Geriatric Health Seminar (study guide)

1- Differentiate between Geriatrics and Gerontology

      Geriatric Medicine, Also referred as Elderly care is a specialty of medicine concerned with physical, mental, and health problem conditions in acute, chronic, rehabilitative, preventive, and end-of-life care in older patients. Focuses on the health care of elderly persons (focuses on pathology). It was developed as a response to the multimorbidity of the growing elderly patient population. It focuses on the prevention, assessment and management of their specific health problems across the disease trajectories. Health complexity is one of the hallmarks of geriatric medicine[1]. The main goals are the maintenance and restoration of functional capabilities, thus improving quality of life and social participation.

      Gerontology, on the other hand, focuses on theory more than health related problems and pathology[3]. Gerontology is the study of the aging processes and individuals as they grow from middle age through later life.It studies cultural, psychological, cognitive and biological changes. It includes:
- The research focus of social changes in older people as they age
- The investigation of the changes in society resulting from our aging population
- The application of this knowledge to policies and programs. As a result of the multidisciplinary focus of gerontology, professionals from diverse fields call themselves "gerontologists"[2]
- It deals with the more theoretical side of elderly health.

while on the other hand Geriatrics is[5]:
- The study of health and disease in later life
- The comprehensive health care of older persons and the well-being of their informal caregiver
- It's a branch of medicine unlike gerontology.

2- Describe physiological and pathological aging

Physiological aging describes *the inevitable genetically programmed decline of a living organism*, it relies on the concept of a genetically programmed longevity which is solely dependent on genetic variations within the species, neglecting accidents, diseases and environmental factors.

Pathological aging describes age-related changes that are due to a disease process or disorders that increase in their incidence substantially as humans age suggesting an underlying age-related process[4,5]. These changes include:

- **Cognitive Changes:**

- Analytical skills involving science and mathematics were found to be in decline with aging.[6,7]
- Changes in sensory functions: (1) involving audition and balance were noted with aging in which there is an increased in the threshold of stimulation of these senses, (2) vision is similarly affected due to global changes to eye structures resulting in decreased visual acuity, weakened eye
muscles and decreased pupil size, (3) olfaction and gustation, there is a decline in tasting ability

secondary to decreased number and shrinking of the taste buds, (4) decreased mucus production impacts olfaction, mucus help trap odors within the nose long enough for the olfactory nerve to be stimulated.[8-11]

- Dementia: The prevalence of dementia such as Alzheimer's and lewy bodies dementia classically increases with aging.

● **Metabolic and Hormonal Changes:**
Decline with aging: Insulin, growth hormone, aldosterone and sex hormones. Increase with aging: Parathyroid hormone, norepinephrine.

Pathological consequences: Increased incidence of orthostatic hypotension, osteoporosis, chronic diseases such as type 2 diabetes mellitus and hypertension in the elderly population.

● **Pulmonary Changes:**
Age-related changes: Structural and immunological changes such as decreased volume of air in the lung due to a narrower chest cavity, decreased clearance of foreign particles through its defensive mechanisms. Pathological consequences: Chronic pulmonary obstructive disease's incidence is highest among those over the age of 60.

● **Cardiovascular Changes:**
Age-related changes: Fat deposition in the heart electrical system may lead to reduced heart rate. Wear-and-tear pigments like lipofuscin may accumulate in heart muscles, increasing its stiffness and reducing its pumping capacity, decreased blood vessel adaptation to postural changes Pathological consequences: Increased incidence of syncope, arrhythmias, heart attacks and strokes.

3- Understand health problems of elderly globally:

Common conditions in older age include hearing loss, cataracts. back and neck pain and osteoarthritis, COPD, diabetes, depression, and dementia. Furthermore, as people age, they are more likely to experience several conditions at the same time.We can divide the health problem in eldrly into three main category :
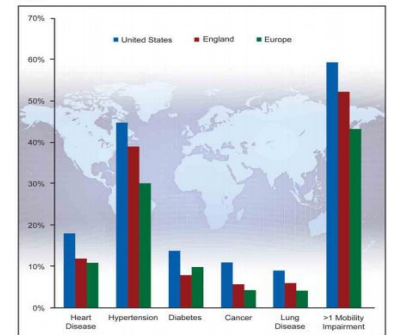
- **Physical Health Problems:** Chronic diseases ,impaired vision and hearing and cancer. Malnutrition (wasting or obesity). Oral and dental problems such as: tooth fall.
- **Mental Problems:** Mental problems such as: dementia, Alzheimer's, depression, delirium, Sleep disorder.
- **Social Problems:** Isolation, Low level of job performance.

**Differences in the prevalence of chronic disease are caused by :**
- Difference in behavioural risk factors (such as obesity, low body weight, smoking and alcohol use).
- Difference in socioeconomic status. In general, people in higher socioeconomic levels have better health.

