The Study Of Life Expectancy At Birth Through The Reality Of The Algerian Health System 1970-2019

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Abstract

The objective of this research paper is to highlight the extent to which the Algerian health system has contributed to improving the health status of the population by studying several demographic and health indicators, including the life expectancy at birth, mortality and Morbidity where we found from our analysis of these indicators and the explanation of the changes that have taken place, that there are several shortcomings and problems that Algeria continues to face in order to enable the health sector to improve the quality of health services, this is through our assessment of the Hospital structures and health equipment that the government spends on processing annually despite efforts to promote it.

Keywords: *Life expectancy, Mortality, Health, Morbidity, Health System.*

❖ Introduction

Life expectancy at birth is considered one of the key indicators reflecting the health of a population. It is calculated using mortality data available for all members of society. Consequently, its measurement facilitates comparisons among populations of different age groups across various times and locations. For a long time, it has been evident that there is a positive relationship between mortality and morbidity rates, with decreases in mortality associated with reductions in disease prevalence. The health status of a population is better assessed using indicators that encompass information on both mortality and morbidity. Additionally, healthy life expectancy is a significant indicator, representing the average number of years a person can live in a specified health state, ideally free from disability. In this study, we aim to examine the health status of the Algerian population and evaluate the government's contribution to achieving objectives aimed at developing the health system according to established programs. This evaluation is based on available data and information regarding life expectancy and mortality rates.

Algeria is among the countries that have experienced changes in prevailing health conditions over the past twenty years. Chronic diseases (such as cardiovascular diseases, cancers, etc.) have become more prevalent, replacing infectious diseases that once dominated the health landscape. This shift in health reality, known as the epidemiological transition, is characterized by diseases linked to factors such as poverty, lack of hygiene, urbanization, lifestyle, and diet, among others. Despite this, previous data indicate a decrease in mortality rates accompanied by an increase in life expectancy across nearly all age groups. During the mentioned period, Algeria implemented specific policies to reform the health system. We will outline the different stages it has gone through since independence to the present day, reflecting the circumstances prevailing in each phase,

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including political, economic, social, and environmental conditions. Each policy had its elements and objectives, but the primary goal has always been the protection of the population's health, with the ultimate aim being individual health.

Recently, the Algerian health system has faced increasing problems and challenges that have hindered the achievement of goals related to improving health services available to citizens. These challenges pertain to administrative and bureaucratic organization, as well as the laxity that has come to characterize most health organizations in Algeria. Additionally, there are difficulties in communication between the various components of these institutions and their external environment, widening the gap between citizens, who are considered customers in the economic sense, and health institutions of all kinds. Therefore, based on the aforementioned, we pose the following research questions: Have the efforts made by the Algerian health system improved the population's health status? What changes have occurred in mortality and life expectancy indicators over the period from 1970 to 2019?

❖ **Hypotheses**
  ▪ The economic and political crisis that Algeria experienced resulted in an increase in mortality rates and a decrease in life expectancy at birth due to the violence faced by the population during the 1990s. This crisis also had a significant negative impact on the health sector, leading to its considerable deterioration.
  ▪ The health sector reforms initiated by the Algerian government at the beginning of the 2000s improved the population's health status, leading to an increase in life expectancy.
  ▪ The rise in mortality rates observed in Algeria since 2017, which continued noticeably until 2019, is attributed to inadequate and insufficient health services, particularly for the increasing number of individuals with chronic diseases. There is also a lack of advanced health facilities equipped with modern medical technologies.

❖ **Study Objectives**
  • To analyze mortality indicators and monitor their development over time, highlighting life expectancy at birth as a reflection of the population's health progress.
  • To utilize demographic and public health data sources, especially national surveys and investigations, which provide a rich database for researchers to study demographic phenomena and achieve significant results.
  • To obtain information and statistics on the Algerian health sector, particularly concerning its equipment and support with material and human resources, and to monitor the quality of health services provided to the population.
  • To analyze the health status of the Algerian population by examining the evolution of communicable and chronic diseases.
  • To highlight the role played by the economic and political crisis from the mid-1980s to the late 1990s, and its impact on mortality and health indicators, reflecting on the health system's collapse during that period marked by terrorist violence.
  • To study the post-violence period, which followed security stabilization, and its role in improving social, health, political, and economic conditions in Algeria.

❖ **Study Importance**
The importance of this study lies in identifying the deficiencies within the Algerian health sector, which has recently struggled to provide high-quality healthcare with advanced medical capabilities and equipment to the Algerian population. This is done by investigating the major changes in life expectancy at birth, mortality, and health indicators, especially over the past two decades. Additionally, comparing statistics across various periods to determine the direction and level of these indicators, albeit imperfectly due to

incomplete data availability, allows researchers to better understand the trends and levels of these health metrics.

❖ Study Methodology

The descriptive-analytical method was employed by reviewing the most important data related to mortality and morbidity (disease rates), which we analyzed over time during each phase. We interpreted the factors that influenced these phenomena and led to changes in their demographic trends using an official national database that facilitated our research. It is worth noting the absence of some crucial statistics related to the decade of violence and the precise mortality rates resulting from it.

