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Mastering Community Medicine



Asif Khan

2nd Edition

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4 Chapter

Demography

1. What are the demographic processes?

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

- Changes in population size (growth or decline).
- The composition of the population
- The distribution of population in space.

It deals with five "demographic processes", namely—

- Fertility or births—fertility means the child-bearing performance of a woman, couple, or population. Generally only live births are included
- Mortality or deaths
- Marriage
- Migration—a permanent or semi-permanent move across an administrative boundary
  - Emigration
  - Immigration
  - Social mobility.

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

2. What is demographic gap?

The difference between the high birth rate and the declining death rate is termed as demographic gap **(Fig. 4.1)**.

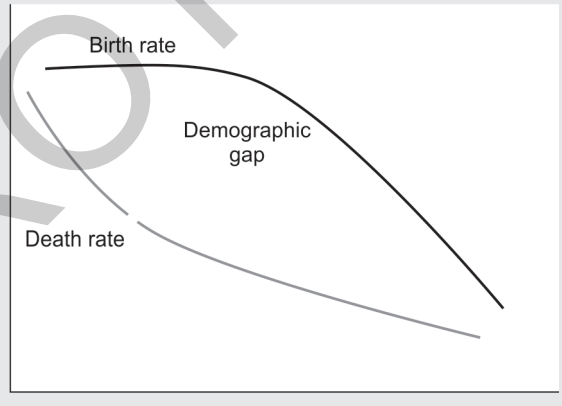

Fig. 4.1: Demographic gap

3. What is demographic cycle?

The history of world population since 1650 suggests that there is a demographic cycle of 5 stages through which a nation passes:

- High stationary stage
- Early expanding stage
- Late expanding stage
- Low stationary stage
- Declining stage

1. *High stationary (First stage)*
   - This stage is characterized by a high birth rate and a high death rate
   - Population remains stationary as high birth rate and high death rate cancel each other.
2. *Early expanding (Second stage)*
   - The death rate begins to go down, while the birth rate remains unchanged.
   - Birth rates have increased in some of these countries possibly as a result of improved health conditions, and shortening periods of breast feeding.
   - Many countries in South Asia and Africa are in this phase.
3. *Late expanding (Third stage)*
   - The death rate declines still further, and the birth rate tends to lessen.
   - The population continues to grow because births exceed deaths.
   - India has entered this phase.
   - In a number of developing countries (e.g. China, Singapore) birth rates have declined rapidly.
4. *Low stationary (Fourth stage)*
   - Stable population characterized by low birth and death rates.

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5. *Declining (Fifth stage)*
   - The population begins to decline because birth rate is lower than the death rate.
   - Some East European countries, notably Germany and Hungary are experiencing this stage.

4. What are the causes of decreased death rate, increased birth rate and of decreased birth rate?

- The causes of decreased death rate

Clue: C BIG PINS

  - **C**ontrol of diseases, e.g. smallpox, plague, cholera, malaria, etc.
  - **B**etterment in food supply
  - **I**nfluence of national health programs
  - **G**rowth of social consciousness among the people.
  - **P**rogressions in medical science, e.g. extensive use of chemotherapeutics, antibiotics, and insecticides
  - **I**mproved health facilities, e.g. establishment of primary health centers and more treatment centers
  - **N**on-appearance of natural checks, e.g. famines and large scale epidemics
  - **S**uccess in public health initiatives, particularly in controlling infectious disease
- Increased birth rate.

