



The epidemiological transition in Algeria: how is it evolving?

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Abstract: Since the 1980s, Algeria has seen a considerable decline in communicable diseases, accompanied by the emergence of non-communicable diseases. This change has been achieved thanks to a great deal of effort in terms of collective hygiene, vaccination, health coverage and education. This epidemiological transition has led to an increase in the morbidity of non-communicable diseases, which have become the main cause of mortality. However, the occurrence of the Covid-19 health crisis interrupted the pattern of this transition and brought it back into the second phase, where communicable and non-communicable diseases are proliferating in parallel. The aim of this article is to present and explain the epidemiological transition in Algeria since 1980.

Keywords: communicable diseases; non-communicable diseases; healthcare system; epidemiological transition, Algeria

Jel Classification Codes : I 10.

ملخص: منذ الثمانينيات، شهدت الجزائر انخفاضاً كبيراً في الأمراض المعدية، مصحوباً بظهور الأمراض غير المعدية. تم تحقيق هذا التغيير بفضل الكثير من الجهود فيما يتعلق بالنظافة الجماعية والتطعيم والتغطية والتثقيف الصحي. أدى هذا التحول الوبائي إلى زيادة معدلات الإصابة بالأمراض غير المعدية، والتي أصبحت السبب الرئيسي للوفيات. علاوة على ذلك، أدى ظهور الأزمة الصحية لـ Covid-19 إلى تعطيل نمط تطور هذا الانتقال وتطبيقه مرة أخرى، على المرحلة الثانية، حيث تتكاثر الأمراض المعدية وغير المعدية بالتوازي. الغرض من هذا المقال هو تقديم وشرح التحول الوبائي في الجزائر منذ 1980

الكلمات المفتاحية: الأمراض المعدية؛ أمراض غير معدية؛ نظام الرعاية الصحية؛ التحول الوبائي؛ الجزائر.

تصنيف JEL : I10

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1. Introduction :

Epidemiological transition refers to the decline in infectious diseases and the predominance of chronic and degenerative diseases. It is the result of improvements in general hygiene and living standards on the one hand, and the development of medical care on the other. This change in the structure of morbidity has also been fostered by a social and economic transition that has seen humanity move from a simple, mainly agricultural way of life to a modern one, with all its harmful effects on health, particularly those linked to stress and pollution.

Since the 1980s, Algeria has been suffering the consequences of an accelerated health transition, resulting from a combination of four major factors. Firstly, there has been an epidemiological transition, thanks to widespread vaccination and improved health coverage, which has led to a decline in communicable diseases, a fall in general mortality and an improvement in life expectancy. But this improvement has been accompanied by a rise in chronic diseases, which have now become the leading cause of mortality (INSP, 2017).

In addition, the country has undergone a demographic transition characterised by a fall in mortality, which has led to an increase in life expectancy and a change in the age pyramid, marked today by a larger proportion of elderly people. Added to this, profound socio-economic changes have accentuated the factors favouring the development of the health transition, namely the change in lifestyle, sedentary lifestyles, the nutritional transition, and the growth in women's employment, among others.

All these factors lead us to the following main question:

What is the evolution of the epidemiological transition in Algeria?

In order to answer this question, we have based ourselves on two hypotheses:

Hypothesis 01: Thanks to compulsory and free vaccination, Algeria has made major progress in eradicating communicable diseases, which places the country in the final phase of Abdel Omran's epidemiological transition plan, where it must prepare for the phase of the cardiovascular revolution.

Hypothesis 02: The pattern of epidemiological transition appears to have been altered since the emergence of the Covid-19 pandemic, which plunged the country (and the world as a whole) into an unprecedented health crisis; this pandemic returned the health system to traditional ways of dealing with infectious diseases through mass vaccination, confinement of the population and isolation of the sick.

The aim of this article is to present the process and context of the epidemiological transition in Algeria, through the interpretation of data collected from various public structures (Ministry of Health, Population and Hospital Reform, ONS, etc.) on trends in communicable and non-communicable diseases since 1980.

2. Trends in communicable diseases in Algeria

Following independence, the disease burden profile of the Algerian population was dominated by communicable, infectious and parasitic diseases, favoured by unfavourable hygiene conditions, malnutrition and low or non-existent vaccination coverage (Yacono, 1982). The declaration of communicable diseases has been compulsory since 1963, and their management has been steadily improving. There are 5 main groups of diseases: water-borne diseases (WBDs), diseases covered by the Expanded Programme on Immunisation (EPI), vector-borne diseases, zoonoses and sexually transmitted diseases.

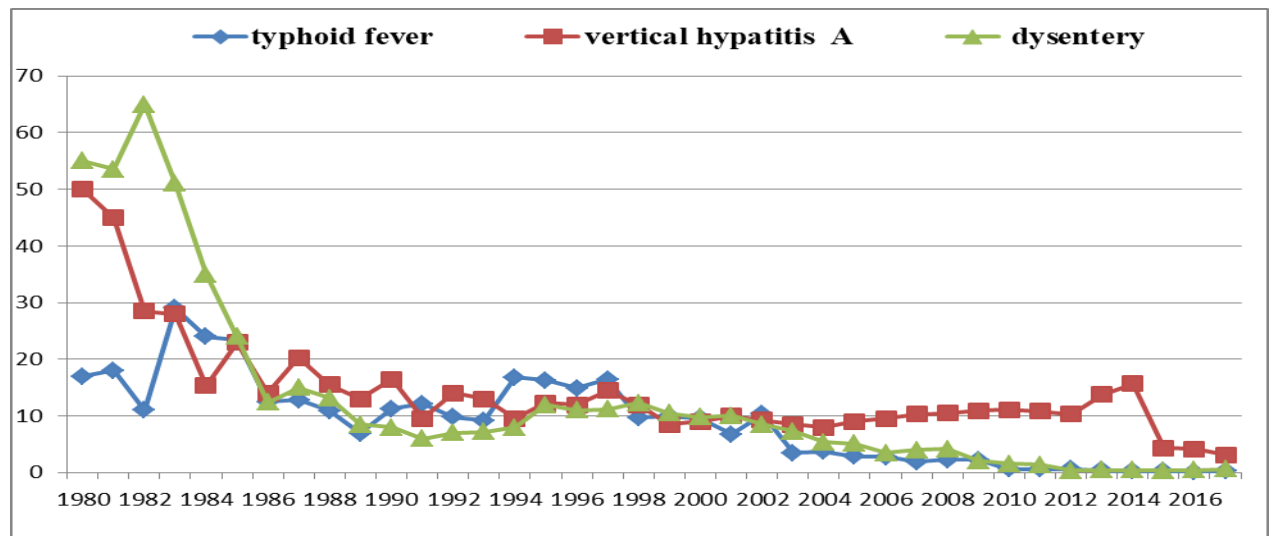
2.1. Water-borne diseases

According to the WHO, in 2007, 1.8 million people worldwide died from water-borne diseases, the majority of them children under the age of 5 (WHO, 2007). These diseases affect the most disadvantaged socio-economic groups where individual and collective hygiene rules are not respected. Until 1990, water-borne diseases ranked first among notifiable diseases in Algeria, accounting for 25% of deaths among children aged between 1 and 14 (Fellah, 1998). Figure 01 below illustrates the evolution of water-borne diseases in Algeria between 1980 and 2015 according to data from the national institute of public health.

