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Determinants of Longevity in Algeria: A Cross-Country Comparative Analysis

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Abstract:
This study analyzes the determinants of longevity in Algeria through an international comparison with Iran, Tunisia, Egypt, South Africa, and Nigeria over the period 2000–2024. The results highlight an effective conversion of resources into health gains, a remarkable increase in life expectancy (from 30 years in 1923 to 75 years in 2023), and one of the smallest gender gaps in longevity within the panel (2.2–3.2 years). The analysis also reveals a moderate rise in median age (projected at 29.5 years by 2030) and superior efficiency in healthcare resource allocation compared to countries with similar economic levels. However, challenges persist, including demographic aging, regional disparities, and the management of chronic diseases. This study underscores the importance of targeted public policies and strategic investments to consolidate health and demographic achievements.

Keywords: Comparative health systems; Health efficiency; Demographic transition; Algeria

JEL Classification: I11 ; J11 ; O55

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Introduction

Since the beginning of the 21st century, the study of longevity has emerged as a critical field for understanding demographic and socio-economic transformations in contemporary societies (World Health Organization [WHO], 2020). In Algeria, this topic holds particular significance amid a demographic transition marked by advancements in public health and improvements in living conditions (Belhadj, 2015). However, these developments can only be fully contextualized through comparative analysis, juxtaposing Algeria's trajectory with that of countries sharing similar geographic, cultural, or socio-economic contexts (United Nations Development Programme [UNDP], 2018).

Selecting a sample of countries such as Tunisia, Iran, Egypt, South Africa, and Nigeria provides a robust analytical framework for situating Algeria's progress (Caldwell, 2006). These comparisons highlight achievements while revealing national specificities and emerging challenges. Key dimensions—including life expectancy trends, gender disparities, and the relationship between health expenditures and outcomes—require in-depth exploration.

Life expectancy in Algeria has been examined in academic studies, reflecting the country's demographic and socio-economic shifts. For instance, Kateb (1998) analyzed gender disparities in mortality during a pivotal period in Algerian history in *Life Expectancy at Birth and Female Excess Mortality in Algeria in 1954* . Despite such contributions, a gap remains in comparative analyses of Algeria's life expectancy trends relative to countries with similar contexts. Such comparisons would anchor Algeria's progress within regional and global frameworks, identifying factors shaping its demographic trajectory (UNDP, 2018).

The central question guiding this study is: *How has Algeria translated resources and public policies into longevity gains?* It also evaluates the effectiveness of health sector investments and Algeria's global positioning amid rising demographic pressures and chronic diseases (WHO, 2020).

The study is structured into three parts. The first situates Algeria's life expectancy trends within an international perspective, comparing trajectories across selected countries. The second explores underlying factors, such as median age shifts, economic indicators (GDP per capita), and health expenditures. The third offers a forward-looking analysis, identifying challenges linked to population aging and outlining strategies to consolidate gains while addressing future needs (Caldwell, 2006).

1. Sample Selection

To understand the dynamics of longevity in Algeria, it is essential to compare the country with a variety of contexts. The selected sample—

comprising Egypt, Iran, South Africa, Tunisia, and Nigeria—provides a relevant framework for analyzing intersecting demographic, socio-economic, and health trajectories. Each country offers a complementary perspective, enriching the understanding of life expectancy determinants.

Egypt , due to its geographic and cultural proximity to Algeria, serves as a key reference. Over two decades, Egypt's life expectancy rose from 64.5 years (2000) to 71.8 years (2024), driven by healthcare access improvements (World Bank, 2023). However, rural-urban disparities persist, hindering progress (UNDP, 2020).

Iran exemplifies rapid demographic transition. Despite geopolitical challenges, life expectancy increased from 69.5 years (2000) to 76.7 years (2024), attributed to health sector investments and education reforms (Rahbari et al., 2021).