Clue: LET ILL USE

  - **L**ow standard of living
    - Where standards of living are low, birth rates are high.
  - **E**arly puberty
    - Indian girls attain puberty early, between 12 and 14 years.
  - **T**raditional practices and customs
    - Preference for male child leads to unstoppable births of female children till a male child is born
  - **I**mproved health conditions
  - **L**ow contraceptive usage
  - **L**ow level of literacy
    - Ignorance about contraception
    - Ignorance about the usage of methods of contraception.
  - **U**niversality of marriage
  - **S**hortening of breastfeeding
  - **E**arly marriage
    - Early marriage and early children
- Decreased birth rate
  - The increase in national income,
  - Improvement in hygiene and nutrition
  - Successful family planning

5. What are the National Socio-Demographic Goals for 2010?

Clue: CRAMP ARAB PAAPI

- **C**ontain the spread of Acquired Immune Deficiency Syndrome (AIDS), and promote greater integration between the management of Reproductive Tract Infections (RTI) and Sexually Transmitted Infections (STI) and the National AIDS Control Organisation.
- **R**educe infant mortality rate to below 30 per 1000 live births.
- **A**ddress the unmet needs for basic reproductive and child health services, supplies and infrastructure.
- **M**ake school education up to the age 14—free and compulsory—and reduce dropouts at primary and secondary school levels to below 20% for both boys and girls.
- **P**romote delayed marriage for girls, not earlier than age 18 and preferably after 20 years of age.
- **A**chieve universal immunization of children against all vaccine-preventable diseases.
- **R**educe maternal mortality ratio to below 100 per 100,000 births.
- **A**chieve 80% institutional deliveries and 100% deliveries by trained persons.
- **B**ring about convergence in implementation of related social sector programs, so that family welfare becomes a people-centered program.
- **P**romote vigorously the small family norm to achieve replacement levels of TFR.
- **A**chieve 100% registration of births, deaths, marriage and pregnancy.
- **A**chieve universal access to information/counseling, and services for fertility regulation and contraception with a wide basket of choices.
- **P**revent and control communicable diseases.
- **I**ntegrate Indian Systems of Medicine (ISM) in the provision of reproductive and child health services, and in reaching out to households.

6. What are the causes of increased death rate and of decreased death rate?

- Increased death rate
  - Due to disasters, accidents, etc.
- Decreased death rate
  - Success in public health initiatives, particularly in controlling infectious diseases
  - Non-appearance of natural checks, e.g. famines and large scale epidemics
  - Control of diseases, e.g. smallpox, plague, cholera, malaria, etc.
  - Progressions in medical science, e.g. extensive use of chemotherapeutics, antibiotics, and insecticides

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- Improved health facilities, e.g. establishment of primary health centers and more treatment centers
- Influence of national health programs
- Betterment in food supply
- Growth of social consciousness among the people.

7. What are the causes of population explosion?

The causes for population explosion in India are:

- Marginal reduction in birth rate as against a steep decline in death rates
  - Decreased death rate
    - Success in public health initiatives, particularly in controlling infectious disease
    - Non-appearance of natural checks, e.g. famines and large scale epidemics
    - Control of diseases, e.g. smallpox, plague, cholera, malaria, etc.
    - Progressions in medical science, e.g. extensive use of chemotherapeutics, antibiotics, and insecticides
    - Improved health facilities, e.g. establishment of primary health centers and more treatment centers
    - Influence of national health programs
    - Betterment in food supply
    - Growth of social consciousness among the people.
- Increased birth rate
  - Improved health conditions
  - Shortening of breastfeeding
  - Low contraceptive usage
  - Universality of marriage
  - Early marriage
    - Early marriage and early children
  - Early puberty
    - Indian girls attain puberty early, between 12 and 14 years.
  - Early onset of procreation
  - Low standard of living
    - Where standards of living are low, birth rates are high.
  - Low level of literacy
    - Ignorance about contraception
    - Ignorance about the usage of methods of contraception.
  - Traditional practices and customs
    - Preference for male child leads to unstoppable births of female children till a male child is born
    - Acceptance of child birth as God's gift
    - Other causes
  - High infant mortality and child mortality leads couples to have larger families to ensure survival of a few
  - Need of more hands to work in the farms to conserve resources within the families
  - Poor literacy and economic status.

