# Demography-II

Dr. Nedal Alnawaiseh: M. B. Ch. B (MD), Baghdad, Iraq. MSc, JUST, Jordan.
MSPH, Tulane University, USA.
PhD, UKM, Malaysia. PhD, UNU, IIGH.
Public Health & Community Medicine Department, Medical School, Mutah University, Jordan.

# 3. Distribution of the population

✓In describing the distribution of any population the following questions have to be answered:

1. What is the percentage of inhabitant land in relation to available land within the national borders of a given country?
2. What is the population density /km$^2$ for the <u>inhabited area</u>?
3. What is the population density /km$^2$ for the <u>available land?</u>

# Distribution of the population

- ✓What are the occurring population movements between different areas of the country (rural- urban)?
- ✓Data on distribution are notable politically, economically as well as socially.
- ✓Changes in distribution are caused by the **Cumulative Effects Of Fertility, Mortality, External And Internal Migration**

# MAJOR DEMOGRAPHIC PROCESSES

# Major demographic processes

## Components Of Population Dynamics

I. Fertility

II. Mortality

III. Migration

# I. Fertility (Natality)

- **Fertility** is the actual Reproductive Performance of a woman or a group of women.
- Statistically a woman's reproductive period is from **15 – 49 years**.

# Measures of Fertility

1. Crude Birth Rate
2. General Fertility Rate
3. Age Specific Fertility Rates
4. Total Fertility Rate
5. Gross Reproduction Rate
6. Net Reproduction Rate

# Measures of fertility

- **Crude birth rate (CBR):** it is the number of live births per 1000 mid year population in a given year and locality

CBR = معدل المواليد الخام

**Total no. of live births in a certain year and locality**

---

**Estimated midyear population (same year and loc.)**

**x 1000**

CBR in Jordan = 30.1 births/1,000 population 2010

CBR: (per 1,000 people) in Jordan was reported at **26.47 in 2016**

# Measures of fertility

- CBR is a crude index of fertility as it relates births to total population (males, females outside the reproductive period as well as unmarried)
- **CBR is useful in:**

A. Making annual comparisons

B. Detect trends in fertility in a given country (30.1 ⟶ 26.47)/1000

C. Comparing different population

⟶ Gaza Strip Birth rate. Birth rate: 31.4 births/1,000 population (2017 est.)

# Measures of fertility

## Factors affecting the crude birth rate:

### A. Factors affecting the Numerator:

1. Number of females in the community specifically those 15 -49 years
2. The age of marriage
3. The level of infant and preschool mortality rates
4. The rate of having children

# Measures of fertility

## Factors affecting the crude birth rate:

### B. Factors affecting the Denominator:

1. Epidemics
2. Wars
3. Famines
4. Migration

# Measures of fertility

- **General Fertility Rate (GFR):** the number of live births a given year and locality per 1000 females in the child bearing period (15-49 years)
- It is equal to:

**Total no. of live births in a certain year and locality**

**x 1000**

***Reproductive Female Population In The Same Year And Locality:*** عدد النساء في سن الانجاب

# Measures of fertility

- GFR is refinement of the CBR as it relates births to those who will carry them in the future.
- It eliminates the influence of the difference in the proportion of males in the community

- **The weakness of GFR is that it does not take into account:**

1. The marital status
2. The differences in fertility levels in various age groups of reproductive period.

# Measures of fertility

## Age specific fertility rate (ASFR):

- Major refinement in measuring fertility allowing for the age differences among women
- The whole reproductive life of women is divided into 7 age groups, each of 5 years duration (15 – up to 45 – 49)
- There are **seven (7)** age specific fertility rates.

# Measures of fertility

**ASFR =**

**Total no. of live births born by females in a specific age group in a certain year and locality**

**_____**

**Female population in the same age group**

**x 1000**

# Measures of fertility

## Total Fertility Rate (TFR)

- The Total Fertility Rate (TFR) is a standard demographic indicator used internationally to estimate the **Average Number Of Children** that a woman would have over her childbearing years (i.e. age 15-49), based on current birth trends.
- **In Jordan TFR = 3.8 children born/woman in 2010**
- It is an estimate of the average number of children born to a woman or a cohort of 1000 women throughout her or their child bearing period subjected to prevailing age specific fertility rates.