The graph below shows different trends between three periods: a downward trend and epidemiological peaks between 1980-1990, followed by stagnation or even a slight increase between 1990-2000, and finally a decline between 2000-2016.

The decline in prevalence during the first period is related to the improvement in the general living environment, although some peaks were recorded during this period. What all these epidemiological peaks have in common is the nature of the living environment, with overcrowded, precarious housing and/or almost non-existent drinking water supply and sanitation networks. The gradual degradation of the environment has prompted public authorities to become aware of the seriousness of the problem and the harmful effects of uncontrolled population growth (Benayada, 2019). In order to improve collective hygiene conditions, the State has invested in housing. Thus, 201 agricultural villages (Baci, 1999) were built in 1982, and at the same time a large number of collective housing units were created. However, development in other related areas (water supply, sewage and domestic waste disposal) has not kept pace, making these efforts insufficient.

Figure 01: Trends in the incidence of water-borne diseases in Algeria 1980-2017.



Source: Graph produced by us from : (INSP, 1980-2017)

During the decade from 1990 to 2000, public spending was affected by the economic and security crisis that hit the country. A structural adjustment plan recommended by the IMF was adopted, aimed at balancing the budget and restoring the major aggregates. Public funds allocated to the housing sector were drastically reduced (public health department, 2007).

As a result, the occupancy rate per dwelling has increased: around 7.1 people per dwelling in 1998 (direction générale trésor, 2013). As stated by the Agence Nationale d'Aménagement du Territoire as part of the United Nations Development Programme, only 45% of housing nationwide was suitable for habitation in 1998. The average rate of dwellings connected to the public drinking water network was only 17.9% in 1998, while the average rate of connection to the sewerage network was only 19.31% (agence nationale d'aménagement du territoire, 2001).

From 2000 onwards, housing conditions improved somewhat, thanks to a number of collective housing projects (Haraoubia, 2011), which meant that the occupancy rate per dwelling fell from 5.54 people in 2009 to 4.86 in 2011, according to the Ministry of Housing and Urban Development (direction générale trésor, 2013). More than 700,000 precarious dwellings have been eradicated, bringing their proportion (ONS, 2008) to just 4.6% of the total national housing stock in 2008. However, the latter is notoriously dilapidated: 53% of the national housing stock, estimated at 3.64 million units, was built before 1962, giving rise to a number of sanitation problems (INSP, 2008).

The quality of housing has also improved. According to a WHO and UNICEF report, 91% of all dwellings inhabited by Algerian households were connected to the drinking water distribution network in 2015 (OMS & UNICEF , 2017), 85.4% of households were supplied with drinking water from protected sources, in accordance with appropriate

recommendations, and 95% of the population benefited from improved sanitation facilities in 2011 (OMS, 2013).

However, other factors have contributed to the persistence of MTH, namely rapid and disorderly urbanisation, where the urbanisation rate (direction générale trésor, 2013) rose from 31.43% in 1966, to 49.7% in 1987 (le gouvernement algérien, 2005), and to 72.63% in 2018 (banque mondiale, 2018). This rapid urbanisation, combined with the urban lifestyle, has led to an increase in the production of domestic waste, which rose from 2.25 million tonnes in 1980 (Demot, 2013), to more than 15, 6 million tonnes in 2007 (Djamaci, 2012). Shortcomings in the management of this waste are exacerbating the deterioration in hygiene, especially as demographic growth continues apace, with Algeria's population rising from 10.4 million in 1962 to over 43.6 million in 2020 (world population review, 2020). Not to mention its uneven territorial distribution: 91% of the population was concentrated in the north of the country in 2008, covering less than 13% of the national territory (ambassade d'Algérie en suisse, 2008).

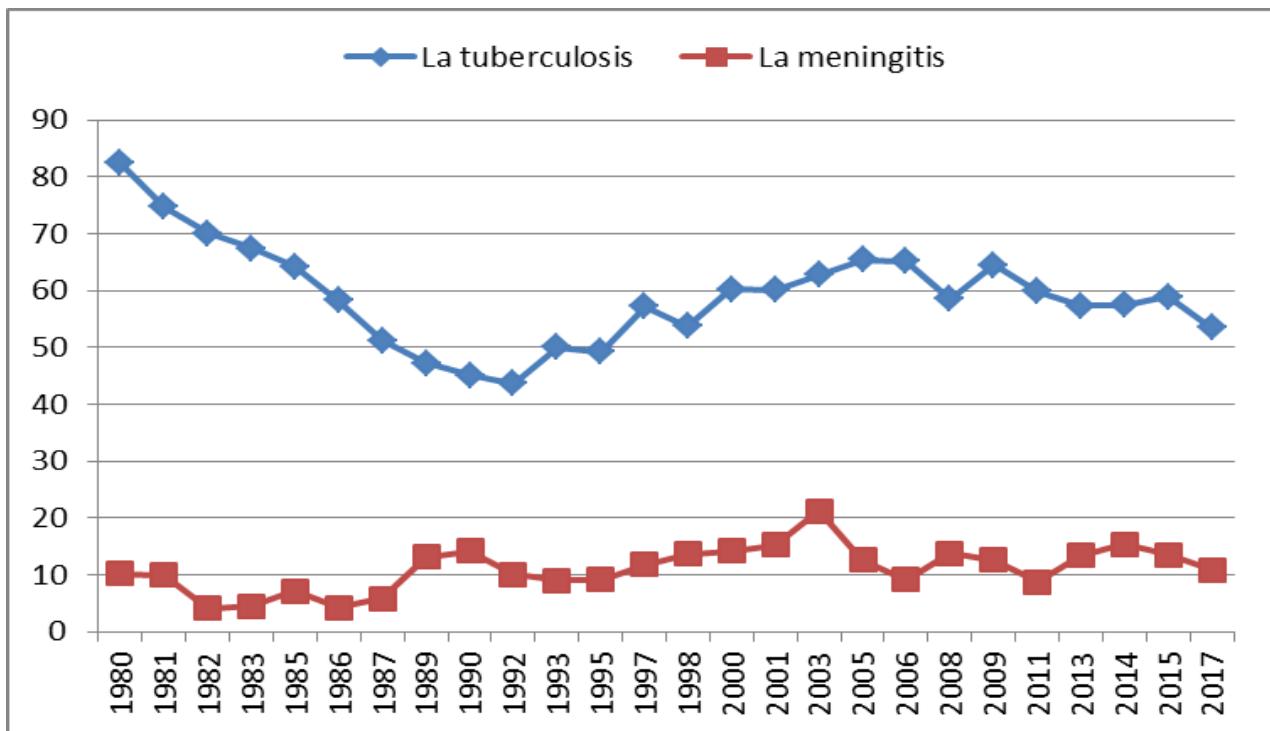
In addition, the MSPRH points out the inadequacy of the technical controls carried out by the hydraulic services on the drinking water distribution network at all stages (study, design, monitoring, construction and acceptance). In 2008, 53% of water towers, 86% of wells, 80% of springs, 90% of pumping stations and 97% of public fountains had not been cleaned (INSP, 2008). The factor most frequently implicated in the emergence of MTH epidemics is the interconnection between drinking water supply networks and sewerage networks, which causes contamination (contaminated water) of the water distributed to households (INSP, 1980-2017). In addition, disinfection processes for water intended for human consumption are obsolete. In 2008, an analysis of the ratio of automatic chlorinators to waterworks showed that one-third of the 1,146 automatic chlorinators were not operational (INSP, 2008).

