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The Gender Aspect of Life Expectancy in the Regional and Sectoral Context of Kazakhstan

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Abstract

Life expectancy is an integral indicator of the health status of the population and the level of socio-economic development of society. The purpose of the article is to identify key gender differences in the life expectancy of Kazakhstan's population within the regional and sectoral contexts and to formulate practical recommendations for reducing inequality. The methodological basis of the research includes quantitative and qualitative methods of analysis, as well as general scientific approaches – systematisation, comparison, analogy and descriptive statistics. The empirical database is based on data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan for 2000-2024, as well as materials from the World Health Organisation and the World Bank. The results of the study showed a steady advantage of women in life expectancy throughout the country. In 2023, the average life expectancy in Kazakhstan was 75.1 years, with 70.99 years for men and 79.06 years for women, corresponding to a gender gap of 8.07 years. The highest life expectancy values were recorded in the cities of republican significance - Almaty (78.28 years) and Astana (78.09 years), as well as in the southern agricultural regions. The minimum life expectancy is observed in the industrial regions of East Kazakhstan (73.2 years) and Karaganda (73.43 years), where mining and processing industries with increased occupational risks prevail. An analysis of the sectoral structure revealed that regions dominated by services, education, and public administration demonstrate higher life expectancy.

Keywords: Gender, Gender Gap, Life Expectancy, Regional Analysis, Sectoral Factor, Population Health, Demography, Labour Protection, Social Development

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1. INTRODUCTION

The life expectancy of the population is a key indicator of the country's socio-economic development and an integral measure of societal well-being. For Kazakhstan, which is in the process of modernising its economy and reforming its social policy, the study of factors affecting life expectancy is becoming particularly relevant. In the context of demographic ageing, high sectoral specialisation of the economy, and pronounced regional imbalances, the analysis of factors determining life expectancy is especially relevant in the gender context.

Several studies show that the gender gap in life expectancy is formed in a complex way: biological factors interact with socio-behavioural (smoking, alcoholism), economic (income level, employment), as well as with access to medical care (Lopez et al., 2002; Sanderson et al., 2016; Mateos et al., 2020). At the same time, global studies emphasise that biology explains only part of the differences, and economic and behavioural factors play a significant role (Hao et al., 2020; Zarulli & Salinari, 2024).

In many countries, the average life expectancy of women is longer than that of men. However, the average indicator hides variations within the country, among regions and industries. Let us consider industry affiliation (employment, working conditions) and regional specifics. We can identify which professions and regions are associated with increased risks and how they affect men and women differently.

There is a steady gender gap in favour of women in Kazakhstan: according to 2023 data, the average life expectancy was 75.1 years, with women living on average 7-8 years longer than men. The gender gap is accompanied by pronounced regional differentiation, reflecting differences in the level of urbanisation, environmental conditions, access to medical care, and the structure of the economy. Thus, in industrial regions (Karaganda and Pavlodar regions), life expectancy is lower than the national average, primarily due to the impact of harmful production factors and environmental stress. On the contrary, in the southern agricultural regions and large cities (Almaty, Astana), life expectancy is higher due to a combination of better access to medicine, a more favourable environmental situation, and employment of the population mainly in the fields of services, education, and management.

A special place in the formation of gender differences is the sectoral factor that determines the working conditions, the level of occupational risks and the socio-economic status of the population. Men are more likely to be employed in the extractive and construction industries, transport and industry sectors, with increased mortality from external causes and occupational diseases. Women are more involved in social and service activities due to more favourable working conditions and access to medical services. Thus, the gender gap in life expectancy manifests itself not only as a biological or behavioural difference but also as a reflection of structural imbalances in the economy and employment.

The need for a comprehensive analysis of gender differences in life expectancy in regional and sectoral contexts determines the relevance of this study. Such a study allows us to identify spatial patterns and regional clusters with different dynamics of life expectancy; to identify industries in which occupational risks contribute most to the gender gap; and to propose targeted health, occupational safety, and social protection policies.

