Introduction to basic Epidemiology

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Objectives

Upon completion of this lesson, the participants should be able to:

- Define basic concept of epidemiology
- Summarize the historical evolution of epidemiology
- Describe the uses of epidemiology

OBJECTIVES AND AIMS OF EPIDEMIOLOGY

Investigation and description of the distribution of the frequency of diseases in human populations

Identification of factors related to the etiology of the pathogeneses of diseases

Provision of data for planning, implementation and evaluation of measures aimed to prevent, tackle and treat diseases and to establish priorities among different measures

What is epidemiology?

It is considered as the basic science of public health and with good reason.

A. Quantitative basic sciences build on a working knowledge of statistics and sound research methods.
B. Developing and testing hypotheses pertaining to occurrence & prevention of morbidity and mortality.
C. A tool of public health action to promote and protect the public health based on sciences, causal reasoning and a dose of practical common sense.

(Cates WJ, 1982)

EPIDEMIOLOGY AND HEALTH CARE

Epidemiology is supposed to be the method of public health
Different perspectives:

❖ Curative medicine

- Patient oriented;
- Individual is only interested to seek help from health delivery service in case of sickness;
- Patient and medical personnel focus on the disease of patient;
- Medical personnel will gain patient's gratitude and credit if she or he succeeds in curing the patient.

❖ Public Health

- Population oriented medicine;
- Prevents the occurrence of disease;
- Measures implemented are often not very popular;
- Interfere with lifestyle patterns: Smoking, alcohol drinking, eating, sexual behavior, etc.;
- Statistical reasoning is not understood neither by curative sector nor by general public.

Definition

The study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to control health problems.

(Last, 1988)

Description of definition

- Study: a scientific discipline “The basic science of public health”.
- Distribution: Concerned with frequency and pattern of health events in population = Descriptive epidemiology.
- Determinants: search for the causes and other factors that influence the occurrence of health related events, attempts to provide the why and how of such events by comparing groups = Analytic epidemiology.

Description (Con't)

- Health related states or events: originally it concerned with epidemic of communicable diseases then it was extended to non communicable diseases and epidemiologic methods have been applied to chronic D+.
- Specific populations: clinician focuses on treating and caring for individual but epidemiologist focuses on the exposure, the potential for further spread in the community, and interventions to prevent cases or recurrences.

Description (Con't)

- Application:

* As a discipline of public health, epidemiology provides data for public health action.
* Epidemiologist uses the scientific method of descriptive and analytic epidemiology in "diagnosing" the health of a community and planning how to control and prevent diseases in the community.

Evolution of epidemiology

- Hippocrates (Greek healer): suggested the environmental and host factors might influence the development of disease (On airs, waters and places.)
- John Graunt (London haberdasher,1662): he is the first to quantify patterns of birth, death, disease occurrence, high infant mortality, noting male female disparities, urban rural differences and seasonal variation.

Evolution (Con't)

- William Farr (British,mid-1800) "a father of modern vital statistics and surveillance, vital statistics and disease classification".
- John Snow (Anesthesiologist,British,1854)

  "The father of field epidemiology" 20 years before the development of microscope.

* Snow conducted studies of cholera outbreak both to discover the cause of D+ and prevent its recurrence.
* A spot map was first applied by him.

Table 1.1
Mortality from cholera in the districts of London supplied by the Southwark and Vauxhall and the Lambeth Companies, July 9-August 26, 1854

Districts with Water Supplied by	Population (1851 Census)	Deaths from Cholera	Cholera Death Rate per 1,000 Population
Southwark and Vauxhall Co. only	167,654	844	5.0
Lambeth Co. only	19,133	18	0.9
Both companies	300,149	652	2.2

Source: 27

Evolution (Con't)

- In the mid and late-1800: many other in Europe and United States began to apply epidemiology methods to investigate D+ occurrence, especially to acute infectious disease.
- In the 1900’s: epidemiologists extended their methods to non infectious diseases.

Evolution (Con't)

- Doll & Hill, 1950: Linking smoking to lung cancer.
- Dawber & Kannel, 1963: The study of smoking and cardiovascular disease.
- Early 1970: applied epidemiology methods to eradicate small pox worldwide.
- To day, public health workers throughout the world accept and use epidemiology routinely.
- Epidemiology is often practiced or used by non-epidemiologists to characterize the health of their communities and solve day-to-day health problems.

Uses of epidemiology (1)

- Population or community health assessment:
  * To set a policy and plan programs.
  * Determine whether services are available, accessible, effective and efficient.
  * The methods of descriptive and analytic epidemiology must be used.
  * Based on the application of epidemiology, the officials can make informed decisions that will lead to improve health for the population.

Uses (2)

- Individual decisions:
  * People may not realize that they use epidemiology information in their daily decisions.
  * When they decide to stop smoking, take stairs instead of elevator, order a salad instead of cheeseburger, choose one method of contraception instead of another.
  * The role of exercise and proper diet in reducing the risk of heart diseases, etc.

Uses (3)

- Completing the clinical picture:
  * Studying a disease outbreak, epidemiologist depends on clinical physicians and lab scientists for proper diagnosis of individual patients.
  * Epidemiologists will contribute to physicians' understanding of the clinical picture and natural history of disease.
  * Ex.: Cases of eosinophilia-myalgia syndrome in 1989 in New Mexico.

Conclusion I

- **Epidemiology as a basic science of preventive medicine and public health is concerned with:**
  - **Disease (or some health status)**
  - **Frequency (enumeration of amount present or rate of development within a specific time period)**
  - **Distribution (patterns produced by disease occurrence in population)**

Conclusion II

- **Determinants (the factors affecting the distribution)**
- **Methods (process employed to describe frequency and distribution and scientific rationale used to determine causal relationship of disease distribution in populations)**
- **Populations (a defined human population)**

Thank you for your kind attention !