South Africa contrasts sharply due to its HIV/AIDS epidemic. Life expectancy rebounded from 53.4 years (2000) to 64.1 years (2024), following antiretroviral therapy programs (UNAIDS, 2022).

Tunisia , Algeria's neighbor, shares cultural and historical ties. Its life expectancy rose from 73.2 years (2000) to 76.7 years (2024), reflecting effective public health policies and near-universal healthcare coverage (Ben Romdhane, 2019).

Nigeria, Africa's most populous nation, highlights healthcare underinvestment. Life expectancy increased modestly from 46.5 years (2000) to 54.7 years (2024), constrained by socio-economic pressures (Adepoju, 2021).

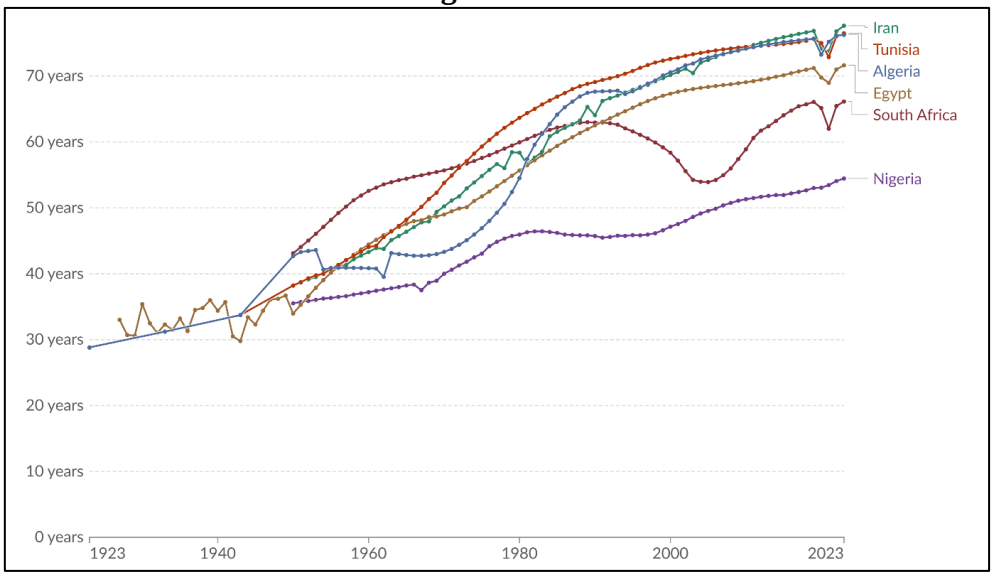
The **global average** life expectancy rose from 66.8 years (2000) to 73.4 years (2024), contextualizing Algeria's performance (WHO, 2022).

2. Comparative Demographic Trajectories: Algeria in Comparison with the Panel Countries

2.1 Evolution of Life Expectancy

Algeria's life expectancy surged from approximately 30 years in 1923 to 75 years in 2023, reflecting public health advancements (Kateb, 1998; ONS, 2023). This aligns with Tunisia (75 years) and Iran (76.7 years), though Algeria's trajectory shows unique challenges linked to post-colonial development (Belhadj, 2015).

Figure 1: Evolution of Life Expectancy from 1923 to 2023: Comparison Between Algeria and Selected Countries



