

# DEMOGRAPHY: POPULATION PYRAMIDS

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**LECTURE OBJECTIVES:**

**At the end of the lecture the student should be able to:**

- **Define demography**
- **List elements of demography**
- **Describe population pyramids**
- **Compare between population pyramids of developed and developing countries.**



## Definition of Demography

- ❖ **Demography** is the science that studies human population. (علم الدراسات السكانية)
- ❖ **Demography**: The study of populations, especially with reference to size and density, fertility(reproductive pattern) , mortality, growth(increasing or decreasing), age distribution, migration, and vital statistics, and the interaction of all these with social and economic conditions. (Oxford Dictionary)

## Elements of Demography

Three main elements of demography:

1. **Size of population (census)** (تعداد)  
"census: an official count or survey, especially of a population." Oxford dictionary  
- example: in 1431 a housing census was performed in Saudi Arabia (Individuals were counted within households to estimate the population).
2. **Composition:**
3. **Distribution:** The distribution of the population in the country, in the capital, big cities, periphery such as suburbs and small towns.

## Population Census

- The population size is determined by counting the inhabitants and their characteristics periodically.
- Census enumeration of a population usually records identity of all persons in every place of residence, with age or birth date, sex, occupation, national origin, language, religion, marital status, income, educational level (or literacy). (This is the composition which is also known as demographic characteristics).
- Census data is of importance for every country for planning purposes and is usually ***done every 10 years***.

# Demography: Population Pyramids

- The population size in inter-censal years (years between each census) is estimated from births, deaths and net migration.
- Example on population in Inter-censal years: last population census was in 1431, so we don't have this year's census; however we can estimate it by considering the number of live births, deaths, immigrants(those that come to a country to live in it not just visit) and emigrants(those that leave a country permanently) from 1431 until now.

## Note:

- Immigrants are those that come to a country to live in it not just visit.
- Emigrants are those that leave a country permanently

## **TYPES OF CENSUS:**

We have 2 types of census:

1. ***De Facto census***
2. ***De Jure Enumeration:***

### **A. De Facto Enumeration:**

It is to count all people in the locality (area) according to their location at the time of enumeration (count) irrespective of the person's usual/permanent residence. (Cross-sectional, it is done over a specific duration). **Temporary residence**

#### **De Facto census is:**

- A simple economic procedure
- It is adopted in the majority of countries.

Disadvantages: counting errors occur when: people move around they can be counted twice or not counted at all; and errors occur due to travelers.

**Twice** if they move from an area already assessed to an area that is not yet assessed, and **not counted at all** if the person moved from an area to be assessed to an area that has already been assessed).

## B. De Jure Enumeration:

A de jure census assigns persons according to their usual place of residence at the time of enumeration. It assesses the population density based on permanent addresses even for someone with multiple addresses as each person's ID (for example in the US the social security number) is linked to one permanent residency address.

Disadvantages:

- Expensive
- More difficult and takes time
- Adopted in U.S.A.

## Last Census data of Saudi Arabia

**Was in (2010/1431).**

**Population (total) 27.163.977**

*Saudi 18.707.576*

Males 9.527.173 (50.9%)

Females 9.180.403 (49.1%)

*Non-Saudi 8.429.401*

Males 5.932.974 (70.4%)

Females 2.496.427 (29.6%)

This is an example of how the population can be checked for different parameters (those are the main characteristics and it helps to check the ratios in relation to the gender for example as well as the nationalities. In non Saudis, the percentage of males is much higher due to immigrants who come to work in Saudi Arabia.

## POPULATION PYRAMIDS

### THE AGE-SEX COMPOSITION OF POPULATIONS

Population pyramid is the graphical presentation of the **age** and **sex** composition of a population of an area or country at a certain point in time.

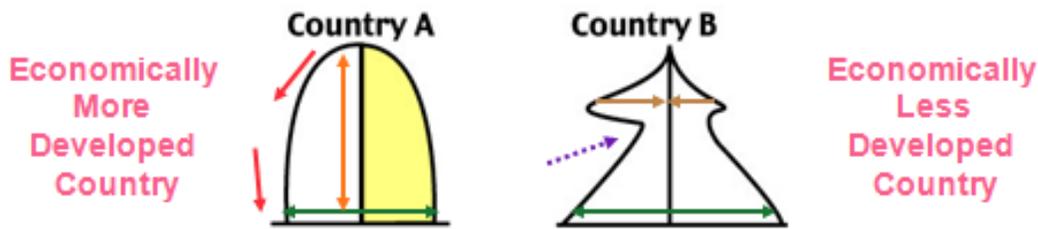
The shape of the pyramid reflects the major influences of births and deaths, in addition to any changes due to migration.