❖ Research Terminology

- **Concept of Life Expectancy at Birth:** Life expectancy at birth is the average number of years a group of individuals can expect to live. It represents the average hypothetical lifespan "or the age 0" of a fictitious cohort that would experience the mortality conditions of a given year at each age. Life expectancy at birth is a special case of the expected age at age x, representing the average number of remaining years from age x "or the mean duration of survival at birth at age x", under the mortality conditions by age of a specific year.
- **Concept of Mortality:** Mortality in a population is measured using several indicators, including the number of deaths, the crude death rate, or age-specific death rates. Age-specific mortality rates are used to construct life tables for calculating life expectancy at birth "average life expectancy".
- **Concept of Morbidity:** Morbidity refers to the condition of illness within a population or the frequency of diseases, injuries, and disabilities among the population. It can be measured by the prevalence of the number of disease cases recorded over a specified period for a particular population, including both new and old cases. Prevalence reports the number of people suffering from a specific disease at a particular time and the population at risk of the disease (Federal.Planning.Bureau, 2015, p. 4).
- **Concept of Health:** The World Health Organization "WHO" defines health as follows: "Health is a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity." The bibliographic citation for this definition is: "Preamble to the Constitution of the World Health Organization, as adopted by the International Health Conference, New York, 19 June - 22 July 1946; signed on 22 July 1946 by the representatives of 61 States. The definition entered into force on 7 April 1948." This definition has not been changed since 1946 (WHO, 1994).

- **Concept of Health System:** A health system is a collection of organizations, institutions, resources, and individuals whose primary goal is to improve health by strengthening health systems. In many developing countries, the poor state of health systems is one of the main barriers to accessing basic care. However, poor countries are not the only ones facing system-related issues. In some rich countries, a significant proportion of the population does not receive care because social protection systems are not equitable, while in other countries, expenditures are high due to the misuse of health resources (WHO, 1994).

❖ Data Sources

- **National Surveys and Investigations**
- ✓ **Algerian Maternal and Child Health Survey 1992**

This survey was conducted as part of the Arab Project on Childhood (PAPCHILD) organized by the General Secretariat of the League of Arab States with financial support from AGFUND, the United Nations Population Fund (UNFPA), the World Health Organization "WHO", the United Nations Children's Fund (UNICEF), and the United Nations Statistics Division. It was carried out by the National Office of Statistics with the contribution of the Ministry of Health and Population. The survey aimed to study demographic phenomena and trends and explore the relationship between fertility and child

health. The selection of primary and secondary sampling units began in February 1992, with a sample size of 6,694 households, including 5,881 non-single women (married, divorced, widowed, and under 55 years old) and 5,288 children under 5 years old living with their families. Completion rates were 92% for the household questionnaire, 94% for the maternal health questionnaire, and 96% for the child health questionnaire (ONS, 1992, pp. 1-10).

✓ **Algerian Family Health Survey ESAF 2002**

This survey was conducted to complement the PAPCHILD project under the protocol endorsed by the Arab Project on Family Health/League of Arab States and the Algerian government represented by the Ministry of Health, Population, and Hospital Reform and the National Office of Statistics, starting in December 2001. The sample consisted of 510 districts, with 20 households selected from each district for the main sample and 40 households for the extended sample. A total of 19,233 questionnaires were completed nationally, with a response rate of 93.5% for selected households, representing 92.8% in urban areas and 94.5% in rural areas. The number of households sampled was 15,156, with an overall response rate of 97.4% "97.2% in urban areas and 97.6% in rural areas" (ONS, 2004, pp. 4-13).

✓ **Algerian Health Survey ENS 2005 Tahina**

The National Health Survey was conducted by the National Institute of Public Health (INSP) starting in June 2005 as part of a research project on epidemiological transition and its impact on health. The survey aimed to estimate the prevalence of diseases in the population and the frequency of risk factors among adults aged 35 to 70 years. The sampling process used the composite index of social health development, dividing 48 provinces into 6 strata, from which 1 to 6 provinces were selected, totalling 16 provinces. From each province, 2 to 6 municipalities were chosen, totalling 64 municipalities, followed by the selection of 1 to 3 areas from each municipality, resulting in 126 areas. A sample of 40 households from each area was drawn, with individuals aged 35-70 years forming the research base. The sample included 4,818 households, representing 60.8% urban and 39.2% rural areas, with 32,463 individuals 50.5% male and 49.5% female (INSP, 2007, pp. 2-11).

✓ **Fourth Multiple Indicator Cluster Survey (MICS4) 2012-2013**

This survey was conducted by the Ministry of Health, Population, and Hospital Reform with technical and financial support from UNICEF and contributions from UNFPA, starting in May 2012. It is a multi-indicator cluster survey aimed at providing accurate statistics on the status of children, women, and households at the national level. The survey focused on monitoring child mortality and improving health programs, particularly maternal health. MICS4 provided multi-faceted indicators related to children and women, with a sample of 1,120 clusters "767 urban and 353 rural". The survey included women aged 15-49 years and children aged 0-4 years, with a sample size of 28,000 households, 41,184 non-single women of reproductive age, and 15,140 children aged 0-4 years, including approximately 4,130 infants (ONS, 2015, pp. 28-37).

