

Demography & Population Trends-I

Demographic Concepts

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1

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2

Vision and mission of RMU

1. To impart evidence based research oriented medical education
2. To provide best possible patient care
3. To inculcate the values of mutual respect and ethical practice of medicine

3

Sequence of Lecture

- ▶ Learning objectives : 2 slides
- ▶ Core subject: 29 slides
- ▶ Family Medicine: 1 slide
- ▶ Ethical Issues: 1 slide
- ▶ Research & online data: 1 slide
- ▶ End of lecture assessment: 1 slide



4

Learning Objectives

By the end of session the students should be able to:

- ▶ Define demography and population dynamics
- ▶ Apply demographic concepts in health system
- ▶ Discuss all major sources of population data with special emphasis on population census

5

Learning Objectives

- ▶ Calculate different rates related to fertility & mortality from given data
- ▶ Discuss linkage of demography with other disciplines
- ▶ Describe demographic, economic, social and interdisciplinary implications of population explosion

6

Core subject

What Is Population?

- ▶ A group of individuals or items that share one or more characteristics from which data can be gathered and analyzed . OR
- ▶ A group of individuals living in the same area and sharing same local conditions of the environment.

7

Core subject

DEMOGRAPHY

Definition: Demography, as understood today, is the scientific study of human population . It focuses its attention on three readily observable human phenomena :

- (a) changes in population size (growth or decline)
- (b) the composition of the population
- (c) the distribution of population in space

8

Core subject

It deals with **five "demographic processes"** , namely:

- 1) Fertility,
- 2) Mortality,
- 3) Marriage,
- 4) Migration and
- 5) Social mobility

These five processes are continuously at work within a population determining size , composition and distribution.

9

Core subject

Population Dynamics


▶ **Definition:** The study of all five "demographic processes" , processes which result in mode of change of population is called population dynamics. These five processes are continuously at work within a population determining size, composition and distribution.

10

Core subject

Population Dynamics

▶ Population dynamics is the study of how and why populations change in size and structure over time. Important factors in population dynamics include rates of reproduction, death and migration.



11

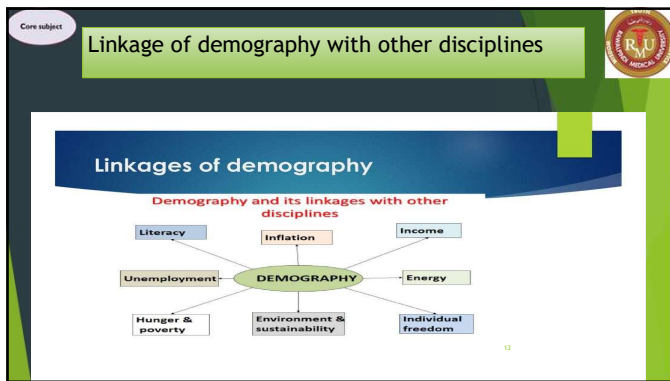
Core subject

Important factors of Population Dynamics

Population dynamics include many factors including changes in the:

- ▶ size of the population in absolute number
- ▶ rate of growth;
- ▶ age-sex structure of the population;
- ▶ average size of household;
- ▶ movement of people from one place to another;
- ▶ occupation distribution of the employed labour force;
- ▶ size of urban and rural population;
- ▶ wealth status of the inhabitants; and
- ▶ family structure.

12



13

Core subject

Example: Developed Countries

- ▶ The populations of most rich countries are growing older. This shift is creating a demography of low fertility and long lives.
- ▶ The rapidly growing populations of the elderly are putting unprecedented stresses on societies, because new systems of financial support, social support, and health care have to be developed and implemented.

14

Core subject

Example: Under-developed Countries

- ▶ The country's burgeoning population has serious implications —
 - a) undue burden on resources and space
 - b) poverty and unemployment
 - c) food scarcity and water crisis
 - d) housing issues and growth of slums
 - e) healthcare problems and illiteracy
 - f) corruption and mismanagement
 - g) growing crimes and conflicts
 - h) populism and ethnic tensions

15

Core subject

Application of Demography within the health system

- ▶ Demography is concerned with the size, breakdown, age and gender structure and dynamics of a population.
- ▶ The same science, and its robust methodologies, is equally applicable to the demography of the health workforce itself. For example In a world with an overall shortage of health workers, studying and understanding demographic characteristics of the workforce can help with future planning.

16

Core subject

Application of Demography within the health system

- ▶ Demographic data is statistical data collected about the characteristics of the population, e.g. age, gender and income for example. It is usually used to research and healthcare services
- ▶ It is important to understand the structure of a population in order to plan health and public health interventions; population structures in advance
- ▶ The concepts of demographic, epidemiological and health transitions help explain dramatic shifts in population structure and patterns of disease that have taken place in most countries.

