

Received : 25 February 2024, Accepted: 31 March 2024**DOI: <https://doi.org/10.33282/rr.vx9i2.127>**

Status of the elderly through population estimates The case of Algeria, Horizons -2050–

Dr.Khaldi Abdelkamel¹, Dr. Djilali Salmi²¹University of Batna 1(Algeria), E-mail: abdelkamel.khaldi@univ-batna.dz²University of Bouira (Algeria), E-mail: d.salmi@univ-bouira.dz**Abstact:**

The latest data related to the population of Algeria, which relate to the last two censuses conducted by Algeria and whose data were published, which were the 1998 and 2008 censuses (although there was a census conducted in 2022, the data have not been published to date). When comparing them, we find an increase in the proportion of the elderly during the 10 years separating between The two censuses suggest that Algerian society is heading towards aging in the future. In other words, the country is part of the “group of countries in a transitional phase,” that is, it is at the entrance to the “corridor” of aging, or in other words, it is at the beginning of the crossing of the corridor of old age.

Therefore, in this article, we will try to give a formula for a model for projecting the elderly population according to the demographic data available to us, which enables us to project the number of the population in old age, which allows us to estimate the elderly population and estimate the various needs that concern them. Here, statistical forecasting has accomplished two basic purposes, which are meeting the citizens’ needs for... ..and services through official and unofficial agencies and achieving a balance between the forces of supply and demand.” (Al-Hassan, 2005, p. 201)

So in this study we're going to try to use one of the mathematical models to make population estimates or projections based on a situational study, which is based on demographic data on population censuses (fertility, births, death...This method is called a vehicle method, an economic method that is one of the best used to make population estimates, in order to determine the demographic status of older persons up to 2050 horizons and their health structures, material needs, and other necessities."

Keywords: estimates, the elderly, aging, needs.

Introduction:

Algeria, like other countries on the path to growth, is experiencing a shift in the age structure, and this is clear by observing the population pyramids of successive censuses. This change in the graphical image of the population pyramid is due to the impact of a group of basic indicators, including the decline in the fertility rate, mortality, as well as the improvement of the hope of life for various people. Ages, and as a result of these changes in the age structure, we will attempt in this study to conduct future population estimates up to the horizons of 2050, the purpose of which is to know the demographic situation of the elderly, in order to consider the requirements of this category of care... and other needs and requirements, and there are many Models To make estimates, we will try to employ one of the mathematical models to make population estimates or projections based on studying the situation. This method is called the composite method, and it is one of the economic methods and is considered one of the best methods used to make population estimates.

Approved methodology:

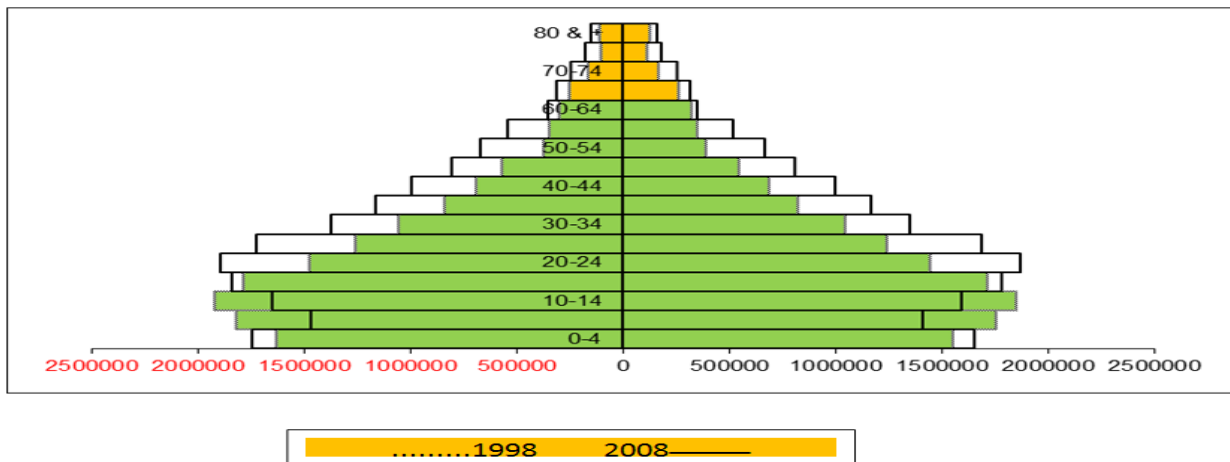
The research paper relies on statistics from the National Office of Statistics, in addition to some data from other sources. We utilize statistical methodology employing various statistical techniques to analyze and interpret the studied phenomenon, such as calculating the annual growth rate, correlation coefficients, linear regression coefficients. Furthermore, population projections will be conducted using the composite method.