✓ **The Sixth Multiple Indicator Cluster Survey 2019 (MICS 6)**

The Sixth Multiple Indicator Cluster Survey MICS 6 is the sixth edition launched by UNICEF at the international level in October 2016. It was institutionally coordinated by the Directorate of Population under the Ministry of Health, Population, and Hospital Reform, and implemented in partnership with the UNICEF Office in Algeria and in collaboration with the Multiple Indicator Cluster Survey team at both regional and central levels. The sample was selected in two stages. The first stage was conducted by the services of the National Statistics Office, involving the extraction of primary sampling units, i.e., enumeration areas (clusters) as defined in the 2008 Census. The second stage was carried out after updating the selected units, where a list of 25 sample households was established for each cluster. From each Enumeration Primary Territory EPT, 179 clusters were

selected, making a total of 1253 clusters for a total of 31,325 sample households. Five questionnaires were used in the 2019 Sixth Multiple Indicator Cluster Survey (Ministry.of.Health.Population, 2020, pp. 25-29).

- **Demographic Publications of Algeria (Civil Status)**

The National Statistics Office conducts an annual comprehensive survey to understand the demographic status of Algeria at the level of civil status departments in municipalities, relating to the four events (births, deaths, stillbirths, marriages). These civil status events allow for:

- Estimating the population size.
- Calculating key demographic indicators and establishing mortality tables.
- Conducting a preliminary analysis of the annual demographic situation.

These data are supplemented by statistics on the number of divorce cases recorded annually, sourced from the Ministry of Justice services. The National Statistics Office informs readers that the raw data collected through the use of monthly digital forms reflect the registration of events in the civil status, which do not cover all events. This necessitates corrections based on coverage rates by gender for each case (ONS, 2020, p. 28).

❖ **General Trends in Mortality Indicators in Algeria**

- **Life Expectancy at Birth**

Observing the development of life expectancy at birth in Algeria between 1970 and 2019 reveals a general trend towards improvement, with an overall increase of 25 years over nearly half a century, from 52.6 years to 77.8 years during the same period. However, this improvement has not been consistent due to fluctuations in this indicator over different periods. During the decade of violence, mortality rates rose significantly, with the life expectancy curve experiencing another shift in 1992, leading to a two-year decline until 1998. The average annual increase dropped to 149 days per year. This period also saw an issue with mortality coverage because many individuals went missing and were not recorded, reducing the number of registered deaths. This gap was not addressed in the publications of the National Statistics Office due to the difficulties Algeria faced during this period. Since 1998, the life expectancy curve has stabilized and shown an overall improvement "+2.6 years" with an average annual increase of 173 days per year. This improvement can be attributed to the return of security stability to the country after the decade of violence (Flici & Hammouda, 2015, p. 10).

Table 1.Development of Life Expectancy at Birth in Algeria for Both Sexes between 1970-2019

Year	Males	Females	Total
1970	52,6	52,8	52,6
1985	62,7	64.2	63,6
1990	66.3	67.3	66.9
*1996	66.8	68.4	67.4
2000	71,5	73,4	72,5
2004	73.9	75.8	74.8
2006	74.7	76.8	75.7
2010	75.6	77.0	76.3
2012	75.8	77.1	76.4
2014	76.6	77.8	77.2
2017	76.9	78.2	77.6
2019	77.2	78.6	77.8

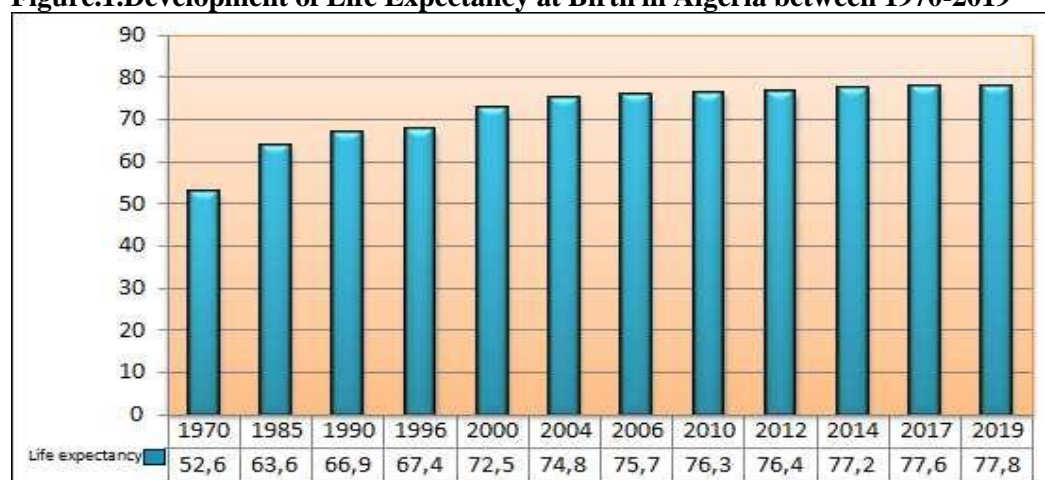**Source: 1970-1996: Population direction, 2001, p. 3**

