



الكلية : كلية طب العام

الفرع : طب السرة والمجتمع

المرحلة : الرابعة

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اسم المادة باللغة العربية: وبائيات

اسم المادة بالانكليزي: Epidemiology

اسم المحاضره الثالثة باللغة العربيه : قياسات التي تستخدم في تصميم الدراسة

اسم المحاضرة الثالثة : Measurements of RR and AR (case control and cohort studies) -

Measurements of RR and AR (case control and cohort studies):

Q7- A study on death rate due to coronary heart disease was carried out among men aged 50 years and above for 10 years. The results are given below:

Population groups	Maximal physical activity	Minimal physical activity
Number of men (aged 50 years and above) followed up	31200	8500
Number of cases which developed during follow up	180	52
Number of deaths during the follow-up period	48	35

1. Calculate appropriate indices to show the extent of risk and death in the two groups due to heart disease.
2. What are the point prevalence rates of heart disease at the end of the follow up period? Assume no complete recovery of diseased persons.
3. Can you list risk factors for coronary heart disease? Which risk factors are modifiable?

Sol:

(Extent of risk) ??????

(extent of difference) ??????

$$\text{Incidence rate} = \frac{\text{No. of new cases of maximum physical activity}}{\text{Pop. At risk}} \times K$$

$$= \frac{180}{31200 - 48} \times 1000 = 5.8 \text{ \textbackslash } 1000$$

$$\text{Incidence rate} = \frac{\text{No. of new cases of minimum physical activity}}{\text{Pop. at risk}} \times K$$

$$= \frac{52}{8500 - 35} \times 1000 = 6.1 \text{ \textbackslash } 1000$$

$$\text{Cause-specific death} = \frac{\text{No. of death}}{\text{Total population}} \times K$$

$$\text{Maximum} = \frac{48}{31200} \times 1000 = 1.5 \text{ \textbackslash } 1000$$

$$\text{Minimum} = \frac{35}{85000} \times 1000 = 4.1 \text{ \textbackslash } 1000$$

$$\text{Point prevalence rate} = \frac{\text{No. of existing cases at a point of time}}{\text{Total population}} \times K$$

$$\text{Maximum point prevalence} = \frac{180 - 48}{31200} \times 1000 = 4.2 \backslash 1000$$

$$\text{Minimum point prevalence} = \frac{52 - 35}{8500} \times 1000 = 2 \backslash 1000$$

Q8- A hypothetical data for a 1-year period , for association between alcoholism and tuberculosis

	Persons with TB	Persons without TB	Total
Alcoholics	40	10	50
Teetotalers (non drinkers)	10	90	100
Total	50	100	150

Calculate:

a- Relative risk (extent of risk).

b-Attributable risk .(risk difference).

c-Attributable risk percent .

Sol:

$$RR = \frac{I_e}{I_o} = \frac{a \backslash a+b}{c \backslash c+d} = \frac{40 \backslash 50}{10 \backslash 100} = 8$$

$$AR = I_e - I_o = \frac{a}{a+b} - \frac{c}{c+d} = \frac{40}{50} - \frac{10}{100} = 0.7$$

$$AR\% = \frac{AR}{I_e} \times 100 = \frac{I_e - I_o}{I_e} = \frac{0.8 - 0.1}{0.8} \times 100 = 87.5\%$$

Q9. Relative risks of infant mortality associated with different methods of infant feeding are shown in the table below:

Type of milk consumed	Relative risk
1. Breast milk only	1.0
2. Breast milk + powder milk	4.0
3. Breast milk + cow milk	2.8
4. Powdered milk only	11.9
5. Cow milk only	8.3

what is meant by “relative risk”? How is it calculated?

. what conclusion can you make from these data?

. If the infant mortality rate among the third group was 32/1000 LB,
at are the infant mortality rates among the other groups?