The pyramid shape changes from population to population, it also changes in one population over the years... A pyramid shape with a wide base that keeps narrowing up means that the population is growing, if it is almost a rectangle throughout it means that the population numbers are almost changing, no steep increase or decrease in the population. An inverted triangle (base being up and apex below) means that the population is facing some severe decrease, lower birth numbers

# Demography: Population Pyramids

**NOTE: THIS IS EXTRA INFORMATION FROM AN EXTERNAL SOURCE IT IS JUST TO HELP YOU UNDERSTAND.**

## What Population Pyramids Show Us

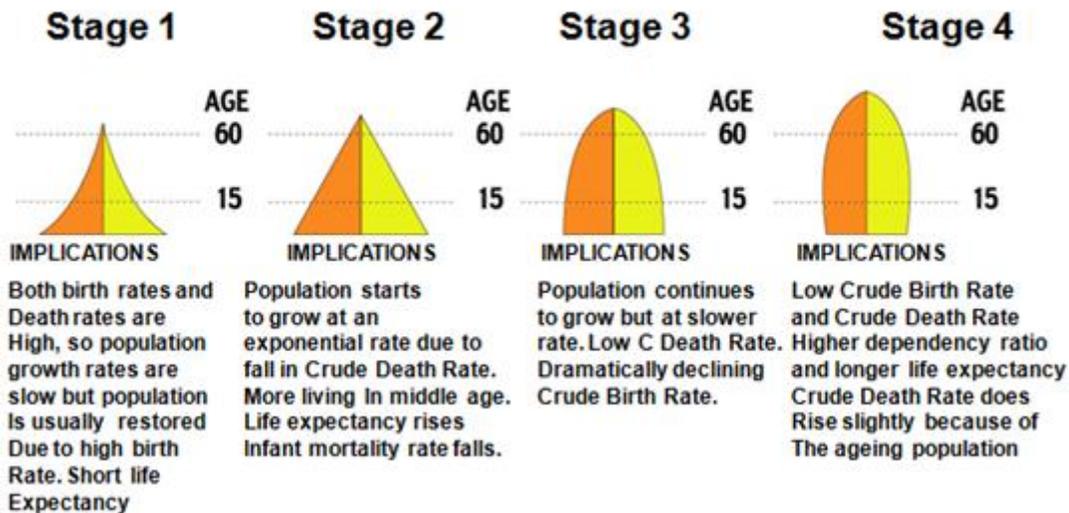


### KEY

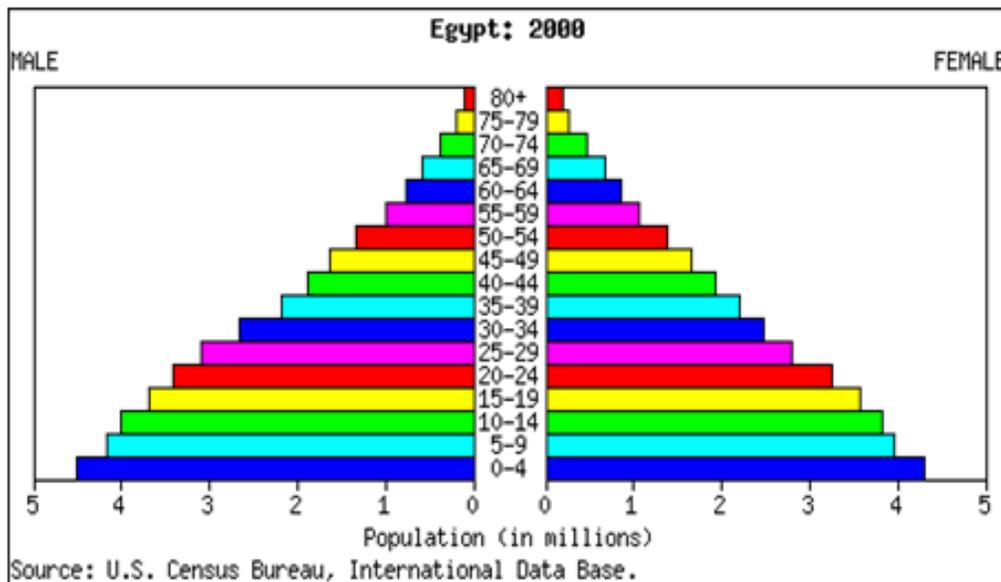
-  slope of pyramid indicate the death rate
-  width of the base is related to birth rate/fertility rate
-  proportions of men and women can suggest male or female migrations
-  height of graph can indicate life expectancy (ignore the very thin end of the wedge as occurs on graph B as these people are a definite minority)
-  "kinks" indicate dramatic reductions in birth rate or increases in death rate in the past
-  area of graph indicates total population - compare areas of different population age groups or different sex on one graph