ONS, Statistical Yearbook of Algeria and Algerian Demography, various years, nº. 326, nº. 520, nº. 575, nº. 890

The life expectancy indicator in Algeria has significantly improved over time, increasing from over 30 years in 1920 to 40 years in 1955, then to 50 years in 1970, and reaching over 77 years currently. Since independence, the decline in fertility and mortality rates, particularly among younger generations, has contributed to a very long life expectancy. Two distinct phases of life expectancy "average expected lifespan" can be identified during this period.

The first phase is characterized by a rapid increase from 1970 to 1985, where life expectancy rose from 52.6 to 63.6 years, with a mortality rate index increase of 20.3% over fifteen years. The increased life expectancy for both men and women during this period reflects the advancement in the health status of Algeria's population. On the other hand, the second phase is slower, spanning from 1985 to 2004, during which life expectancy reached 75.7 years in 2004, a 20.7% increase compared to 1985 "19 years" (BEDROUNI, 2007, p. 66) Life expectancy continued to rise in recent years, reaching 77.8 years in 2019 (ONS, 2020, p. 7).

Another notable aspect of life expectancy is the difference between the average lifespan of both sexes, with women generally living longer than men. The current difference, after updating coverage rates, is estimated at two years. Life expectancy at age 60 was about 18 years in 1970, saw a decline during the 1980s, and continued to decline until the early 1990s, reaching 16.58 years in 1991. However, it increased in the following years, reaching 20 years in 2000, 21.6 years in 2010, and 22.9 years in 2019, a nearly five-and-a-half-year increase compared to 1970.

Figure.1.Development of Life Expectancy at Birth in Algeria between 1970-2019

Life expectancy	1970	1985	1990	1996	2000	2004	2006	2010	2012	2014	2017	2019
	52,6	63,6	66,9	67,4	72,5	74,8	75,7	76,3	76,4	77,2	77,6	77,8

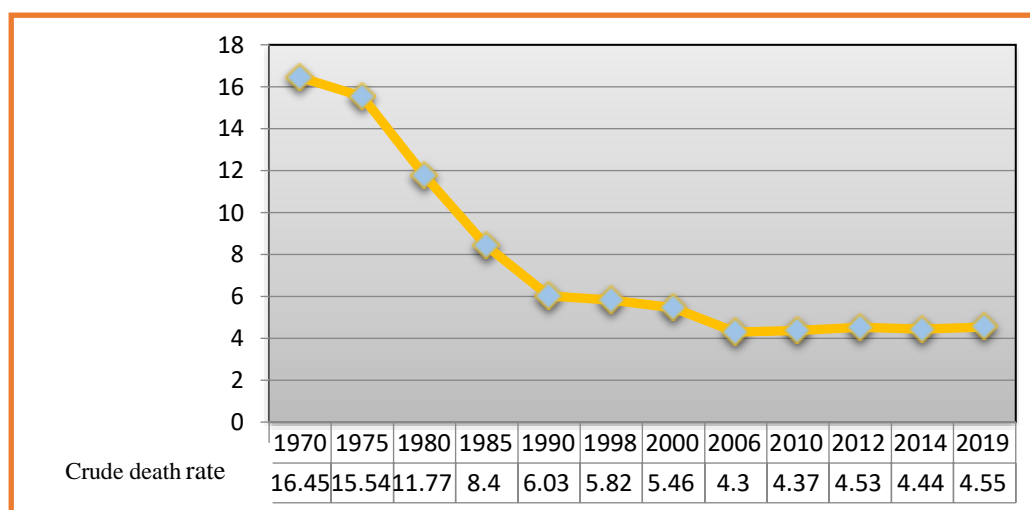**Source: Table 1**

▪ **General Mortality**

Mortality rates in Algeria have undergone significant changes over the past three decades. The crude death rate or the annual mortality report per average population of the same year, which was estimated at 16.45 ‰ in 1970, stabilized at 5.46 ‰ in 2000. Subsequently, this rate experienced a decline and fluctuation in the following years, with values ranging between 4.3 ‰ and 4.55 ‰ during the years 2006-2017. Similarly, the actual number of deaths decreased noticeably from 137,099 deaths in 1970 to 113,511 in 1990. However, these numbers began to rise again starting in 1998, reaching 131,708 and continued to increase in the following years significantly. In 2019, the number of deaths was estimated to be around 181,302 (ONS, 2020, p. 7).

