

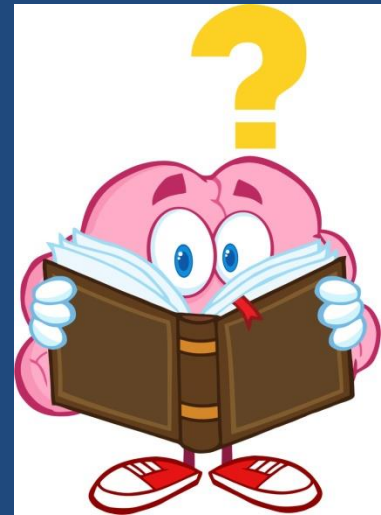


Demography

Dr. Sunila Sanjeev, Assistant Professor,
Dept. of Community Medicine, MGM
Medical College, Navi Mumbai

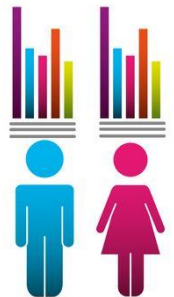
Learning Objectives

- Define Demography
- Describe Demographic cycle
- Describe Demographic indicators
- Describe factors affecting fertility
- Describe fertility related statistics



Definition of Demography

- Demography is the scientific study of human population.
- Focuses on- Change in population (a) size
(b) Composition (c) Distribution
- The five demographic processes which work are- (1) Fertility (2) Mortality (3) Marriage (4) Migration (5) Social mobility



Demographic Cycle

- 5 stages-

Stages	Birth-rate	Death-rate
First stage(High Stationary)	↑ ↑	↑ ↑
Second stage (Early Expanding)	↑ ↑	↑ ↓
Third stage (Late Expanding)	↑ ↓	↓ ↓
Fourth stage (Low stationary)	↓ ↓	↓ ↓
Fifth stage (Declining)	↓ ↓ ↓	↓ ↓

Demographic Indicators

These are divided into two parts-

- **Population statistics-**

1. Population size
2. Sex ratio
3. Density
4. Dependency ratio

- **Vital Statistics-**

1. Birth rate
2. Death rate
3. Growth rate
4. Life expectancy at birth
5. Mortality rates
6. Fertility rates



Population statistics- size



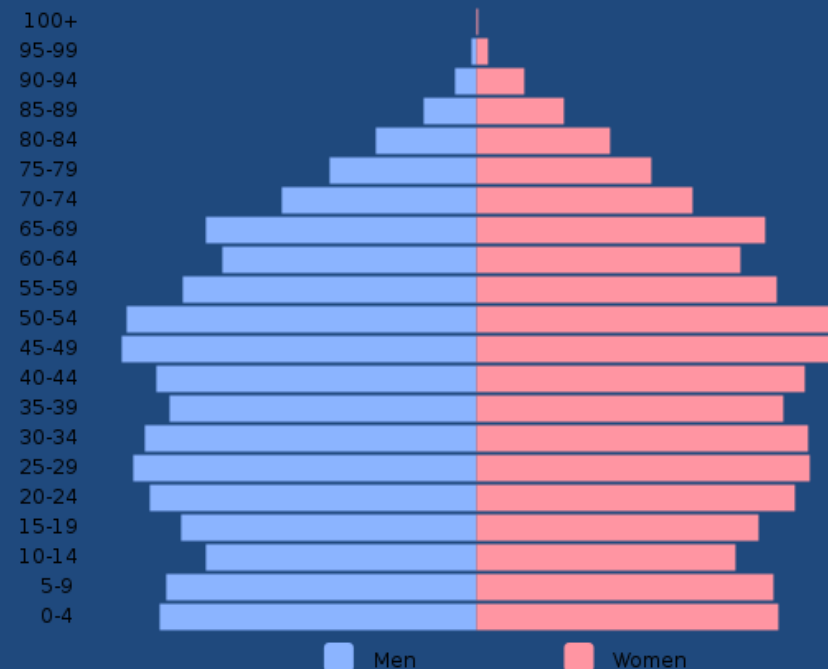
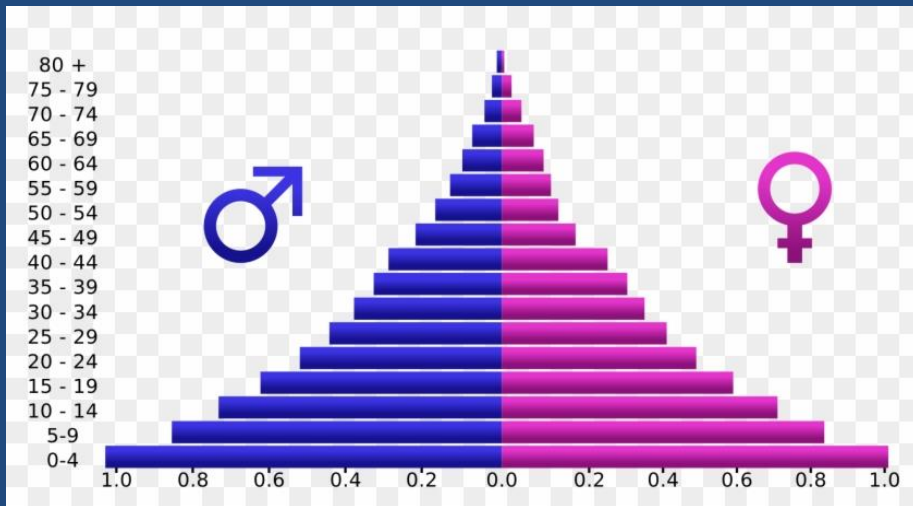
- India is second populous country in the world with only 2.4% of the World's land area supporting 17.5% of the World's population.
- The year 1921 is called the 'Big Divide' –as absolute number added to the population each decade is increasing since then.
- Uttar Pradesh is the most populous state in the country followed by Maharashtra and then Bihar.