The overall shape of the population pyramid can indicate whether it is an Economically More Developed Country or Economically Less Developed Country

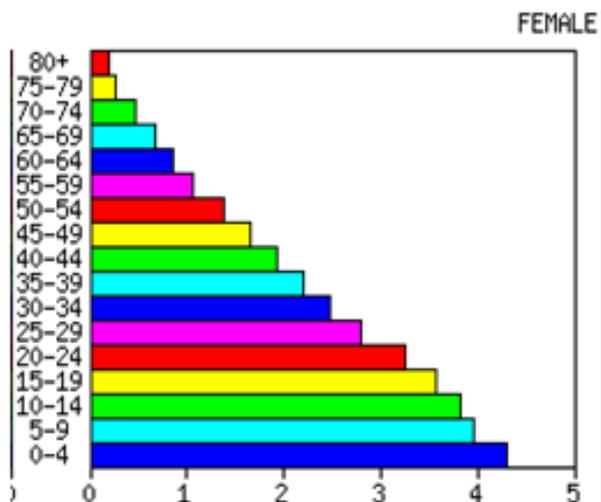
## Population Pyramids related to the Demographic Transition Model



## STRUCTURE OF POPULATION PYRAMID

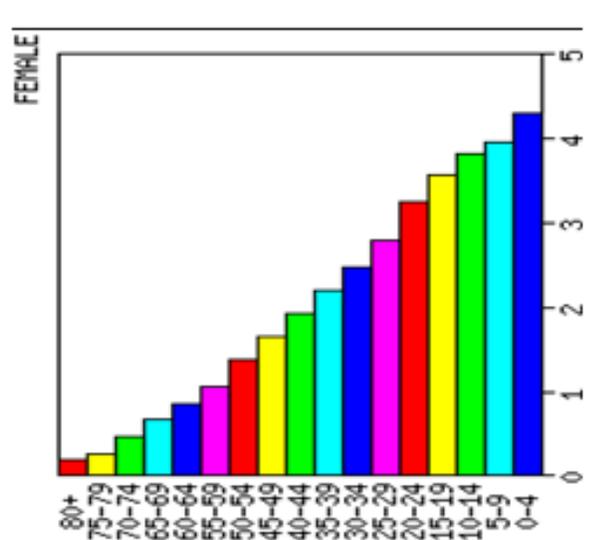


## Structure of Population pyramid



**ON THE LEFT: Bar chart for are distribution of females.**

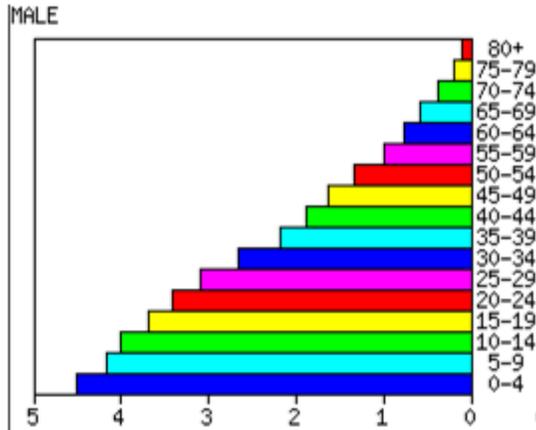
**When we want to talk about numbers it is better to use percentages. (Percentage of the total population group).**



