

Epidemiology.

#1

Epidemiology :-

General studying of distribution & determinants of disease & health related problems in human population.

Distribution:- occurrence of mortality or morbidity or health related problems in human being according to

- 1 Personal characteristics
- 2 Place
- 3 Time

① Personal characteristics

- Age
- gender

② Place

- area of residence
- place of work

③ Time

- Long-term variation LTV (Secular) (non-epidemic)

Cyclic or periodic variation

- [# of cases increase every specific period of time]

ex: Diarrhea more common in summer



ex:- measles increase every 3-4 years

Short-term variation STV (epidemic)

abnormal & temporary increase in # of cases over short period of time.

ex:- the expected # of poliomyelitis cases is 3-4 every year, & then we have 10 cases. (outbreak of poliomyelitis)

Determinant:- factor which increases or decreases the occurrence of disease.

Risk factor (RF):- factor which is significantly associated / related to the occurrence of a disease ($P \leq 0.05$)

P value:- statistical significant level.

P

- $P \leq 0.05$ significant (RF stronger)

$P > 0.05$ non significant

ex:- $P = 0.02$ \Rightarrow 0.02 of cases is by chance
 \Rightarrow 0.98 real association

Criteria of causation

#2

- 1 Type of epidemiological study

2 Dose - Response relationship
Dose = Quantity of risk factor.

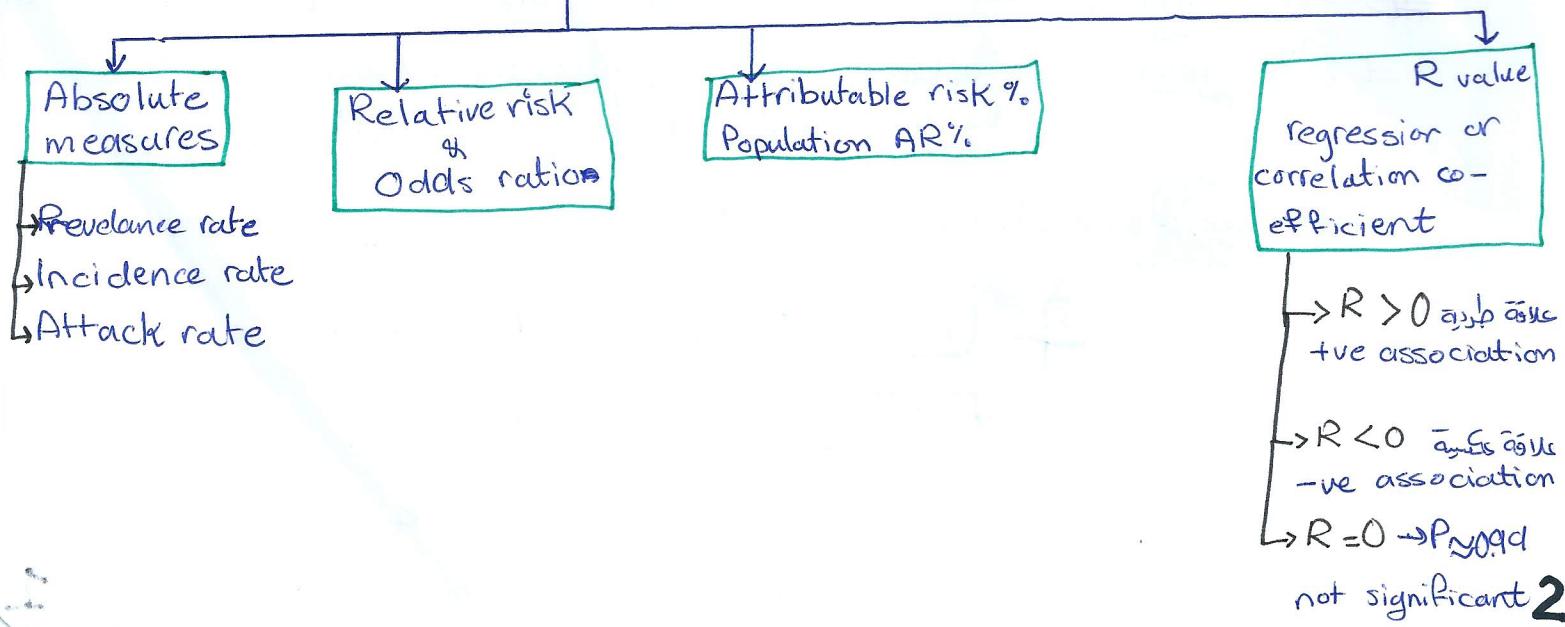
3 Temporality (time sequence) = RF comes first then the disease

4 Amount / Degree of association btwn RF & disease
measured by
 - Relative risk RR → Cohort studies
 - Odds ratio OR → case control studies