Table2. Evolution of the number of deaths and the crude death rate between1970-2019

Year	Number of deaths	The ‰ rate
1970	137 099	16.45
1975	155 675	15.54
1980	142 707	11.70
1985	137 974	8.40
1990	113 511	6.03
1998	131 708	5.82
2000	127 951	5.46
2006	132 460	4.30
2010	144 482	4.37
2012	156 026	4.53
2013	154 445	4.39
2014	159 644	4.44
2015	167 718	4.57
2016	165 648	4.42
2018	177 127	4.53
2019	**181302**	4.55

Source: From 1970 to 2011: ONS, Statistical Retrospective 1962 – 2011, p. 2
From 2012 to 2019: ONS, various years, Algerian Demography, no. 520, no. 575, no. 658, no. 690, no. 740, no. 779, no. 890

Figure.2. Evolution of the crude death rate ‰ in Algeria between 1970-2019

	1970	1975	1980	1985	1990	1998	2000	2006	2010	2012	2014	2019
Crude death rate	16.45	15.54	11.77	8.4	6.03	5.82	5.46	4.3	4.37	4.53	4.44	4.55

Source: From 1970 to 2000: Population direction, 2001, p. 3
From 2006 to 2019: ONS, various years, Algerian Demography, n0 520, n0 575, n0 890

▪ **Infant Mortality**
The infant mortality rate is considered the best indicator of health status, and it is available in Algeria through vital registrations and demographic surveys. The infant mortality rate (the number of deaths of children under one year of age during a year per number of live births during the same period) has decreased significantly, estimated at about 180 per thousand in 1962 and then experiencing a notable decline starting in the early 1990s. It is worth mentioning that all these rates have been recalculated twice by the National Statistics Office ONS. The first adjustment was based on the correction rate for 1981, according to the results of the 1982 Demographic and Labour Force Survey MOD 82. Subsequently,

these coverage rates were adjusted in 2002 based on the results of the 1998 General Population and Housing Census RGPH and the 2002 Algerian Family Health Survey EASF 2002 (Mokaddem & Mostafa, 2007-2011, pp. 19-20).

During the economic crisis phase resulting from the decline in energy commodity prices in 1986, which severely affected the living standards of the population and had repercussions on the social sectors and public health expenditures, infant mortality rates increased. It is noteworthy that reducing this rate is linked to improving the living conditions of the population as well as implementing the national control program against infant mortality, which includes a series of sub-programs such as vaccination, in addition to the country's security stability. Infant mortality rates decreased from 36.9‰ to 21‰ between 2000-2019 (BEDROUNI, 2007, p. 68).

Table3. Evolution of infant mortality rates ‰ for both sexes in Algeria between 1970-2019

Year	Infant Mortality Rate ‰		
	Male	Female	Total
*1970	142	141	141,5
1989	61,9	55,4	58,8
**1992	50,8	36,7	43,7
1998	38,7	36	37,4
2000	38,4	35,3	36,9
***2002	33,7	28,6	31,2
2004	32.2	28.5	30.4
2008	26.9	23.9	25.5
2010	25.2	22.2	23.7
2012	23,9	21,2	22,6
2014	23,5	20,4	22,0
2019	22,5	19,4	21,0

Source: *ENSP 1970, **EASME 1992, ***PAPFAM 2002

The other figures were taken from the ONS publications titled Algerian Demography.

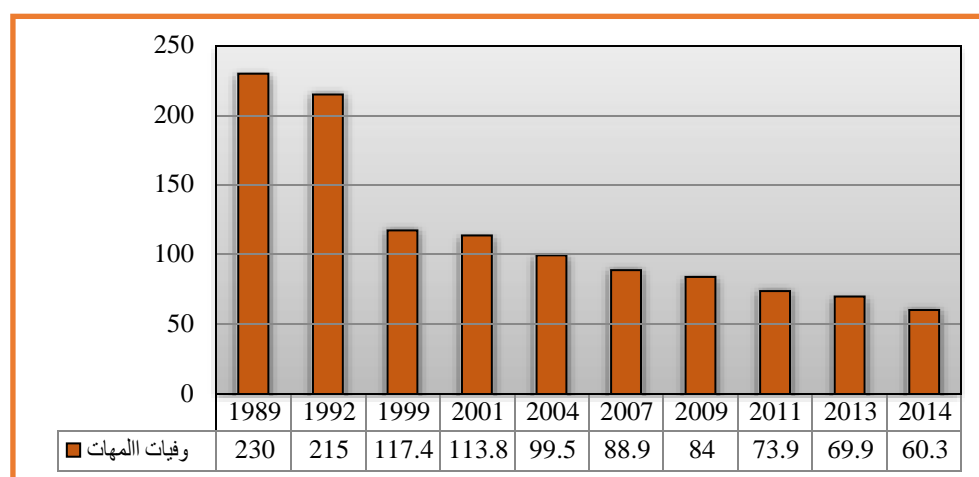**Figure.3. Trends in under-5 mortality rates in Algeria**
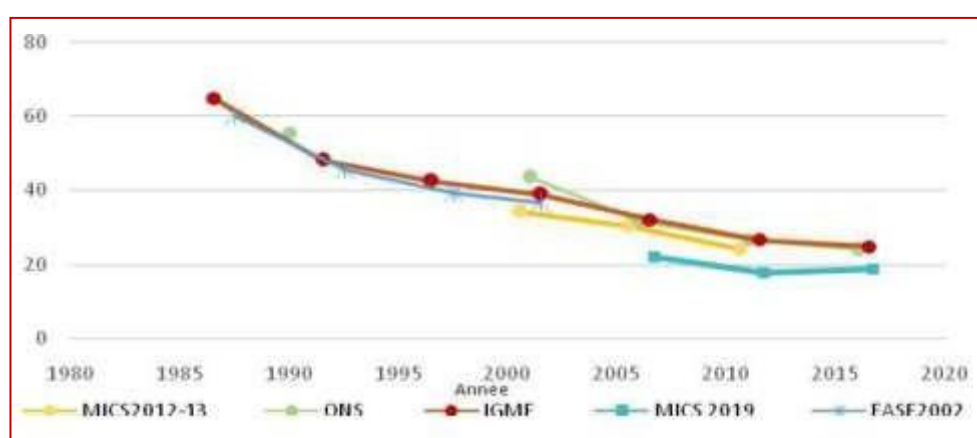
Source: Sixth Multiple Indicator Cluster Survey, 2020, p 123

