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Analysis of the recent evolution of healthy life expectancy in the MENA region with a focus on Algeria

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Abstract

Introduction: Healthy life expectancy is a significant indicator for assessing a population's health status. It guides policymakers in designing efficient prevention strategies and global health programs. Furthermore, it enables comparisons of health status over time and space.
Methods: This paper examines the recent evolution of healthy life expectancy in the MENA region over the last two decades using data from the Global Burden of Disease and some independent studies. Algeria has been given special consideration.
Results: The findings reveal two facts. First, while women live longer lives than men, men live healthier lives. Second, the MENA region is globally experiencing an expansion of morbidity. Nevertheless, Algeria enjoys better health conditions than the majority of MENA countries.
Conclusion: In the MENA region, there is an evident lack of data and research on healthy life expectancy. Thus, MENA countries are encouraged to strengthen their health information systems and provide independent national estimates of healthy life expectancy.

Keywords: Healthy life expectancy, Algeria, MENA, Global Burden Disease.

Introduction

Because it is directly related to human capital, health is a critical factor contributing to economic growth (Bloom et al., 2004). Health status has a strong influence on an individual's performance and attitude towards work, consumption, spending, and decision-making. Tracking and analysing the evolution of health conditions allows for expecting and controlling future trends.

According to recent estimates, life expectancy is improving (United Nations, 2019). It may appear to be a positive sign, but it is not when the additional years gained in life expectancy are associated with poor health. Increasing the length of healthy life has always been one of the goals of governments. Furthermore, improving health and well-being is one of the main Sustainable Development Goals (SDGs). To that end, authorities implement short- and long-term plans and programs to reduce the risk factors for communicable and non-communicable diseases, as well as the incidence of disability. In Algeria, several examples could be given; the most recent ones are the national multi-sector strategic plan to prevent risk factors of non-communicable diseases (2022-2030) and the national strategic plan for STI/HIV/AIDS prevention (2020-2024).

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The effectiveness and impact of preventive public health strategies can be assessed using health summary measures. These indicators must be capable of tracking the prevalence, severity, and duration of diseases or/and disabilities. Traditionally, life expectancy has been used as a proxy for population health (Jaba et al., 2014; Poças et al., 2010). Nonetheless, it allows for the measurement of mortality risk within a given population regardless of its health status. This implicitly assumes that the quality of life improves with increasing length, which is not always true. Thus, the need for a more appropriate measure was highlighted, resulting in the introduction of a new health status measure known as healthy life expectancy (HLE). HLE is now a fundamental health indicator to assess the health of a given population. Since its introduction, international efforts have been made to promote the use of this indicator (Bone, 1992). The use of HLE has emerged as a result of the efforts of the REVES network (Réseau Espérance de Vie en Santé) and the Global Burden of Disease project, as well as its recognition as an adequate indicator of population health by the World Health Organization (WHO), and the Organisation for Economic Co-operation and Development (OECD). Africa ranks last among the continents in terms of HLE estimation. Jagger and Robine (2011) pointed out that the REVES database contained estimates for only nine African countries by 2009 against four countries in the Middle East. Furthermore, estimates from three countries only are based on independent national surveys.

HLE allows us to identify health disparities based on region, marital status, educational level, income, and so on, and to analyse their evolution over time. Hence, it is a critical tool for directing policymakers toward designing more efficient policies and, as a result, improving the community's health. Nevertheless, Comparing countries is difficult due to differences in health surveys (Robine et al., 1999), the adopted definition of health, and the methods used to calculate HLE in addition to differences in the study period. The majority of MENA countries lack national independent studies. In general, available estimates are based on international surveys.

HLE combines the length and quality of life into a single metric. Regardless of the definition of health used, HLE is defined as the number of healthy years remaining for an individual at age (x). Life expectancy is thus divided into healthy and unhealthy years. The first estimate of HLE was published in a report by the United States Department of Health, Education, and Welfare (Sullivan, 1971). This report included preliminary estimates of Disability-Free Life Expectancy (DFLE) calculated using Sullivan's method, which applies to any state of health definition.

