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PERSPECTIVE ARTICLE

Measuring the Burden of Disease in the United Arab Emirates, 1990 – 2019: A Road to Future

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Before the early 1990s, there was no comprehensive assessment to estimate the burden of disease, injuries, and risk factors. It was challenging to deliver effective and high-quality care to patients without knowing their distribution and epidemiological characteristics. To overcome these fundamental challenges and to improve population health, the World Health Organization (WHO) and the World Bank launched the Global Burden of Disease (GBD) study in 1991 [1]. Since then, the GBD study provides an annual health assessment through systematic and comparable estimates of each condition and reports the burden of disease using standardized metrics. The most recent assessment of the GBD is the 2019 study that provided results for 1990, 2010, and 2019 in collaboration with several hundred investigators. These investigations provided novel results published in *The Lancet* covering 369 disease burden and 87 attributable risk factors from 204 countries and territories. Until now, the availability of data to assess the population health and transitions in health care in the United Arab Emirates is lacking. Given the scarcity of analysis of the disease burden and temporal trends in mortality, health loss, risk factors, and health care services in the UAE from 1990 to 2019, here we summarized the results of the burden of disease, injuries, and risk factors study (GBD) 2019 in the UAE population during 1990 – 2019. A careful reading of the results of GBD 2019 shatters uneven progress in non-communicable diseases and suggests an urgent warning to increase efforts to address preventable risk factors that are major contributors to the burden of disease and disability.

According to the Lancet GBD study 2019, the overall life expectancy of the UAE population in 2017 was 72.8 years

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(95% uncertainty interval: 70.9 – 74.7) and is expected to be 76.3 years (72.7 – 80.1) by 2050 and 79.6 years (74.1 – 84.4) by 2100, respectively (Fig. 1) [2]. The total fertility rates declined steadily in the UAE population and reached 1.31 (1.71 – 1.49) in 2017 from 4.1 (3.87 – 4.34) in 1990 and forecasted to reach 1.27 (1.02 – 1.82) by 2100 [2]. The findings suggest more than half a million females and 1.5 million males are 35-40 years old (Fig. 2).

In 2009, the top 10 individual causes of death in the UAE were non-communicable diseases (ischemic heart disease, stroke, chronic kidney disease, diabetes, and chronic obstructive pulmonary disease) and injuries (road injuries, self-harm, drug use disorders, falls). In 2019, the decrease in all three of four top injuries related mortality rates plateaued [3]. Alarming, between 2009 and 2019, pancreatic cancer (increased by 241.7%), hypertensive heart disease (↑155.6%), ischemic heart disease (↑130.6%), and diabetes (124.2%) have become the fastest-growing cause of death in the UAE. Alongside this alarming cancer epidemic, pancreatic cancer is growing at an unprecedented scale, with a 1300.1% (793.4% - 1887.0) increase in new cases in 2017 and 7.67 (3.88 – 12.12) deaths per 100,000 population (Fig. 3) [4].

The UAE health has dramatically changed over the past 30 years as measured by age-standardized death and disability-adjusted life years (DALYs) rates. Between the 1990-2019 time period, six non-communicable diseases were among the top ten causes of death in the UAE in 2019: ischemic heart disease (ranked one), stroke (third), chronic kidney disease (fourth), diabetes (fifth), COPD (sixth) and hypertension (seventh) (Table 1). However, transport injuries remain the second leading cause of death, contributing to 13.5% of the total deaths occurring in the UAE.