Figure 8.
Prevalence of Chronic Disease and Disability among Men and Women Aged 50-74 Years in the United States, England, and Europe: 2004


Coronavirus: case fatality rates by age

As we can see during the pandemic the death rates increase by age and this is can be due to low immune system and multiple chronic disease
One factor affecting the country's death rate may be the age of its population — Italy has the oldest population in Europe, with about 23% of residents 65 or older. The median age in the country is 47.3
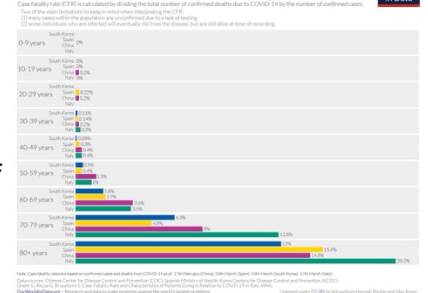
Dementia is a syndrome usually of a chronic or progressive nature – in which there is deterioration in cognitive function (i.e. the ability to process thought) beyond what might be expected from normal ageing. It affects memory, thinking, orientation, comprehension, calculation, learning capacity, language, and judgement.

The complexity of the disease and the wide variety of living arrangements can be difficult for people and families dealing with dementia, and countries must cope with the mounting financial and social impact. The challenge is even greater in the less developed world, where an estimated two-thirds or more of dementia sufferers live but where few coping resources are available

The Growth of Numbers of People with Dementia in High- income Countries and Low- and Middle-income Countries: 2010-2050
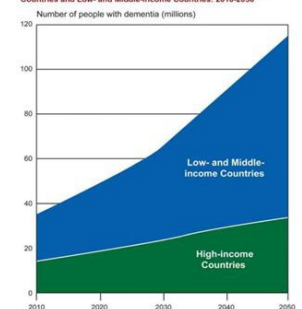
New Disease Patterns:

High death rates from infectious diseases are commonly associated with the poverty, poor diets, and limited infrastructure found in developing countries. Over the next 10 to 15 years, people in every world region will suffer more death and disability from such noncommunicable diseases as heart disease, cancer, and diabetes than from infectious and parasitic diseases. By 2030, non communicable diseases are projected to account for more than one-half of the disease burden in low-income countries and more than three-fourths in middle-income countries.

Figure 6.
The Increasing Burden of Chronic Noncommunicable Diseases: 2008 and 2030

2008

High-income Countries   Middle-income Countries   Low-income Countries

2030
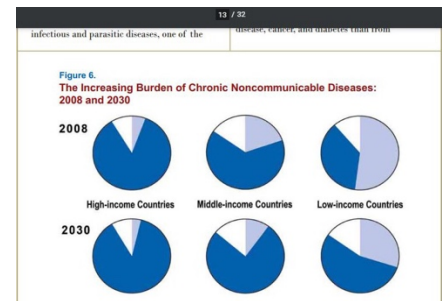
4- Explain the demographic changes associated with ageing of the population

The impact of aging affects all fields of life. It is mostly noticeable in its economic, social, and public health effects. (An inevitable consequence of the demographic transition). Between the year 2000 and 2050, the proportion of the population aged 60 years and above worldwide will double, from about 11% to around 22%[1,2].

Before explaining the demographic changes associated with aging of the population, we should define these two terms:

1-Demography: "Demography is the study of the size, territorial distribution, and composition of population, changes therein, and the components of such changes, which may be identified as natality, mortality, territorial movement (migration), and social mobility (change of status)."[3]

2-population aging: is the rise of the average age and the shifts in the age distribution (age structure) of a population toward people of older ages[4,5]

Generally speaking we have three **types** of population pyramids created from age-sex distributions :