17

Core subject

Application of Demography within the health system

- ▶ Demography is concerned with this and with understanding population dynamics - how populations change in response to the interplay between fertility, mortality and migration. This understanding is a pre-requisite for making the forecasts about future population size
- ▶ Uses resource allocation
- ▶ Health, educational, transport and housing planning
- ▶ The denominator for health and other population statistics
- ▶ Analyses of population trends on a wide range of areas: for example health, illness etc.

18

Core subject

Why is Patient Demographic Data Important?

- Patient demographics are the information gathered from patients that give you a better idea of who they are. This lets your practice tailor your care to their specific healthcare needs.
- Demographics can help know what certain groups need attention and the most help.

19

Core subject

Sources Of Population Data

The primary sources of the population data on the population size, characteristics and demographic structure are :

1. Census,
2. Projections,
3. The Registrations,
4. Migration Reports and
5. The Surveys

20

Core subject

Population Census

- a) The population census which is regarded as the most important source of basic data for the population data and it is conducted either decennially or quinquennially.
- b) A census count offers us a spectrum of the population at a specific point in time covering a vast range of the economic demographic and social attributes of the very population.
- c) Ones we have the process of census in our country then it became a continuous process and repeated in the country after every 5 to 10 years.
- d) In modern terms the census is defined as a process of collecting, compiling and publishing the economic, social and demographic data pertaining to all the individuals living in a country at any specific point in time

21

Core subject

Measures of Mortality

A. CRUDE MORTALITY RATE

$$CMR = \frac{\text{Number of deaths in a specified period}}{\text{Mid year population}} \times 1000$$

- The main disadvantage of the crude mortality rate is that it takes no account of the fact that the chance of dying varies according to age, sex, race, socio-economic class and other factor.
- It is usually not appropriate to use it for comparing mortality in different time periods or geographical areas

22

Core subject

B. SPECIFIC DEATH RATES:

- i. Age & Sex-specific death rate

e.g Specific death rate for males

$$\frac{\text{Number of deaths among males during a calendar year} \times 1000}{\text{Mid-year population of males}}$$
- ii. Disease specific death rates

e.g Specific death rate due to tuberculosis

$$\frac{\text{Number of deaths from tuberculosis during a calendar year} \times 1000}{\text{Mid-year population}}$$

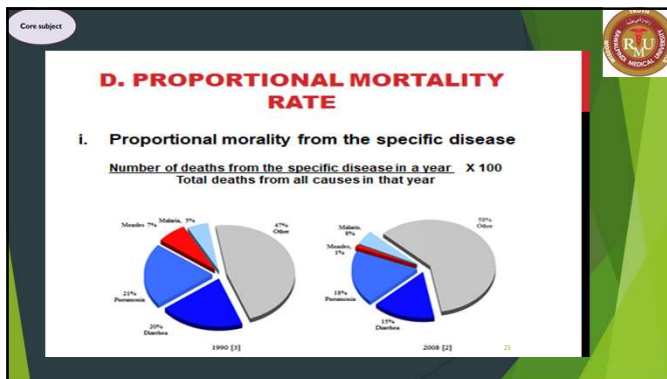
23

Core subject

C. CASE FATALITY RATE



24



25

Core subject

Measures of Fertility

Definition: By fertility is meant the actual bearing of children. Some demographers prefer to use the word natality in place of fertility. A woman's reproductive period is roughly from 15 to 45 years - a period of 30 years.

26

26

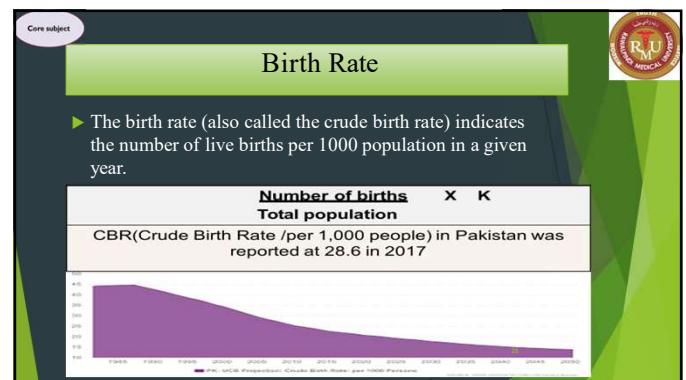
Core subject

FACTORS AFFECTING FERTILITY

- Psychological
- Social
 - Duration of married life
 - Education
 - Caste and religion
 - Age at marriage
- Economic
- Demographic
 - Biological effects
 - Replacement effects
 - Insurance effects
- Spacing of children / Family planning
- Nutrition
- Other Factor

27

27



28

Core subject

General Fertility Rate

$$\text{GFR} = \frac{\text{Number of births}}{\text{Number of women Ages 15-49}} \times K$$

The fertility rate for Pakistan in 2018 was 3.550 births per woman, a 1.28% decline from 2017. The fertility rate for Pakistan in 2017 was 3.596 births per woman, a 1.29% decline from 2016.