# Demography: Population Pyramids

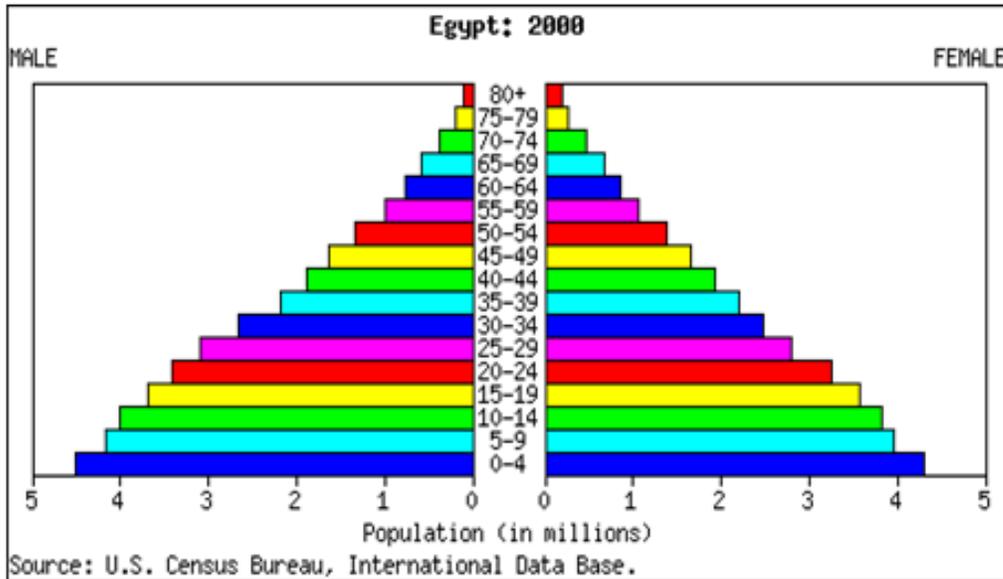
ON THE RIGHT: Rotated Bar graph for age distribution of females