1-Expansive population pyramids: shows larger numbers or proportion of the population in the younger age groups, usually each age group is smaller in size or proportion in comparison to the one born before it(typical pyramid shape). These types of population pyramid has typical
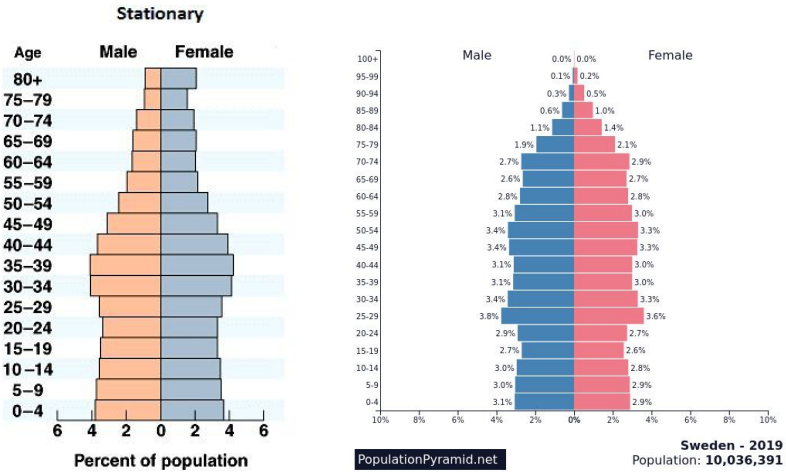
pyramid shape with a wide base and a narrow top and are usually found in populations with **very high fertility rates and lower than average life expectancies**. Third World countries would most likely display expansive population pyramids[1,3,7,8] like West africa.
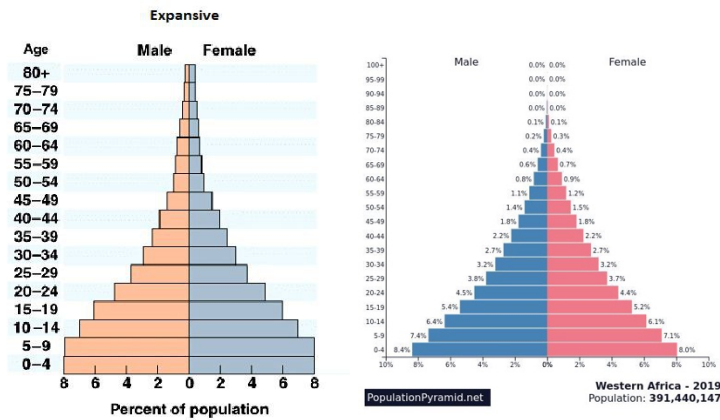
2-CONSTRICTIVE population pyramids:are named so because they are constricted at the bottom and have smaller percentages of people in the younger age cohorts and more in the working age group(15-64). Constrictive population pyramids show **declining birth rates, long life expectancy, a low death rate**, low death rate and relatively higher life expectancy[1,2,3,7,].Brazil is a good example.
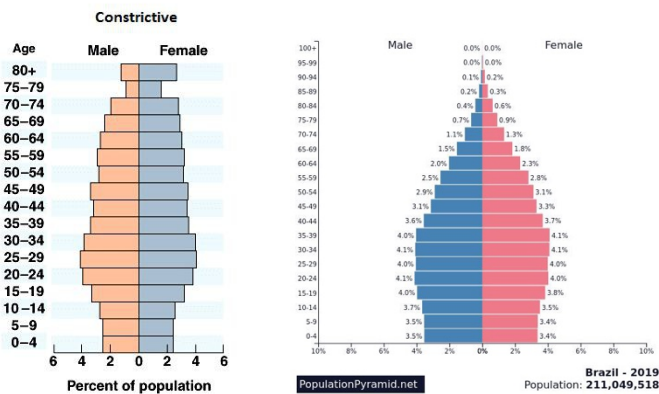
3-Stationary, or near stationary, population pyramids: are used to usually describe populations that are not growing. Stationary pyramids have a characteristic rectangular shape, and have relatively the same percentages and proportions across all the different age groups that taper off toward the top. These pyramids are often seen in developed nations, where **birth rates are low and overall quality of life is high** European countries are a good example[1,2,3,7].

Stationary

Age	Male	Female

80+
75–79
70–74
65–69
60–64
55–59
50–54
45–49
40–44
35–39
30–34
25–29
20–24
15–19
10–14
5–9
0–4

6 4 2 0 2 4 6

Percent of population

Male — Female

	Male		Female	
100+		0.0%	0.0%	
95-99		0.1%	0.2%	
90-94		0.3%	0.5%	
85-89		0.6%	1.0%	
80-84		1.1%	1.4%	
75-79	1.9%		2.1%	
70-74	2.7%		2.9%	
65-69	2.6%		2.7%	
60-64	2.8%		2.8%	
55-59	3.1%		3.0%	
50-54	3.4%		3.3%	
45-49	3.4%		3.3%	
40-44	3.1%		3.0%	
35-39	3.1%		3.0%	
30-34	3.4%		3.3%	
25-29	3.8%		3.6%	
20-24	2.9%		2.7%	
15-19	2.7%		2.6%	
10-14	3.0%		2.8%	
5-9	3.0%		2.9%	
0-4	3.1%		2.9%	

10% 8% 6% 4% 2% 0% 2% 4% 6% 8% 10%

PopulationPyramid.net

Sweden - 2019
Population: 10,036,391

Finally, for better understanding of these changes in populations we must define one more important concept which is:

Demographic transition: Movement and changes of death and birth rates in a society, from a state where both are high (in the pre-transition stage) to one where both are low (in the post-transition stage). Transition is the interval between these two stages during which the population increases usually rapidly, as births exceed deaths[9]. And usually it divided into 5 **stages**.

The demographic transition in 5 stages

Our World in Data

Birth rate
Death rate

Birth and death rates (per 1,000 people per year)

40

30

20

Natural Increase

10

Total Population

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Birth rate	High	High	Falling	Low	Rising again
Death rate	High	Falls rapidly	Falls more slowly	Low	Low
Natural increase	Stable or slow increase	Very rapid increase	Increase slows down	Falling and then stable	Stable or slow increase
Population Pyramid					

Men Women

The author Max Roser licensed this visualisation under a CC BY-SA license. You find more information at the source: http://www.OurWorldInData.org/world-population-growth

FIGURE1: Roser, M., Ritchie, H. and Ortiz-Ospina, E., 2019. *World Population Growth*. [online] Our World in Data. Available at: <https://ourworldindata.org/world-population-growth#:~:text=a%20temporary%20phenomenon%3F-,The%20Demographic%20Transition,all%20parts%20of%20the%20world.> [Accessed 18 November 2020].

