BASIC STATISTICS IN MEDICAL PRACTICE

Pages with reference to book, From 230 To 231

Syed Ejaz Alam (PMRC Research Centre, Jinnah Postgraduate Medical Centre, Karachi.)

Epidemiological Methods and Measurements

Epidemiology is the study of the distribution and determinants of disease1. We try to find out who gets the disease arid why. For example. Is the disease more frequent among men or women, young or old, rich or poor, blacks oi whites? Did they get the disease because of a genetic trait an occupational exposure, or a lifestyle habit, such as cigarette smoking? Epidemiology differs from clinical medicine in two important regards: First, epidemiologists study groups of peopl; not individuals Second, epidemiologists studywell people, in addition to sick people, and try to find out the crucial difference between those stricken and those spared.Although a single study can be designed to provide. descriptive and analytic data, but in actual practice the design of a studyis mainly determinedbythe need to obtain data of one or different kinds.

Descriptive Studies

Descriptive studies are carried out to find out the frequency of a disease, the type of peopie suffering from it and where and when it occurs2. Such studies are often based upon hospital records which contain information on variables like age, sex,. time and place where they developed disease. Thesestudies show characteristics how people are affected by a disease and therefore it is necessary to relate observation made on the patients to similar observation in the general population. Descriptive studies are usually based on observa-, tions made at one point for this reason they are called cross sectional studies. Now if the observations are repeated in the same community over a prolonged period then these studies are termed as' longitudinal studies. Both cross sectional and longitudional studies are included in the term "descriptive studies". These studies provide information which is of immediate relevance to the plannmg of medical services. Moreover they may indicate problems which may demand further work like marked geographical variations in the frequency of certain tumours as found in the cancer studies.

Retrospective studies

In retrospective studies, all the relevant events have already occurred where the 'study is started. In these studies comparisons are made between a group which do not have the disease called the controls. The proportion of cases exposed to or possessing the characteristics or factor of etiological interest is compared to the corresponding proportion in the control. If a higher frequency of individuals with the characttristics is found among the cases than the controls, an association between the disease and the characteristics is indicated.

Prospective Studies

In these studies a sample of the popuiations is selected and information is 'obtained to determine if they have the characteristics, a particular living habit, exposure to a' possible etiological agent that may be related to the development of the disease which is being investigated. This type of study is known by a number of terms, e.g., cohort, incidence, longitudional, forward looking and followup The most widely used is the word cohorts Cohort is defined as a group of people sharing common experience.

Epidemiological Measurements:

Following terms are generally used for the analysis of results: 'a Rate To determine if a study is an epidemiologic study look for a control or companson group To make a comparison you need to develop a rate

e. Birth rate:

$$\frac{\text{Number of births in a year}}{\text{Population at mind year}} \times \text{Unit}$$

f. Death rate

$$\frac{\text{Number of deaths in a year}}{\text{Population at mid year}} \times \text{Unit}$$

g. Fertility rate:

$$\frac{\text{Number of Live births}}{\text{Number of women aged (15-44 years)}} \times \text{Unit}$$

h. Preinatal mortality:

$$\frac{\text{Number of still birth + death in 1st week of life}}{\text{Total birth}} \times \text{Unit}$$

i. Specific death rate:

$$\frac{\text{Number of Deaths from a specific disease}}{\text{Population at mid year}} \times \text{Unit}$$

j. Infant death rate:

$$\frac{\text{Number of infant deaths in a year}}{\text{Number of live births for the year}} \times \text{Unit}$$

k. Neonatal death rate:

$$\frac{\text{Number of neonatal deaths in year}}{\text{Number of live births}} \times \text{Unit}$$

l. Still birth rate:

$$\frac{\text{Number of still births for a year}}{\text{Number of live births}} \times \text{Unit}$$

m. Maternal death rate:

$$\frac{\text{Number of maternal deaths for a year}}{\text{Number of live birth for the year}} \times \text{Unit}$$

n. Case rate:

$$\frac{\text{Number of cases of specific disease}}{\text{Population at mid year}} \times \text{Unit}$$

o. Severity rate:

$$\frac{\text{Number of days of illness}}{\text{Number of illness}} \times \text{Unit}$$

events

Rate = ‘ ‘- x10,000 Population at risk

Example No of TB cases m town A

Year
1975 1980
No. of cases 60 80
Population 30,000 50,000
1975 Rate = 63/30,000x 10,000 = 20 per 10,000
1980 Rate = 80/50,000 x 10,000 = 16 per 10,000
Attack Rate An attack rate measure proportion of the pop ulation that develops disease among the total exposed to specific risk
Number of person ill
AttaekRate= x100
Number of person at risk ‘
Example: 500 guests (men ‘200 and women 300) ‘attend marriage dmner Food poisoning m 150 guests (90 men 60 women) Fmd attack rate of men and women.
Attack rate of men = 9Q/200 x 100 = 45% Attack rate of women “ = 60/300 x 100 = ‘20%.
Incidence and prevelance ‘are the two majOr measurements of disease
e. Incidence Rate Incidence rate are designed to meaáure the rate at which people without a disease develop the disease during a specific period of time, i.e., the number of NEW cases of a disease in a population over a period of time.
No. of new cases developing a
disease during a period of time