Generally, there are two types of health indicators: health expectancies and health gaps (Mathers et al., 2006). The most commonly used health gap measures are Healthy Life Years (HLY), Quality-Adjusted Life Years (QALYs), and Disability-Adjusted Life Years (DALYs). There are various types of health expectancies depending on the definition of health used. As a result, the variety of health definitions explains the variety of health expectancies (Jagger & Robine, 2011). The most common ones are Disability Free Life Expectancy (DFLE), and Disease-Free Life Expectancy (DisFLE).

Despite the differences in the types of HLE, the estimation methods are the same, with two types of outputs represented by the average number of years spent in good and poor health. Estimation methods generally rely on prevalence or incidence data, depending on the data source and availability, as well as the question the study seeks to answer. The literature identified three main methods: the Sullivan method (Sullivan, 1971), the multistate life tables, and the double decrement life table.

Sullivan (1971) referred to HLE as DFLE. The Sullivan method requires two pieces of information to be implemented: survivorship data and health conditions. The number of person-years lived in each age interval during the observation period is provided by life

tables; the state of health condition is represented by the prevalence rates by age. The prevalence rate is the proportion of the population experiencing the health condition out of the total population at each age interval. The prevalence of the health state is frequently obtained from cross-sectional surveys, but it can also be obtained from other sources. Details about the method can be found in the REVES network's guidelines (Jagger et al., 2014).

The Multistate Life Table (MSLT) method is based on the incidence of the health condition. Therefore, the data source must be a longitudinal survey. This helps explain why this method is less popular than Sullivan's. Rogers et al. (1989) were the first to estimate health expectancy using the MSLT method. This method is distinguished by its ability to provide transition probabilities between different health statuses as well as the death rates by health status. Typically, the method considers three possible states: healthy, unhealthy, and dead, and attempts to estimate the transition probabilities from one state to another. The number of transitions is proportional to the amount of available data. Six transition rates are obtained under ideal conditions, as shown in figure 1. Arrows are used to represent transitions. As can be seen, an absorbing state of "dead" exists. Details on the method and its application can be found in Saito et al. (2014) and Lièvre et al. (2003).

Because it considers only one transition from unhealthy condition to death, the double decrement method could be incorporated into the Multistate method. The multiple decrement method is another special case of the MSLT method that allows no transition from an unhealthy to a healthy state. This is true for several diseases that cause permanent damage, such as dementia, diabetes, and some disabilities (Katz et al., 1983). Other methods exist, such as microsimulation, grade of membership, and Bayesian inference methods (Saito et al., 2014). However, these methods are rarely used. Guillot and Yu (2009) proposed another method for estimating the transition probabilities based on two consecutive but independent cross-sectional surveys.

HLE can be used to analyse population health from a variety of perspectives. The basic one entails examining the absolute level/ evolution of the healthy/ unhealthy years. Analysing the unhealthy expectancy as a percentage of total life length allows for the determination of how the extra years gained in life expectancy are spent. Typically, we consider three scenarios: expansion, compression, and balance. Expansion refers to an increasing life expectancy but at a slower rate than unhealthy life expectancy, and it is also known as "the failure of success" elsewhere (Gruenberg, 1977; Kramer, 1980). This is because advances in medicine, technological invention, and economic developments have resulted in an increase in the remaining life expectancy of disabled people without postponing the onset age of disabilities. In the opposite situation, we speak of "morbidity compression" (Fries, 1980), which refers to a healthy life expectancy improving faster than life expectancy, causing the onset age to be delayed and disability to be concentrated at the end of life. When the two indicators evolve at the same rate, it results in a situation of "dynamic equilibrium" (Manton, 1982), or of a balance between healthy and unhealthy years taken as a share of life expectancy. Later, absolute/ relative expansion/ compression concepts were proposed and widely used in the literature (Nusselder, 2002; Robine, 1993).