5- Discuss existing Global and national programs for elderly care explain the demographic changes associated with ageing of the population in KSA

Populations around the world are rapidly aging, so it is important for governments and communities to build age friendly environments in order to meet their needs like elderly healthcare centers, home services and nursing homes. There are multiple international and national programs and health care centers designed and specialized in taking care of the elderly populations. These programs aim to establish an environment suitable to take care of elderly, especially those with special needs and dementia. Creating a setting to provide high quality care for elderly to further promote and enhance their health status.

In accordance with a recent World Health Resolution, a global strategy and action plan on ageing and health is being developed by WHO. The strategy and action plan draws on the evidence of the World report on ageing and health and builds on existing activities to address 5 priority areas for action:

- Commitment to Healthy Ageing (raising awareness of the value of healthy aging and and commitment to establishing evidence based policies that strengthen elderly abilities)
- Aligning health systems with the needs of older populations
- Developing systems for providing long-term care
- Creating age-friendly environments
- Improving measurement, monitoring and understanding of aging issues

An international example of an elderly support program is Medicare. This US based federal health government program aims to provide health insurance mainly to individuals who are 65 of

age or older, under 65 with disabilities and individuals with End-Stage Renal Disease(ESRD).Their service divides into three categories; Medicare part A(hospital insurance), part B(medical insurance) and part C(prescription drug coverage).

The Saudi government made sure to provide multiple social and health related services that mainly supported elderly. Sultan bin Abdulaziz Al Saud Foundation is a non profit charity organization in Saudi Arabia built and funded by the late Crown Prince Sultan in 1995.Situated in Riyadh and is now called Sultan Bin Abdulaziz Humanitarian city. The organization provides a variety of humanitarian services, one of which include providing social, healthcare, nursing homes and rehabilitation to the elderly and handicapped.

A national program called the Saudi Elderly Support Organization "WAQAR" is a non profit organization that has been founded in 2015 in the capital city riyadh. Its main aim is to support the elderly population in Saudi Arabia by creating programs and initiations that suit their needs, improving the services provided to them and empowering elderlies and their role in the society. WAQAR has created and developed elderly support programs that covered every aspect of elderly lives.

Special Health care services and follow up for elderly with chronic disorders, past surgeries, neurological degenerative disorders like dementia and Parkinson's disease provided by Saudi government hospitals like KKUH.

King Salman Social Center is one of the most known saudi centers which helps elderly in maintaining good physical activity and health by providing specialized and broad fitness and rehabilitation programs and physiotherapy to those who suffered from past stroke and motor vehicle accidents.

6- List the health and social problems associated with ageing in KSA

Ageing process is usually associated with various changes in an individual life which can result in problems that would reflect on both health and social levels. Most common health problems in geriatric population in Saudi arabia are the following:

Comorbidities; more than one disease existing at the same time associated with decreased level of health status and increased likelihood of disability. A study was conducted in Jeddah estimated that the prevalence of having at least two co-morbidities among eldery people is 60.4%, also a study was carried out in southern Saudi Arabia showed even higher prevalence 89%. Most prevalent disease was hypertension followed by diabetes mellitus. Other diseases were also reported but were variable such; stroke, dementia, osteoarthritis, and Alzheimer. They may also experience emotional disorders and sexual adjustments.

Polypharmacy: as a result of co-morbidities many elderly patients will end up in using multiple medications to maintain their health condition.(5 or more medications.). (55% of the patients have polypharmacy. An average of 6.4 medications were prescribed for patients aged

between 65 and 70 years). It makes elderly people at high risk of developing side effects such as drug-drug interaction due to increased number of medications ,which will also increase healthcare cost, also it may affect their compliance as many medications are prescribed with different doses and timing.

Malnutrition among eldelry is common and it is defined as "faulty or inadequate nutritional status (or) undernourishment characterized by insufficient dietary intake, poor appetite, muscle wasting and weight loss" that may be due to sensory changes accompanied by ageing such as taste or smell or low income.

While social problems that face geriatric population are varies from social isolation to the consequences of their comorbidities as it limits their daily activity especially they are more prone than any age group for falling and may lead to serious injuries, making them more dependent on others and as a result of dependency they may face some physical abuse. They also require someone who takes care of them to help them throughout daily activities, for example having a caregiver, these changes and consequences may contribute to the most common psychological disorder among elderly, depression.

7- Describe the interaction between physical ill-health, social problems, psychological problems and functional limitations

To Understand the burden of psychological disorders on elderly, it was estimated that in the United States alone, the number of people older than 65 with psychiatric disorders will become 15 million by the year 2030, compared to only 4 million in 1970 [1]. Another study found that the prevalence of mental disorders increased to almost double from age groups 55-59 years to age group 80-84 years[2]. Dementia specifically becomes more prevalent as people age. Depression among the older population is more common in older patients living in care settings[3]. This is alarming because older populations are more likely to depend on care settings. In most countries that are members of the EU suicide rates is higher among older populations. Moreover, it has been hypothesized that depression increases the likelihood of functional limitations in the elderly population, however the literature suggests otherwise[4].

