Community Review

This lecture will be a review of the material we took about the tests made to understand.

Prospective cohort study:
This means a follow up study it's one of important study design
We divide healthy people into two groups: exposed and non-exposed.

E: exposed
E~: non-exposed
D: diseased
D~: non-diseased

In this type of study we take healthy people and divide them into two group
One of them we expose them to agents and the other group we don't expose them
After a while of follow ups we see which of them develop the disease and which not!

In the schedule we have four groups

	D	D~
E	a	b
E~	C	d

A: those who are exposed and develop disease
B: those who are expose and not develop disease
C: those who are not exposed and develop disease
D: those who are not exposed and not develop disease

Prospective cohort study

Cohort mean: group of people who are similar to each other's in some features.
RR: relative risk, rate ratio, this means the risk of developing the disease among the exposed compared to risk of developing the disease among non-exposed (controls)

RR=IE/IE~
IE: incidence of developing the disease among exposed and equal: those who are diseased and exposed/ subtotal off all exposed (a/a+b)
IE~: incidence of developing the disease among non-exposed and equal: those who develop the disease and non-exposed/ subtotal off all non-exposed (c/c+d)

Suppose that RR= x
This means that the rate of developing the disease among the exposed equal "x" times to that among the non-exposed.

- RR= (a/a+b) / (c/c+d)

- Important note: cohort rate gives us incidence rate not prevalence rate.
- The cross sectional study is the one that gives us prevalence rate.
- Incidence rate: number of new emerging cases.

Let's take an example: suppose that they measure the blood pressure of our patch and found out that 10 of us had hypertension previously and 5 of u are new cases
The incidence = 5/total
The prevalence rate= 10+5/total

- So most of the time the prevalence is greater than the incidence

P=I*D

- P=prevalence
- I=incidence
- D=duration

Important: when would you find P=I??

- The disease has short duration.
- the disease is highly fatal "like: rabies".

Risk difference: (IE-IE~) *100%

- Incidence: the percentage of the disease in all the population
- IR = a+c / (a+b c+d)

Cross sectional study:

- It is a prevalent type of design, it gives prevalence NOT incidence.

Ex) we studied diarrhea / no diarrhea in rural population VS urban population.

Notice that there are 200 rural and 100 urban, so total # of patient with diarrhea = 300.
Total population (with diarrhea and without diarrhea) = 1000

Q) Prevalence rate of disease in the study population is:

$$\frac{\text{\# of patient with diarrhea}}{\text{prevalence rate of diarrhea}} \text{ Total \#of population study} * 100 = (300/1000) * 100 = 30\% \text{ -----}\rightarrow$$

- Case control study:
- Ex) for smoking & lung cancer we take (cases) of lung cancer and we compare them with controls in hospitals.
  Modes of comparing : one : one
  One: two
  One: three

  They are similar in everything except disease under investigation .
  If we study a female case, we should compare it with a female control in the hospital, this applies also to age, residency area … etc.
  That is to increase any differences in the results. So the results will be pure due to the exposure.

I ask the patient for what happened in the past, (backward) For example. I ask him: have you been exposed to radiation 10 years ago? Answer by yes or no. and I ask him many other questions.
So, all the questions will be in the past that's why it is called retrospective. (Case reference study).

*the results we obtain are termed to as **OR** (Odds Ratio).

- **OR** (Odds Ratio) is an approximation of RR that we calculated in the cohort study.

- OR: it is the likelihood of having the exposure among the disease compared to the non-disease (control).

Ex) (lung cancer) cases / controls / smokers / non- smokers

40	10	20	50
A	B	C	D

OR = (A*D) / (B* C) =➔ (40 * 50) / (10 * 20) = 10

What does the result mean?
The likelihood of being exposed to smoking or being smoker is 10 times among diseased (who have cancer) than among the controls.

نسبة حدوث سرطان الرئة بالنسبة للمدخنين 10 اضعاف نسبة حدوثها عند غير المدخنين .