2.2. Diseases covered by the expanded programme on immunisation

These are diseases for which vaccination is provided by the State; it is compulsory and free for the entire population. According to decree 69-88 of 19/06/1969, the following diseases are covered by an extended vaccination programme: tuberculosis, diphtheria, tetanus, whooping cough, poliomyelitis and meningitis.

Measles was included in the national compulsory vaccination programme in 1985, which helps to explain the subsequent drop in the measles epidemic in 1985 compared with 1984, as shown in the following figure, which illustrates the trend in diseases covered by the Expanded Programme on Immunisation from 1980 in Algeria to 2017.

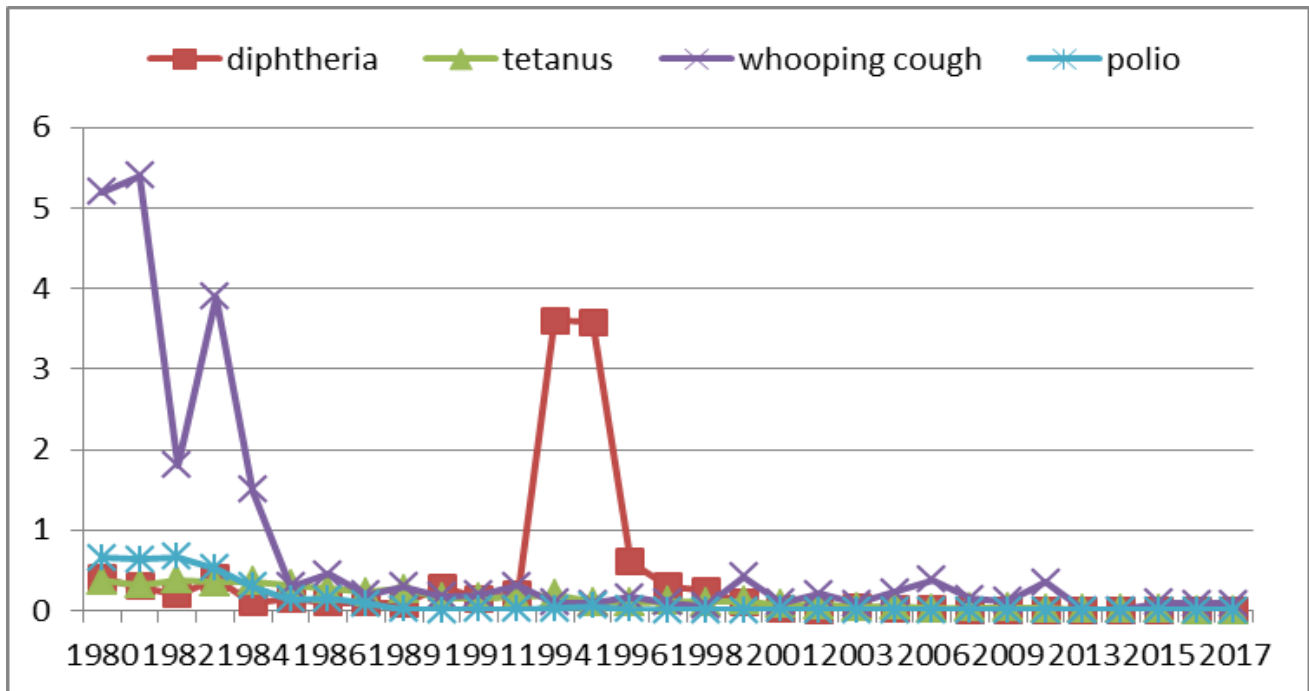
Figure 02: Trends in the incidence of diseases covered by the Expanded Programme on Immunisation (EPI), still persisting in Algeria, 1980-2017



Source: Graph compiled by us from (INSP, 1980-2017)

The incidence of tuberculosis has fallen sharply since independence: in 1967, 4% of schoolchildren had the disease, according to former Ministry of Health surveys. This rate was brought down to 0.48% in 1982 thanks to free compulsory vaccination and national anti-tuberculosis programmes. However, despite the decline recorded during the 1980s, the incidence of the epidemic seems to have stabilised at around 60 cases per 100,000 inhabitants since 2000. In the case of meningitis, the trend has been stable since 1980.

Figure 03: Trends in the incidence of diseases covered by the Expanded Programme on Immunisation (EPI) and eradicated in Algeria from 1980 to 2017.



Source: Graph compiled by us from (INSP, 1980-2017)