We relied on a range of programs such as MORTPAK to conduct population projections.

First- The statistical situation of the elderly based on the last two censuses (1998/2008)

All indicators indicate that the countries of the world that are on the path of growth will at one time experience the phenomenon of aging, which is known today in developed countries as a result of the decline in birth and death rates and the gradual improvement in life expectancy. The wider the base of the population pyramid indicates the higher the dependency ratio, and this is what is usually expressed. From the classic picture of the population pyramid.

What is noticeable about the population pyramid of Algeria during the last two published censuses (1998/2008) is that its image still bears the classic pattern, which is related to high birth rates compared to deaths.

Figure 01: The population pyramid of Algeria according to the 1998 and 2008 censuses.

Source: Achieved by researchers

Through our observation of the population pyramid, we find an increase in the age groups [60-64], [65-69], [70-74], [75-79] and 80+ during the period 1998/2008 AD. These groups represent the elderly or the population of Retirement: This increase inevitably increases dependency rates, which inevitably requires more care and greater financial allocations. Anyone who follows the situation in Algerian society knows that the post-independence generation has lived through difficult social conditions. They are currently in the category of elderly people, “taking into account the modest productive capabilities of the elderly in the country.” “Given the widespread illiteracy of the vast majority of them and the limited job opportunities they have due to their disability or difficult economic conditions, poverty and need lurk for many of them if programs and mechanisms are not established to surround them, care for them, and preserve their dignity.” (League of Arab States, Social Affairs Sector, 2008, p. 201)

And through our comparison between the age compositions according to the largest age groups of the population between the two censuses, and this is if we consider that the group 60 years and over represents the population in old age or the population who have the right to leave work and enjoy their retirement, where the proportion of this group reached 6.58% of the total population in the year 1998 AD, rising ten years later to 7.43% based on data from the last two censuses.

According to data related to the 2019 Multiple Indicator Cluster Survey (MICS6) conducted in Algeria in 2019, by the Population Directorate of the Ministry of Health and Hospital Reform, which was implemented with financial and technical support from the United Nations Children’s Fund and a financial contribution from the

United Nations Population Fund, which included: 31,325 families, where the response rate was estimated at 96.7%. Thus, the number of families that were subjected to the interrogation reached 29,919 families. The percentage of elders (60+), calculated by us based on the available data, was 11.84%. This confirms that Algerian society is moving towards aging. (League of Arab States, Social Affairs Sector, 2008, p. 200).

- Construction guide:

“Population aging can be defined as the process of turning the elderly into a relatively larger portion of the total population,” which is the result of the demographic transition, that is, the transfer of death and birth rates from their high levels to their low levels, which in turn leads to a change in the age structure of the population".

(League of Arab States, Social Affairs Sector, 2008, p189)

"By applying this rule to the population of the region, we find."

"Table 01: Reconstruction Guide for the Population of Algeria during the period (1998/2008)."

The year	1998	2008
Construction guide	18.15	26.50

Source: Achieved by researchers based on census data from 1998 and 2008.

“By reading the table, we find that the reconstruction rate increased from the beginning of the period to the end, with a difference of 8.35%, as it moved from 18.15% during the 1998 National Housing and Population Census to reach 26.50% in the last census, as this change demonstrates the transformation of the Algerian population from A young society to a mature society, and this indicates that Algerian society is moving towards an elderly society, and this is what requires the authorities to take the necessary measures for this, as it faces a set of challenges in the field of the elderly, including:

- "The expected increase in the percentages and numbers of the elderly in the future, potentially exceeding the capacities and capabilities of many countries."