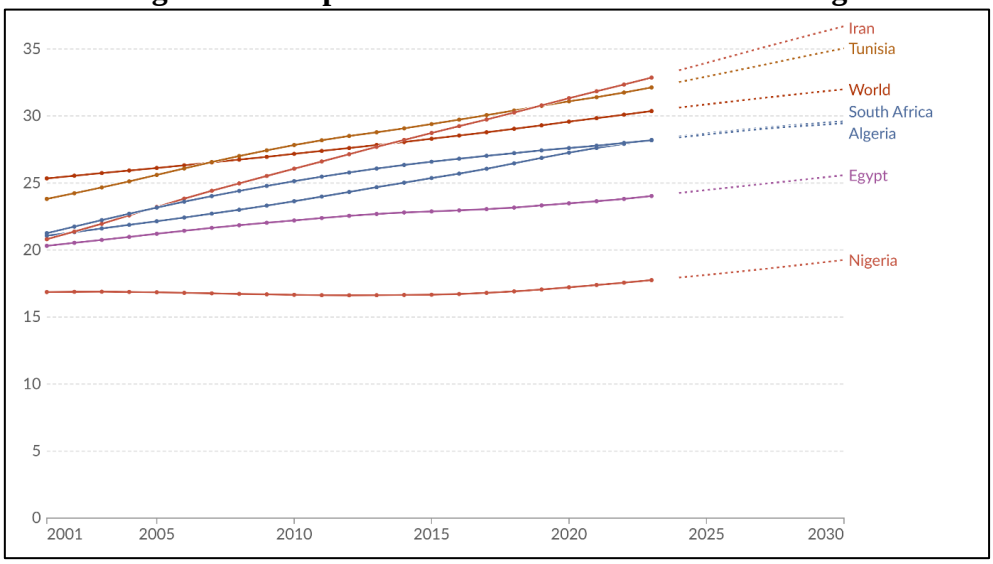
Source : UN, World Population Prospects (2024)

Egypt, despite experiencing fluctuations, has also seen a notable increase, reaching approximately 70 years in 2023. In contrast, **South Africa** faced significant declines due to the HIV/AIDS epidemic, but life expectancy has rebounded to around 65 years in 2023. **Nigeria**, on the other hand, shows slower progress, rising from 30 years in 1923 to 55 years in 2023.

2.2 Evolution of Median Age

Since the beginning of the 21st century, Algeria has experienced a significant increase in the median age of its population. In 2000, this indicator stood at approximately 20.7 years. This upward trend has continued, reaching 27.6 years in 2020, with projections estimating it will rise to 29.5 years by 2030.

Figure 2: Comparison of the Evolution of Median Age



Source : UN, World Population Prospects (2024)

Compared to regional neighbors and countries with diverse demographic contexts, Algeria exhibits a moderate trajectory. Iran , for instance, is experiencing rapid aging, with a median age of 34 years in 2024, projected to exceed 35 by 2030. This acceleration stems from stringent birth control policies implemented in the 1990s, creating challenges in pension funding and economic productivity (Mehran et al., 2022). Tunisia follows a similar path, with a median age of 33 in 2024 (projected to reach 35 by 2030), driven by advancements in women's education and fertility control (Ben Salah, 2020).

Egypt , despite cultural and economic similarities to Algeria, transitions more slowly. Its median age rose from 21 in 2001 to 26 in 2024, hindered by higher fertility rates and regional disparities (World Bank, 2023). Nigeria contrasts sharply, with a median age stagnant at 17–18 years, reflecting challenges in managing population growth and investing in education and healthcare (UN, 2021).

South Africa presents a unique case, with a median age of 28 in 2024, shaped by the HIV/AIDS epidemic's impact on mortality and fertility (UNAIDS, 2022). Though lagging behind North African nations, it highlights how health crises reshape age structures.

Globally, the median age increased from 26 in 2001 to 30 in 2024, aligning Algeria with the global average (UNDESA, 2023). However, this convergence masks disparities in socioeconomic contexts and policy effectiveness.