:

IMR for 3rd group 32\1000

RR for 3rd group 2.8

$$RR = \frac{IMR_e}{IMR_o}$$

$$2.8 = \frac{32}{X}$$

$$X = \frac{32}{2.8} = 11.4\backslash1000$$

$$RR \text{ for } 1^{st} \text{ group} = 1 = \frac{IMR_e}{11.4}$$

$$IMR \text{ for } 1^{st} \text{ group} = 11.4\backslash1000$$

$$RR \text{ for } 2^{nd} \text{ group} =$$

$$4 = \frac{IMR_e}{11.4} = 45.6\backslash1000$$

$$\text{RR for 4}^{\text{th}} \text{ group} = \frac{\text{IMR e}}{11.4} = \frac{11.9}{11.4} = 1.0438 \approx 1.04$$

$$\text{RR for 5}^{\text{th}} \text{ group} = \frac{\text{IMR e}}{11.4} = \frac{8.3}{11.4} = 0.7281 \approx 0.73$$

Q10. In study of the relationship between smoking and anxiety, 1000 people (sample) from population were simultaneously classified according to smoking status (smoker, or not) and current level of anxiety (high or low). 300 of this sample were found to have a high level of anxiety, 500 were identified as smokers, and 200 were smokers who also reported a high level of anxiety.

1- Draw 2x2 table.

2-What type of study is this .

3- What is the percentage of high anxiety levels .

4-prevalence of anxiety compared in smoking and non-smoking. (prevalence of disease compared in exposed and non-exposed) $a/a+b$ and $c/ c+d$

5-prevalence of smoking compared in low anxiety and high anxiety. (prevalence of exposed compared in diseased and non-disease). $a/a+c$ and $b/ b+d$.

Sol:

	High Anxiety	Low anxiety	Total
Smoker	200	300	500
Non-smoker	100	400	500
Total	300	700	1000

cross-sectional study

$$= \frac{300}{1000} \times 100 = 30\%$$

PREVALENCE RATE OF ANXIETY COMPARED TO SMOKER AND NON SMOKER

$$\text{Prevalence rate of SMOKER} = \frac{a}{a+b} = \frac{200}{500} = 0.4$$

$$\text{prevalence rate non-smoker} = \frac{c}{c+d} = \frac{100}{500} = 0.2$$

PREVALENCE RATE OF SMOKING COMPARED TO HIGH AND LOW ANXIETY

$$\text{The prevalence rate of high anxiety} = \frac{a}{a+c} = \frac{200}{300} = 0.7$$

$$\text{the prevalence rate of low anxiety} = \frac{b}{b+d} = \frac{300}{700} = 0.4$$

Q11- To study the possible association between oral contraceptive pills used and the occurrence of Rheumatoid arthritis an investigator select 100 women with a confirmed diagnosis of RA and 200 women undergoing treatment at the same medical facility for other musculoskeletal condition .

They were reviewed for evidence of OCP used. 40 from 100 exposed to OCP and have the disease and 120 exposed or used OCP but have not disease.

a- What type of study design .

b-Is there any association between OCP used and RA .(draw 2x2 table).

C- Measure the excess risk of disease , that can be solely attributed to the risk factor .

Sol:

a- case-control study

b-

	Occur	Non occur	Total
Expose	40	120	160
Non	60	80	140
	100	200	300

c-

odd ratio

$$OR = \frac{ad}{bc} = \frac{40 \times 80}{120 \times 60} = 0.4$$

$$AR\% = \frac{OR - 1}{OR} \times 100 = \frac{0.4 - 1}{0.4} \times 100 = - 150 \%$$

Q12-A study was carried out to ascertain the relationship of parental smoking to the risk of acute respiratory infection among children aged less than five years. A total of 800 children of smoking parents and 1200 of nonsmoking parents were followed up for six months. During the follow up period, 592 of the first group and 636 of the second group developed at least one attack of acute respiratory infection. Do these results suggest that parental smoking predisposes children to acute respiratory infection?