Population statistics- age and sex composition

1. Age pyramid

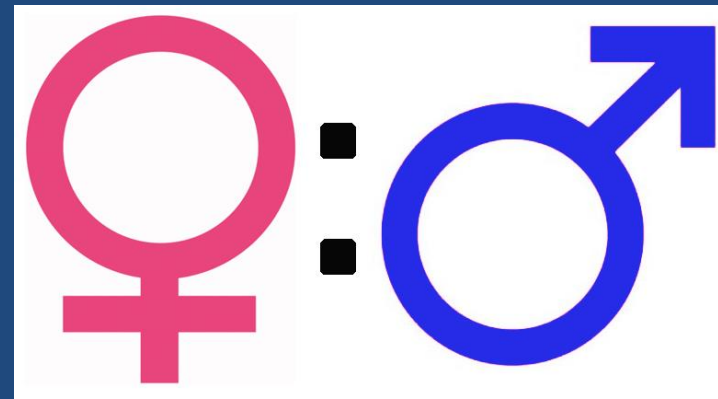
2. Sex ratio

- Age Pyramid is the graphical representation of age and sex composition of the population.



Population statistics- age and sex composition (Continued)

- Sex ratio-
 - It is defined as the number of females per thousand males
 - 'Female deficit syndrome' is adverse because of social implications.
1. Sex ratio at birth.
 2. Child sex ratio(0-6 years).



Population statistics- Density



- According to Indian census, density is defined as number of **persons per square km**.
- Urban area is defined as places-
- (a) ≥ 5000 persons
- (b) Density of either ≥ 1000 person per square mile or ≥ 390 per square km.
- (c) $\geq 3/4^{\text{th}}$ of adult male population persueing employment other than agriculture.

Population statistics- Dependency ratio

Total

$$\text{Dependency Ratio} = \frac{\text{Children 0-14 years age} + \text{Population more than 65 years age}}{\text{Population of 15 to 64 years}} \times 100$$

Young age

$$\text{Dependency Ratio} = \frac{\text{Children 0-14 years age}}{\text{Population of 15 to 64 years}} \times 100$$

Old age

$$\text{Dependency Ratio} = \frac{\text{Population more than 65 years age}}{\text{Population of 15 to 64 years}} \times 100$$

Expressed as percentages.

Population statistics- Dependency ratio (Cont'd)

- **Demographic bonus** – when the young age dependency ratio declines due to decrease in fertility. (Transition between III and IV stage of demographic cycle)
- **Demographic burden** – when the old age dependency ratio increases.
- Between the shift from demographic bonus to demographic burden we need to give a push to development by investing in health care, education and skill development.