The purpose of the article is to identify key gender differences in the life expectancy of Kazakhstan's population within the regional and sectoral contexts and to formulate practical recommendations for reducing inequality. To achieve this goal, statistical data from official sources are used, and quantitative and qualitative analyses of the dynamics and structure of indicators are carried out. The determinants underlying the identified differences are then discussed. Thus, the study of gender differences in life expectancy within regional and sectoral contexts has significant scientific and practical importance.

2. LITERATURE REVIEW

The study of gender differences in life expectancy over the past decades has become one of the key areas of demographic and socio-medical research. The results of international research indicate that biological differences play an important but not decisive role: the persistent gender gap in life expectancy is primarily explained by social conditions, employment patterns, access to medical services, occupational risks, and lifestyle (WHO, 2023; World Bank, 2024). These patterns are confirmed for both high-income and transition economies. The systematisation of international and national scientific experience allows us to build an analytical framework for research, compare key approaches and identify areas that require further deepening.

The analysis of the sources shows. The gender gap in life expectancy remains in the international context, but its magnitude depends on the country and changes over time (Sanderson et al., 2016; Mateos et al., 2020). The study of scientific literature on gender differences has enabled the classification of worldwide research into areas that explain these differences. A large number of modern studies show that gender differences in life expectancy are formed due to the interaction of biological, behavioural and social factors (Zarulli & Salinari, 2024).

Researchers identify a combination of biological factors, such as genetics (for example, the XX chromosome in women), hormonal differences that may give some advantage to women, and behavioural risks, as key drivers of higher mortality in men at most ages. At the same time, trends are changing: in several countries, the gender gap is narrowing due to lifestyle changes (an increase in smoking among women, a decrease in male mortality). It should be noted that biological differences explain only part of the difference. However, behavioural risks (smoking, alcohol consumption), external causes of death (risky professions, accidents, injuries, violence) and socio-economic factors (income level, access to medical care) play a leading role. These factors operate independently of the industry, but their influence can be amplified in hazardous industries (Smith & Sinkford, 2022; Pinho-Gomes et al., 2023). However, many studies remain at the level of a general analysis of mortality by age, gender, and socio-economic status.

In this regard, there are several characteristic points in Kazakhstan. Firstly, non-communicable diseases—cardiovascular and oncological—make the main contribution to mortality, which is especially noticeable in adults and the elderly. This is reflected in the indicators and increases regional differences in life expectancy (Davletov et al., 2014). Secondly, several studies have noted the influence of alcohol consumption and external causes of death (accidents, injuries, suicides) on male mortality, especially in the northeastern and some other regions (Davletov et al., 2015). Finally, studies show ethnic and spatial differences in mortality rates (for example, higher rates among ethnic Russians compared to Kazakhs), which also affect regional patterns (Sarsembayeva et al., 2025).

The existing differentiation between regions often reinforces gender differences. In less developed regions or rural areas with poorer living conditions and poorer access to medical care, the gender gap may be larger or distorted due to high mortality from external causes. Regional studies in Kazakhstan indicate a high proportion of cardiovascular diseases and a significant contribution of external causes and alcohol-related problems to male mortality in several areas. Many studies have shown that regional inequalities (income levels, access to medicine, and the environmental situation) affect both absolute life expectancy and the gender gap: depressed regions exhibit both lower life standards and substantial variations in the gender gap. This situation is typical for many countries, as confirmed by studies conducted in the UK and the USA, which show stable differences in the directions of “north-south” or “city–province” (WHO, 2023).

The indicator of life expectancy is closely related not only to the level of healthcare, the environmental situation and social conditions, but also to the peculiarities of professional employment of the population. Profession, employment, and skill level determine access to medical services, as well as income, lifestyle, and the impact of occupational factors on health (Omirgazy, 2025). However, it should be noted that there are relatively few publications in the world's scientific literature that would break down life expectancy by profession/industry and gender in multinational contexts with regional details. For example, a study by Detre et al. (2001) compares the mortality rate of men and women who worked in comparable senior positions. They found that women in such positions demonstrated significantly lower mortality rates, even when controlling for the exact job requirements. That is, corporate, administrative, or "high-status" positions can make a difference in their health effects, at least in developed countries. The importance of the industry factor is noted: professions with increased injury and harmful conditions correlate with a lower life expectancy, and men are more represented in these sectors, which partially explains gender differences (Hemström, 1999). At the same time, there are practically no studies that simultaneously study life expectancy by gender, industry, and region.