*Estimate magnitude of association here is OR, which means the larger the OR the stronger association between the risk factor and the exposure while in cohort study, RR is the estimate magnitude of association, the larger the RR, the stronger the association.

We talked previously about population attributable Risk percent and attributable risk percent.

Attributable Risk = IE – IN (Incidence of exposed – Incidence of non-exposed).

$$\text{Attributable Risk percent} = \frac{IE - IN}{IE} * 100$$

Population attributable Risk = IP- IN.

$$\text{About Population attributable Risk percent} = \frac{IP - IN}{IP} * 100$$

EX) Disease (D) : 20
Non-disease (ND) : 30
Exposed (E) : 70
Non-exposed (NE) : 5
Total #of people involved in the study = 125

Attributable risk = IE – IN
IE = 20/50 IN = 5/75

$$\text{Attributable risk} = \frac{20}{50} - \frac{5}{75} = 1/3$$

Attributable risk percentage = (attributable risk / IE)*100% = ((1/3)/ (20/50))*100% = 83%

Population attributable risk = IP – IN
IP = (the total number of infected people / total number of the population)
so, IP in the example = (20+5)/(50+75)
IN= (5/75)
population attributable risk =((20+5)/(50+75))- (5/75) =(25 / 125) – (5/75) = 0.13 = 13%

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Occupational lung Changes are of two types:

1- Restrictive pattern

2- Obstructive pattern

* Obstructive pattern:

I.e. Byssinosis (occupational asthma), chronic bronchitis, emphysema, COPD (chronic obstructive pulmonary disease).

Byssinosis→due to cotton dust exposure

Restrictive pattern: *

i.e. (silicosis), (asbestosis) →pneumoconiosis (dusty lung disease).

Pneumoconiosis→ due to dust (silica / coil /asbestos) exposure
The dust alters the fibroblasts making them proliferate producing more collagen, this collagen (abnormal) disturbs the lung → decreasing the vital capacity of the lung.

Regarding the occupational health: -

*Occupational diseases →disease caused because the works is exposed to a certain factor.

*Work related diseases→ the work nature makes the worker disease worse.

*Work injury→accidents (biological / physical / psychological).

- The worker should be protected from diseases like:

Viral infections (i.e. hepatitis / HIV) → vaccination.

Zoonotic diseases, especially for those whose work is related to animals.

Occupational medicine programs (which is established in the developed countries) have three components:

1- Occupational (Industrial) physician.
2- Occupational health nurse.
3- Industrial safety engineer.

Their role is to maintain the workers' health, perform a Pre-employment medical examination, periodic medical examination, monitoring the exposure to chemicals.

Progressive massive fibrosis

Types of silicosis in relation to years of exposure: acute (first 5yrs), accelerated (5-10yrs), chronic (more than 15yr).
Many changes in the lung will be noticed (in the x-ray) such as Calcification and there are changes will be notices in the lymph nodes.

Monitoring of Lead and mercury: Blood / urine tests, if an exposure detected the Workers reaching the toxicity level must be excluded from work and subjected to Treatment by chelating agents in the form of BAL {British anti Lewisite chelating agents (Dimercaprol)}.
Penicillamine is the drug of choice in mild toxicity. (For Mercury).
Ca-EDTA is the drug of choice for Lead poisoning.

One of the important things in prevention the development of such diseases is to:
1-encourage the workers to wear the personal protective equipment (mask, etc),
2-maintain the monitoring (8hrs threshold limit value=20 micro gram) (level of mercury, lead in the factory mustn't exceed ceiling value = 40 microgram, the factory will be shut down until the level of poisonous materials return to the allowed values.

Byssinosis: due to the exposure of cotton dust.

In nutrition material it is **important** to know:
What are the meanings of Low-birth weight and very-low-birth-weight?
Gestational aid and whats related to it.
Epidemic and endemic and pandemic meanings.
Relating to mid-term questions focus on the deficiencies (vitamin c deficiency, etc).