8. Describe population pyramid.

Population pyramid or age-sex pyramid

- A population pyramid, also known as an age-sex pyramid
- It is a graphical illustration that shows the distribution of various age groups in a population (typically that of a country or region of the world), which normally forms the shape of the pyramid.
- It typically consists of two back-to-back bar graphs, with population plotted on the x-axis and age on the y-axis, one showing the number of males and one showing females in a particular population in five-year age groups (also called cohorts).
- Males are conventionally shown on the left and females on the right, and they may be measured by raw number or as a percentage of the total population.
- A great deal of information about the population broken down by age and sex can be read from a population pyramid, and this can shed light on the extent of development and other aspects of the population.
- The wide base of the pyramid indicates a large number of children, and the steady upwards narrowing shows that more people die at each higher age band.
- The pyramid indicates a population in which there is a high birth rate, a high death rate and a short life expectancy. This is the typical pattern for less economically developed countries, due to little access to and incentive to use birth control, negative environmental factors (for example, lack of clean water) and poor access to health care.

Types of population pyramid

- While all countries' population pyramids differ, three types have been identified by the fertility and mortality rates of a country.
- Stationary pyramid:
  - A population pyramid showing
    - An unchanging pattern of fertility and mortality.
- Expansive pyramid:
  - A population pyramid showing
    - A broad base - indicating
      - High proportion of children
      - Rapid rate of population growth
      - Low proportion of older people.
- Constrictive pyramid:
  - A population pyramid showing
    - Lower numbers or percentages of younger people.

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9. What are the factors responsible for higher fertility in India?

The factors responsible for higher fertility in India are

Clue: CELL DRLS

- **C**aste and religion
  - Muslims have a higher fertility than Hindus.
  - Among Hindus, the lower castes seem to have a higher fertility than the higher castes.
- **E**arly marriage
  - Females who marry before the age of 18 gave birth to a larger number of children than those who married after
  - The Child Marriage Restraint Act of 1978 makes it obligatory the legal–age of marriage as 18 years for girls and 21 years for boys.
- **L**ow literacy levels
  - There is an inverse association between fertility and educational status.
  - The advanced is the educational status, the lesser is the fertility.
- **L**ow socio-economic status
  - Economic status also has an inverse relationship with fertility.
  - The total number of children born declines with an increase in per capita expenditure of the household.
- **D**ecreased spacing of children
  - If all births are postponed by one year, in each age group, there is a decline in total fertility. Thus, spacing of children may have a general reduction in the fertility rates.
- **R**educed family planning practices
  - Family planning is another important factor in fertility reduction.
  - In spite of the government having incentive-linked schemes, the contraceptive usage is low which can lead to a higher fertility.
- **L**ow nutritional status
  - The effect of nutrition on fertility is largely indirect.
  - Practically, all well-fed societies have low fertility, and poorly-fed societies, high fertility.
- **S**ocial and cultural factors:

Like

Clue: BLOW HIB

- **B**reastfeeding
- **L**ocal customs and beliefs
- **O**pportunities for women
- **W**idow remarriage
- **H**ousing
- **I**ndustrialization and urbanization
- **B**etter health conditions.

10. What are the indicators of fertility?

The indicators of fertility are:

- General Fertility Rate (GFR)
- General Marital Fertility Rate (GMFR)
- Total Fertility Rate (TFR)
- Total Marital Fertility Rate (TMFR)
- Gross Reproduction Rate (GRR)

General Fertility Rate (GFR): It is the "number of live births per 1000 women in the reproductive age-group (15–44 or 49 years) in a given year".

$$GFR = \frac{\text{Number of live births in an area during the year}}{\text{Midyear female population age 15–44 in the same area in the same year}} \times 1000$$

General Marital Fertility Rate (GMFR): It is the "number of live births per 1000 married women in the reproductive age group (15–44 or 49 years) in a given year".

$$GMFR = \frac{\text{Number of live births in an area during the year}}{\text{Midyear married female population in the age group 15–49 years}} \times 1000$$

Total Fertility Rate (TFR): Total fertility rate represents the average number of children a woman would have if she were to pass through her reproductive years bearing children at the same rates as the women now in each age group.

Total Marital Fertility Rate (TMFR): Average number of children that would be born to a married woman if she experiences the current fertility pattern throughout her reproductive span.