Sol:

	+ve A.R	-ve A.R	Total
Smoking parent +ve	592	208	800
-ve	636	564	1200
Total	1228	772	2000

Cohort study

$$RR = \frac{le}{lo} = \frac{a \backslash a+b}{c \backslash c+d} = \frac{592}{636} = 1.4$$

$$le = \frac{592}{800} \times 1000 = 740$$

$$lo = \frac{636}{1200} \times 1000 = 530$$

So 1.4 times parent smoking predispose children to acute respiratory infection

Q13-. The table below shows the results of a case control study conducted to find out the relationship of pelvic inflammatory disease and duration of use of intrauterine device (IUD):

Use of IUD	Cases	Controls
Long term	12	10
Short term	15	47
Non users	72	340
Total	99	397

- Explore the degree and direction of association (if any) between PID and use of IUD.
- Can you suggest an alternative epidemiological method to study the same association? Explain your proposed design.

Sol:

part one

	cases	control	Total
Long term	12	10	22
Non use	72	340	412
Total	84	350	434

$$\text{Odd ratio} = \frac{ad}{bc} = \frac{12 \times 340}{10 \times 72} = 5.7$$

Part two

	cases	control	Total
Long term	12	10	22
Short term	15	47	62
Total	27	57	84

$$\text{Odd ratio} = \frac{12 \times 47}{10 \times 15} = 3.7$$

Q14- A clinical trial was done with patients who had suffered at least two recurrences of duodenal ulcers , they were currently in remission and tested positive for the presence of H. pylori , a bacteria commonly found in the human duodenum , participants were divided randomly into two groups . One group received a frequently used ulcer medication; the other one received the same ulcer medication plus an appropriate antibiotic (second generation erythromycin). Patients were followed for one year and ulcer recurrence was assessed in each patient during the 12 months period of observation.

Treatment	Recurrence during observation period		Total
	Yes	no	
Ulcer medication +antibiotic	9	99	108
Ulcer medication	89	15	104
total	98	114	212

Calculate:

- 1- The incidence of recurrence in each group.
- 2-The relative risk of ulcer recurrence in patients treated with ulcer medication plus antibiotic compared to patients treated with ulcer medication only.
- 3- The risk attributed to omitting antibiotic therapy in ulcer recurrence. What do we call this measure .
- 4-the proportion of ulcer recurrence cases among the group treated with ulcer medication only that can be attributed to omitting antibiotic therapy. What do we call this measure?
- 5-from all the above measures of risk can you conclude that adding antibiotic therapy has a special value in reducing ulcer recurrence rate.
(Answer by agree or not agree).

Sol:

Incidence of recurrence

$$I_e = \frac{a}{a+b} = \frac{9}{108} \times 100 = 8.3$$

$$I_o = \frac{c}{c+d} = \frac{89}{104} \times 100 = 85.57$$

$$RR = \frac{I_e}{I_o} = \frac{8.3}{85.57} = 0.096$$

$$AR = I_e - I_o = 8.3 - 85.57 = -77.27$$

$$AR\% = \frac{AR}{I_e} \times 100 = \frac{8.3 - 85.57}{8.3} \times 100 = -930.9\%$$

Q15- The association between low birth weight and maternal smoking during pregnancy can be studied by obtaining smoking histories from women at the time of the first prenatal visit and then subsequently assessing and assigning birth weight at delivery according to smoking histories .

- a- What type of study is this? cohort
- b- What is the exposure? Smoking
- c- What is the outcome? LBW

Q16- To study association between smoking and broncogenic carcinoma, what is the study design that can be used and WHY ?

Sol:

Case -control study	Cohort study
Two group Bronchogenic -ve	Two healthy group
Smoking Non smoking	Follow 10 years
كلما كانت نسبة التدخين اكثر يكون اكثر يكون اكثر المرض	1 st group expose to smoking 2 nd group non smoking
X ² analysis	
Odds ratio	RR