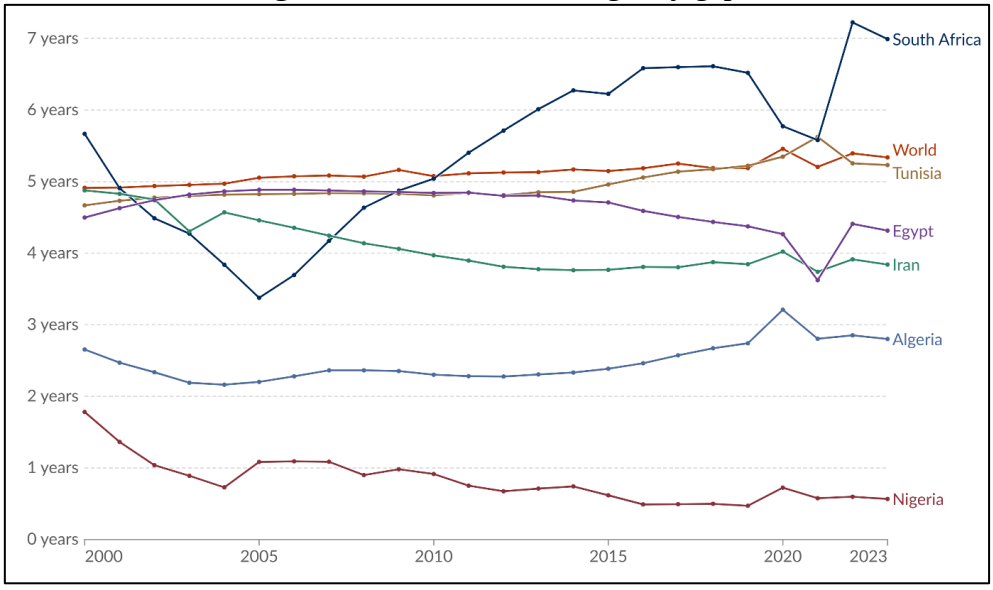
For Algeria, this moderate progression offers opportunities and challenges. The rising median age creates a "demographic dividend" —a window where the working-age population outweighs dependents. However, aging-related pressures, such as pension and healthcare funding, demand strategic planning. Iran and Tunisia's experiences underscore trade-offs of rapid transitions, while Nigeria and South Africa emphasize the need for human capital investments to ensure sustainable growth (World Bank, 2021; Demographic Research Institute, 2023).

3. Determinants of Life Expectancy: Gender, Economy, and Health Investments

3.1 Gender Disparities in Longevity:

A comparative analysis of gender-based life expectancy gaps in Algeria relative to other nations from 2000 to 2023 reveals significant and distinct trends.

Figure 3: Gender-based longevity gap



Source : UN, World Population Prospects (2024)

Algeria exhibits a trajectory characterized by remarkable relative stability, with the gender-based longevity gap fluctuating between 2.2 and 3.2 years in favor of women. This places Algeria consistently at the lower end of the group of studied nations. This positioning likely reflects smaller gender

disparities in health and longevity compared to other countries in the analysis.

In stark contrast, South Africa shows pronounced volatility, with the gap peaking at nearly 7 years in 2020–2021—over double Algeria's maximum disparity. Tunisia and Iran, geographically and culturally closer to Algeria, maintain larger gaps, typically between 4 and 5 years.

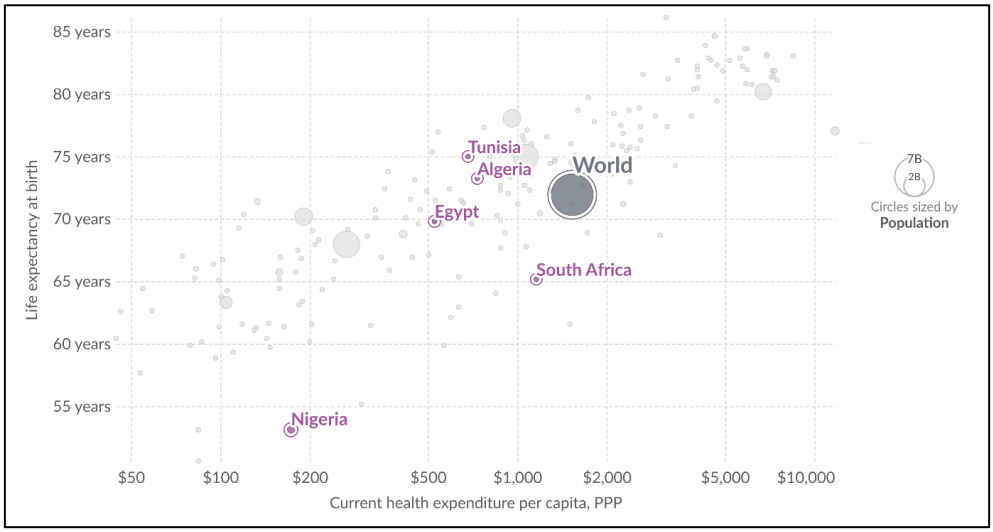
A striking observation is Algeria's divergence from the global average. While the global average sustains a stable 5-year gender longevity gap, Algeria remains in a lower range, suggesting distinct societal and health dynamics. This discrepancy may stem from structural factors such as specific public health policies, unique cultural norms, or socioeconomic conditions differentially impacting male and female life spans.