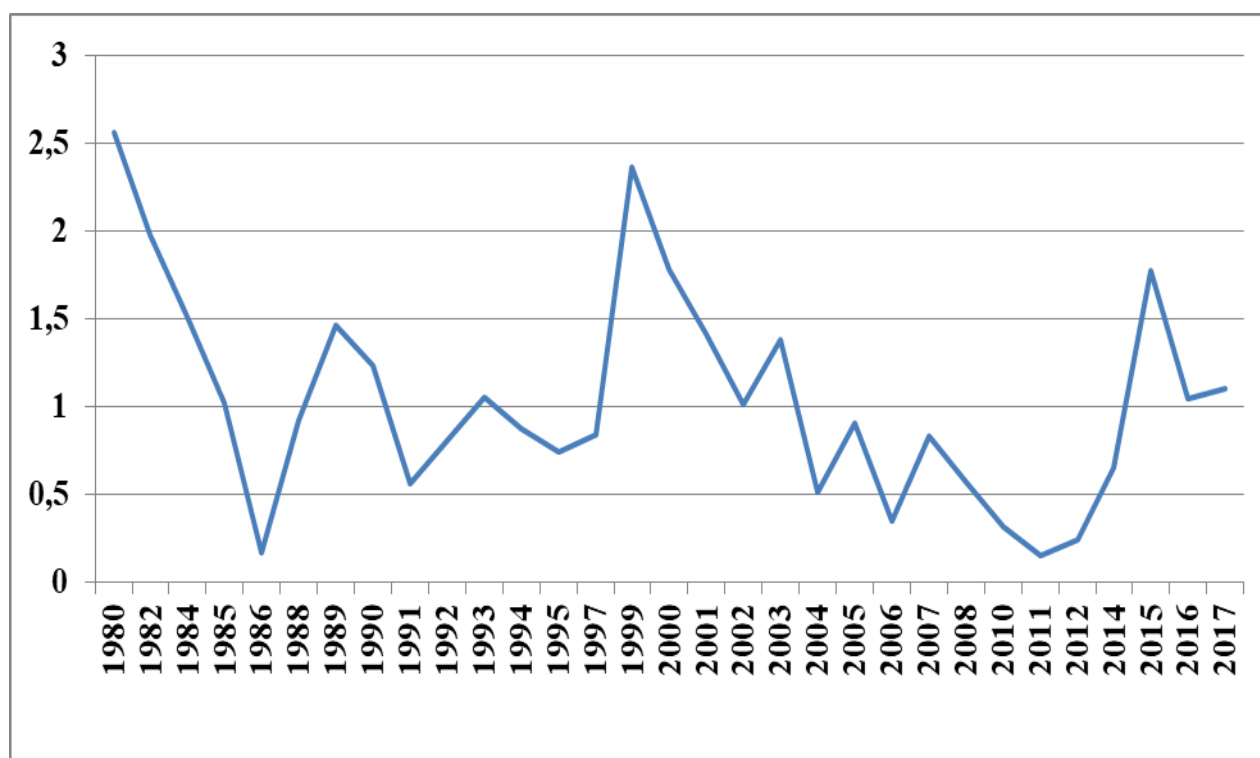
Apart from tuberculosis and meningitis, the rest of the diseases appear to have been eradicated, due to the very low or zero incidence recorded since 2000, such as diphtheria, tetanus and poliomyelitis, which recorded zero incidence in 2017, whooping cough with 0.09 cases per 100,000 inhabitants, and measles with 1.87 cases per 100,000 inhabitants.

2.3. Vector-borne diseases

There are many vector-borne diseases in the world, such as malaria, trachoma, dengue fever, Congo haemorrhagic fever, yellow fever, However, as global statistics show, malaria is the disease that claims the most victims, with more than 400,000 deaths worldwide in 2017 (OMS, 2020).

In Algeria, before the 1950s, the number of malaria victims was between 50,000 and 70,000 cases per year due to the parasitic endemic. Around 1960, the disease reached peaks of 100,000 cases a year due to a decline in malaria control (INSP, 2009). With 70,000 cases a year, it was the leading infectious disease. From 1962 onwards, modern methods of combating infectious diseases (spraying of insecticides, chemoprophylaxis) reduced endemicity rates to lower levels, with a parasite index of between 3 and 6% (INSP, 2014).

Figure 04: Trends in the incidence of malaria in Algeria, 1980-2017



Source: Graph compiled by us from (INSP, 1980-2017)

In 1963, with technical support from the WHO and in coordination with Morocco and Tunisia, Algeria decided to launch a programme to eradicate malaria in stages from east to west, covering all the Wilayat; by 1983, no more cases of malaria had been recorded, which should allow us to conclude that there were no indigenous cases in 1983.

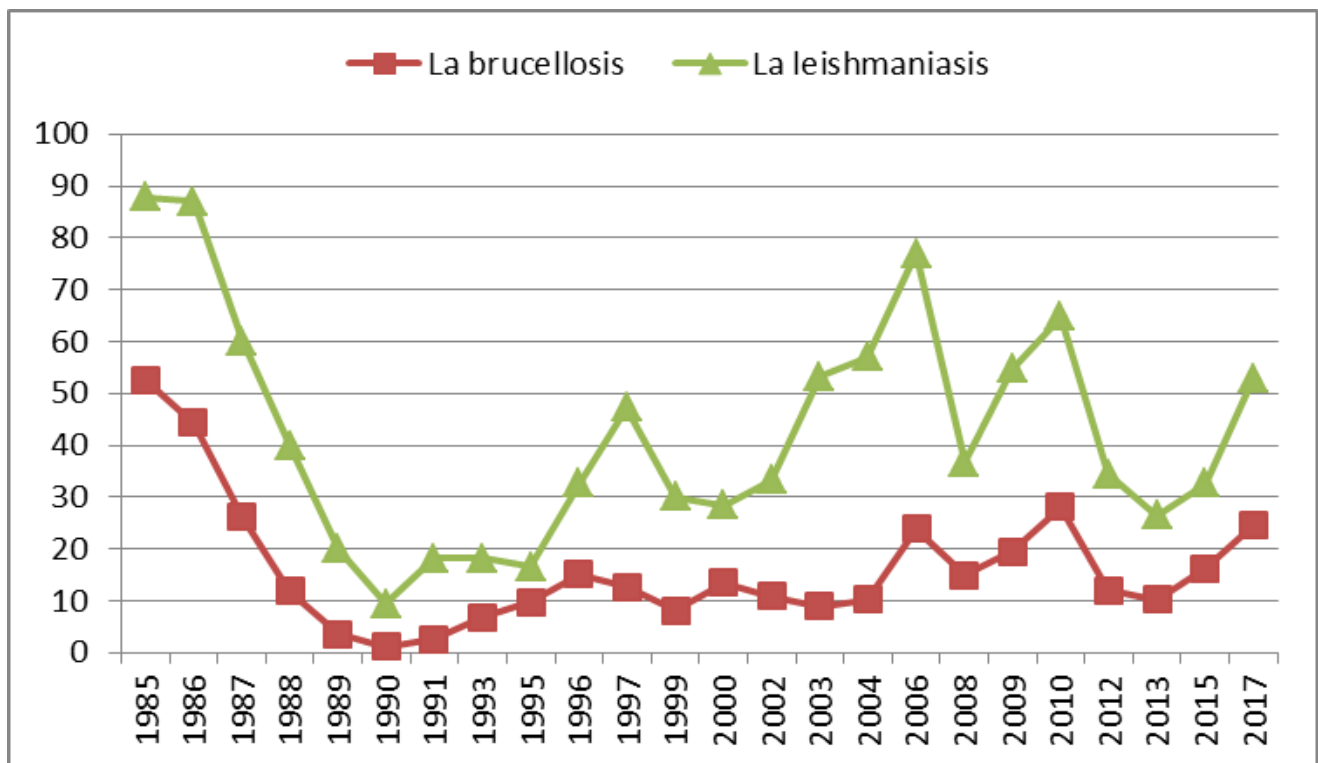
In addition, a Central Office for the Eradication of Malaria (BCEP) was set up, whose main task was to take technical charge of the operations. The results of this programme were remarkable. No more cases of indigenous malaria were reported in Algeria from 1975 onwards. The fight against imported malaria has been the subject of an action plan since 1999, which has focused on epidemiological surveillance, particularly targeting the high-risk wilayats on the country's southern borders.