The purpose of this study is to use HLE to assess the levels and the recent evolution of the health situation in MENA countries, with a particular focus on Algeria. The MENA countries share some cultural and political similarities with Algeria. Thus, it is worthwhile to compare Algeria's performance to that of these selected countries. If significant differences are revealed, it will encourage researchers to conduct additional explanatory research and policymakers in the various MENA countries to learn from each other's experience in addressing public health issues.

Materials and Methods

HLE can be estimated using two different data sources: cross-sectional surveys or censuses and longitudinal/panel surveys. The cross-sectional surveys provide information about the current state of the population, whereas longitudinal surveys allow for tracking the changes in cohort health state over the survey period. In addition, administrative data is a valuable but underutilised source. In most countries, this data source is either difficult to access or data is not collected and stored properly due to the lack of electronic health record systems.

The shortcomings of health surveys include failing to consider people living in institutional settings such as orphanages and home care (Jagger & Robine, 2011). Furthermore, the majority of health data collected is based on self-rated status, which is subjective and influenced primarily by socio-demographic characteristics. Another issue is the low performance of health information systems and the lack of availability of chronological series, in addition to the fact that health data are sometimes paper-based rather than computer-based, making them difficult to access.

Many international and national surveys made it possible to estimate HLE. For example, we can cite the health and retirement study (HRS), the longitudinal study on ageing (LSOA), the survey of health, ageing, and retirement (SHARE), the National Long Term Care Survey (USA), the Global Burden of Disease (GBD), the European Community Household Panel (ECHP), Statistics of Income and Living Conditions (SILC) a survey conducted in all 25 European countries. As far as we know, The GBD study is the only data source that allows for spatial and temporal comparison. A small number of studies used GBD results to examine HLE in MENA countries such as Iran (Sepanlou et al., 2017; Shahraz et al., 2014) and the Eastern Mediterranean Region (Mokdad et al., 2016).

The GBD study began in 1990 to provide temporally and spatially comparable data (Murray et al., 2012). It is the result of collaboration between the World Bank, the World Health Organization (WHO), and the Harvard School of Public Health. The GBD study collects data from a variety of sources, including disease registers, population surveys, and epidemiological studies (Mathers et al., 2006); all of the data sources used are illustrated by the county on the Institute of Health Metrics and Evaluation website[1]. By 2019, the GBD had expanded its reach to 204 countries and territories. It gives data about mortality and morbidity, as well as 369 diseases and injuries and 87 risk factors. The results are updated regularly due to the addition of new data sources and more advanced estimation and modelling methods (Wang et al., 2020).

The GBD study comprises a variety of demographic and health indicators, including age-specific fertility, under-5 mortality, life expectancy, HLE, and DALY. In this paper, we are interested in HLE. The GBD study employs the Sullivan method to calculate this indicator. Life tables and severity-weighted prevalence estimates are used in this method. The estimation method is described in Mathers et al. (2001).

In this paper, we examined and compared the evolution of HLE at birth, the share of healthy years in LE, the gender gap of HLE, and the gender gap in terms of the share of HLE in LE across MENA countries. Then, with a particular focus, we evaluated Algeria's case in comparison to the other MENA countries. It should be noted that the comparison was limited to the 2000-2019 period. The MENA countries included in our study were Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Syria, Tunisia, UAE, and Yemen. Also, we used estimates of HLE from independent national studies.