Nigeria, the only country with a smaller gap (around 1 year), further underscores Algeria's intermediate position in this comparative landscape. Algeria thus occupies a median position between sub-Saharan trends and Mediterranean nations.

3.2 Life Expectancy and Health Spending

An analysis of health spending per capita on a logarithmic scale reveals far greater disparities than initially apparent. Algeria, at approximately $1,000 per capita in PPP terms, is significantly distant from Nigeria ($200)—representing five times the spending, not merely double as a linear interpretation might suggest. Similarly, the gap with the global average ($2,000) means the latter spends double Algeria's amount, not just a nominal $1,000 difference.

Figure 4: Life Expectancy and Health Spending



Source : UN, World Population Prospects (2024)

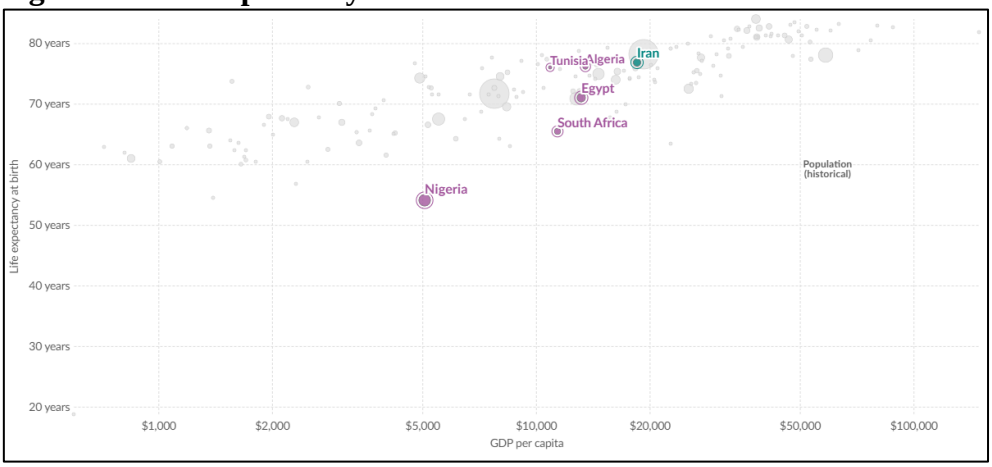
The apparent similarity between Algeria and Tunisia takes on new significance: their health spending is strikingly close on the logarithmic scale, suggesting remarkably similar policy choices and cost structures. The difference with Egypt ($500) becomes more striking, as Algeria actually spends **twice as much per capita** .

The logarithmic scale also highlights the exponential investments required to gain additional years of life expectancy. While the jump from $200 (Nigeria) to $1,000 (Algeria) corresponds to a gain of over 20 life expectancy years, the subsequent doubling of spending toward the global average ($2,000) yields a far smaller marginal gain. This underscores the **diminishing returns** on health investments beyond a certain threshold.

3.3 Life Expectancy and GDP

This graph, which correlates GDP per capita (logarithmic scale) with life expectancy, reveals fundamental dynamics in the relationship between wealth and health across national contexts.