Although Algeria was certified malaria-free on 22/05/2019, having reported no indigenous cases since 2013, the disease still persists in its imported form, despite the efforts made to prevent it. This phenomenon is further exacerbated by the exodus of people from neighbouring countries due to the prevailing political insecurity and problems of poverty. Moreover, in 2017, of the 453 cases of malaria recorded, 446 were classified as imported (INSP, 1980-2017).

2.4. Zoonoses

Zoonoses in Algeria persist and continue to record alarming rates. All the more so as these are diseases that leave serious after-effects on humans. The main zoonoses are rabies, brucellosis and leishmaniasis.

Figure 05: Trends in the incidence of zoonoses in Algeria, 1985-2017



Source: Graph compiled by us from (INSP, 1980-2017)

- Brucellosis: This is a disease caused by bacteria carried by direct or indirect contact with animals, mainly cattle. The population most at risk are farmers, who sometimes catch the disease without realising it, either through eating raw dairy products or through direct contact with sick animals. The brucellosis epidemic is widespread in pastoral regions, affecting mainly males. According to a survey carried out in 2012 by doctors Tabet Derraz and Bestaoui (Tabet Derraz & Bestaoui, 2012), the age group most affected is between 31 and 40, accounting for almost a third of recorded cases, with livestock farmers predominating. The main source of contamination is direct contact with cattle, and the most frequent sites of infection are the joints and bones. Controlling the epidemic requires intensive surveillance, the introduction of compulsory reporting and, above all, the implementation of a national brucellosis control programme.

- Leishmaniasis: This is a common parasitic disease in the Mediterranean basin; it ranks first among notifiable diseases in Algeria, because it is a real public health problem (Achour & Madiou, 2009). According to INSP data, the incidence of the disease is constantly rising, with over 6,500 cases recorded in 2015. The disease leaves unsightly, indelible scars after it has healed. More than two-thirds of the world's cases of cutaneous leishmaniasis are recorded in six countries, including Algeria.

What's more, leishmaniasis, which used to be a very common disease in rural areas due to contact between humans and livestock, is now beginning to spread to urban areas as a result of climate change (significant increase in heat and humidity) and environmental degradation (pollution, inadequate sanitation and poor hygiene in residential areas).

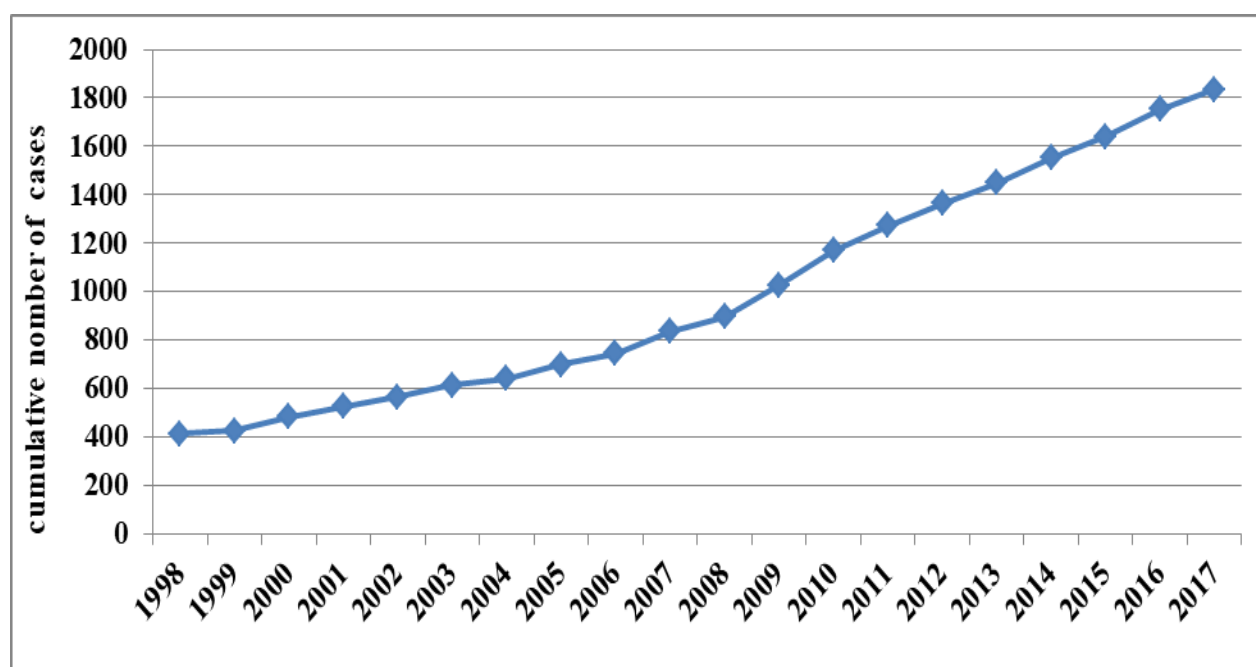
Since March 2006, a national action plan to combat leishmaniasis has been put in place by the Ministry of Health, characterised by vector control campaigns and intensive awareness-raising through various means of communication (radio, television, posters in health centres).

2.5. Sexually transmitted diseases

In Algeria, the only sexually-transmitted disease currently subject to compulsory reporting is AIDS; statistical data on other categories of sexually-transmitted infection are not available. AIDS screening and reporting is compulsory under the ministerial decree of 24 May 1998.

The surveillance system for STIs and HIV infection is based on notification of cases of infection under the notifiable diseases surveillance programme. However, there is under-reporting of this type of condition, which remains a taboo subject for many people.

Figure 06: Trends in the prevalence of AIDS in Algeria, 1998-2017



Source: Graph compiled by us from (INSP, 1980-2017)

In short, communicable diseases persist, even though Algeria has succeeded in eradicating several of them thanks to numerous programmes to combat these scourges (vaccination, preventive action). However, the persistence of certain communicable diseases calls on the various public health players to review the shortcomings observed in national programmes and to step up multi-sectoral efforts.