29

29

Core subject

Age- Specific Fertility Rate

► Fertility rates can also be calculated for specific age groups to see difference in fertility behavior at different ages or for comparison over time.

$$\frac{\text{Number of births to women Ages 20-24}}{\text{Number of women Ages 20-24}} \times K$$

1 According to the PDHS, if current age-specific fertility rates were to remain unchanged in the future, the average woman in Pakistan would have 1.6 children by the time she reaches age 25, 2.9 children by age 30, more than four children by her thirty-fifth birthday, and 5.4 children by the end of her childbearing ..

30

30

Core subject

Total Fertility Rate

- The TFR is a synthetic measure; no individual women is very likely to pass through three decades conforming to the age specific fertility rates of any single year. In reality, age specific rates change and fluctuate from year to year, even if only gradually.
- The TFR is one of the most useful indicators of fertility because it gives the best picture of how many children women are currently having.

$$\text{TFR} = \frac{\text{Sum of ASFR} \times 5}{1000}$$

31

Core subject

Net Reproduction Rate (NRR)

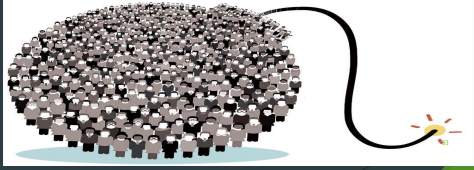
- Net Reproduction Rate (NRR) is defined as the number of daughters a newborn girl will bear during her lifetime assuming fixed age-specific fertility and mortality rates.
- NRR is a demographic indicator.
- NRR of 1 is equivalent to attaining approximately the 2-child norm. If the NRR is less than 1, then the reproductive performance of the population is said to be below replacement level.

32

Core subject

Population Explosion

- **Definition:** A rapid increase in the size of a population caused by such factors as a sudden decline in infant mortality or an increase in life expectancy



33

Core subject

Causes Of Population Explosion

1. Increase in Fertility rates
2. Early marriages
3. Increase in longevity/ decrease death rate
4. Improve in public health and medical services
5. Improvement of MMR
6. Lack of education
7. Migration

34

Core subject


The Effects Of Population Explosion

- More people means an increased demand for food, water, housing, energy, healthcare, transportation, and more. All that consumption contributes to ecological degradation, increased conflicts, and a higher risk of large-scale disasters like pandemics

35

Core subject

Control Measures Of Population Explosion



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graph LR
    PCS[Population control strategies] --> Social
    PCS --> Economic
    PCS --> Others
    Social --> MAM[Minimum age of marriage]
    Social --> WE[Women empowerment]
    Social --> SE[Spread of education]
    Social --> SS[Social security]
    Economic --> INC[Incentives]
    Economic --> EMP[Employment]
    Economic --> LA[Laws]
    Others --> MF[Medical facilities]
    Others --> AG[Awareness generation]
  
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36

Family Medicine and Demography

- ▶ The data obtained from demographic studies can also help family medicine practitioners develop educational programs that target specific population groups.
- ▶ Demography is an essential aspect of family medicine. By understanding the demographics of specific populations, family medicine practitioners can provide customized healthcare services that address the unique health needs of their patients.

37

Ethical Issues

- ▶ Population ethics is the philosophical study of the ethical problems arising when our actions affect who is born and how many people are born in the future.
- ▶ However, demographic theory, which explores theoretically when, how, and why populations grow, based on empirically observed patterns, has until now played only a minor role in population ethics.

38

Online Research and Books

- ▶ Kpark, 25th edition preventive and social medicine
- ▶ <https://www.bisp.gov.pk/SiteImage/Misc/files/Population-Dynamics.pdf>
- ▶ <https://study.com/academy/lesson/population-data-sources-census-vital-statistics-surveys.html>
- ▶ The world population explosion: causes, backgrounds and projections for the future
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3987379/>

39

End Of Lecture Assessment (EOLA)

Q1- When a country reports high birth rate and high death rate it will have:

- Low growth rate
 - High natural increase
 - High natural increase rate
 - Low immigration rate
 - High net migration rate
- ▶ Key answer A

40

Thank you

41