[1] https://ghdx.healthdata.org/gbd-2019

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Results

According to the findings of the GBD study, HLE in the MENA region improved between 2000 and 2019. However, this improvement varies by country and sex (Figure 1). Syria and Libya are exceptions, with male HLE dropping dramatically in 2015. Lebanon is another outlier, with a male HLE that has remained nearly unchanged during this period. As shown in Figure 1, the highest HLE was observed in Kuwait throughout the study, while the lowest was observed in Yemen. In 2000, the average HLE at birth in MENA countries was 61.9 years for males and 62.4 years for females. In 2000, the maximum HLE attained by females was 68.4 years in Kuwait, while the minimum was 55.6 years in Yemen. In terms of males, Kuwait had the highest HLE with 67.6 years, while Yemen had the lowest with 55.6 years. The average HLE of males and females has improved by nearly 3 years in 2019 compared to 2000. Iran experienced the largest increase from 2000 to 2019 with 4.5 years, while Libya experienced the smallest, with only 0.3 years.

Table1: Average, min, and max HLE in the MENA region, by sex in 2000 and 2019

	2000		2019	
	Males	Females	Males	Females
Average HLE	61.91	62.44	64.97	65.34
Min	55.07	55.55	58.15	59.1
Max	67.57	68.40	69.61	71.59

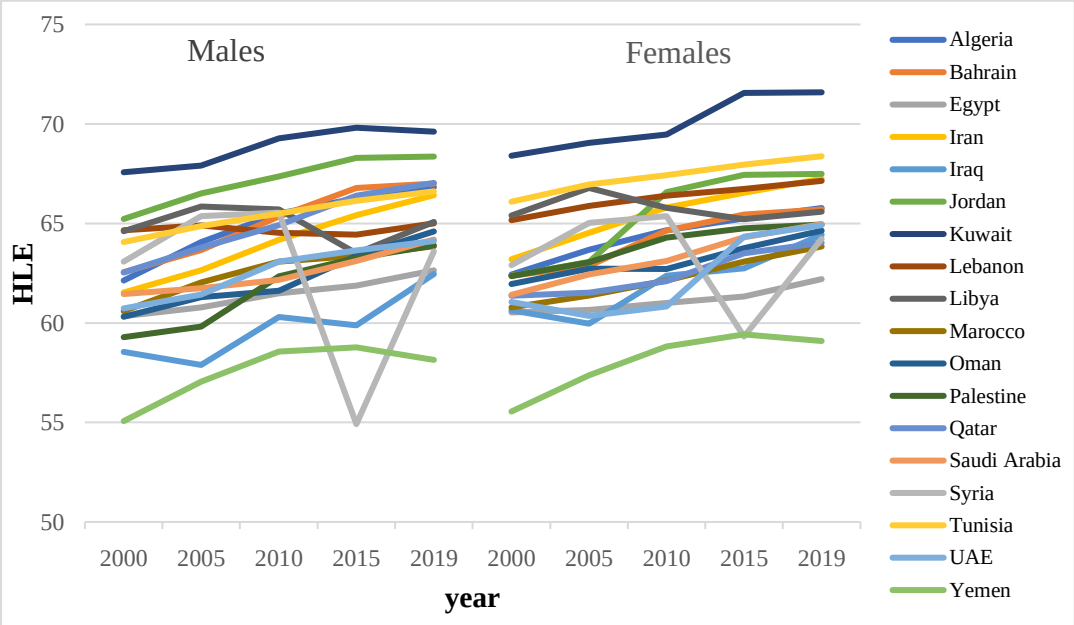

Figure 1: Healthy life expectancy at birth in MENA countries, from 2000 to 2019 by sex.

The evolution of the proportion of HLE from LE (Figure 2) revealed that over the last two decades, MENA countries experienced periods of expansion, compression, and, in some cases, dynamic equilibrium. Despite this, the overall trend indicates a situation of expansion of morbidity. Nonetheless, only one population experienced a dynamic equilibrium: Egyptian females.