Physical illness and psychological problems relatively lead to each other. It may come as no surprise that people with physical illness like chronic conditions are more prone to developing depressive symptoms and other psychiatric illnesses. However, Older populations that express depressive symptoms are also prone to developing chronic illnesses like diabetes, hypertension, and alzheimers [5].

Social problems alse appear to strongly evident among the elderly population. In A cross-sectional study conducted among outpatients aged 60 years and above, 36.2% of participants said that they feel like they are a burden on their families, 36.6% feel that they are not loved by family members. More importantly, 56.3% feel that they are deprived of finances [6]. And the number one reason for being sad was poverty. The majority of those problems could be caused or influenced by the fact that these people are out of the working force, and therefore could be financially dependent on others.

Social problems along with general psychological problems must be constantly addressed and revisited by programs run on the governmental level which aid to make this population more independant. However, their negative impact on the psychological wellbeing could be minimized by better addressing the insecurities that this group of people present with. It is noteworthy to mention that these social problems could greatly differ depending on the social factors that affect all age groups in general.

8- State the top ten causes of years lived with disability, disability adjusted life years lost and death among elderly 70+ years in KSA
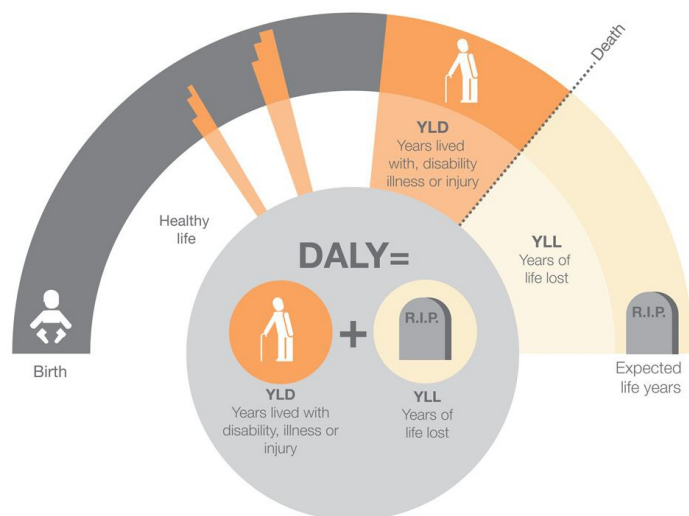
What is 'burden of disease'?
Burden of disease is a concept that was first introduced to the world in the 1990s by the Harvard School of Public Health, the World Bank and the World Health Organization (WHO) to describe The sum of mortality and morbidity and can be measured by a metric called '*Disability Adjusted Life Years*' (DALYs). DALY is a measuring of lost health and it is a standardized metric that allows for direct comparisons of disease burdens of different diseases across countries, between different populations, and over time. Conceptually, one DALY is the equivalent of losing one year in good health because of either ***premature death*** or ***disease or disability***.[1]

How can the burden of disease be measured?
The burden of a particular disease or a medical condition can be calculated by adding :
- The number of years of life a person loses as a consequence of dying early because of the disease (YLL, or Years of Life Lost). calculated from the number of deaths multiplied by a standard life expectancy at the age at which death occurs.[2]
- The number of years of life a person lives with disability caused by the disease (YLD, or Years of Life lived with Disability). YLD can be calculated by multiplying the prevalence of disability in a population by the disability weight.[2]

Adding together these two measures gives a single-figure estimate of disease burden, called the Disability Adjusted Life Year (DALY). One DALY represents the loss of one year of life lived in full health.[2]

Newton, J. N., Briggs, A. D., Murray, C. J., Dicker, D., Foreman, K. J., Wang, H., ... & Vos, T. (2015). Changes in health in England, with analysis by English regions and areas of deprivation, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet, 386*(10010), 2257-2274.
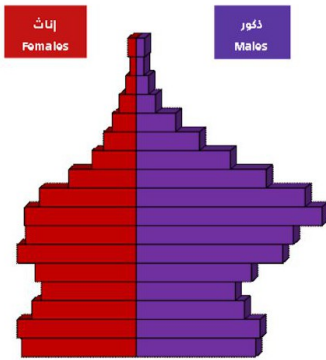
Why is it important to measure the burden of disease?