By comparing the rates of under-five mortality obtained from the Sixth Multiple Indicator Cluster Survey 2019 with rates from other data sources, it is observed in Figure 3 that the trend is declining, and different sources tend to support this trend.

▪ **Maternal Mortality**

By participating in the Millennium Development Goals, Algeria has committed to combating maternal mortality. In 1999, a survey conducted by the National Institute of Public Health estimated the maternal mortality rate for that year to be around 117 per 100,000 live births. To achieve the Millennium Development Goals, Algeria aimed to reach a rate of 50 per 100,000 live births by 2015. However, maternal mortality rates remain high compared to countries with similar levels of development. In 2012, the maternal mortality rate was 70.3 per 100,000 live births, and hospital maternal mortality was estimated at 54 per 100,000 live births, with the number of live births being 978,000 for the same year. In 2014, the maternal mortality rate was 60.3 per 100,000 live births, with the number of live births estimated at 1,014,000.

Figure.4. Evolution of the maternal mortality rate in Algeria per 100,000 births between 1989-2014

	1989	1992	1999	2001	2004	2007	2009	2011	2013	2014
■ وفيات المهات	230	215	117.4	113.8	99.5	88.9	84	73.9	69.9	60.3

Source: MMI 1989, EASME 1992, ENMM 1999
From 2001 to 2014: National Plan for Reducing Maternal Mortality, 2015-2019, p 12

❖ **He** maternal mortality **n Algeria**

▪ **Stages of Development of the Health System**
✓ **The 1962-1974 Period:** After independence, Algeria had about 500 doctors, 50% of whom were Algerian, to cover the needs of a population estimated at approximately 10.5 million people. The health situation during this period was characterized by a high infant mortality rate, especially among infants, which reached a rate of 180‰, and a life expectancy that did not exceed 50 years. The main cause of mortality was the prevalence of infectious diseases related to environmental and living conditions.

  Given this situation and the limited available resources, the Ministry of Health set two main objectives:
− Redistribution of general and private health institutions and doctors across different regions of the country to allow all inhabitants equal access to treatment. This included mandatory part-time work in the public sector for private sector practitioners and the formation of mobile medical teams.
− Combating mortality and eradicating infectious diseases and epidemics.
  This stage also saw the implementation of several health programs aimed at protecting disadvantaged groups, leading to the establishment of mandatory vaccination for children.

✓ **The 1974-1989 Period:**

Due to significant social pressure and population growth on one hand, and the resurgence of diseases and epidemics on the other (the existing health system with its modest capabilities was unable to meet all healthcare needs), the decision was made to establish free medical care. This was the most important decision taken by the political authorities to cater to the poor segments of the population. The problems hindering the health system in Algeria were substantial, as the health strategy focused on hospitals and therapeutic services, leading to the neglect of primary care and prevention. This resulted in overcrowding and congestion within public sector hospitals, a shortage and scarcity of medicines, and the most significant issue being the low wages for doctors and healthcare workers as a whole. These factors contributed to the deterioration of the public health system, leading to a brain drain, especially among doctors, either abroad or to the private sector. During this period, a considerable number of health facilities were built, particularly public hospitals and primary health structures (multi-service clinics and health centers), to achieve the principle of equal access to healthcare and free treatment.

Thirteen university hospital centers were established during this period with three main tasks: care and treatment, training, and research. By 1986, the mortality rate, especially infant mortality, had decreased, thanks to national health programs such as the tuberculosis and malnutrition eradication program and the mandatory and free vaccination program. This period also saw a significant decline in communicable diseases, and life expectancy increased from 50 years in 1962 to 65 years in 1989.

✓ **The 1989-1999 Period:**

Algeria experienced a severe economic and political crisis during this decade, leading to an unprecedented and deteriorating security situation and instability in all areas, resulting in the destruction of educational, commercial, industrial, and health infrastructure, rendering them non-functional. Despite this, this period saw the reorganization of the health sector through the issuance of executive decrees, allowing the establishment of necessary health units to humanize and modernize national healthcare structures.