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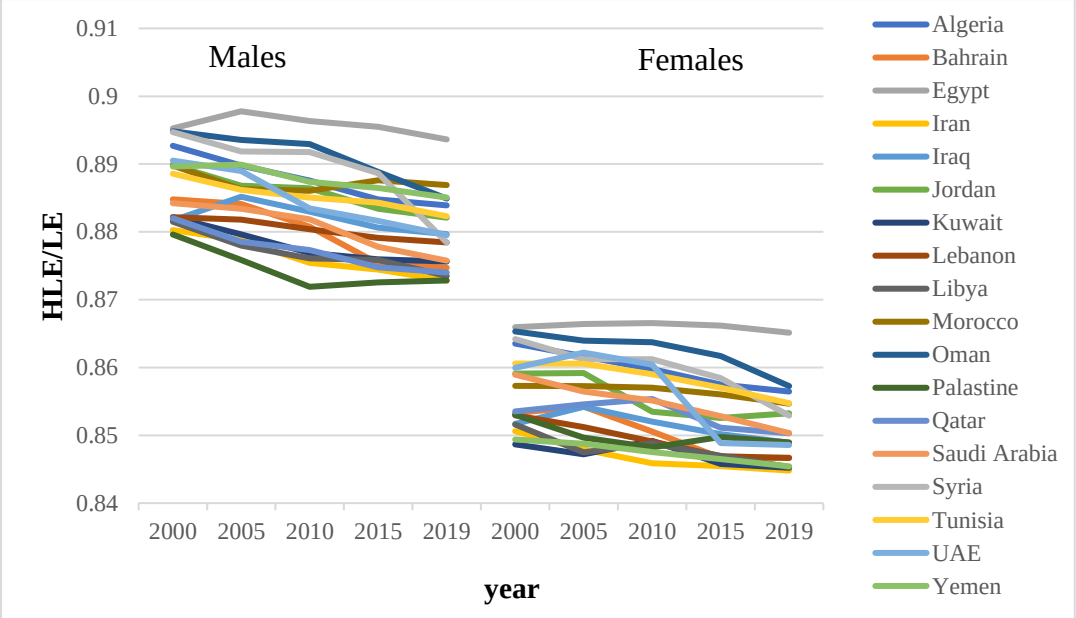

Figure 2: The share of healthy years in LE in MENA countries, from 2000 to 2019 by sex.

In most countries, the difference between the HLE of males and that of females (Figure 3) demonstrates that women live more years in good health than men. Despite this, Algeria, Bahrain, Egypt, Jordan, Morocco, and Qatar are among the countries that violate this rule. In some countries, such as Algeria, Qatar, and Yemen, the gender gap is growing, while in others, such as Iran, Palestine, and Oman, is getting smaller. In Morocco and Oman, the gap nearly disappeared in 2019. The largest gap was observed in Syria in 2015, with 4.4 years in favour of females.