5 Consistency
 - Consistent: the probability that the risk factor cause that disease increases
 - inconsistent: ex:- In a study degree of association is 8.5
 - if it is more or less in other studies → Consistent
 - if it is 5 and above → inconsistent!
 this part is ^{most} the part that takes time from us
 you need to go back to studies & books--

Risk: the probability of having bad outcome [mortality & morbidity]

Measurements of risk



$$\text{Incidence rate IR} = \frac{\# \text{ new cases}}{\text{Sample size} - \# \text{ of old cases}} * 100\%$$

$$\text{Prevalence rate RR} = \frac{\# \text{ of new cases} + \# \text{ of old cases}}{\text{Sample size}} * 100\%$$

Prevalence rate = IR * D, D: average duration of the disease.

* most of the rates calculation

$$\frac{x}{y} * K \quad x: \# \text{ of cases}$$

y: study population

K: constant [most likely it is 100]

$$\text{IR in smokers} = \frac{\# \text{ of new cases of bronchitis in smokers}}{\text{total } \# \text{ of smokers}}$$

$$\text{IR in non-smokers} = \frac{\# \text{ of new cases in non-smokers}}{\text{total } \# \text{ of non-smokers}}$$

$$\text{IR in the whole-population} = \frac{\text{total } \# \text{ of new cases}}{\text{total pop of the study}}$$

كل أسلمة عن حالات أخرى
RF المعرفين للـ smokers
RF غير المعرفين للـ non-smokers

↳ Cases of bronchitis Dr.
use المعاين بأعراض المذكورة
في السؤال.

$$RR = \frac{\text{IR in smokers}}{\text{IR in non-smokers}}$$

RR > 1 → positive association

RR = 1 → no association

RR < 1 → protective association

↳ P value

if $\text{IR}_{\text{in smokers}} = \text{IR}_{\text{in non-smokers}}$ → no association

$$\text{AR \%} = \frac{\text{IR in smokers} - \text{IR in nonsmokers}}{\text{IR in smoker}} * 100\%$$

↳ ينفي لو حفظت بطل يرثها
كم ينفي لو حفظت بالمعنى

$$\text{PAR \%} = \frac{\text{IR in pop} - \text{IR in nonsmokers}}{\text{IR in population}} * 100\%$$

↳ تبع نسبة الإصابة بالمعنى كاملاً

⇒ always $\text{AR \%} > \text{Pop AR \%}$

note ⇒ P value can't be determined by Cohort study

note: In Cohort studies, the participants must be free from the disease at the beginning, all participants who had the disease before must be excluded

Case Control Study

#4

ex:- smoking & bronchitis

→ we take equal number of cases who have bronchitis and who don't have bronchitis.

→ assume that we took 100 case

100 have bronchitis
Case group
~~Control group~~

100 who don't have bronchitis
Control group

you ask each of them if they were smokers or not
you make this table

	Control	Cases
RF +ve	A	B
RF -ve	C	D

RF +ve = smokers

RF -ve = non-smokers

$$\text{Odds Ratio} = \frac{A * D}{C * B}$$

OR
OR > 1 positive association
OR = 1 no association
OR < 1 protective association

→ if OR = 3 in this study what does that mean?
Cases with bronchitis are 3 times more likely to be smokers when compared to Control. (RR 3 times)

Note PR & IR can't be determined from this type of studies

Epidemiological Studies.

#5

Observational

Descriptive

describe the occurrence of a disease according to person, place, time

Analytic

held to know or analyze the reason behind the occurrence of certain disease

Clinical trials

applied on certain individuals
Volunteers

Community trials

applied on selected group of people or selected community

Cross Sectional

- very common, simple cheap & quick
- In U.K 60% of the publications are cross sectional studies
- In Jordan almost all publications are cross sectional. why?
 1. Cheap, simple & quick
 2. Researchers don't know how to conduct case-control or cohort studies

Objectives:-

1. Prevalence rate
2. Risk Factor

Cohort studies

- ### Objectives:-
1. IR
 2. Causation

Case Control Studies

- ### Objectives:
- to find causation

Objectives:-

1. IR
2. Causation
3. Efficacy / efficiency

ex:
Efficacy → ability of the antibiotic to cure a certain disease

efficiency → how efficient is the drug compared to other drugs in the market.

Examples on exam questions:

from which study we can find the following:-

PR → cross sectional

AR% → cohort

IR% → cohort

RR → we need to find IR from cohort

OR → case control

Findings of this study is similar to findings
of other studies. ⇒ Consistency

Cohort study starts by RF then ended by
the outcome. ⇒ Temporality

Temporality can be achieved in → cohort + Case-control

■ IR = the number of new cases per population in
a given time period.