Significant social transformation occurred at all levels:

- In health, the transformation was marked by the return of waterborne and other communicable diseases and the emergence of chronic diseases such as diabetes, heart, and respiratory diseases. This situation was due to poor public hygiene, deteriorating housing conditions, expanding poverty, malnutrition in some social classes, and climate changes.

- Economically and socially, the transformation was driven by low income and high debt, which ranged from $37.28 billion in 1990 to $72.25 billion in 1993, reaching $47.30 billion in 1998. These factors led to a decline in social standards, a lack of job creation, and consequently, high unemployment due to reduced public spending, including health expenditures.

  Regarding health coverage in 1998, the following figures illustrate the situation: 2 beds per 1,000 inhabitants, one clinic per 60,731 inhabitants, one health center per 25,454 inhabitants, one treatment room per 6,667 inhabitants, and one doctor per 1,123 inhabitants. Demographic indicators showed a crude mortality rate of 5.82‰, an infant mortality rate of 37.4‰, and a life expectancy of 71.6 years.

✓ **The 1999-2017 Period:**

This period was characterized by security stability. At the beginning of this period, a national health map was developed to reduce disparities between regions, taking into account the specificities and urgent needs of each area, and addressing organizational and coordination imbalances. The implementation of the new health map contributed to strengthening health structures of all types, bringing healthcare closer to citizens. The private sector also contributed to improving this situation, with 286 clinics, 5,095 specialist doctors, and 6,205 general practitioners. The budget allocated to the health sector to achieve

the Millennium Development Goals set by the United Nations continued to grow, reaching 76.70% in the 2008 Finance Bill compared to 58% in 1999.
This period was demographically and healthily marked by:
- The epidemiological transition, where most communicable diseases such as leprosy, measles, diphtheria, and whooping cough were eradicated. According to WHO statistics in 2007, there were about 8,439 tuberculosis cases.
- The emergence of chronic diseases such as heart diseases, diabetes, hypertension, and cancer. It was found that 10.5% of the population was affected by these diseases, with hypertension leading at 4.38% and diabetes at 2.10% (Kharoubi, 2011, pp. 37-54).

Demographic and health indicators for 2017 were as follows:
- Life expectancy at birth was about 77.6 years, with 78.2 years for females and 76.9 years for males, according to National Statistics Office data. The population was 41.7 million, with a growth rate of 2.09%. The general mortality rate was 4.55‰, and the infant mortality rate was 21‰.

Regarding health structures in 2016:
- General hospitals: 200 with approximately 38,407 technical beds.
- Hospital institutions: 9 with approximately 1,324 technical beds.
- University hospital centers: 15 with approximately 12,910 technical beds.
- Specialized hospital institutions: 75 with approximately 11,725 technical beds.
- Private maternity homes: 123.
- The number of doctors in the public sector was 55,158, and in the private sector, it was 19,779, equating to one doctor per 545 inhabitants (ONS, 2017, p. 25).

▪ **Health Situation of the Population**

After independence, tuberculosis was one of the main causes of death, accounting for 20% of hospital beds. An epidemiological survey conducted between 1964 and 1966 revealed that the annual incidence rate was very high, estimated at approximately 150 cases per 100,000 people. This prompted the authorities in 1968 to launch the first vaccination campaign against tuberculosis and other diseases, followed by the adoption of mandatory and free vaccination against tuberculosis at the beginning of 1969.

During the period from 1986 to 1989, the epidemiological situation improved rapidly thanks to the development of health services that provided coverage for more than 90% of the population. The incidence rate dropped from 53 to 35 cases per 100,000 people. However, in the early 1990s and the new millennium, tuberculosis experienced a strong resurgence due to interruptions in medication supply.

During this period, Algeria made significant progress in efforts to combat the spread of diseases and mortality. However, the burden of communicable diseases remained high, accounting for 27%, similar to non-communicable diseases at 36%, and injuries, especially those related to traffic accidents, at 9%. In other words, Algeria is undergoing an epidemiological transition, which requires new solutions to emerging problems.

A national survey on family health was conducted in 2005 based on a sample representing the population, studying diseases in individuals aged 35 to 70 years. Among adults, high blood pressure accounted for 26% of chronic diseases, followed by diabetes at 13%, asthma at 8%, rheumatism at 8%, other cardiovascular diseases at 7%, and mental illnesses at 5%, making them the most prevalent chronic diseases among adults. For children, the distribution of chronic diseases was different, with respiratory diseases being more common, accounting for 22% of asthma cases and 11% of allergic rhinitis.

Sensory disabilities ranked third among chronic diseases at 10%, and mental disorders constituted a significant group of chronic diseases, ranking fourth at 8%. Neurological diseases and epilepsy accounted for 8% and 7% of chronic diseases in children, respectively. Diabetes and hypertension represented 2.59% and 0.72%, respectively. Cancer has become a public health issue in recent years, explaining the development of the cancer control plan implemented during the 2015-2019 period and currently in progress.