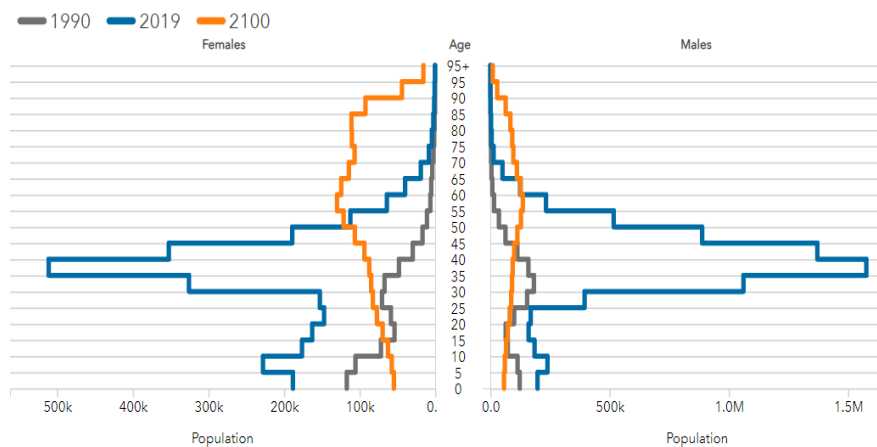


Fig. (1). Population age structure for males and females in 1990, 2019 and 2100 in the UAE. Forecasted data based on Global Burden of Disease 2017 results.

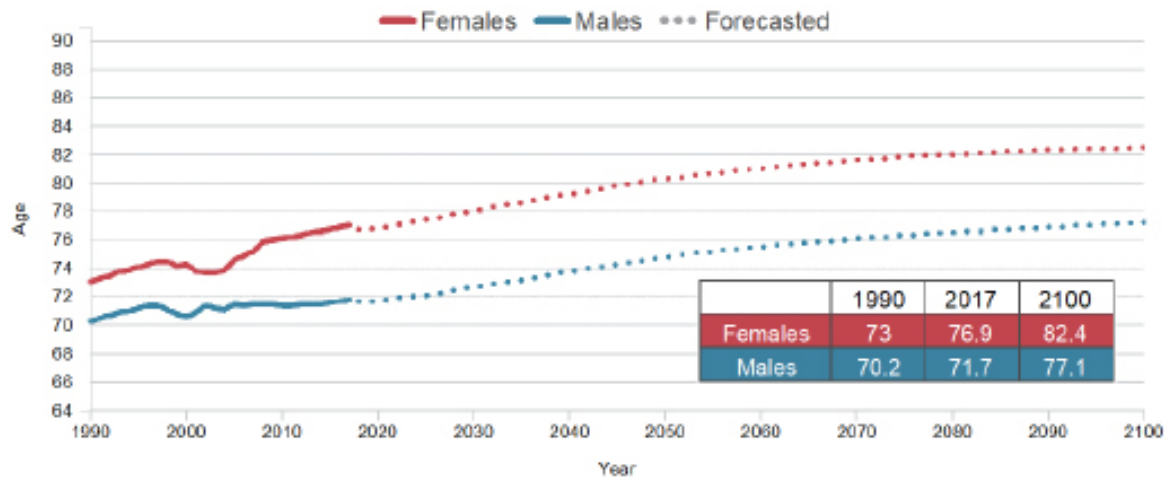


Fig. (2). Life expectancy at birth in the UAE, 1990–2100. Forecasted data based on Global Burden of Disease 2017 results.

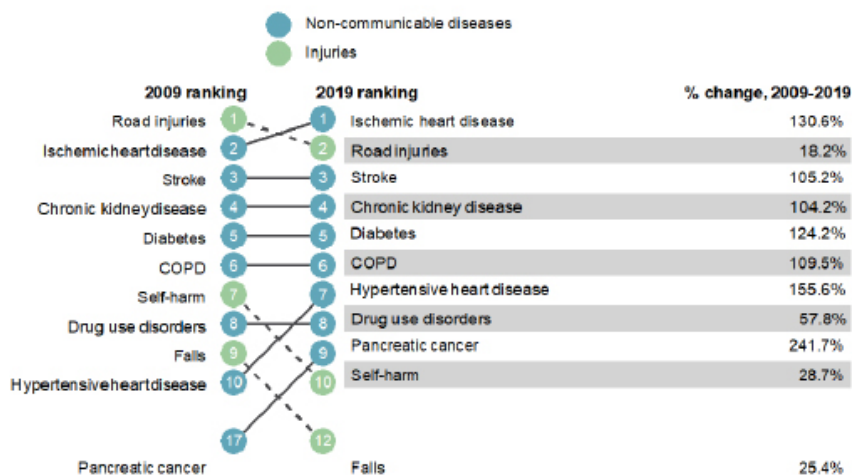


Fig. (3). Top 10 causes of the total number of deaths in the UAE in 2019 and percent change from 2009–2019.