- "The rapid development that the Arab region has witnessed and is witnessing, economically and socially, and the expansion of the scope and effects of globalization, which resulted in the emergence of the role of the nuclear family in a noticeable way, especially in cities that witnessed internal migration, and resulted in a decline in the role of the extended family, which will affect the circumstances and situations of the elderly in the future.” (Salmi, Ladrem, 2019, p. 643) "Despite the evolution of the Arab family in its structure and lifestyles and changing its value

system, the Arab family has maintained many fundamentals and moral and social values, the most important of which is the existence of the phenomenon of family solidarity. Family health surveys have shown that the proportion of older persons receiving material support from their children is still high in Arab societies, ranging from 61 % in Algeria to 86.4 % in Palestine and 71 % in Tunisia, while it falls to only 27.8 % in Lebanon. (Khaledi, 2017, p 91)

One aspect of Arab family solidarity is the fostering of elderly family members, The proportion of elderly persons living alone in countries surveyed remains low and almost 5% is found only in Djibouti, Lebanon and Palestine." (League of Arab States, Social Affairs Sector, 2008, p. 195)

- The noticeable increase in the costs and expenses of living, the departure of women to work, and the insufficient pensions and retirement salaries will be reflected, albeit slowly, in the increase in home care and care clubs for the elderly.

-The increase in the percentage and number of elderly people will be directly reflected in an increase in the demand for direct and indirect health care.

"These challenges, undoubtedly absent from planning considerations, require focused attention and incorporation into the planning process, particularly when devising methods and implementation tools within the framework of a plan for elderly care, whether at the national or international level. Undoubtedly, any plan must be based on a set of feasible means, tools, and programs for implementation." (Salmi, Ladrem, 2019, p. 643)

Second: The statistical situation of the elderly based on population estimates

"The population estimates require those involved in this process to predict some of the indicators related to population growth from the past to the present in order to define the parameters of future society, and "policies of control and guidance of population phenomena demonstrate the positive attitude that human beings are trying to balance the rate of population growth with the rate of means of livelihood in the society in which they live, so that if there is an increase in the population as a result of rapid population growth caused by birth factors and migration to society, or if there is a decrease in the population as a result of a lack of births, an increase in the rate of mortality and an increase in the rate of migration from society does not correspond to the means of living available to society, society intervenes in laws, legislation and procedures that help to rebalance the size of the population with the means of living." (Salmi, Sheikhi, 2018, p. 899) "Malthus, in his renowned theory on

population, discussed the reciprocal relationship between population growth and food growth. However, the rate of increase in these two factors does not occur at the same pace. In his view, population growth increases geometrically, while food growth increases arithmetically. This creates an imbalance between what the earth produces and what humans consume, leading countries to work within the framework of what is called food security, attempting to restore the balance between the population size and the means of living."

"Most countries oversee an important phase imposed by demographic transformations and the environment they define with different sizes and patterns that have made the elderly an important and collective responsibility that must be taken into account in the formulation of medium- and short-term policies and strategies that are directly and indirectly related to the elderly. (League of Arab States, Social Affairs Sector, 2008, p p. 199-200)

1 - Survival Rates: "The life schedules of a group of countries, such as France, Portugal, Belgium, Germany, Spain and Italy, for the geographical proximity of these countries to Algeria and the impact of Algerians on the European reality. By reading the various tables and conducting a series of calculations, we found that the closest model to the projection on Algerian reality, for both males and females, was France's own life schedule, given the similarity beginning in 2004/2013 in Algeria and corresponding to 1995/2004 in France. For females, 2013 for Algeria corresponds to 1978 for France where convergence occurred during 1965/78. Therefore, as for future trends in survival rates, we have adopted the following assumptions:

- Starting in 2013 and during the five consecutive periods, we adopted France ' s life schedule as a model for future estimates, assuming a steady increase of 0.3 per year from age 79.3 for males. This is due to fluctuations in the lifetime increase rate, which in the last five years has been stabilized by a constant increase of 0.3 years. For Algeria, from 2004 to 2013, there have been mixed results between the increase and the decrease. However, if we exclude these fluctuations, we reach an average increase of 0.3 years. These results have led us to adopt this hypothesis." The results are shown in the table below.

Table 02: Evolution of life expectancy at birth until the year 2050 by gender

	2015- 2020	2015- 2020	2020- 2025	2025- 2030	2030- 2035	2035- 2040	2040- 2045	2045- 2050
Males	76.7	77.3	78.4	79.9	81.4	82.9	84.4	85.9
Females	77.7	78.3	79.6	80.9	82.4	83.9	85.4	86.3

Source: Achieved by researchers

The life expectancy at birth (e_0) for males and females in 2019, according to the latest data from the National Office of Statistics, was 78.6 years for females and 77.2 years for males, with an overall average of 77.8 years. These results closely align with the estimations or expectations made regarding life expectancy.