Non-communicable diseases are the focus of a comprehensive national strategic plan against risk factors for 2015-2019. Infectious diseases have significantly evolved since the 1990s: polio has been eradicated, and tetanus has also been eliminated. Similarly, the rates of measles, whooping cough, and typhoid fever have decreased significantly. Cholera has not been reported since 1990.

The annual incidence rate of tuberculosis (per 100,000 people) in all its forms was approximately 53.5 in 2013, compared to 62.8 in 2003. The same declining trend was observed for pulmonary tuberculosis, from 27.3 cases in 2003 to 18.6 cases in 2013. On the other hand, there was an increase in extra pulmonary tuberculosis cases, presenting a new challenge. In 2014, 845 cases of HIV were diagnosed, including 435 among men and 410 among women. The most affected age group was 25-29 years accounting for 13.2% and 16.3% of new cases, respectively. The age group from 0 to 4 years accounted for about 3.9% of new infections, reflecting a decrease in mother-to-child transmission rates (WHO, 2016)

▪ **Medical Causes of Death**

According to the World Health Organization, the medical causes of death are categorized into four groups:

- Communicable diseases and conditions related to birth and maternity
- Non-communicable diseases
- Injuries
- Unspecified causes "symptoms, respiratory distress, natural death, suspicious death, unspecified causes".

The distribution of deaths by disease group for 2013, according to the International Classification of Diseases, shows that the leading cause of death is cardiovascular diseases, accounting for 21.6%, compared to other groups. The second leading cause is birth-related conditions, accounting for 15.4%. The third cause of death comprises tumors at 10%, followed by endocrine diseases at 5%.

- Respiratory diseases: 6.3%
- Digestive diseases: 3.2%
- External causes of death: 6.3%

There are unspecified causes, estimated at 19.3%, indicating that the quality of data depends not only on the quality of medical records but also on the practitioner's ability to identify the true cause of death at the time of certification. In 2013, the gender distribution showed that non-communicable diseases had a higher rate among females at 57% compared to 51.6% among males (INSP, 2006, pp. 5-12) .

❖ **Study Results**

Based on the data and information presented in this research regarding mortality indicators by age and gender, both old and recent, especially life expectancy at birth, we analyzed the health situation of the Algerian population, highlighting the role played by the Algerian government in the reforms it implemented to support and develop the health sector. We arrived at the following results:

▪ It was observed that the economic and political crisis affected the life expectancy at birth curve since the early 1990s, with rising mortality rates. However, the lack of coverage during that difficult period due to the non-registration of most deaths does not illustrate this clearly. Therefore, the available data do not show the declining trends interestingly, particularly the missing population excluded from registration.

▪ The end of the decade of violence and the beginning of security stability in Algeria with the onset of the 2000s served as a factor and motivation, for the Algerian government to begin preparing a health plan covering all regions of the country to eliminate disparities. This is evident from the achievement of the Millennium Development Goals set by the United Nations by strengthening the health sector through directed funding to provide new

health structures. During this period, life expectancy at birth increased rapidly from 72.5 to 77.8 years between 2000 and 2019, with general mortality rates decreasing from 5.46 ‰ to 4.55 ‰, and infant mortality rates from 36.9 ‰ to 21 ‰. Additionally, there was an improvement in the health situation of the population, marked by the eradication of some communicable diseases.

▪ The crude death rate was 4.55 in 2019, after being estimated at 4.42 in 2016. It showed noticeable fluctuation between 2006 and 2019. When examining the number of deaths, we find an increase of about 4,175 cases, a significant rise between 2018 and 2019 compared to previous years. However, there is a delay in publishing statistics on health structures for these two years. All indicators suggest the absence of a policy and plan with international standards directed at the health sector, and the costs do not cover the health needs of the population, with the Millennium Development Goals set by the United Nations not being fully achieved.

❖ **Conclusion**

Despite the increase in life expectancy among Algerians during the studied period and the decrease in mortality rates compared to previous years, the Algerian health system has not achieved all its goals. On the contrary, it suffers from several organizational problems related to health structures and institutions of all kinds. This negatively impacted the general functioning of these institutions, resulting in difficulties in providing healthcare services to the population, which was confirmed by the return of rising mortality numbers in 2017. Consequently, the gap widened between the health system and the citizen, who was already burdened by weak purchasing power, further exacerbated by the high cost of maintaining health.

❖ **Recommendations**
- Improve the social and economic conditions of doctors and healthcare sector employees in all its components.
- Add healthcare facilities and equip them with various advanced medical devices that meet global standards.
- Implement the health programs and policies set by international bodies comprehensively.
- Combat the remaining epidemic diseases that threaten the lives of the population.
- Provide opportunities for medical professionals abroad to collaborate and work towards developing the health sector.
- Offer advanced supported training for specialist doctors and nurses.
- Educate the population on the importance of maintaining their health through healthy nutrition and engaging in physical activities, especially for the elderly who are at risk of chronic diseases.

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