## Structure of Population pyramid



Bar graph for age distribution of males

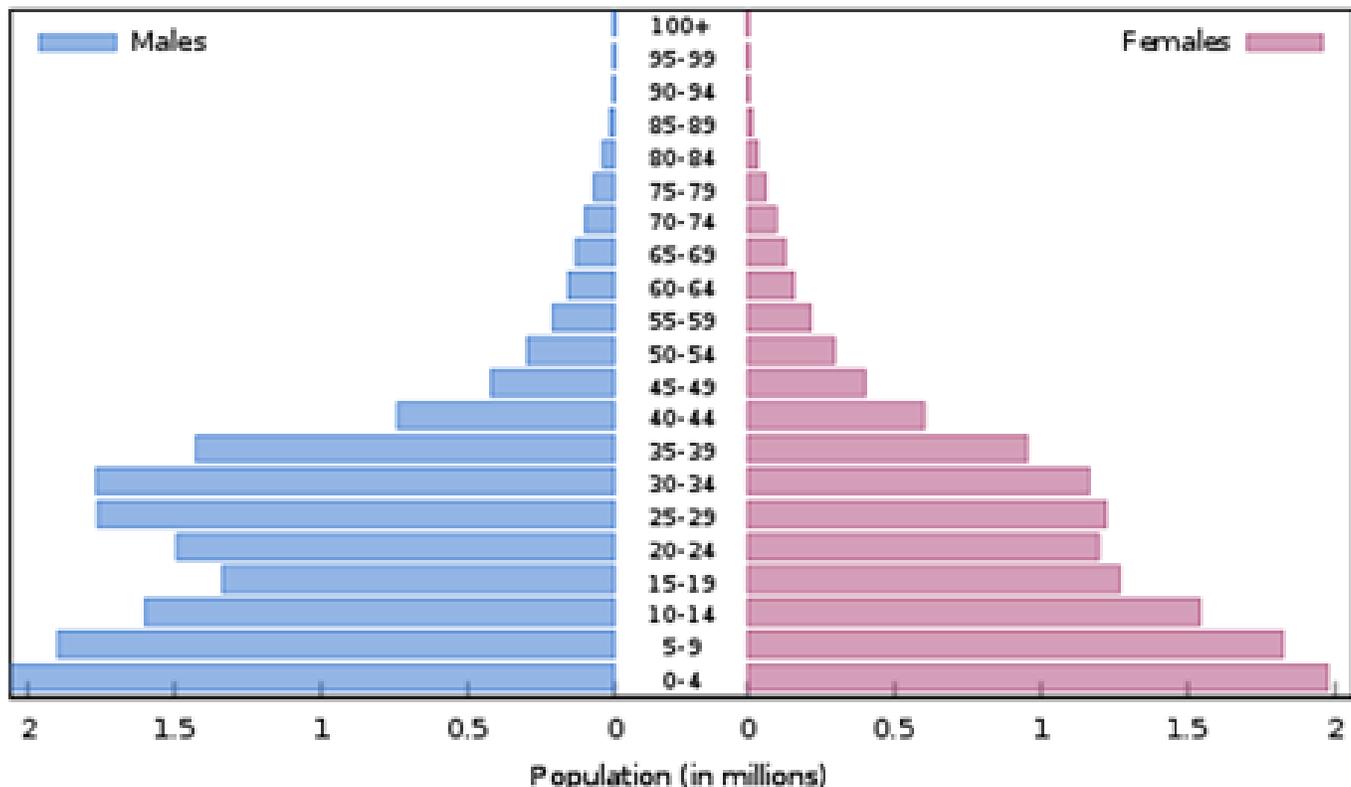
## STRUCTURE OF POPULATION PYRAMID



Both bar graphs are put back to back to help in comparison.

## POPULATION PYRAMID OF SAUDI ARABIA 2009

Population of Saudi Arabia (2009)

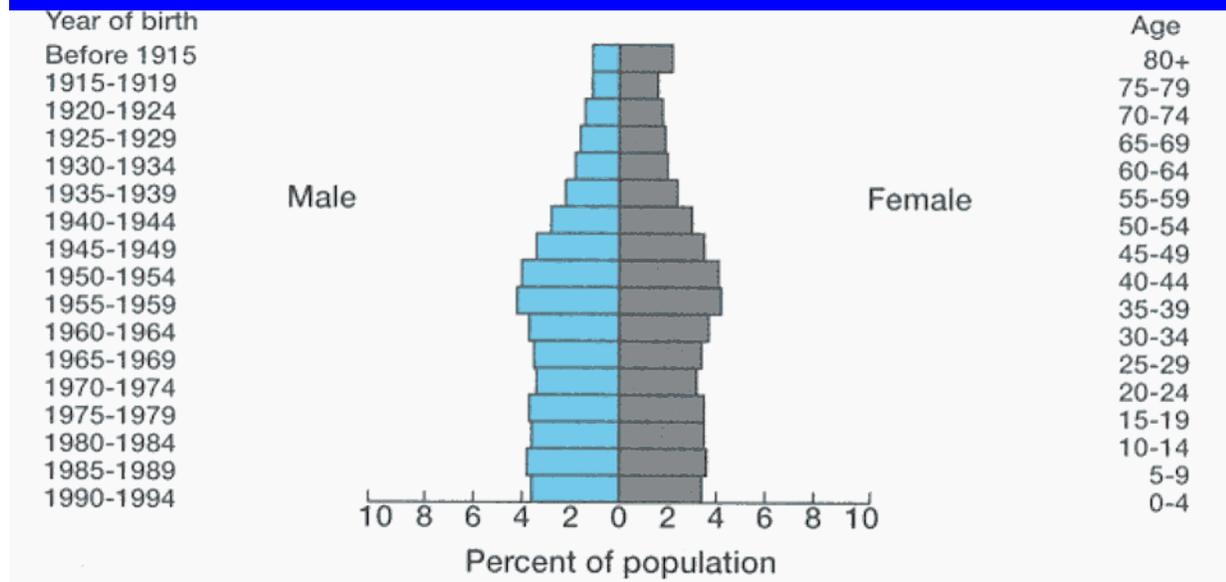


This shows a sloping distribution; it's the general shape for developing countries. The base is much bigger, high fertility rate. The mortality here is usually higher than developed countries.

Here there is a bulge which usually means there is an add, it usually is due to migration for work. It is usually due to people not originally from that country; in this pyramid this add is usually in non-Saudi people.

There can be a notch which is usually due to a problem that caused increased mortality rates in that population such as war or fire.

## United States Population, 1995



Source: Joseph A. McFalls, Jr. Population: A Lively Introduction. Population Bulletin 46(2); 1995: 22.