Table 1. Age-standardized cause of deaths and DALYs in both sexes in the UAE from 1990 to 2019.

Cause of death or DALYs	Death rate per 100,000 people			DALYs per 100,000 people		
	1990	2019	Percentage change (1990 – 2019)	1990	2019	Percentage change (1990 – 2019)
Ischemic heart disease	837.8 (666.7 – 1072.7)	4880.1 (3503.7 – 6754.7)	482.4%	5526.7 (4596.7 – 6821.4)	3370 (2554.9 – 4399.5)	-39%
Road injuries	772.3 (562.3 – 998.9)	3833.4 (2150.6 – 5761.1)	396.3%	2830.1 (2118.8 – 3582.4)	1837.6 (1174 – 2570.7)	-35%
Stroke	483.2 (368.3 – 677.6)	2168.4 (1543.5 – 3025.7)	348.7%	3565.5 (2877.6 – 4746.3)	1925.6 (1517 – 2457.9)	-1.37%
Congenital defects	388.2 (246 – 534.3)	226.4 (169.5 – 301.4)	-41.6%	1610.4 (1062.2 – 2177.3)	560.4 (430.9 – 729.1)	-65.2%
Neonatal disorders	329.4 (236.7 – 436.2)	83.1 (51.2 – 126.9)	-74.7%	1504.7 (1126 – 1939.8)	507.6 (393.1 – 656.5)	-66.2%
Chronic kidney disease	206.7 (157 – 262.9)	1433.4 (914.7 – 2257.2)	593.2%	1343.1 (954.6 – 1636.8)	1136.9 (787.6 – 1645.9)	-15.3%
Diabetes	189.4 (148.7 – 235)	1325.1 (930.7 – 1773.3)	599.5%	1972.8 (1628.1 – 2349.4)	1945.8 (1533.5 – 2430.4)	-1.37%
COPD	141.3 (86 – 192)	1090.1 (652.6 – 1560.5)	671.2%	1001.4 (738.8 – 1279.2)	886.1 (698.8 – 1101.3)	-11.5%
Hypertensive heart disease	121.9 (46.1 – 235.3)	1044.6 (348.9 – 2223.3)	756.7%	865.1 (347.2 – 1576.1)	802.3 (297.6 – 1587.5)	-7.26%

DALY: Disability-adjusted life year; COPD: chronic obstructive pulmonary disease.

The pace of decline in the age-standardized DALY rates accelerated in age groups younger than 60 years during the 1990-2019 time period [5]. These changes made complex trends for specific diseases and the number of DALYs driven by some key non-communicable diseases and injuries (Table 1). A substantial decline in age-standardized rates was seen in congenital disabilities (64.2%), and neonatal disorders (66.2%) were observed, followed by ischemic heart disease (39%) and road injuries (35%). Little progress in the percentage decline in the DALYs rate of stroke (1.3%), diabetes (1.3%), and hypertensive heart disease (7.2%) was observed between 1990 to 2019.

The GBD 2019 data provided more rigorous trends and magnitude of 87 risk factors exposure for 204 countries and territories [6]. In the UAE, over half of the death and DALYs are attributed to just four risk factors: high LDL cholesterol, high systolic blood pressure, high body-mass index, and high fasting plasma glucose. The exposure of metabolic risks has dramatically increased from 2009 with an average percentage change of 147% for high fasting plasma glucose, high LDL levels (141.5%), high blood pressure (140.1%), dietary risks (136.9%), smoking (136.3%) and high body-mass index (133.4%). Moreover, the obesity prevalence has risen across the country – a leading cause of several non-communicable diseases and premature cardiovascular disease. The

contribution of each risk factor to the total DALYs in the UAE in 2019, and their percentage have increased from 1990 to 2019, as shown in Fig. 4. The list of leading risk factors includes multiple diet components, and physical inactivity components account for 9.7% of DALYs in the UAE, 2019. The burden attributed to tobacco smoking (including secondhand smoke) remains constant (5.7% of DALYs) from 1990 to 2019. Focusing on these broad transitions explains the profound change in disease burden and a more significant fraction of attributed risk factors causing years to live with a disability and premature deaths in the UAE.