Connection with the "main profession-type of employment". The article "Happiness and life expectancy by main occupational status" shows that for both men and women, life expectancy differs depending on the type of occupation: a person in a leadership position often has advantages over workers in manual labour or with a high level of risk (Lozano & Solé-Auró, 2021). This is consistent with the hypothesis that professions with high workload, harmful working conditions, stress, or physical risks can reduce life expectancy, and the impact may vary by gender.

Studies that purposefully compare life expectancy by profession or industry show systematic differences: workers in hazardous industries (mining, construction, transport, heavy industry) have a lower life expectancy than white-collar workers. Individuals directly assess their "occupation-based life expectation" and relate the difference to health status, working conditions, and socio-economic status. These effects are often more pronounced in men, as the proportion of male employment in hazardous industries is higher (Deeg et al., 2021).

In Kazakhstan, there is practically no open research with an industry breakdown; however, several works can be noted that provide indirect information and context. Thus, the article examines how socio-economic factors (income, employment, education) affect the life expectancy of men and women in Kazakhstan in recent years; however, a detailed breakdown by industry is not provided (Sarsembayeva et al., 2025). The authors of the article investigate gender inequality in the labour market in Kazakhstan, analysing labour activity, wage differences, and the employment of men and women in different sectors. However, the study practically does not address life expectancy. The Asian Development Bank proposed the gender assessment of Kazakhstan based on an analysis of the economic activity of women and men, and the distribution by economic sector (ADB, 2013). At the same time, the report notes that women are more likely to participate in the informal sector, while men are more likely to participate in the formal sector, sometimes working in more "dangerous" industries (ADB, 2013). This is important because when working in a more dangerous industry, their life expectancy can be statistically reduced. The Report "Gender Policy in modern Kazakhstan" provides an analysis of institutional, social aspects and gender differences in access to resources, healthcare, etc., which indirectly affects life expectancy (Nikolaeva, 2022). The OECD report "Gender Gaps in Eurasia: Global and Regional Context" discusses gender gaps in health, economic activity, and other important issues for the countries of the region, including those in Central Asia (OECD, 2021). However, these

reports do not provide a breakdown by profession.

Studies of gender differences in life expectancy and their causes, along with social, value, and behavioural factors, conducted in neighbouring countries, provide a sound methodological and theoretical background. However, they rarely address the sectoral section of employment (Rodionova & Kopnova, 2020). In 2024-2025, articles and reports were published analysing the regional dynamics of mortality in Kazakhstan (including studies on causes of death and regional trends). Open academic publications reveal significant regional differences and the increasing role of noncommunicable diseases; however, there is a notable lack of direct industry breakdowns (life expectancy by industry and gender within regions) in open sources (Aimyshev et al., 2025).

3. METHODOLOGY

The research methodological basis combines quantitative and qualitative analysis methods with general scientific approaches, providing a comprehensive study of gender differences in the life expectancy of Kazakhstan's population across regional and sectoral contexts. The application of a multi-level approach makes it possible to take into account a set of biological, behavioural and structural factors that determine life expectancy, as well as to identify spatial and sectoral patterns of gender gap formation.

The empirical base of the study was formed using official statistical materials from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan (BNS RK) covering the period 2000-2024. Additionally, data from international organisations such as the World Health Organisation (WHO) and the World Bank were used, as well as the results of national and foreign studies on mortality, regional differentiation of health and gender differences. The statistical data are aggregated by region and type of economic activity, which makes it possible to ensure their comparability and systematic analysis.

