Community Medicine

Summary

Slide # 11

Epidemiology

الحمد لله القوي المتين و الصلاة و السلام على المبعوث رحمة للعالمين و بعد:

Introduction to Epidemiology

We will start by defining some words from the slides:

1-What is meant by Epidemiology?

It is the core science of Public health. (علم الأوبئة)

2-What is Public Health?

Is the science that deals with preventing disease and prolonging life (بإذن الله) and promoting health.

3-What is Health?

It is the physical, mental and social well-being, not absence of disease.

4-What is a Disease?

It is a Physiological or psychological dysfunction.

5-What is illness?

A state of not being well. (you could be ill but not have a disease but it is rare to have a disease and not feel ill).

6- What is sickness?

A state of social dysfunction.

- Epidemiology has 3 different definitions that were defined in different years and they are:

1- Frost's definition (1927) : science of mass phenomena of infectious diseases or natural history of infectious diseases.
2- Stallbrass's definition (1931) : science that deals with prime causes, propagation (انتشار) and prevention of infectious diseases. PPP
3- J.M. definition (1988) : study of frequency, distribution and determinants of health related issues.

Epidemiology also can be explained as scientific methods of disease investigation.

Also we are concerned in measuring frequency of diseases, disabilities and deaths in particular population. (for your information only).

-Distribution : studying an event by person, place and time.

-Determinants: factors that if present/absent affect occurrence and level of event. (المسببات)

Why do we need to know the determinants?

It helps us develop policies and interventions that will prevent the health problem.

Epidemiology deals with populations while clinical medicine deals with patients, so epidemiology is a science and practice(applied science). (For your information only)

How to Investigate an outbreak of a disease?

A person called Rudyard Kipling introduced 5 questions that must be asked in order to investigate an outbreak they are:

1-What is the event = clinical (problem)

2- Who is affected = Person

3-Where = place

4- When= time

5- Why/How= causes, risk factors and way of transmission

Questions 1-4 are called descriptive epidemiology while question 5 is called analytical epidemiology.

- Objectives of Epidemiology

1- Study etiology of disease and mode of transmission.
2- Determine extent of disease problems in community.
3- Study natural history of disease.
4- Evaluate existing and new preventive ways of therapy.
5- Develop public policy.

- Basic tenets (مبادئ) of epidemiology:

1- Target of study is human population.
2- Change of the structure of population should be taken in consideration during data analysis.
3- Diseases don’t occur randomly

4- Conclusion is based on comparison : we compare rates of disease among people that are exposed to it and those that are not exposed.
5- Describe events by time, place and person to formulate hypothesis(فرضية) of the cause.

After all of that we conclude that ultimate aims of epidemiology are:
1- To eliminate or reduce health problems
2- To promote health of society

-Brief definition of Endemic, Epidemic and Pandemic:
*Endemic: Disease X is found in a particular geographic area(it is its habitat).

*Epidemic: Disease X is found in a community or region in excess of normal expectancy.

*Pandemic: Worldwide Epidemic.

London Smog Disaster (1952):
Air pollution that caused respiratory illness and death, it happened because of coal burning which created a dense smog in the winter of 1952 that continued for 5 days and increased mortality rate from 2062 in previous week to 4703 deaths.

Epidemiology of polio vaccine :
In April 1955 Dr. Thomas Francis , director of polio vaccine in University of Michigan announced that 2 year trial of Salk vaccine against polio was 90% effective, this marked the beginning of end of polio as most life threatening disease to children in USA.

Scope of Epidemiology (نطاق)
Epidemiology recently is applied to all diseases but originally it was applied only to epidemics of communicable diseases.

History of epidemiology

Seven landmarks in history of epidemiology:
1-Hippocrates (460BC) : environment and human behavior affects health.
2-John Graunt (1662) : Quantified births, deaths and diseases. Quantified يعني حدد كمية
3-Lind (1747) : scurvy could be treated with fresh fruits.

4-William Farr (1839): established vital statistics for evaluation of health problems.
5-John Snow (1854) : tested a hypothesis on origin of epidemic cholera.
6-Alexander Louis (1872) : systematized application of numerical thinking.
7-Bradford Hill (1973) : suggested criteria for establishing causation.

So Epidemiology started in 460BC and became a discipline in 1940s.

John Snow : (قصته باختصار)
He was an English physician that used scientific methods to identify that cause of epidemic cholera in London in the year 1854, he believed that water from the water pump in Bradford street was responsible for cholera, he collected data and asked the 5 W's (page 4) and found that indeed the water pump in Broad street was responsible for the transmission of cholera so he went to Broad street and broke the handle of the pump preventing people from drinking its contaminated water, this lead to a decrease in no. of people diagnosed with cholera so death rates have decreased sharply.

Theories of the causes of disease :
-nineteenth century theories:
1-contagion theory
2-supernatural theory (العفاريت و الأرواح الشريرة)
3-personal behavior theory
4-miasma theory

-twentieth century theories
1-Germ theory (viruses and bacteria)
2-lifestyle theory
3-enviromental theory
4-multi-causal theory

How do we measure diseases occurrence ?
By:
1-numbers
Ex. 100 cases of TB in community A.

2-Ratios
Ex. Ratio of TB in community A to Community B is 1:10.

3-proprtions
Ex. Proportion of TB cases in community A is 10%.

4-Rates: measures occurrence of event overtime with a multiplier usually 1000 or 100000

There are 3 types of rates:
1-crude rates : applies to total population in a given area.
2-specific rates: applies to specific subgroups in population.(Ex. sex, age etc…….)
3-standarized rates : used to compare rates in populations with different structures.
It has two types: direct and indirect.

Measurement of disease occurrence :
Morbidity rates: rates that are used to quantify the magnitude of disease.
There are two types:
1-Incidence rates(cumulative incidence)
2-Prevalence(period prevalence)

*Incidence rate is the proportion of population that develops a disease overtime, helps determine the risk of an individual developing a disease overtime.

How to calculate cumulative Incidence?
No. of cases during specific period/population at risk in the same period of time

Challenges in measuring Incidence rate:
1-Identification of population at risk, are individuals free of disease and are susceptible to it.
2-population is always changing due to births, death and migration.
3-people are at risk until they get the disease

Prevalence rate:
Measures proportion of a population with disease at specific period or point in time.
There is point prevalence and period prevalence.

Point prevalence rate= persons with disease at point time/total population.

Prevalence= incidence* duration of disease
In highly fatal diseases P=I.

Please refer to the last 3 slides for examples.

Summary of slide 11 is done بفضل الله