report, series, ecological and cross sectional studies. Analytical studies are classified as case control, cohort and cross sectional studies depending on direction of enquiry. Observational studies are associated with bias and confounding. Experimental or interventional studies are done to find causal relationship between intervention and outcome.

There are several types of experimental designs including uncontrolled and controlled studies. Uncontrolled studies are done at either individual or cluster design. Controlled studies are either non randomized or randomized. Non randomized studies are done with either historical, external or concurrent control whereas randomized studies are done at individual, cluster level with parallel or cross over designs.

Qualitative research is intended to understand how things occur in natural setting and not in the laboratory. It helps identify cultural and social factors that affect health and provision of health care positively or negatively. The common study designs include ethnography, phenomenology, action research, historical backgrounds, case studies and grounded theory.

Depending upon the studies, there are different measurements. In this article, only epidemiological measurements are taken describing the occurrence of disease, associations between risk factor and outcome and measures of impact. Population is defined as a group of people with a common characteristics such as age, gender, place of residence, religion, village, community etc.

First step is usually measuring the frequency or occurrence of disease or any health related condition in population. Two important measure of occurrence are incidence and prevalence. They include a numerator representing number of people affected by disease, denominator representing the size of the population and time period involves the period for which the measures are calculated. They are used for descriptive analysis as only describe a condition in one or more group in a population.

Prevalence is the measure of the frequency of an existing disease. It is defined as proportion of persons in study population that has the disease or health related condition of interest over at a specified period.
Attributable risk is the difference measure of effect and is defined as between exposure and outcome under study. It is useful only if a causal association exists that can be attributed to exposure in exposed population. It estimates the difference in risk of outcome i.e. exposure is positive for outcome.

Difference measure quantifies the difference in risk of outcome between exposed and unexposed group. It is used to estimate the risk that can be attributed to exposure in exposed population. It estimates the baseline excess in absence of exposure and excess risk of disease who have the factor. It is useful only if causal association exist between exposure and outcome under study.

Attributable risk is the difference measure of effect and is defined as number of cases attributable to exposure in exposed group.

If AR > 0, it implies that the risk in exposed group is more than risk in unexposed group. No. of cases could be prevented if exposure is removed from the exposed group. If AR < 0, it implies that the risk in exposed group is less as compared to unexposed group. No. of cases have been prevented by exposure in the exposure group.

Attributable fraction (AF) is the proportion of total disease in exposed group attributable to exposure.

Measures of impact are used to determine the impact or burden of disease that can be reduced if we reduces the exposure. It includes Population attributable risk.

Population attributable risk (PAR) compares the risk of outcome in the population as a whole (both exposed and unexposed persons) with the risk in unexposed group. It estimates the impact of remove or change in the exposure on the risk of outcome from population. It is the excess risk in population over and above the background risk (i.e risk in unexposed) attributed to exposure. It measures number of cases that could have been prevented in entire population if exposure could be removed.

Data collection tools and management aims at providing high quality data by minimising errors as much possible and gather maximum data. It includes development of data collection tools, database for data entry followed by entry, processing and analysis. Tools for data collection should be precise and accurate. Precision/reproducibility is also known as consistency and reliability. It is defined as degree to which the results obtained is reproducible every time with nearly the same value each time it is measured. Validity is degree to which any measurement approach or instrument succeeds in describing or quantifying what it is designed to measure. Diagram show reliability and validity. Methods used for data collection can be qualitative or quantitative. Qualitative methods are related to quality and deals with finding out people perception, opinion, attitude, views, behaviours, cultural and social factors. Quantitative methods quantify, collect and analyse the numeric data with the help of statistics eg. age, experience.

Data collection can be done by questionnaire, case reports form and diaries.

Questionnaire is a research instrument which can be face to face, self administered and telephonic. It can also be based on existing validated questionnaire and can be closed or open ended. In closed ended questionnaire, respondents are to choose answers from a particular range of possible answers specified by investigator whereas in open ended questionnaire respondents provide answer on blank space with no prelisted answers.

Case report form is formed by the researcher himself or herself. It is based on technical language and questions are completed by patient, medical records and observation. Diaries are the tools particularly maintained by participants on repetitive events. Information can also be collected by electronics, smart phones and apps.

General layout of the data collection tool include theme of the study (example medications, socio demographic data), header and footer along with the coding. Header consists of the title of the study, name of the form, unique participants number, visit number in follow up study, date of visit or date of completion. Footer consist of page number and version of form.

Coding is a process of converting reported answers in CRF to numerical code that will be used for analysis either during or after interview with participant, before or while data entry. Example dates can be in American format (dd/mm/yyyy) or european format (dd/mm/yyyy). Binary variable coded 0, 1 or 1, 2. Categorical variable can be coded in 0,1,2,3 etc. For Data management, an electronic data base to be developed. Example: MS excel , access , epi – info, SPSS. Each row is identified as unique number or patient id with analyzable numeric form.

Conclusion
The knowledge of methodology enables a new research worker to do better research ability to evaluate and use research results with reasonable confidence. It also make him able to judge the adequacy of the methods by which they have been obtained and use them.
intelligently and efficiently. Therefore knowledge of research is must for medical students.

REFERENCES