# Measures of fertility

**Total fertility rate entails two assumptions:**

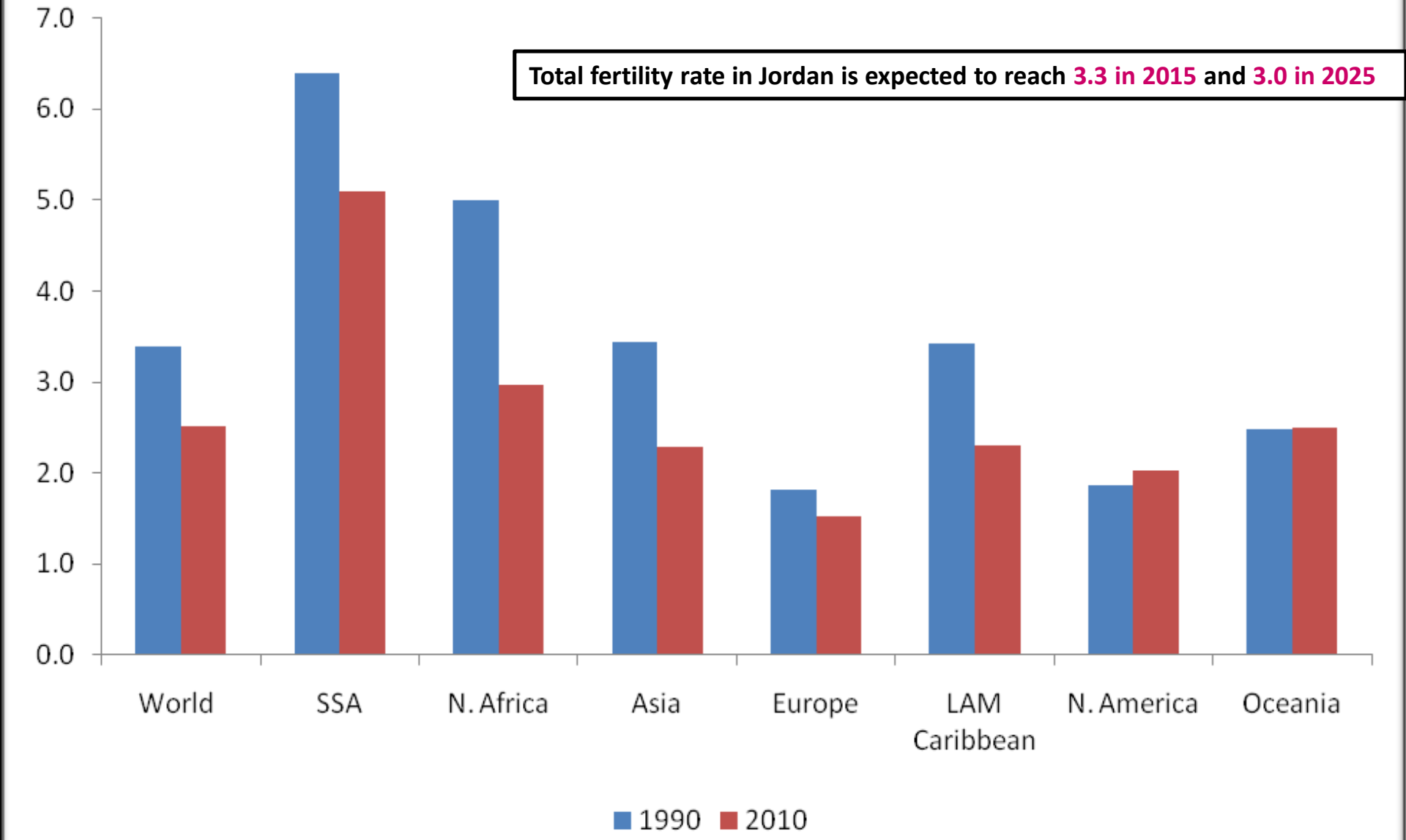
1) **The ASFRs remain constant for this cohort of females till the end of their reproductive life.**