Gross Reproduction Rate (GRR): Average number of girls that would be born to a woman if she experiences the current fertility pattern throughout her reproductive span (15–44 or 49 years), assuming no mortality.

11. Add a note on 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.
- The NRR employs the same fertility data as the GRR, but also takes into account the effects of mortality.
- An NRR of 1 means that each generation of mothers is having exactly enough daughters to replace itself in the population.
- NRR of 1 is equivalent to attaining approximately the 2-child norm.
- NRR = 1 can be achieved only if at least 60% of the eligible couples are effectively practicing family planning.

Disadvantage

- The net reproduction rate cannot be calculated unless both age-specific fertility and mortality data are available.

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12. Add a note on eligible couples.

Eligible couples

Definition

An "eligible couple" refers to a currently married couple wherein the wife is in the reproductive age, which lies between the ages of 15 and 45.

Occurrence

- There will be at least 150 to 180 such couples per 1000 population in India.
- About 20 per cent of eligible couples are found in the age group 15-24 years

Frequency of increase

On an average 2.5 million couples are joining the reproductive group every year.

Records

- The "eligible couple register" is a basic document for organizing family planning work.
- It is regularly updated by each functionary of the family planning programme for the area falling within his jurisdiction.

Importance

These couples are in need of family planning services.

13. What do you mean by target couples?

- The term target couples are applied who have had 2-3 living children, and family planning was largely directed to such couples.
- The definition of a target couple has been gradually enlarged to include families with one child or even newly married couples with a view to develop acceptance of the idea of family planning from the earliest possible stage.

14. What is couple protection rate?

- Couple protection rate (CPR) is an indicator of the prevalence of contraceptive practice in the community.
- It is defined as the percent of eligible couples effectively protected against childbirth by one or the other approved methods of family planning, namely
  - Sterilization
  - IUD
  - Condom
  - Oral pills.
- Sterilization accounts for over 60 percent of effectively protected couples.

15. Add a note on zero population growth.

- Zero population growth is a concept coined by American sociologist Kingsley Davis.
- It is a condition of demographic balance where population in a specified population neither grows nor declines
- Zero population growth occurs when there is neither a net growth nor a net decline in population, but rather a steady state in which the numbers added by annual births and immigration exactly balance the numbers who die and emigrate each year.
- The ending of population growth when birth and death rates are equal. This would require an average number of 2.3 children per family.
- In the long-term zero population growth can be achieved when the birth rate of a population equals the death rate.
- Achieving zero growth is difficult because a country's population growth is often determined by economic factors, incidence of poverty, etc.

VIVA-VOCE

1. What is dependency ratio?
2. What is closed population?
3. What is demographic transition?
4. What do you mean by depopulation?
5. What is doubling time?
6. Define gross reproduction rate (GRR).
7. Define growth rate.
8. Define life expectancy.
9. What is a life table.
10. Who was the economist famous for his theory that the world's population tends to increase faster than the food supply?
11. What do you mean by median age?
12. What does An NRR of 1 mean?
13. What is commonly known the population per unit of land area?
14. What is population pyramid?
15. What is "push-pull" hypothesis?
16. The level of fertility at which a couple has only enough children to replace themselves, or about two children per couple is also called as.....
17. What is zero population growth?
18. Who coined the term zero population growth (ZPG)?
19. What does Malthusian theory of population state?
20. What is informed choice?
21. Define population density.
22. What is crude population density?
23. What is mid-year population?
24. What do you mean by dependency ratio?
25. When was the first population pyramid published?
26. Where was the first population pyramid published?
27. Define sex ratio.
28. Give an example of stable population.
29. What is stationary population?