"Within this context, the repercussions of the increasing size of this population group become apparent, strengthened by the continuous extension of life expectancy at birth and improvements in the health, economic, social, and psychological conditions of the elderly." (League of Arab States, Social Affairs Sector, 2008, p. 200)

2- Fertility: The process of population projections also requires estimates of the number of births in future periods, and this process is calculated based on the number of females surviving in the future and those of childbearing age based on certain assumptions about their fertility in the near, medium and long terms, and through previous demographic data and on For example, when we read the population pyramid related to the last two censuses in Algeria, we find the following:

- There is an increase in the number of births beginning in the year 2003 AD, due to an expansion of the age group [0-4] during the last housing and population census of 2008 AD compared to the general housing and population census. For the year 1998 AD. Therefore, we expect an increase in fertility for a certain period. This increase is due to the accumulations experienced by the population during the dark decade, as well as the improvement of living conditions, after which they return to decline and decline, that is, a return to the natural state. ." (Salmi, Sheikhi, 2018, p. 902) .

These projections correspond to recent data published by the National Statistics Office in 2019 according to the mid-level hypothesis where the total fertility rate (child/woman) was 3.0.

3. Immigration: The impact of immigration has been overlooked due to the absence of data related to this element, in addition to the stability that Algeria is experiencing in this period. This reduces the magnitude of the impact of this element, and we thus consider the abnormal movement non-existent.

-Estimating the population of Algeria from 2020 AD to 2050 AD according to the middle hypothesis:

Population data is considered one of the necessary elements in the planning process. On another level, the growing number of elderly people in Arab societies imposes practical measures that must be included in the legislation and regulatory texts in the urban, cultural field (such as preparing sidewalks and providing public seats), establishing automatic elevators, and allocating a percentage Residential complexes for the elderly and disabled,.....etc. (League of Arab States, Social Affairs Sector, 2008, p p 200-201)

And after the series of calculations, we get the following results:

Table 3: Estimating the population of Algeria up to 2050 (unit: million)

	-2020	-2025	-2030	-2035	-2040	-2045	-2050
Maximum	43.399	47.728	51.570	54.809	57.669	60.564	63.663
Middle	43.629	47.487	50.645	53.221	55.715	58.560	61.467
Minimum	43.156	46.275	48.696	50.845	53.099	55.482	57.763

Source: Achieved by researchers

Since we are targeting the elderly in this study, we will try to clarify the development of this group at the expense of other groups (children and youth), that is, according to the largest age groups, and this is what the following table shows:

Table 4: Distribution of the population of Algeria for 2025/2050 by major age group

Age group	2025	2035	2045	2050
	%	%	%	%
(14-0)	30.30	23.69	20.02	20.47
(59-15)	58.80	61.65	60.15	57.40
60+	10.90	14.66	19.83	22.13
Total	100	100	100	100

Source: Achieved by researchers

From our reading of the table, it becomes clear that the proportion of the elderly will reach 1/5 in the horizons of 2050, or about 22.13% of the total population. This is consistent with what was stated in the Arab Family Health Project for the year 2008, which stated, “Accordingly, as fertility continues to decline in every Arab countries and the development of life expectancy at birth. The next few decades will witness an increase in the percentage of the elderly population in large proportions, reaching in 2050 about a quarter of the population in Bahrain, Kuwait, Lebanon, Tunisia, and the Emirates, and a fifth in each of Algeria, Egypt, Libya, Morocco, Qatar, and Syria. It will not be less than 10% except in Yemen, Somalia, Mauritania, Djibouti and Palestine.” (League of Arab States, Social Affairs Sector, 2008, p. 190)

This increase imposes many governmental procedures and measures. Among the important challenges facing families and governments in elderly issues is the large cost of treatment, especially with the severity of the illness of the elderly and its long duration, and the high rate of disability among them compared to other groups, and the high cost of medications for chronic diseases and machines to assist movement or mobility. On hearing and other pathological phenomena that cost the budgets of families and governments a lot in a difficult economic period in which expenses are increasing due to rising prices and the inflation of budgets allocated to energy sources, foodstuffs and their raw materials, from which all Arab countries import necessities.”