Quantifying the burden of disease helps identify conditions and risk factors to target and provides important health data that can be used to improve public health and quality of life.[3]
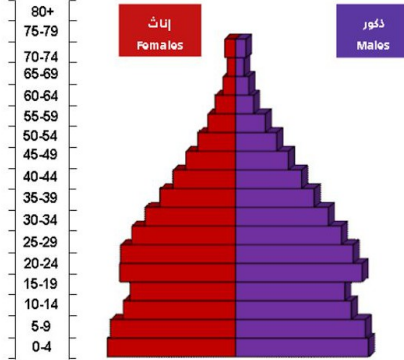
Burden of Disease of geriatric patients in Kingdom of Saudi Arabia:

The Kingdom of Saudi Arabia made tremendous improvements in its health care systems in a short time because of extensive investments.[4-5] The Ministry of Health is responsible for 60% of the health care services, with the remaining 40% managed by many semi public organizations and the private sector.[6] Regarding the age structure of the Saudi Arabian population 24.8% of the total population are less than 15 years while the people who range between 15-64 years old represent 72%, but only 3.2% are older than 65 years.[14] Despite being a young population those who are between 15-64 will eventually age, and for that Saudi Arabia is facing a rising burden of disease, also another cause is the tremendous changes in behaviors, and this demonstrates the need for major intervention to reduce these burdens and to engage other sectors of the government and the community in these efforts.

الهرم السكاني لإجمالي السكان
Kingdom's Total Population Pyramid

الهرم السكاني للسكان السعوديين
Saudi Population Pyramid

إناث Females — ذكور Males

80+, 75-79, 70-74, 65-69, 60-64, 55-59, 50-54, 45-49, 40-44, 35-39, 30-34, 25-29, 20-24, 15-19, 10-14, 5-9, 0-4

Top 10 leading risk factors in 2009 and 2019 attributable to Burden of disease , expressed as a percentage of Saudi Arabia DALYs:[31]

1. High body mass index.
2. High blood pressure.
3. High fasting plasma glucose.
4. Dietary risks.
5. Air pollution.
6. Tobacco use.
7. High LDL.
8. Kidney dysfunction.
9. Low physical activity.
10. Malnutrition.

United Arab Emirates: 1 | 4 | 3 | 5 | 16 | 2 | 8 | 10 | 14 | 9

Age-standardized DALY rate per 100,000, 2019

See related publication: https://doi.org/10.1016/S0140-6736(20)30925-9

What risk factors drive the most death and disability combined?

Metabolic risks
Environmental/occupational risks
Behavioral risks

2009 ranking		2019 ranking		% change, 2009-2019
High body-mass index	1	1	High body-mass index	56.3%
High blood pressure	2	2	High blood pressure	29.4%
Air pollution	3	3	High fasting plasma glucose	53.3%
Dietary risks	4	4	Dietary risks	37.0%
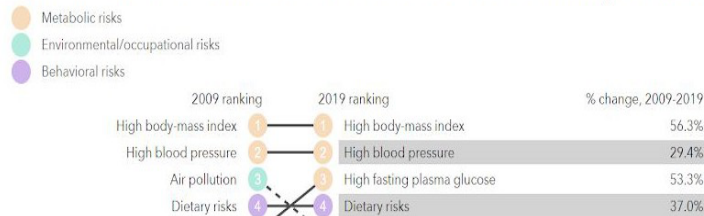
10 causes of Years of Life Lost(YLL) in The Kingdom of Saudi Arabia:[32]

1. Ischemic Heart Disease.
2. Road Accidents.
3. Cerebrovascular Diseases.

4. Congenital Defects.
5. Lower Respiratory Tract Infection.
6. Chronic Kidney Disease.
7. Neonatal Preterm Birth Complications.
8. Alzheimer's Disease.
9. Sepsis.
10. Diabetes Mellitus.

Rank	Disease	YLLs per 100,000
1	Ischemic Heart Disease	2,172.10
2	Road Accidents.	1,103.40
3	Cerebrovascular Diseases.	964.7
4	Congenital Defects.	766
5	Lower Respiratory Tract Infection	560.2
6	Chronic Kidney Disease.	504.2
7	Neonatal Preterm Birth Complications.	461.5
8	Alzheimer's Disease	394
9	Sepsis	218.4
10	Diabetes Mellitus	200.9

Touchie, C. (2013). Report of the incidence and prevalence of diseases and other health related issues in saudi Arabia. *A study for the MCC blueprint project. Medical Council of Saudi Arabia*.

Leading causes of burden of disease and mortality among elderly +70 years in Kingdom of Saudi Arabia :[7-30]

1. **Cardiovascular and circulatory diseases:**
   Cardiovascular disease (CVD) is now recognized as the leading cause of death and disability worldwide, The World Health Organization (WHO) estimated that in 2008, out of 17.3 million CVD deaths globally, myocardial infarction and strokes were responsible for 7.3 and 6.2 million deaths respectively.[15] CVD was estimated to be responsible for 42% of deaths in Saudi Arabia. The main risk factors of CVD were Hypertension, Diabetes, Obesity, Sedentary lifestyle.[16]

   - Hypertension.
   - Ischemic heart disease.
   - Heart failure.
   - Stroke.
   - Anemia.

- Peripheral arterial disease.