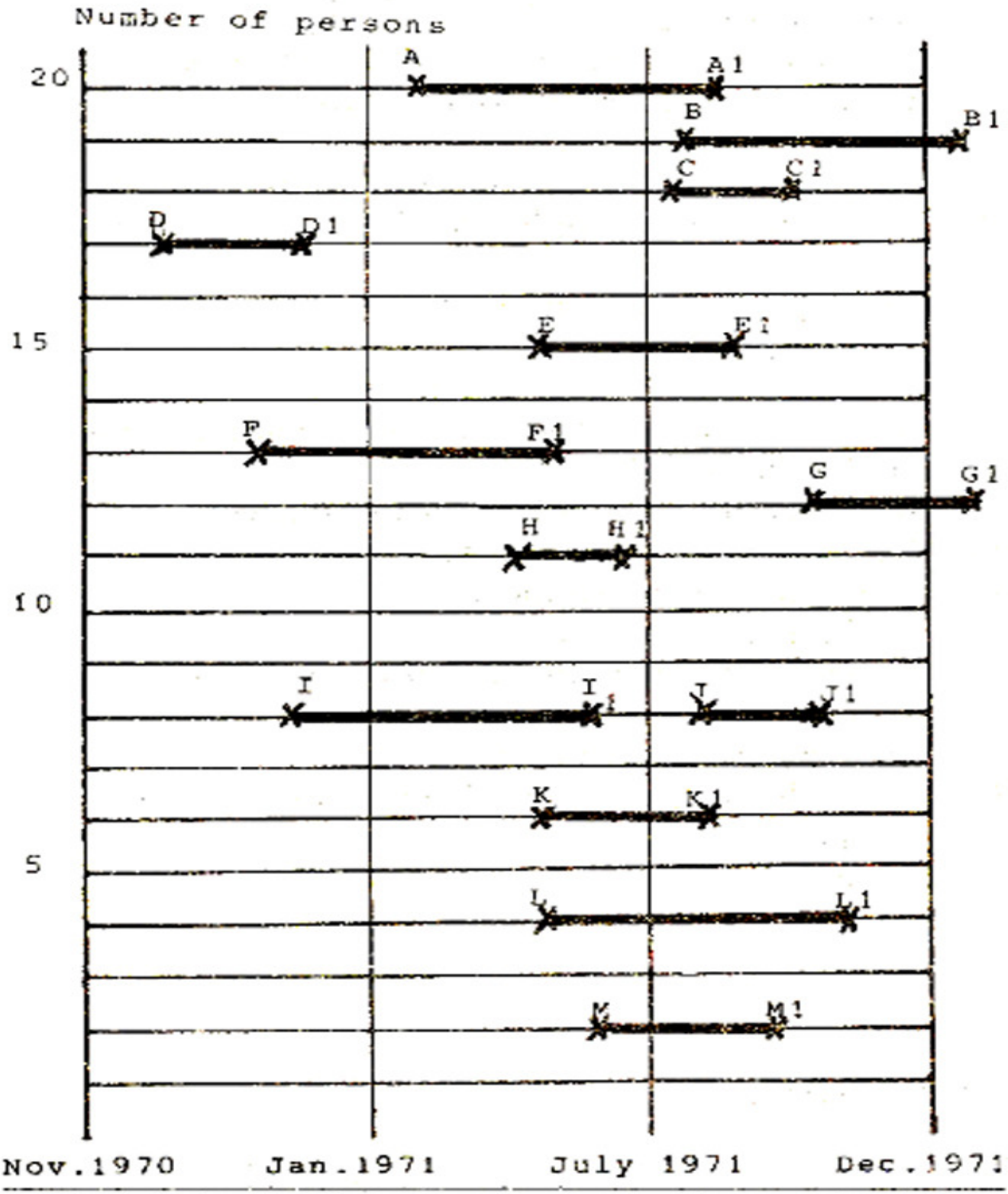

Figure. Episodes of infectious mononucleosis in a population 20.

Incidence rate = x 10,000
Population at risk

d. Prevalence Rate: Prevalence rate measure the number of people in a population who have the

disease at a given point in time.

Total number of cases of a disease at a given time

Prevalence rate = x Unit

Total Population

[Where unit is 100 or 1000 or 10,000]

Example: Each heavy black line between the X's on (Figare) represents an episodes of -infectious mononucleosis, and each line represents a person (sothat there isa defined population of 20). For 1971 compute; for mononucleosis1.

1. Incidence
2. Prevalence

Solu: Incidence rate = 10/20x100 = 50% (The episosdes J-J1 is counted as contributing to incidence in 1971, although it appears to be reinfection)

Prevalence rate = 11/20x100 = 50% (10 new + 1 old)