Construction guide:

Table 5: Construction guide for the population of Algeria (2025/2050).

year	2025	2035	2045	2050
Construction guide	35.97	61.87	99.01	108.07

Source: Achieved by researchers

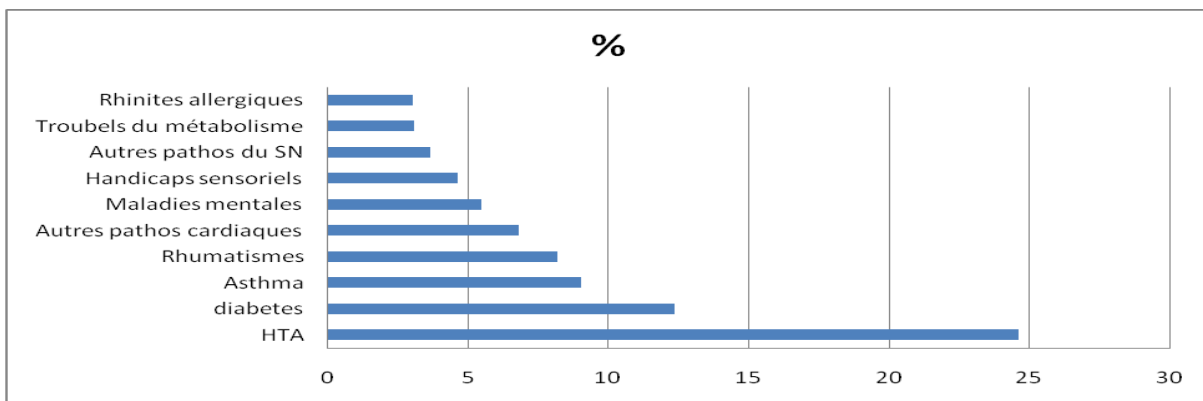
When we read the table, it becomes clear that by 2050, the number of elderly people will exceed the number of children, and this increase will exceed 8%. Thus, “the economic repercussions of displacement or reconstruction will worsen, represented by what complains about the financial systems of social coverage institutions (sickness insurance, retirement, compensation, etc.).) of a deficit that increases year after year in light of the decline in employment operations for the first time, that is, a

decline in the rate of benefiting from new contributions to these systems and an increase in expenditures, the most important of which is directed to the elderly. (League of Arab States, Social Affairs Sector, 2008, p. 201)

In late 2019, the emergence of the new Corona virus was recorded, which made the health situation in the world in general and in Algeria in particular, and immediately after the outbreak, there was much talk about the elderly and those with chronic diseases such as diabetes and blood pressure..."and others, that this group is the most vulnerable to death in the case of HIV infection, and there is much talk of healthy diets that indirectly reflect on individual health by increasing the levels of immunity." (Salmi, 2022, p. 556)

According to the study conducted by the Ministry of Health in 2005 on the epidemiological transformation and the health system, the spread of infectious diseases in Algeria is shown in the figure.

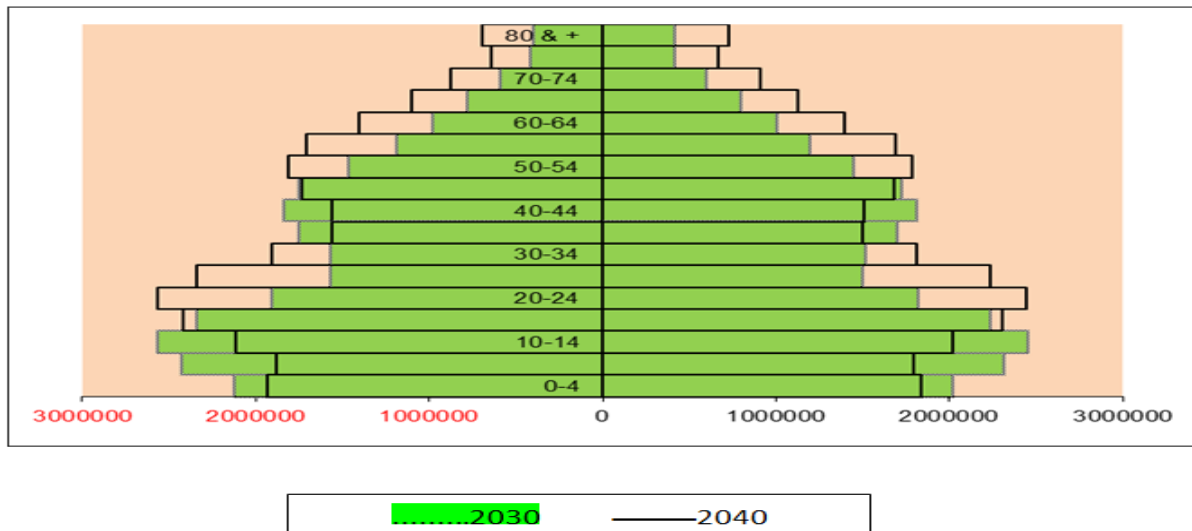
Figure 2: Distribution of chronic diseases by cause in Algeria 2007



