Epidemiological Studies

Epidemiology is the scientific method of studying the occurrence of diseases among groups of people and application of this study to control the health problem. Various methods can be used to carry out epidemiological investigation.

Classification of methods:

Observational studies:

1-Descriptive Epidemiological Studies .

They are represent the first phase of an epidemiological investigation. It involves observing the distribution of disease in human and identifying the associated characteristics of that particular.

Procedure steps in descriptive epidemiology:

1-Define the population to be studied. They can be whole sample of population or selected such as age or occupational groups.

2-Define the disease under study.

3-Describing the disease by time, place and person.

4-Measurement of disease. Morbidity of disease is measured by two aspects; incidence(is obtained from longitudinal studies) and prevalence (is obtained from cross sectional studies).

5-Comparing with known indices.

6-Formulation of etiological hypothesis

Measurement of the disease:

Cross sectional studies: these are surveys designed to identify the levels of condition and association risk at the same time. Science it measure the prevalence of disease also these studies called as(prevalence studies), although it is easy and rapid to under taken, but they are not able establish cause and effect, this method of investigation is much used in dentistry in regular survey of oral health.

a-Cross-sectional Studies

- Often used to study conditions that are relatively frequent with long duration of expression (nonfatal, chronic conditions)
- It measures prevalence, not incidence of disease
- Example: community surveys
- Not suitable for studying rare or highly fatal diseases or a disease with short duration of expression

Disadvantages

-Weakest observational design,

- (it measures prevalence, not incidence of disease). Prevalent cases are survivors

-The temporal sequence of exposure and effect may be difficult or impossible to determine

-Usually don't know when disease occurred

b-Longitudinal Studies:

These studies are conducted over a long period of time for calculating the incidence rate of the disease also useful for studying the natural history of the disease and its outcome. These studies are cross sectional studies done for a long duration by repeating periodically.

2-Analytic epidemiological studies:

They are next step of epidemiological study, that test hypothesis about disease causation and prevention. Two type of analytical study designs are commonly used:

a-Case control study

It is the first approach to test and search a causal hypothesis in the past, go back in time. This study involve two population case and control groups. It is a comparison study taking into consideration confounding factors like age, gender, occupation….etc. These studies effectively used in studies of medical serious condition like oral cancer, liver cirrhosis…etc. Many steps are followed in conducting this study:

1-Selection of case and controls. It is the first step to identify a suitable group of case and controls.

2-Matching. A comparison between cases and controls as they differ according to factors like age, social status….etc.

3-Measurement of exposure. The same methods should be used to obtain the information for both cases and controls to over come the bias or systemic error

4-Analysis of collected data.

b-Cohort studies:

This study also known as longitudinal studies, incidence studies and forward looking studies a people who have a higher exposure to the risk factor than normal or control are identified, however cohort mean that a group of people who share a common characteristic or experience within a defined time period E.g, occupation, age, pregnancy, exposure to drug or x-ray .

Usually case control study differ from cohort study as followed:

Case control study	Cohort study
1-Start with disease	1-Start with people expose to risk factor
2-Involve few number of subjects	2-Involve large number of subjects
3-Quick results	3-Delay results
4-Suitable for study of rare disease	4- Suitable for study of common disease
5-Yield information about one disease	5-Yield information about more one disease
6-Relatively inexpensive	6-Expensive

Experimental Epidemiology:

After a disease has been described and analyzed, various methods of intervening the disease are tried, this is done with experimental epidemiology. This aims to:

1-Provide scientific proof of etiological or risk factor to control of the disease.

2-Provide a method of measuring the effectiveness of health services for prevention, control and treatment.

These studies are classified as:

1-Randomized clinical trails: These are experimental and prospective. RCTs are based on the principle that two groups used are identical in all respects except in the subject of the simplest design, in simplest design subject are randomly divided to two groups (one group receives the test treatment and other placebo (no treatment). They are most useful in the evaluation of new materials.

Ideally to avoid the bias which may occur due to errors from assessment of the outcome, the study should be undertaken blind

a-Single blind trail (in which the investigator should not know whether a subject is a member of test or control group).

b-Double blind trail (if the subject and investigator in ignorance of whether he/she is using a test product or placebo).

RCTs are often seen in trail that evaluate dental filling material.

2-Fielf trials:

These studies involve people who are disease free but presumed to be risk, data collection takes place in the field. Since the subject are disease free and the purpose is to prevent the occurrence of disease that may occur with relatively low frequency. Example: using preventive measure like vaccination against disease.

3-Community Trial:

In this study it is not possible to randomly allocated people to test and control groups however in this form of experimental the treatment groups are communities rather than individual. Limitation of such studies is that only a small number of communities can be included and random allocation of communities is not practicable. In this type of study the whole community is taken as the study group. Example fluoridation has be tried out for reducing dental caries. Communities in the neighborhood is taken as the control group for comparison.

Book: Essential of Preventive and Community Dentistry