Vital Statistics - Birth Rate and Death Rate

Crude birth rate = $\frac{\text{Number of births in one year}}{\text{Mid-year population in the same year}} \times 1000$

Crude death rate = $\frac{\text{Number of deaths in one year}}{\text{Mid-year population in the same year}} \times 1000$

Vital Statistics- Growth rate

Growth rate= Crude death rate - Crude birth rate of that particular year.

- The factors that contribute to growth rate are-

1. Age distribution
2. Marriage customs
3. Social factors
4. Economic factors
5. Cultural factors



Annual

rate of = $\frac{\text{Current growth rate} - \text{past value}}{\text{Past value}} \times 100$

Growth Past value

It is expressed as percentage.

Vital Statistics- Life expectancy at birth

- It is the average number of years a person born is expected to live according to the mortality pattern prevalent in that country.
- It is the best indicator of a country's level of development and health status of the population.
- It is calculated using Life tables with age specific mortality rates in the country.

Vital Statistics- Mortality rates

- Mortality rates are as follows-

1. Crude death rate
 2. Specific death rates
(group specific/disease specific)
- 
- expressed/1000 population

1. Case fatality rate
 2. Proportional mortality rate
 3. Survival rate
- 
- expressed as percentage

Vital statistics- Fertility rates

- Factors that contribute to fertility are-
 1. Age at marriage
 2. Duration of married life
 3. Spacing of children
 4. Education
 5. Economic status
 6. Caste and religion
 7. Nutrition
 8. Family planning
 9. Other factors

Fertility related statistics

1. Birth rate
2. General fertility rate
3. General marital fertility rate
4. Age specific fertility rate
5. Age specific marital fertility rate
6. Total fertility rate
7. Total marital fertility rate
8. Gross reproduction rate
9. Net reproduction rate
10. Child-Woman ratio
11. Pregnancy rate
12. Abortion rate
13. Abortion ratio
14. Marriage rate

Fertility related statistics (Cont'd)

1. Birth rate =
$$\frac{\text{Number of births in one year}}{\text{Mid-year population in the same area in the same year}} \times 1000$$
2. General fertility rate =
$$\frac{\text{Number of births in one year}}{\text{Mid year population age 15-44 (or 49) in the same area in the same year}} \times 1000$$
3. General Marital Fertility rate =
$$\frac{\text{Number of births in one year}}{\text{Mid-year married female population in the age group 15-49 years}} \times 1000$$

Fertility related statistics (Cont'd)

4. Age specific

Fertility rate = $\frac{\text{Number of live births in particular age group}}{\text{Mid-year female population of that same age group}} \times 1000$

5. Age specific marital

Fertility rate = $\frac{\text{Number of live births in particular age group}}{\text{Mid-year married female population of that same age group}} \times 1000$

6. Total fertility rate = $5 \times \sum_{15-19}^{45-49} \text{ASFR} \div 1000$

Fertility related statistics (Cont'd)

$$7. \text{ Total marital fertility rate} = 5 \times \sum_{15-19}^{45-49} \text{ASMFR} \div 1000$$

$$8. \text{ Gross reproduction rate} = 5 \times \sum_{15-19}^{45-49} \text{ASMFR for female live births} \div 1000$$

9. Net reproduction rate is defined as number of daughters a new-born girl will bear during her life-time assuming fixed age specific fertility.

Fertility related statistics (Cont'd)

10. Child woman ratio is number of children (0-4 years) per thousand woman of child bearing age (15-44 or 49 years).
11. Pregnancy rate is the ratio of number of pregnancies in a year to married women (15-44 or 49 years).
12. Abortion rate is the annual number of all types of abortions per 1000 women of child bearing age.

Fertility related statistics (Cont'd)

13. Abortion ratio is the ratio of the number of abortions performed during a particular time period by the number of live births over the same period.
14. Marriage rate-
 - a) Crude marriage rate- Number of marriages in a year per thousand population.
 - b) General marriage rate- Number of marriages in one year per thousand unmarried persons of child bearing age (15-49 years).

Note to the student

- Must read Demography chapter 8 , Park textbook of preventive and social medicine 25th Edition
- Learn the Fertility related statistics thoroughly.

The End