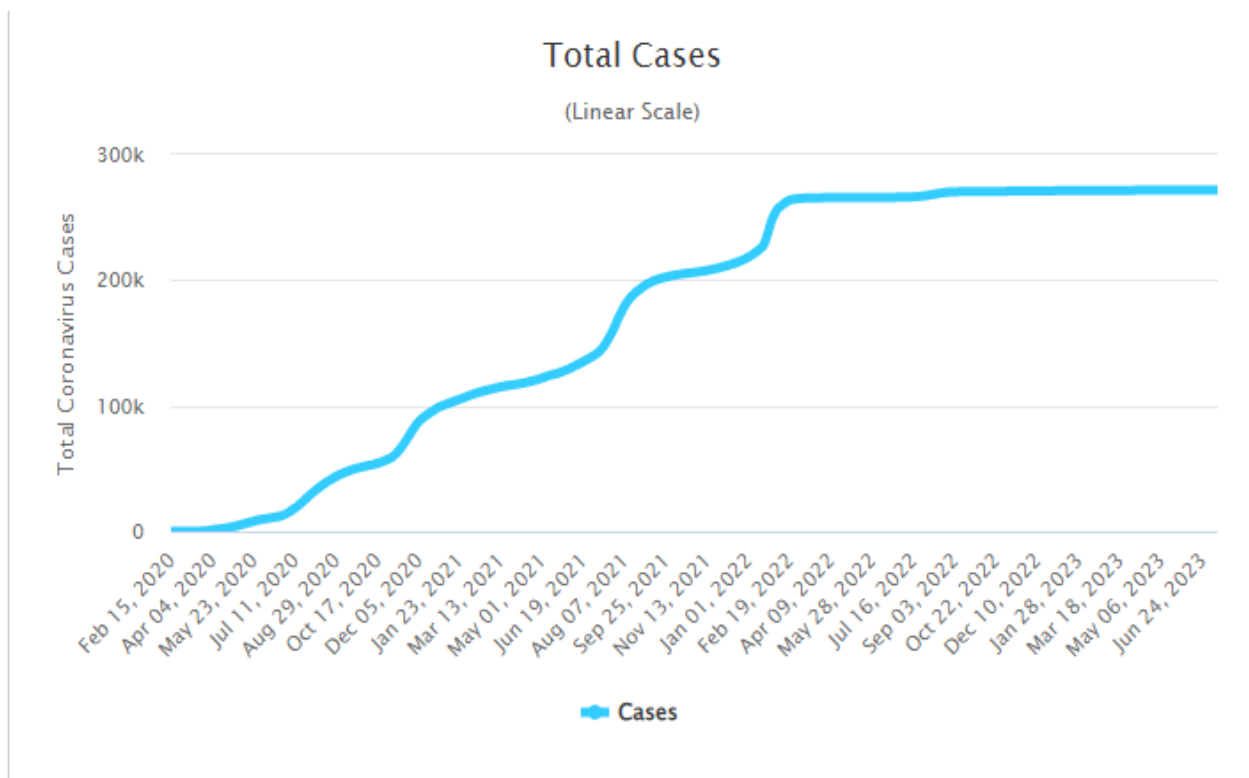
The persistence of these diseases means that Algeria is facing a double burden of morbidity, given the spread of non-communicable diseases; health action is becoming increasingly important in this context; NCDs affect more than 60% of the population, and were responsible for 54.5% of deaths in 2016 according to the INSP (INSP, 2017). Such a health profile suggests that the country is still in the second phase of the health transition, according to Abdel Omran.

2.6. The covid epidemic in algeria.

The Covid pandemic appeared in December 2019 in Wuhan (China), and has since affected every country in the world. In the six WHO regions, as of 30 January 2022, more than 22 million new cases and more than 59,000 new deaths have been reported. In addition, more than 370 million confirmed cases and more than 5.6 million deaths have been reported worldwide since the start of the pandemic (OMS, 2022). Waves of infection are becoming increasingly severe and prolonged as the number of variants multiplies around the world, and vaccination rates remain low, particularly in developing countries.

Algeria has not been spared by this pandemic, having recorded its first case on 25 February 2020, and since then the number of cases has fluctuated according to the waves of contamination, influenced by the control measures taken by the MSPRH.

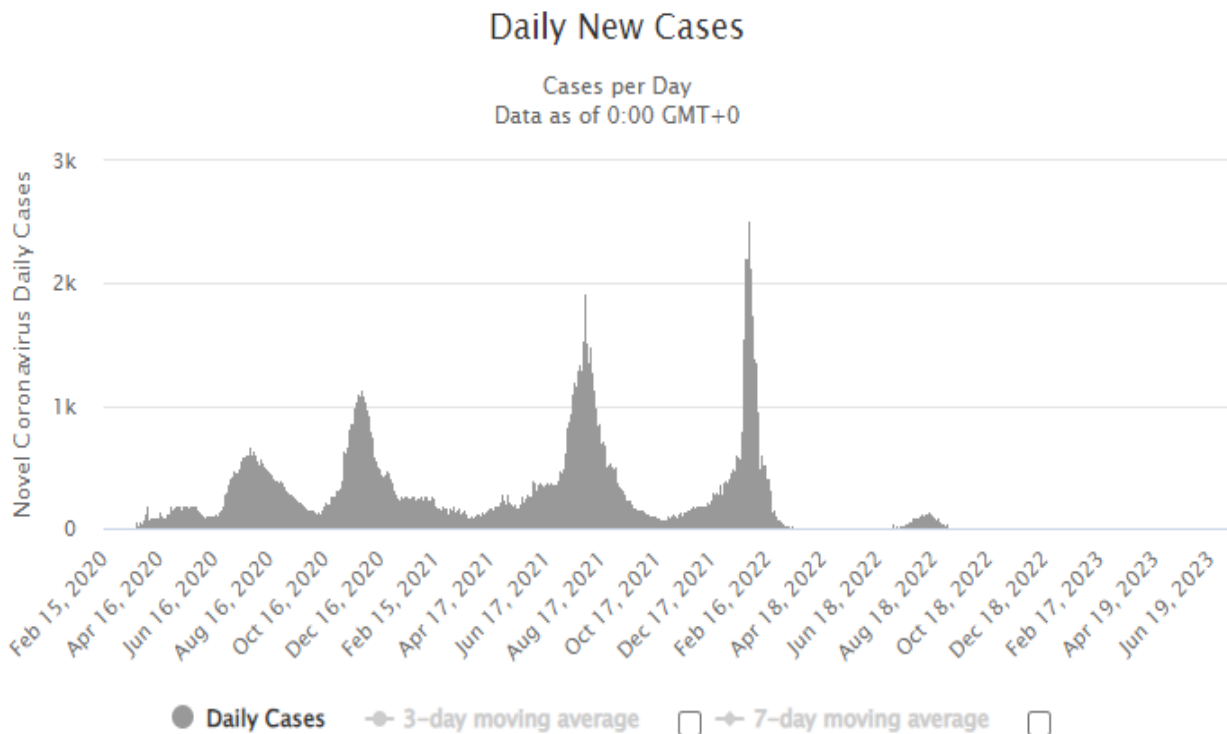
Figure 07: Daily change in the number of new cases confirmed and new deaths by COVID-19 from 25 February 2020 to 12 January 2022 in Algeria



Source: (WHO, 2023)

According to the Ministry of Health, the mortality rate due to Covid will reach 9.26/100,000 inhabitants in 2022; 223,806 confirmed cases and 6372 deaths have been recorded since the start of the pandemic up to 12 January 2022. Incidence is uneven across the different wilayas. There is a concentration of cases in the wilayas of the Central Health Region, which can be explained by their high urban density.