Source: Institut National de santé Publique, Transition épidémiologique et système de santé Projet TAHINA, Enquête Nationale Santé, 2007.p59.

From our analysis of Figure 02, we find that the most significant non-communicable diseases known in Algerian society include hypertension, diabetes, asthma, rheumatism, heart diseases, mental disorders, sensory disabilities, metabolic disorders, and allergic rhinitis. Hypertension remains the most prevalent, causing deaths at a rate approaching 25%, followed by diabetes with a rate exceeding 12%. The least impactful is allergic rhinitis with less than 4%. (Salmi, 2022, p. 558).

Regarding the distribution of population by age and gender up to the 2050 horizons, it appears in the following population pyramids

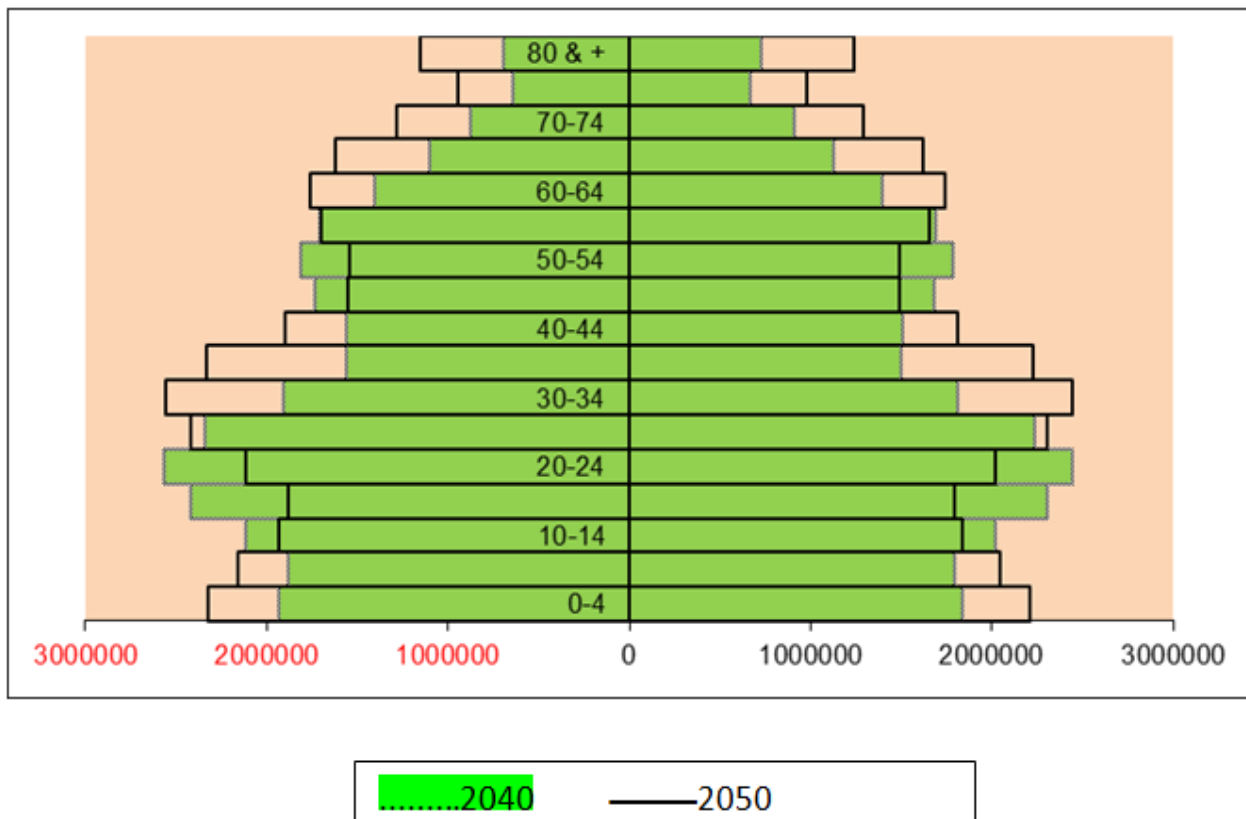
Figure 03: he population pyramid of Algeria in the years 2030 and 2040