Figure 5 : **Life Expectancy and GDP**



Source : UN, World Population Prospects (2024)

Algeria, with a GDP per capita of approximately $10,000 and a life expectancy nearing 75 years, demonstrates remarkable performance. This positioning becomes particularly intriguing in comparative context. Indeed, at a similar wealth level, Algeria achieves a life expectancy comparable to Tunisia, which has nearly identical indicators, suggesting equivalent efficiency in converting national wealth into health outcomes.

Iran, with a slightly higher GDP per capita ($15,000), achieves similar health results, indicating a "plateau" effect in life expectancy gains once a certain economic development threshold is reached. This underscores that additional wealth does not automatically translate into proportional health improvements.

The contrast with Nigeria is striking: despite a GDP per capita of $5,000, life expectancy there remains significantly lower (around 55 years), highlighting systemic challenges in converting national wealth into health outcomes. Egypt, with a GDP per capita similar to Algeria's, records a slightly lower life expectancy, underscoring Algeria's relative efficiency in its development model.

South Africa presents a unique case: despite a GDP per capita comparable to Algeria's, its life expectancy is notably lower (around 65 years), illustrating that wealth alone does not determine health outcomes. Social inequalities and health system effectiveness play critical roles.

This positioning places Algeria in a relatively favorable standing, demonstrating effective capacity to translate economic resources into tangible health results. However, the logarithmic GDP scale emphasizes that wealth disparities between nations are far steeper than visually apparent,

signaling immense challenges for countries seeking to catch up to higher development levels.

4. Discussion of Results

In-depth analysis of the study's findings on longevity in Algeria reveals significant trends and critical implications for the country's future healthcare system. Data shows remarkable improvements in life expectancy—from 30 years in 1923 to 75 years in 2023—a trajectory aligning with Tunisia and Iran and surpassing regional averages (Office for National Statistics [ONS], 2023). This progress reflects the effectiveness of long-term public health policies, such as expanded healthcare access and infectious disease control (Algerian Ministry of Health, 2021).

Algeria's demographic transition is marked by a moderate rise in the median age, projected to reach 29.5 years by 2030 (from 27.6 in 2020) (UNDESA, 2023). This progression aligns with the global average of 30 years, positioning the country in a favorable **"demographic dividend"** phase. This transitional window offers significant opportunities for economic and social development but requires strategic planning to maximize benefits, particularly in education and employment (World Bank, 2022).

A notable finding concerns **gender disparities** in life expectancy: Algeria's gap (2.2–3.2 years in favor of women) is narrower than the global average of 5 years (WHO, 2022). This suggests relative equity in healthcare access, though disparities in maternal health and chronic disease management indicate areas for targeted interventions (Belhadj, 2019).

Economically, Algeria's health spending of $1,000 per capita (in PPP terms) positions it intermediately between African nations ($200) and the global average ($2,000) (IMF, 2023). The efficiency of resource allocation is evident: Algeria's GDP per capita ($10,000) converts into life expectancy (75 years) more effectively than in comparator nations like Egypt (71.8 years) and South Africa (64.1 years) (World Bank, 2023).

Conclusion

The comparative analysis of longevity determinants in Algeria reveals significant progress, including a sharp rise in life expectancy, a reduced gender gap, and efficient healthcare resource allocation. These outcomes reflect the impact of public policies, such as expanded access to healthcare and efforts to combat infectious diseases. However, Algeria faces structural challenges: demographic transition, marked by a rising median age, requires

strategic planning to harness the demographic dividend while anticipating pressures linked to aging populations (pension systems, management of chronic diseases).

Comparisons with panel countries offer valuable insights. Iran and Tunisia illustrate the risks of accelerated aging, while Nigeria and South Africa highlight the urgency of investing in human capital. For Algeria, optimizing healthcare infrastructure, strengthening social protection, and adapting policies to regional realities are priorities. Finally, despite limited gender disparities, targeted efforts in maternal health and prevention remain necessary.

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