Slide 1

Demography & Population Trends-2

Demographic transition

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Slide 2

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Slide 3

Vision and mission of RMU

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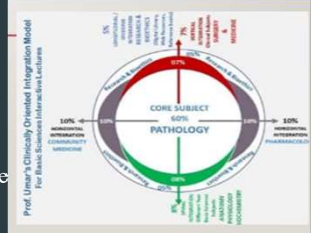3. To inculcate the values of mutual respect and ethical practice of medicine

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Slide 4

Sequence of Lecture

- Learning objectives : 2 slides
- Core subject: 24 slides
- Family Medicine: 1 slide
- Ethical Issues: 1 slide
- Research & online data: 1 slide
- End of lecture assessment: 1 slide

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Slide 5

Learning Objectives

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

- Discuss theory of demographic transition
- Describe and interpret stages of demographic cycle with examples and logical reasoning
- Graphically illustrate the stages of demographic cycle
- Explain limitations of this model

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Slide 6

Learning Objectives

- Discuss Malthusian theory of population growth
- Explain population momentum
- Describe the effect of population momentum on growth of population
- Discuss demographic dividend, bonus, trap
- Calculate growth rate from given data
- Calculate and interpret population doubling time

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The Demographic Transition

▶ Definition: The demographic transition refers to the change that populations undergo from high rates of births and deaths to low rates of births and deaths.

Stage I: (Pre-Transitional /High Stationary)

1. High birth rate
2. High death rate → Little or no growth

▶ Causes of High Death Rate
a. Feminine/drought
b. Communicable diseases/pestilence
c. Poverty
d. Wars
e. Natural disasters

▶ Causes of High Birth Rate
a. People intended to produce more children to compensate lost ones
b. Religious beliefs

Stage II:(Early Transitional /Early Expanding)

1. High birth rate
2. Falling death rate → High growth

➤ Causes of falling Death Rate
a. Receding pandemics
b. Vaccines
c. Better sanitation
d. Antibiotics
e. Literacy

The decline in mortality usually precedes the decline population growth during the transition period. Fertility rates fall neither as quickly nor as dramatically as death rates, and thus population grows rapidly.

Stage III: (Mid Transitional / Late Expanding)

1. Declining birth rate
2. Relatively low death rate → Slowed growth

➤ Causes of declining Birth Rate
a. Literacy
b. Late marriages
c. Contraceptive prevalence

➤ Causes of Low Death Rate
a. Better health care
b. Degenerative diseases

Stage IV: Late Transitional / Low Stationary)

1. Low birth rate
2. Low death rate
3. Very low population growth

Stage V: (Post Transitional / Declining)

1. Number of people is actually decreasing.
2. These points must be noted while describing the transition.
   a. The model excludes the affect of migration
   b. Transition takes a long time
   c. Transition occurs without any governmental intervention
   d. Model cannot be applied to all countries
   e. Transition occurs when there is a widespread use of family planning measures

Graphically : Stages of Demographic Cycle

The five stages of the demographic transition
The demographic transition is a model that describes why rapid population growth is a temporary phenomenon.

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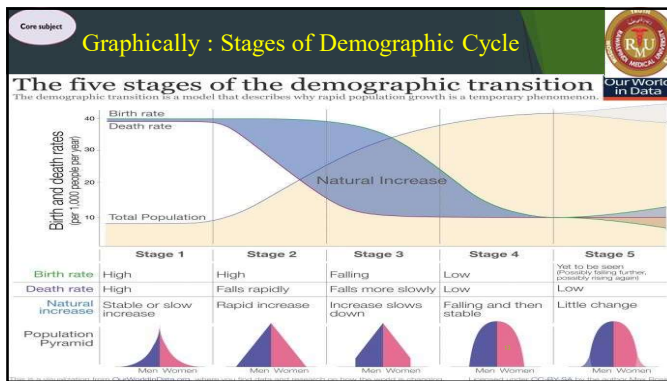
Limitations of Demographic Transition Theory

- ➤ The demographic transition model does not take into account large-scale global challenges like pandemics or climate change.
- ➤ The DTM does not take into account migration which is a huge determinant of population growth.
- ➤ It neglects varying factors within a country which influence birth and death rates

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Malthusian theory of population growth

- ➤ In 18th centaury the Malthusian theory looks at the relationship between population growth and resources (specifically food supply).
- ➤ It states that there is an optimum population size that the world's food supply can support.
- ➤ If the population increases beyond this figure, there would be a reduction in living standards, coupled with events to curb the population.

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Malthusian theory of population growth

- ➤ Malthus posited that the food supply would eventually be unable to keep up with population growth as the latter would double in 25 years
- ➤ He was of the view that the food output increases in arithmetic progression, like, 1,2,3,4 and so on.
- ➤ But the human population increases in geometric progression, like, 1,2,4,8 and so on.

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Population Momentum

- ➤ **Definition:** For any population, changes over time in its size and composition are driven by levels and trends of :
  - I. Fertility,
  - II. Mortality
  - III. Migration
  - IV. Age structure (including for trajectories of growth or decline)
- ➤ Or Term referring to the rate at which the population would grow if the current generation of childbearing women started producing children at replacement fertility, i.e., they are having enough children to replace themselves

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Population Momentum

- ➤ **Example:** Japan reached its peak population of 129 million in 2009, despite its TFR remaining below replacement levels since 1985. The inertia from Japan's youth entering reproductive years kept the population growing for a few additional decades. Japan's aging population increases its negative population momentum.