2) **Non of the women beginning their reproductive life will die before reaching their menopause**

# Measures of fertility

- In most developed countries the TFR is **below 2.0**
- In a number of developing countries it is **over 6.0** (very high rate)
- **In Jordan TFR = 3.8 children born/woman in 2010**

# Total fertility rates in 1990 and 2010 for the world and its major regions



# Measures of fertility

- **Even if this target is achieved the population will grow for another period by the effect of Demographic Momentum (large % of women will reach reproductive age (الزخم الديموغرافي). So,**

**Total number of births can increase even if TFR falls.**

# Measures of fertility

**Gross Reproduction Rate (GRR):**

- **It shows only the number of Female Births who are expected to be future mothers**

- **It is defined as the number of female births / 1000 women or /woman throughout her or their child bearing period subjected to prevailing age specific fertility rates.**

- **In calculation it is similar to that of TFR but except that it refers only to female births only vs.**

$$TFR = \frac{\Sigma \text{ (average number of children (males + females)}}{\textbf{Female population in the same age group}}$$

# Measures of fertility

- GRR is calculated by multiplying the TFR to the percentage of females to the total births.
- GRR = TFR X % of female births.

  e.g. 3.8*0.55=2.09
- The drawback of the rate is that the deaths of women during their reproductive period are not taken into consideration

# Measures of fertility

## Net reproduction rate (NRR):

- It is derived from and is less than the GRR
- It **corrects the drawback** of the GRR where deaths of women during their reproductive period are taken into account using life tables of females.
- NRR measures the actual number of female children born to a woman during her child bearing life, subject to prevailing age specific fertility and specific mortality rates.

# Measures of fertility

- Drawback of NRR is that it Assumes that the ASFR and the death rates in a certain year will remain constant through a generation.

**N.B:**

- TFR, GRR, and NRR are **hypothetical** measures of fertility.

# II. Mortality

- Mortality data are relatively easy to obtain and reasonably accurate.

**Measures of mortality:**

1. Crude death rate
2. Age specific mortality rates
3. Sex specific death rates
4. Cause specific death rate
5. Proportionate mortality rate

# Mortality

## Crude Death Rate: CDR

$$\frac{\text{Number of deaths in a certain year and locality}}{\text{Estimated mid year population in the same year and locality}} \times 1000$$

- The Jordanian figure for CDR 2010 = 7 deaths/1000 population

# Mortality

- The main advantage of CDR is its **Summarizing Power** (its ability to portray a general impression by a single value.
- However it **lacks comparability** between different communities that have different structures as regard factors governing the probability of death e.g. **age, sex and race composition**

# Mortality

## Age Specific Death Rate:

$$\frac{\text{Total deaths in a certain age and a certain year and area}}{\text{Total number of the same age group in the same year and same area}} \times 1000$$

# Mortality

## Sex Specific Death Rate

Number of deaths in a certain sex during a year in a certain locality

X 1000

Total number of the same sex during the same year and locality

# Mortality

## Cause Specific Mortality Rate;

**Total number of deaths due to a certain cause during a year and a given locality**

**X 1000**

**_____**

***Estimated midyear population during the same year and locality***

# Mortality

## Proportionate Mortality Rates

**Total number of *Deaths Due To A Certain Cause* during a year and a given locality**

**_____ X 100**

**Total number of *Deaths From All Causes* during the same year and locality**

# III. Migration

**Definition:**

- It is the **movement** of populations **across a specific boundaries** for the purpose of residing.
- It is the **change of residence** of a person or a group of persons for better life and higher standard of living.

# Migration

- The terms **Immigration and Emigration** are used for **international migration** (movement between countries); also called **external migration.** It can be **temporary or permanent.**
- The parallel terms **in-migration and out-migration are** used for **internal migration** (internal movement between different areas within a country)

# Migration

- Although migration affects the characteristics of the population, its **role is minimal** when compared to fertility and mortality, in most of the countries