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30. What is fertility transition?
31. What is demographic transition?
32. What is net reproduction rate (NRR)?
33. What is population explosion or population bomb?
34. What do you mean by closed population?
35. How do you calculate net migration?
36. What are the factors for current high population growth rate?
37. How do you calculate population growth?
38. What is demographic trap?
39. What is the percent of the world's population in India?
40. India constitutes ___ percent of the globe's land area.
41. National policy on older persons has been adopted by_____.
42. Adolescents represent about a _____ of India's population.
43. When was the Child Marriage Restraint Act enforced?
44. Define population dynamics.
45. What is population density?
46. How do you calculate growth rate?

ANSWERS

1. The ratio of persons in the ages defined as dependent (under 15 years and over 64 years) to persons in the ages defined as economically productive (15–64 years) in a population.
2. A population with no migratory flow either in or out, so that changes in population size occur only through births and deaths.
3. The historical shift of birth and death rates from high to low levels in a population.
4. The state of population decline.
5. The number of years required for the population of an area to double its present size, given the current rate of population growth.
6. The average number of daughters that would be born alive to a woman (or group of women) during her lifetime.
7. The number of people added to (or subtracted from) a population in a year due to natural increase and net migration expressed as a percentage of the population at the beginning of the time period.
8. The average number of additional years a person could expect to live if current mortality trends were to continue for the rest of that person's life.
9. A tabular display of life expectancy and the probability of dying at each age (or age group) for a given population, according to the age-specific death rates prevailing at that time.
10. Thomas Malthus
11. The age that divides a population into two numerically equal groups; that is, half the people are younger than this age and half are older.
12. An NRR of 1 means that each generation of mothers is having exactly enough daughters to replace itself in the population.
13. Population density.
14. It is a bar chart, arranged vertically, that shows the distribution of a population by age and sex.
15. A migration theory that suggests that circumstances at the place of origin (like poverty and unemployment) repel or push people out of that place to other places that pull (like a high standard of living or job opportunities).
16. Replacement–level fertility.
17. A population in equilibrium, with a growth rate of zero, achieved when births plus immigration equal deaths plus emigration.
18. Kingsley Davis
19. Population if unchecked increases at a geometric rate whereas the food supply grows at an arithmetic rate.
20. Voluntary decision by a client to use, or not to use, a contraceptive method (or accept a sexual and reproductive health service) after receiving adequate information regarding options, risks, advantages and disadvantages of all available methods.
21. The ratio of a population to a given unit of area.
22. The number of people living per unit area
23. Arithmetic mean of the population on 1 January and the population on 31 December of a year. It is used to calculate annual rates.
24. The ratio of persons in the ages defined as dependent (under 15 years and over 64 years) to persons in the ages defined as economically productive (15-64 years) in a population
25. 1874
26. United States
27. Ratio between the number of males and the number of females, expressed as the number of males per 100 females.
28. Stationary population
29. Population in which the annual number of births equals the number of deaths, thus producing a zero growth rate.
30. Transition from an establishment of "natural" fertility (not controlled by couples) towards a establishment of “controlled” fertility.
31. The historical shift of birth and death rates from high to low levels in a population.
32. The average number of daughters that would be born to a woman (or a group of women) if she passed through her lifetime conforming to the age-specific fertility and mortality rates of a given year.
33. Trend of rapid population growth, resulting from a world birth rate much higher than the world death rate.

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34. A population with no migratory flow either in or out, so that changes in population size occur only through births and deaths.
35. difference between the number of persons who enter a territory (immigrants) and the number who leave (emigrants), generally calculated over a year.
36. • The large size in the reproductive age-group (estimated contribution 60%);
    • Higher fertility due to unmet need for contraception (estimated contribution 20%); and
    • High wanted fertility due to prevailing high IMR (estimated contribution about 20%).
37. Births – deaths + net migration
38. Demographic trap is used when a country's population is continuously growing very rapidly due to high birth rates and low death rates.
39. 16 percent of the world's population.
40. 2.4 percent
41. Ministry of Social Justice and Empowerment in January 1999
42. Fifth
43. 1976
44. It is the branch of life sciences that studies changes in the size and age composition of populations, and the biological and environmental processes influencing those changes.
45. Number of persons per square kilometre or square mile of land area.
46. CBR – CDR/10.

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