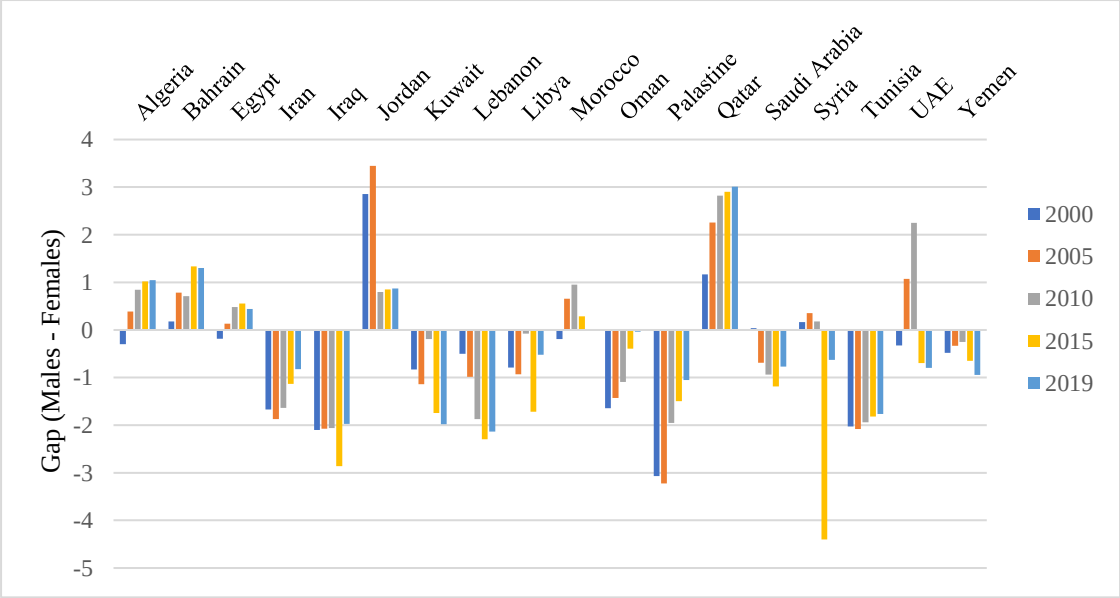

Figure 3: The gender gap in HLE in MENA countries, from 2000 to 2019.

Figure 4 illustrates the gap in terms of the share of healthy years in LE between men and women. The findings show that males in MENA countries spend a larger proportion of their LE in good health than females. The difference ranges from 2.2% to 4.1%. Qatar and Palestine had the smallest gender gap, while Yemen had the largest.

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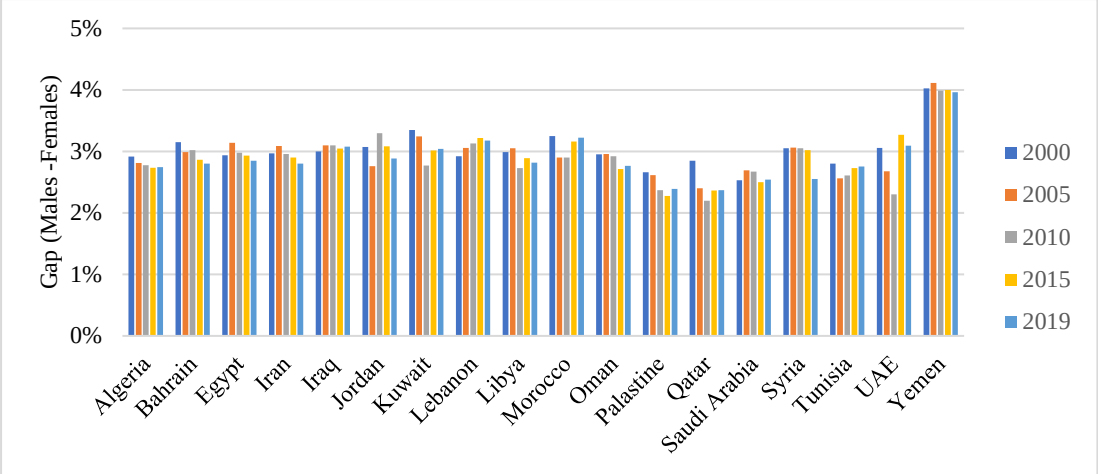

Figure 4: The gender gap in terms of the share of HLE in LE in MENA countries, from 2000 to 2019.

HLE in Algeria is comparable to Bahrain for both males and females, and to Qatar and Tunisia for males only. During the observed period, Algerian males expect to spend between 88% and 89% of their total LE in good health whereas their female counterparts spend a shorter share ranging from 85% to 86%. In comparison with neighbouring countries, these findings are more consistent with what has been observed in Tunisia than in Morocco and Libya. Furthermore, Algeria outperforms many MENA countries including Jordan, Kuwait, Iraq, and Qatar, while falling short of Oman and Egypt. Like most MENA countries, Algeria is experiencing an expansion of morbidity as HLE progress lags behind LE. Algeria, along with Yemen and Bahrain, has the smallest gender gap. This gap is narrowing in relative terms while widening in absolute terms.