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Population Momentum

Core subject

- Future world population growth is fuelled by components: the demographic momentum, which is built into the age composition of current populations, and changes in reproductive behaviour and mortality of generations yet to come.

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Effect of Population Momentum on Population Growth

Core subject

- Population momentum explains why a population will continue to grow even if the fertility rate declines (at least two or three decades)
- Population momentum occurs because:
  a) number of children per woman
  b) number of women in reproductive age
- For world population, the UN projections shows global fertility rate dropping to replacement level sometime in the middle of this century. Due to population momentum, the size of our global population is expected to grow beyond 2100

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Demographic Dividend or Bonus

Core subject

- Demographic dividend It is the potential for economic gains when the share of the working-age population (15 years – 64 years) is higher than the non-working age group.
- This means that the labor force is growing more rapidly than the population that is dependent on it, creating a window for faster economic growth and family welfare

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Demographic Dividend

Core subject

populyst Achieving the Demographic Dividend

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Demographic Dividend Example

Core subject

- As the world's sixth most populated country, totaling 207 million in 2017 (Census 2017)
- Pakistan contends with the risk of natural disasters, a large and growing youth population, entrenched poverty and inequality
- An estimated 3.1 million people, of which 2.1 million will be young, are expected to enter the labour force in Pakistan every year over the next four decades, reaching a projected 181 million by 2050 (Population Council estimates).

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Demographic Trap

Core subject

The term demographic trap is used to refer to a sustained pattern that comprises:

a) High fertility and low infant mortality (leading to a high rate of children that survive to adulthood relative to the current adult population)

b) Low death rates

c) Very little economic growth of the type that would promote declines in fertility (such as urbanization, improved contraceptive access, change in societal values away from the direction of valuing childrearing)

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Demographic Trap

A situation where no increase in living standards is possible, because the population is growing so fast that all available savings are needed to maintain the existing capital–labour ratio.

Country sail to provide or decline in:

i. Medical services
ii. Educational services
iii. Food production
iv. Safe drinking water
v. Housing services

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Population Growth Calculation

▶ To calculate the Population Growth (PG) we find the difference (subtract) between the new population and the old population at Time 1, then divide by the old population and multiply by 100.

▶ A general formula for calculating the population growth rate is Gr = N / t. Gr is the growth rate measured in individuals, N is the change in population, and t is the period of time.

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Population Growth Calculation

$$\text{Population Growth Rate} = \frac{\text{New Population - Original Population}}{\text{Original Population}} \times 100$$

▶ Suppose District Rawalpindi new population is 5,000,000, (2023) if the original population (old population at given time) was 4,500,000, (2013) calculate the population growth rate:

▶ Answer: Therefore, the population growth rate for total population is ?

▶ Annual percentage growth for ten years ?

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Population doubling time

▶ Definition: Doubling time means the amount of time it takes for a population to double given that it is growing at a constant rate. In other words, it's the time period over which something doubles

▶ We can find the doubling time for a population undergoing exponential growth by using the rule of 70. To do this, we divide 70 by the growth rate.
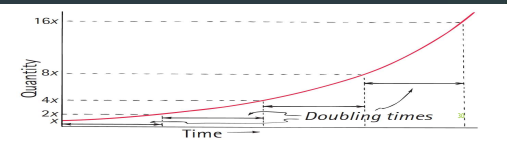
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Population doubling time

▶ There is an important relationship between the percent growth rate and its doubling time known as "the rule of 70": to estimate the doubling time for a steadily growing quantity, simply divide the number 70 by the percentage growth rate. For example, if Bozeman, Montana, maintains an annual growth rate of 4%, its population will double every 17.5 years (70/4 = 17.5 years).

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Population doubling time

The importance of the exponential curve of Figure 1 is that the time required for the growing quantity to double in size, a 100% increase, is a constant. For example, if the population of a growing city takes 10 years to double from 100,000 to 200,000 inhabitants and its growth remains exponential, then in the next 10 years the population will double to 400,000 and 10 years after that to 800,000 and so on.

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Family Medicine

▶ The data obtained from demographic studies can also help family medicine practitioners develop educational programs that target specific population groups.

▶ Understanding the demographics of specific populations, family medicine practitioners can provide customized healthcare services that address the unique health needs of their patients.

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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.

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Online Research and Books

▶ Kpark, 25th edition preventive and social medicine
▶ https://www.nsta.org/science-teacher/science-teacher-julyaugust-2020/exponential-growth-and-doubling-time
▶ 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/

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End Of Lecture Assessment (EOLA)

Q1- The demographic transition refers to the change that populations undergo from high rates of births and deaths to low rates of births and deaths. The fourth stage or late transitional stage of demographic transition compromises of:

a. Low population growth
b. Low natural resources
c. High population growth
d. Low immigration rate
e. High net migration rate

▶ Key answer A

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Thank you

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