Figure n°08 : daily new cases of Covid 19 in Algérie



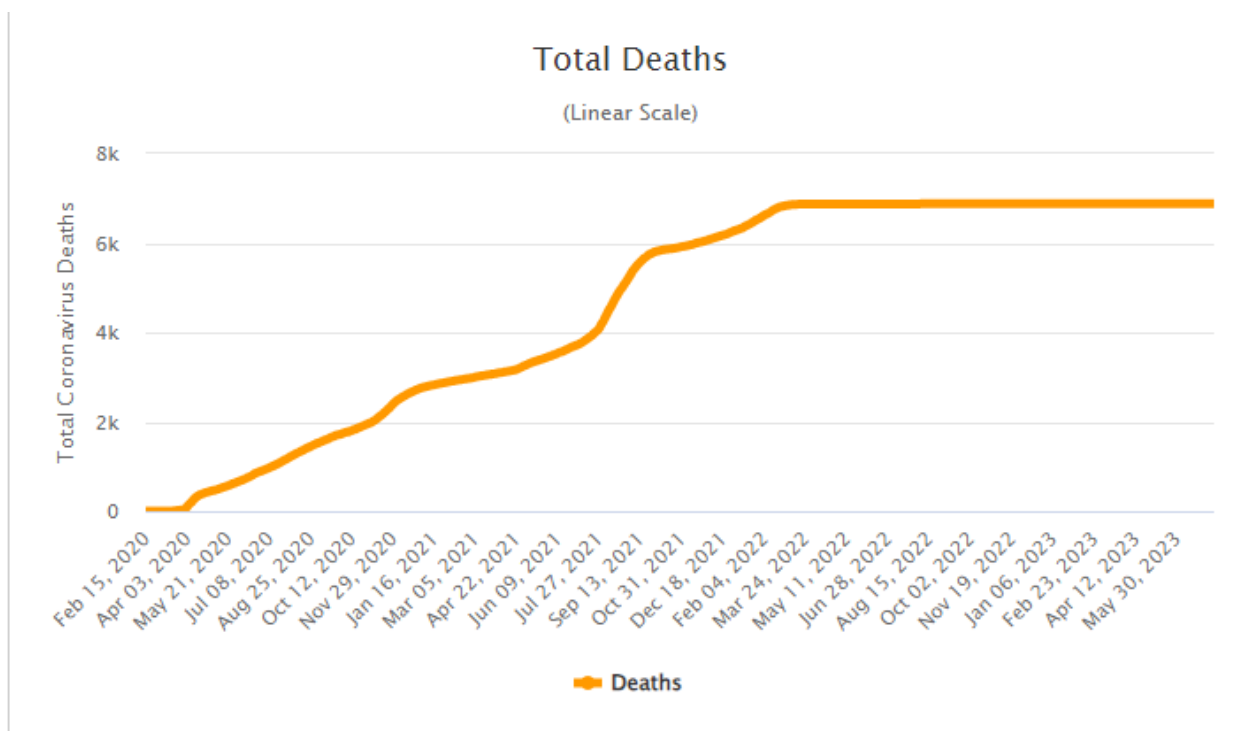
Source : (WHO, 2023)

A number of measures have been taken to combat the spread of the epidemic:

- Free vaccination offered to the entire population. According to data from the Ministry of Health, the number of people vaccinated with at least 1 dose was 7,233,590 individuals on 10/01/2022. The number of people fully vaccinated was 5,775,901 (OMS, 2022). On 09 March 2022, the number of people who had received at least two doses of vaccine reached 6,170,966, or 13.83% of the population.
- On 22 March 2020, the Ministry of Health announced that Algeria had entered the third phase of the coronavirus epidemic. As a result, on the following day, it became compulsory to wear a mask in public places, on pain of a financial penalty. A toll-free number (3030) has been set up by the health authorities to provide information and answer questions about the coronavirus.
- On 28 June 2020, the authorities decided to close all borders. The partial reopening of air borders took place on 1 June 2021 for 11 countries. Travellers were required to present a negative COVID RT-PCR test less than 36 hours old on boarding and to undergo an antigen test at their own expense on arrival. Maritime borders were reopened on 12 October 2021 for passenger transport with Spain and France. Lastly, land borders with Tunisia were partially reopened on 3 January 2022 for citizens resident in both countries and on presentation of a vaccination pass, in addition to the health protocol in place for other borders.

- On 26 November 2021, the Algerian Pasteur Institute decided to introduce the 3rd dose of the anti-Covid-19 vaccine for the elderly and chronically ill, following the observation of a drop in immunity six months after the 1st and 2nd doses. According to the Ministry of Health, 158,466 people concerned by this protocol had received their third dose by 10 January 2022.
- The introduction of a compulsory vaccination pass as a condition of entry to and exit from the national territory and for access to certain spaces, places and buildings open to the public where ceremonies, festivals and events of a cultural, sporting or festive nature, etc., take place, is a step in the right direction.
- On 21 December 2021, the Agence nationale des produits pharmaceutiques (ANPP) announced the marketing of the anti-covid vaccine "CoronaVac", produced by the Saïdal group in partnership with the Chinese laboratory Sinovac (INSP, 2021)

Figure n°09: number of Covid's deaths in Algérie



Source : (WHO, 2023)

Despite all these measures, the epidemic is gaining ground, and we are continuing to register new cases and, above all, new deaths, despite the efforts made by the Ministry of Health through its various health establishments and all its medical staff, supported by the WHO regional office. However, the vaccination rate remains low, at barely 10% of the population according to the WHO in October 2021 (who, 2021); the pressure on hospitals is increasing, and the need for intensive care is leading to saturation of care services and burnout among healthcare staff, following the country's entry into the 4th wave.

The occurrence of this new pandemic has called into question the epidemiological transition under way in Algeria, characterised by the eradication and/or control of communicable diseases, and has plunged the country (and the world as a whole) back into the era of infectious diseases, with all the adverse effects on the economy, health systems and people's quality of life.

3. The prevalence of non-communicable diseases in Algeria

Non-communicable diseases are a real public health problem in Algeria, given the ever-increasing burden of their morbidity. They accounted for 55% of deaths in 2016, compared with 16.8% attributed to communicable diseases, according to the INSP (INSP, 2017). Their marked increase is illustrated by the following data from the national TAHINA survey conducted in 2005; they are characterised by the growing weight of the following conditions:

- Arterial hypertension: this ranks first, with a prevalence of 26%, representing an estimated 4,500,000 cases,
- Type 2 diabetes: with a prevalence ratio of 8.9%, representing an estimated 1,800,000 cases,
- Cancers: the crude incidence rate is 143.3 per 100,000 inhabitants; the number of new cases is expected to reach 65,000 by the beginning of 2021.
- Chronic respiratory diseases: with an incidence of 7.6% (3.8% for asthma).

The prevalence of chronic diseases increases with age. In the case of hypertension, for example, the 60-69 age group accounts for 20% of cases, while the over-70s account for 26%. Similarly, diabetes accounts for 10.6% of cases in the 60-69 age group.