For the first time in the UAE's history, estimates related to disease burden and attributed risk factors were summarized. The findings from the GBD 2019 series have brought new perspectives on public health and encouraged debate. Our investigation shows that the burden of disease imposed by metabolic risk factors is particularly dramatic and requires the public health community's greater attention to the importance of non-communicable disease and attributed risk factors. Evidence-based interventions should be prioritized to empower and educate individuals, making them aware of the potentially detrimental consequences of their unhealthy risk factors. New information and communication technologies could be exploited to forecast changes and to track changes over time, along with longitudinal investigations.

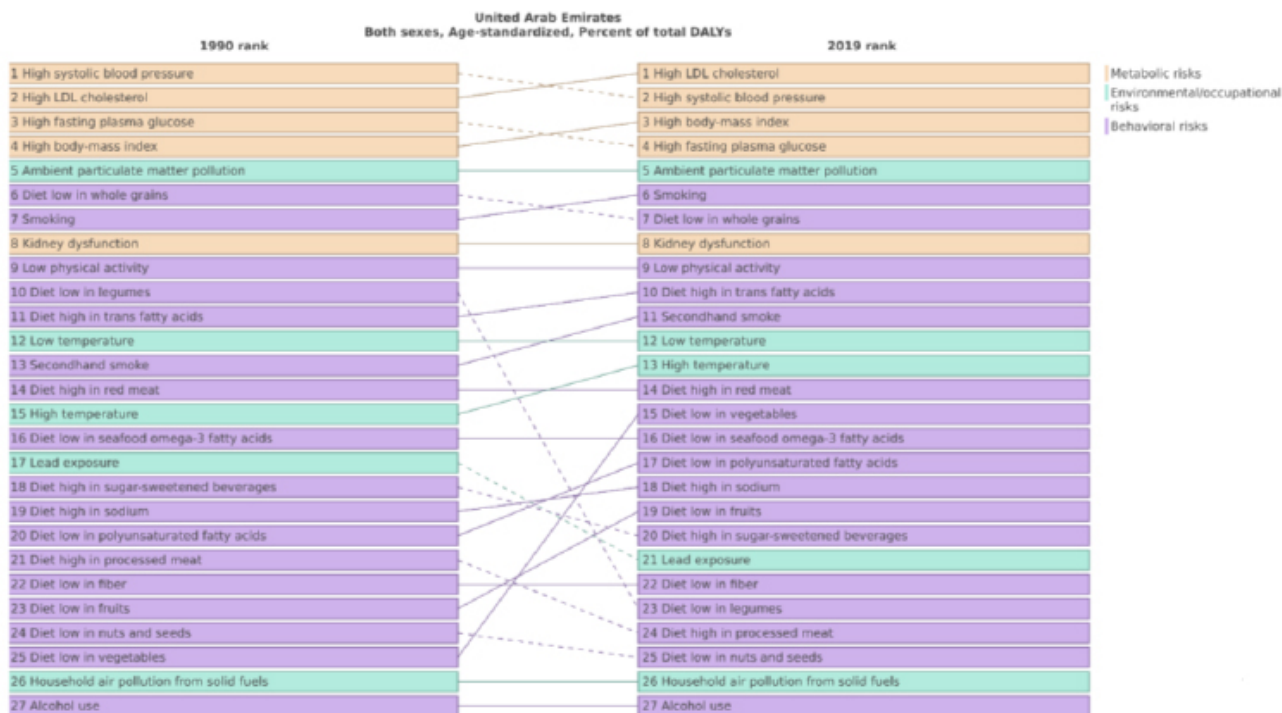


Fig. (4). Age-standardized risk factors contributing to the total number of DALYs in 2019 and percent change from 2009–2019.

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