Here the base is not big, the general shape is rectangular; the older age groups have less mortality rates meaning its well controlled. Here as this is a developed country the birth and mortality rates are close.

The increase in the middle age groups is usually due to increased migrations into the United States mainly for work.

- **Structure of Population pyramid**
- **Sex**
  - Males are shown on the left side of the pyramid
  - Females on the right
- **Age**
  - young persons at the bottom, and
  - The elderly at the top.
- The pyramid consists of a series of bars, each drawn proportionately to represent the percentage contribution of each age - sex group
- The y-axis is for the age groups often in five-year groupings to the total population starting from the age interval 0-4 being lowest on the scale and as you go up the age intervals increase.
- The x-axis is for the population (whether it's a percentage scale or a thousand/million scale).
- The total area of the bars represents 100 per cent of the population.

## **Bases for Comparison:**

- 1) **Variation across age groups**
- 2) **Variations within each age group by sex**

## **The importance of the population pyramids**

1. Sex ratio: Percentage of males and females. (females are usually more in the elderly, but in KSA men are usually more due to immigration)
2. Age structure:
  - **Base** denotes births (broad or narrow base)
  - **Apex** denotes elderly
3. Mortality and emigration: Shape of sides (sloping or steep).
4. Life expectancy: (Average number of years that a newborn is expected to live if current mortality rates continue to apply)
  - **Height** of the pyramid and shape of the **apex**.

## 5. **Median Age:** (lower or higher)

The point in the vertical axis of age through which passes the horizontal line that divides the surface area of the pyramid into two equal parts (50% younger and 50% older).

The position of this defined point is inversely related to the width of the base.

The wider the base, (i.e. the higher the birth rate), the lower will the median age be and vice versa.

Median age means the age in the middle, the 50%.

it is related to the shape of the pyramid in the concept of when there is a very wide base it means that a big percentage of the population are in the younger age groups.

the bigger/wider the base -in relation to the rest of the pyramid- the more people will be in that group meaning it is of a greater population percentage, thus the younger the median age group

Bigger base → younger (lower) median age

Smaller base → older (higher) median age

## 6. **Dependency Ratio**

- The Dependency ratio describes the relation between the potentially self-supporting portion of the population and the dependent portions at the extreme of age (below 15 and above 65). This means that anyone younger than 15 or older than 65 is expected to be dependent on the people in between the ages 15 and 65 as they don't work.
- Types of dependency ratio:
  - **Young dependency:** Proportion of population below 15 years of age.
  - **Old dependency:** Proportion of population above 65 years of age.
  - **Total dependency:** Proportion of population below 15 years of age plus the proportion of population above 65 years of age. Contains all dependent groups.

## Dependency Ratio

$$\text{Young dependency ratio} = \frac{\text{Population below 15 years}}{\text{Population aged between 15 - 65 years}} \times 100$$

$$\text{Old dependency ratio} = \frac{\text{Population above 65 years}}{\text{Population between 15 - 65 years}} \times 100$$

$$\text{Total dependency ratio} = \frac{\text{Population below 15 years} + \text{those above 65 years}}{\text{Population aged between 15 - 65 years}} \times 100$$

### Demographic Data of Saudi Arabia

- Life expectancy at birth (2006) Both sexes 70.0 years (Female 73.0 Male 68.0)
- Population median age (years) is 24 (in year 2006)
- Population proportion over 60 (%) 4.0 % (in year 2006)
- Population proportion under 15 (%) 34.0% (in year 2006)

This means 38% of the population is dependent which is bad for the economy (this is a developing country).

**Compare between Population Pyramid of a developing and a developed country**

# Demography: Population Pyramids

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Compare between Population Pyramid of a developing and a developed country

Items	Developing country (KSA/Egypt)	Developed country (USA)
1- The base	.....Wide/Broad.....	.....narrow.....
2- The sides	.....sloping...	...steeper.....
3- The height	.....low.....	.....high.....
4- The median age	.....Lower..... .....	.....Higher..... .....
5- The dependency ratio (DR)		
a) The young DR.	.....more.....	.....little.....
b) The old DR.	.....little.....	.....more...
c) The total DR.	<u>more</u> or the same	<u>less</u> or the same

In USA less young dependency but more elder dependency than KSA and Egypt, thus they need more institutions and rehabilitation centers.

## References

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