Table n°01: Prevalence of chronic diseases as a % of the total population in Algeria between 2006 and 2012

Disease	2006 survey(*)	2012 survey(**)
Blood Pressure	4.4	5.6
Diabetes	2.1	2.9
Heart Disease	1.1	0.9
Asthma	1.2	1.3
Joint Diseases	1.7	1.2
Other Chronic Diseases	2.4	1.7

The source:

(*):- (ministère de la santé de la population et de la réforme hospitalière; ONS, 2008).

(**): (ministère de la santé de la population et de la réforme hospitalière; ONS, 2015).

Faced with this situation, Algeria adopted the Global Programme for the Control of NCD Risk Factors in 2000 (ministère de la santé de la population et de la réforme hospitalière, 2015), adopting a political declaration in September 2011 in which it made a commitment to reduce the burden of NCDs. Moreover, the WHO has developed a Global Action Plan for the Control of Noncommunicable Diseases 2013-2020 (OMS, 2013) to assist countries in their national efforts. Algeria's commitment is mainly reflected in :

- Its adherence to the WHO STEPS approach, an integrated approach to surveillance, prevention and management of NCDs, in June 2002.
- Creation, by Executive Decree no. 02-246 of 23 July 2002, of a special fund from the proceeds of the additional tax on tobacco products. This special fund is dedicated, among other things, to the fight against smoking: covering the cost of treatment for tobacco-related illnesses and anti-smoking information campaigns.
- Algeria's ratification of the WHO Framework Convention on Tobacco Control in 2012.
- the creation, by Executive Decree 12-343 of 17 September 2012, of a cancer fund to finance the National Cancer Plan.
- the adoption by the National People's Assembly of the Government's 2013-2014 Action Plan, which includes the development of an intersectoral National Strategic Plan to combat the risk factors of NCDs and the establishment of a multisectoral coordination framework.
- the establishment of a multisectoral national strategic plan for integrated control of NCD risk factors 2015-2019 (ministère de la santé de la population et de la réforme hospitalière, 2015).

According to the Algerian Society of Hypertension (SAHA), the prevalence of hypertension rose from 24.5% of the population in 2007 to 35% in 2013 in Algeria (Chibane, 2014). This disease, when associated with type 2 diabetes, is responsible for the development of chronic renal failure; in 2018 there were 23,500 dialysis patients. The prevalence of hypertension was estimated at 23.6% in 2017, according to the national survey conducted in 2017 by the Ministry of Health, Population and Hospital Reform (MSPRH) on measuring the burden of risk factors for non-communicable diseases using the WHO STEP wise approach. This survey revealed a prevalence of 23.1% in men compared with 24.1% in women, reaching almost 67% in the adult population (≥ 60 years of age), bearing in mind that life expectancy in this population bracket (≥ 60 years) has risen from 4% in the 1980s to over 9% of the general population. The survey also revealed that among all respondents in households with high blood pressure figures, 30.8% had never had their blood pressure taken, and 71.9% were not taking any treatment (ministère de la santé de la population et de la réforme hospitalière, 2019).

Furthermore, according to a study carried out between 2003 and 2010 by the researcher FERKAOU (Fortaki, 2017), 12.56% of strokes affected the 16 to 50 age group, and the 16 to 44 age group accounted for 9.64% of stroke cases.

In addition, according to a recent survey carried out by FORTAKI on 9,196 patients hospitalised in the East health region in 2015, 62.6% of hospitalisations were caused by non-communicable diseases; 48.25% of patients were aged between 15 and 59, and 42.07% were over 60, giving a high

prevalence of NCDs among people of working age. According to the same study, the leading cause of hospitalisation is cardiovascular disease, responsible for 30.18% of cases (34% of which are under 60), followed by cancer with 17.02% of cases (49% of which are between 30 and 60), which shows that the prevalence of cancer is increasing, and has overtaken the prevalence of diabetes in recent years to become the second leading cause of hospitalisation and death in Algeria. According to the same study, NCDs were responsible for 65.24% of deaths in 2015 in the Eastern health region, 18% of which were caused by NCDs in subjects aged between 45 and 59. 45% of deaths were caused by cardiovascular diseases, followed by cancer with 17% of deaths (Fortaki, 2017).

What is worrying is the fact that chronic illness is increasingly affecting people of working age, reducing their productivity and sometimes leading to disability. So, on the one hand, they continue to receive their salaries and consume care, and on the other, they participate less in economic growth. This situation will undoubtedly have adverse effects on the financial equilibrium of the social security system, which is seeing a reduction in its resources on the one hand, and sustained growth in its expenditure on the other.

4. Conclusion

Accelerated urbanisation and the lifestyle of Algerians have had a major impact on health. In particular, the lack of physical activity and risky behaviour, such as smoking and alcohol consumption, have had a major impact on health. These factors, combined with heredity and ageing, have contributed to an increase in the burden of non-communicable diseases such as hypertension, hyperglycaemia, obesity, cancer, etc.

The traditional epidemiological transition diagram suggests that Algeria was at the end of the second phase of the process developed by Abdel Omran in his theory. This was a phase in which the health system was able to take control of communicable morbidity, and face up to the emergence of non-communicable diseases. After this phase, the country would have embarked on the phase of cardiovascular revolution and mastered this pathology, which is a new public health problem and the leading cause of death in recent years. However, the arrival of the Covid pandemic interrupted the process of epidemiological transition, and forced our healthcare system to return to the fight against this new transmissible disease, unknown to health practitioners, and for which no vaccine yet existed. This created a situation of asymmetry of information and doubt about the virus and the vaccine subsequently proposed. It is against this backdrop that vaccination has failed to live up to expectations, given that the virus has mutated several times and the epidemic has persisted for more than two years in Algeria, as in every other country in the world.

Our healthcare system has had to cope with a double burden of disease and respond to a demand for care that is more demanding, costly, spread over time (see chronic) and diversified. On the one hand, it has to combat the Covid epidemic by raising awareness, vaccinating and caring for patients, and on the other, it has to prevent, provide health education and control chronic diseases, which affect more than 60% of the population.

5. Results

- Algeria is experiencing an unfinished epidemiological transition which is in the second phase of evolution according to the theory of Abdel Omran since the 80s, characterized by the double morbidity of the population by communicable and non-communicable diseases,
- A situation which was further confirmed by the Covid 19 pandemic, which plunged our health system into a long period of vaccination, prevention, care and awareness of the communicable disease.
- The coexistence of communicable and non-communicable diseases constitutes a costly management challenge for our health system, since the management and prevention strategy for each group of diseases is different.
- The management of non-communicable diseases is long and costly, in particular with the cost of their medical management (Azri & Brahamia, 2018) and the increase in life expectancy at birth achieved thanks to the demographic transition (Azri & Brahamia, la transition démographique en Algérie, 2018).

6. Recommendations

- It is necessary to maintain the system of care and prevention of communicable diseases, given the persistence of some of these diseases,
- At the same time, we must invest more in the primary prevention of non-communicable diseases in order to act upstream of the appearance of the often chronic non-communicable disease;
- Reinforce the secondary prevention of non-communicable diseases which aims to control the evolution of these diseases and to control their severity.

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