2. Endocrine disorders:

Diabetes mellitus (DM) is rapidly becoming one of the main health issues among humans in the 21st century and the number of patients is steadily increasing, globally, both in the developed and developing countries. Diabetes can be prevented and managed to a large extent but it is very difficult to cure because it has many contributing factors like Genetics and environmental factors. The World Health Organization (WHO) has reported that Saudi Arabia ranks the second highest in the Middle East, and is seventh in the world for the rate of diabetes. The prevalence of diabetes was 34.1% in males and 27.6% in females, The mean age for onset of diabetes in males and females was 57.5 and 53.4 years respectively.[18] In Saudi Arabia, the national healthcare burden because of diabetes is likely to exceed $0.87 billion, it omits the indirect costs associated with diabetes, such as absenteeism, loss of productivity from disease-related complications, unemployment due to disability and early mortality by disease.[17]

- Diabetes melitus.
- Thyroid gland disorders.

3. Mental and behavioural disorders:

A survey examining 7,970 Saudi nationals aged 60 and over across Saudi Arabia reported that 39% scored at or above the cutoff of 10 on the 30-item Geriatric Depression Scale (GDS).[19] Another regional study in Abha city, home-based interviews were conducted with 810 persons aged 65 or over using the 15-item GDS; 18% scored at or above the established cutoff score of 5.[20]

- Depression.
- Anxiety.
- Bipolar disorders.
- Schizophrenia.

4. Cancers:

Cancer is a serious problem facing the entire world due to industrial advancing, environmental pollution, and bad lifestyle habits like smoking. In Saudi Arabian males incidence of each of the cancers remained fairly stable up to the age of 35 years. After this point, incidence increased exponentially to reach the peak at 70-74 years and Colorectal cancer being the most common. In females thyroid cancer incidence started to increase at age of 15–19 years, reaching a peak of 22.7 at 60–64 years. Breast cancer incidence rose steeply from the age of 20–24 years to 50–54 years. It then decreased slightly before rising again to reach a peak at 70–74 years.[21]

- Colorectal cancer in men.
- Prostate cancer in men.
- Endometrial cancer in women.
- Breast cancer in women.

5. Respiratory system disorders:

Respiratory disease has a major effect on morbidity and mortality at all ages especially elderly. Chronic respiratory diseases represent a public health challenge in both industrialized and developing countries because of their frequency and economic impact. Asthma, COPD and pneumonia were the leading causes of hospitalization among patients with respiratory disorders. The prevalence of chronic obstructive pulmonary disease in Saudi Arabia is 4.2% among the general population and 14.2% among smokers.[22]

- Pneumonia.
- COPD.
- Asthma.

6. Accidental injuries:

Falls account for more than half of injury-related hospitalisations among old people, The consequent injuries of falls are considered a major public health problem. The 1-year prevalence of falling among elderly 60 years or more was 49.9%, 74% of those who experienced falls had post fall injuries. osteoporosis, poor vision and back pain were found to be predictors for falls among the elderly. [23]

- Car accidents.
- Falls.

7. Musculoskeletal system disorders:

Osteoporosis has attracted much attention in the last two decades all over the world. Being a silent disease, it goes undetected for many years. Due to its prevalence worldwide, osteoporosis is considered a serious public health concern. Risk factors include alcohol, smoking, vitamin D deficiency, poor nutrition, insufficient exercise and low dietary calcium intake. a prevalence of either spine or femur osteoporosis of 28.2% and 37.8% among women and men above 50 years respectively.[24]

- Osteoporosis.
- Osteoarthritis.

8. Neurologic disorders:

Dementia is not a disease but rather a group of manifestations, it includes loss of memory, language, problem-solving and other thinking functions often severe enough to impair daily life. The risk of developing a kind of dementia increases with obesity, diabetes mellitus, and cardiovascular disorders. The prevalence of Alzheimer's disease in Saudi Arabia is 3.85%-5.2%.[25] Parkinson's disease is caused by damage to a certain part of the basal nucleus in the brain, Clinical symptoms usually begin between the ages of 40 to 60 with a higher incidence in later stages of life. Manifestations include, stooped posture, rigidity, unstable gait. The prevalence of Parkinson's disease in Saudi Arabia has been estimated to be 27 per 100,000 population.[26]

- Alzheimer's disease.
- Parkinson's disease.
- Ophthalmic disorders.

9. Urogenital disorders:

Chronic kidney disease (CKD) is a global public health problem, affecting more than 10% of the world's population and more than half of adults older than 70years, associated with an increased risk of cardiovascular disease. Hypertension and diabetes

are the leading causes of End Stage Renal Disease (ESRD). 54.8% of patients treated by hemodialysis are males. 20.7% of hemodialysis patients are 66 years or older.[27] benign prostatic hyperplasia (BPH) is a common problem among older men, and is responsible for considerable disability. There is a significant relation between BPH and age as 6.2% of cases were 60–69 years, 43.8% were 70–79 years and 44.0% were 80 years or more.[28]

- Sexual dysfunction.
- Urinary tract infections.
- Renal impairment.
- BPH in men.

10. Gastrointestinal disorders:

Gastrointestinal diseases are among the common health problems that affect the elderly. According to **the Saudi National Survey for Elderly Health (SNSEH) 2006–2015** GIT disorders are the third most common conditions that elderly suffer from and females suffer from these disorders more than males especially functional disorders like IBS.[29] The oral health of the elderly population in Saudi Arabia is generally poor and their treatment needs are high, this due to many factors like smoking and poor dental hygiene.[30]

- Irritable Bowel Syndrome.
- Chronic liver diseases including cirrhosis.
- Dental disorders.
- Nutritional abnormalities.