Source: Achieved by researchers

Since the population pyramid is an abbreviated picture that expresses the demographic history of societies for many successive generations, it is accordingly “the base of the pyramid shows the children and gradually progresses to the young and then the elderly. If the society is passing through a (primitive pattern), then the birth rate is very high and the death rates are high.” Therefore, the levels of the pyramid decrease rapidly, and thus life expectancy appears low as the pyramid is short, but if the society is going through (a transitional pattern), then the birth rate is high, but the death rates will have decreased greatly due to benefiting from international cooperation in fighting epidemics and diseases. Therefore, the base of the pyramid is wide, and the decrease in the degrees of the pyramid is gradual, and the pyramid rises somewhat. If the society reaches the (stable pattern), where the birth rate is low and death rates are very low due to health care and the high standard of living, then the drawing is In the shape of the pyramid, it is closer to a “bottle” than to a pyramid, as the steps of the pyramid are very close.” (Daoudi, Khalaf, 2016)

The three forms of population pyramids, from figure 01 to figures 03 and 04, confirm that population communities will inevitably go through these stages, thus confirming what the theory of demographic transformation and the theory of epidemiological transformation came about, through policies adopted by the countries of the world to reduce population growth rates for a better life and living conditions favourable to the human race.

Figure 04: The population pyramid of Algeria in the years 2040 and 2050



Source: Achieved by researchers

Conclusion:

In conclusion, what we can emphasize is that the elderly population requires care and support from the active population, providing all the necessary conditions for a better life. Authorities must give due importance to demographic changes in shaping their future developmental policies, especially in the face of the prevalence of chronic diseases and their impact on the elderly. With the growth of this demographic group, there will be a direct increase in the demand for both direct and indirect healthcare, necessitating the establishment of reception facilities, family support, medical staff, and more. This is crucial to avoid falling into the trap of shortages in the future.

References :

- League of Arab States, Social Affairs Sector. (2008). Economic, Social, and Health Conditions of Arab Family Members Between Reality and Challenges, Arab Family Health Project 2008. Egypt: League of Arab States.

- Salmi, El djilali. (2022). The Epidemiological Situation in Algeria from the Colonial Period to the Emergence of the COVID-19 (Coronavirus) Pandemic. *Intellectual Perspectives*, p. 556
- Khaldi, Abdelkamel. (2017). Traffic Accidents in Algeria: A Demographic Study. Doctoral Thesis, University of Batna 1.
- Khaldi, Abdelkamel, Qasmi, Amar. (2020). Distribution of Fertility and Poverty by Province in Algeria (1995/1996). *Al-Bahith Journal of Humanities and Social Sciences*, Ouargla.
- Salmi, El djilali, Sheikhi, Rashid. (2018). Educational Planning and Population Estimates (A Case Study of Algeria). *Route Educational and Social Science Journal*, p. 899.
- Salmi, El djilali, Ladrem Ahmed. (2019). The Elderly Category in Algeria: Between Reality and Prospects (A Case Study of Algeria). *Route Educational-Social Science Journal*, p. 642.
- Mahdi Salah Daoudi, Aliaa Hussein Khalaf. (2016). Population Pyramid Analysis in Iraq from the Perspective of Human Development. *Diali Journal*, pp. 582-583.
- Office national des statistiques, **Recensement Général de la population et de l'habitat** (RGPH) ,1998 , collections statistiques n0 80 , ALGER, 1998 .
- Office national des statistiques, **Armature 2008- final**, ONS, ALGER .
- Office national des statistiques, collections statistique, les **principaux résultats du sondage au1/ 10ème 2008**, ONS, ALGER , décembre 2008
- Institut National de santé Publique, Transition épidémiologique et système de santé Projet TAHINA, Enquête Nationale Santé, 2007.p59.