Despite the benefits of the GBD study, we must acknowledge that the estimates provided are based on indirect methods and cannot, under any circumstances, replace those based on national surveys. A recent study in Algeria looked at the evolution of Dis-FLE (Flici & Chinoune, 2022). During the study period (2006-2019), men and women lost 1.2 and 1.7 healthy years respectively. Based on the relative evolution of the expected healthy years compared to LE, the authors concluded that Algeria is experiencing a morbidity expansion. Despite differences in health definition and estimation methods, the results confirm previous findings. Dis-FLE was also estimated in Palestine at the age of 20 in 2006 and 2010, showing a 1.3 years improvement for women and a 1.6 year decrease for men during the study period (Qlalweh, 2012).

In Egypt in 2016, the DFLE at birth was 58.9 years for men and 60.9 years for women. Despite women having higher DFLE, men spend a greater proportion of their lives without disability (Metwally, 2021). In Tunisia, Younsi and Chakroun (2012) estimated DFLE at age 25 to 43.5 and 45.9 for males and females, respectively, during the 2006-2011 period. In 2018, the same authors published another study in which they estimated DFLE at age 35 for the period 2001-2013, with values of 33.5 years and 35.9 years for males and females, respectively (Younsi & Chakroun, 2018).

Some countries, such as Palestine and Egypt, focused on the levels or the evolution of HLE in the elderly. Between 2006 and 2010, the DFLE at age 60 in Palestine increased by 1.3 years for men and 1.8 years for women (Brønnum-Hansen, 2015). For Egypt, women at age 60 in 2016 are expected to live 51% of their remaining life without disability, compared to 44% for men (Metwally, 2021).

Discussion

In this paper, we examined the levels and trends of HLE in the MENA region over the last two decades using GBD data, with a particular focus on Algeria. Furthermore, we shed light on some independent HLE estimates. Despite significant differences in HLE across MENA countries, the findings show some similarities, particularly in terms of the proportion of healthy years in LE and the gender gap. Overall, the findings reveal two facts. First, while women live longer lives than men, men live healthier lives. Second, despite improvements in HLE in the majority of MENA countries over the last two decades, its share in LE has declined. This translates as "morbidity expansion", implying a worsening health situation in the MENA region.

Yemen had the lowest HLE in the MENA region, according to the findings. This could be attributed to the numerous conflicts and civil wars in the country in recent decades. As a result, the health consequences were severe, including increased mortality among children under the age of five, decreased vaccine coverage, the spread of diseases such as diarrhoea and anaemia, and a lack of access to proper sanitation (El Bcheraoui et al., 2018). Another example of how wars affect health is the sharp decline in HLE in Libya and Syria by 2015. These countries have also been the victims of civil wars and conflicts that began eleven years ago. Since 2012, the Syrian conflict has destroyed health infrastructures and deteriorated public health services (Sahloul et al., 2016). On the other hand, Kuwait had the best achievement. One possible explanation is Kuwait's efforts to promote public health. The country has implemented several health promotion programs ranging from curative measures to prevention and sensitization (Salman et al., 2020).

HLE variation across countries could be explained by a set of socioeconomic indicators (unemployment rate, level of education, race, gender, occupational status, education, and income). Crimmins and Cambois (2002) and Jagger and Robine (2011) provide in-depth reviews of social inequalities in HLE. Recent research has shifted the focus to the elderly (Head et al., 2019; Pongiglione et al., 2015). Overall, favourable socioeconomic conditions lead to a long and healthy life.

Developing countries are encouraged to improve their health information systems and make health indicators estimate available more frequently. To do so, health data must be collected or generated by establishing an electronic health record system or conducting regular health surveys to provide consistent time series of health summary measures. To avoid any bias when comparing values and analysing their evolution, the questions and methods of data collection must be identical (Jagger & Robine, 2011).

Conflicts of interest

None

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