Mental disorders were concentrated mostly in age groups from 15 through 44 years.
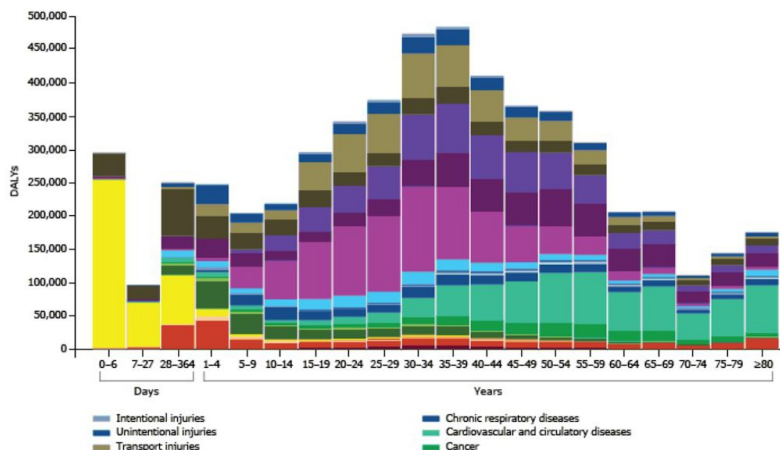
 Leading Risk Factors Attributable to Disability-Adjusted Life Years by Sex, Kingdom of Saudi Arabia, 1990, 2005, and 2010:[13]

Table 3. Leading Risk Factors Attributable to Disability-Adjusted Life Years by Sex, Kingdom of Saudi Arabia, 1990, 2005, and 2010

Rank	1990 Male (%)	1990 Female (%)	1990 Total (%)	2005 Male (%)	2005 Female (%)	2005 Total (%)	2010 Male (%)	2010 Female (%)	2010 Total (%)
1	Dietary risks (4.49%)	Dietary risks (2.27%)	Dietary risks (6.76%)	Dietary risks (6.44%)	Elevated BMI (3.98%)	Elevated BMI (10.20%)	Elevated BMI (7.02%)	Elevated BMI (4.61%)	Elevated BMI (11.64%)
2	Elevated blood pressure (3.64%)	Elevated blood pressure (2.27%)	Elevated blood pressure (5.91%)	Elevated BMI (6.22%)	Elevated FPG (2.90%)	Dietary risks (9.25%)	Dietary risks (6.64%)	Elevated FPG (3.28%)	Dietary risks (9.68%)
3	Elevated BMI (2.96%)	Elevated BMI (2.17%)	Elevated BMI (5.13%)	Elevated FPG (5.63%)	Dietary risks (2.81%)	Elevated FPG (8.53%)	Elevated FPG (6.25%)	Dietary risks (3.04%)	Elevated FPG (9.53%)
4	Elevated FPG (2.59%)	Iron deficiency anemia (1.67%)	Elevated FPG (4.05%)	Elevated blood pressure (4.99%)	Elevated blood pressure (2.47%)	Elevated blood pressure (7.46%)	Elevated blood pressure (5.19%)	Elevated blood pressure (2.64%)	Elevated blood pressure (7.83%)
5	Ambient air pollution (2.36%)	Elevated FPG (1.46%)	Ambient air pollution (3.78%)	Physical inactivity (3.32%)	Physical inactivity (1.66%)	Physical inactivity (4.98%)	Physical inactivity (3.51%)	Physical inactivity (1.82%)	Physical inactivity (5.33%)
6	Smoking (1.65%)	Ambient air pollution (1.42%)	Iron deficiency anemia (3.14%)	Ambient air pollution (2.77%)	Iron deficiency anemia (1.59%)	Ambient air pollution (4.02%)	Ambient air pollution (2.77%)	Iron deficiency anemia (1.55%)	Ambient air pollution (4.05%)
7	Occupational risks (1.61%)	Suboptimal breastfeeding (0.95%)	Smoking (2.40%)	Smoking (2.11%)	Ambient air pollution (1.25%)	Iron deficiency anemia (2.82%)	Smoking (2.49%)	Ambient air pollution (1.27%)	Smoking (3.02%)
8	Iron deficiency anemia (1.47%)	Household air pollution (0.92%)	Household air pollution (2.23%)	Occupational risks (1.88%)	Elevated total cholesterol (0.72%)	Smoking (2.79%)	Occupational risks (1.91%)	Intimate partner violence (0.73%)	Iron deficiency anemia (2.68%)
9	Elevated total cholesterol (1.47%)	Childhood underweight (0.87%)	Elevated total cholesterol (2.23%)	Elevated total cholesterol (1.49%)	Smoking (0.68%)	Elevated total cholesterol (2.21%)	Drug-use disorders (1.66%)	Elevated total cholesterol (0.66%)	Drug-use disorders (2.24%)

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