The following methods were used in the study: systematisation, comparison, analogy and descriptive statistics. The quantitative analysis included:

(1) trend analysis of the dynamics of life expectancy for men and women by country and region, highlighting the stages of growth, decline and recovery after the COVID-19 pandemic;

(2) regional decomposition of indicators with identification of spatial clusters and regions with consistently high and low life expectancy values;

(3) sectoral profiling of regions by dominant types of economic activity (mining, agriculture, services, education, public administration, etc.) in order to identify the relationship between the sectoral structure of the economy and public health;

(4) causal decomposition of the gender gap with the determination of the contribution of male and female mortality to changes in aggregate indicators;

(5) event analysis for 2020-2021, which allowed us to take into account the short-term effects of the pandemic.

Indicators and variables

The key indicator is life expectancy at birth, differentiated by gender, region, and dominant industries. The level of urbanisation, employment structure by type of economic activity, availability of medical services, environmental parameters, and socio-economic characteristics of the regions were used as additional variables. The gender gap was calculated as the absolute difference between the life expectancy of women and men in the corresponding regional and sectoral groups.

4. ANALYSIS AND RESULTS

It has been reported by the Bureau of National Statistics of the Republic of Kazakhstan (2023) that the average life expectancy in Kazakhstan amounts to 71.5 years, the average for males reaching 67.8

years, and the average for females reaching 75.1 years. This information indicates a sustained gender gap of around 7–8 years, consistent with patterns observed in various post-Soviet countries, and significantly higher than the average gap found in European Union member states, where discrepancies typically range from 4 to 5 years. These disparities are a testament to the complex combination of behavioural, occupational, and healthcare-oriented factors that consistently impact the demographic profile and the outcomes for public health in Kazakhstan (Table 1).

TABLE 1. Life expectancy: Kazakhstan, 2022 and 2023

Category	2022 (years)	2023 (years)	Absolute increase
Kazakhstan (average)	74,44	75,09	+0,65
Men (average)	70,26	70,99	+0,73
Women (average)	78,41	79,06	+0,65
Almaty city	77,32	78,28	+0,96
Ulytau region	71,44	72,41	+0,97

Note: compiled from the source Bureau of National Statistics (2023)

Based on Table 1, there is clear evidence of an overall improvement in the health of the population of Kazakhstan. The positive dynamics, an annual increase in life expectancy of more than 0.6 years, reflect gradually improving living conditions and advancements in healthcare, including better access to medical services, enhanced disease prevention, and a reduction in mortality rates. Despite this general progress, a persistent gender gap in life expectancy remains: in 2023, women lived on average 8.1 years longer than men, a difference that, while slightly less pronounced statistically than in previous years, continues to be a significant demographic feature. Notably, both the city of Almaty and the Ulytau region demonstrated substantial improvement in life expectancy, with an increase of approximately one year. This positive change can be attributed to different factors: in Almaty, the effect is likely linked to the presence of a well-developed healthcare system and higher living standards. At the same time, in Ulytau, it may be associated with the implementation of targeted state programs aimed at improving medical infrastructure and quality of life in remote regions. Over the ten years from 2014 to 2023, Kazakhstan's overall life expectancy showed a consistent upward trend, except for the temporary decline in 2020–2021 caused by the COVID-19 pandemic. Nevertheless, the gap between men and women has remained significant, averaging around eight years nationwide, as illustrated in Figure 1, confirming that gender-based differences in health outcomes persist despite overall improvements in population well-being.

The most prominent pattern recognised in Kazakhstan shows a stable increase in life expectancy from the early 2000s onward, building upon a decline in the 1990s. This favourable trajectory was disrupted in 2020–2021 due to the COVID-19 pandemic's effects, followed by a gradual recovery from 2022 onward until 2024. Regardless of these fluctuations, the gender gap in life expectancy has experienced relative stability, oscillating between six and ten years for most regions, with females living longer than males. Particularly, the time span between 2000 and 2010 was characterised by a stable growth in life expectancy, which coincided with the country's recovery from the socio-economic challenges experienced during the previous decade, while the gender gap itself stayed the same.

Between 2010 and 2019, Kazakhstan experienced additional stable improvements that were traceable to enhanced healthcare service delivery, socioeconomic growth, and increased access to healthcare services.

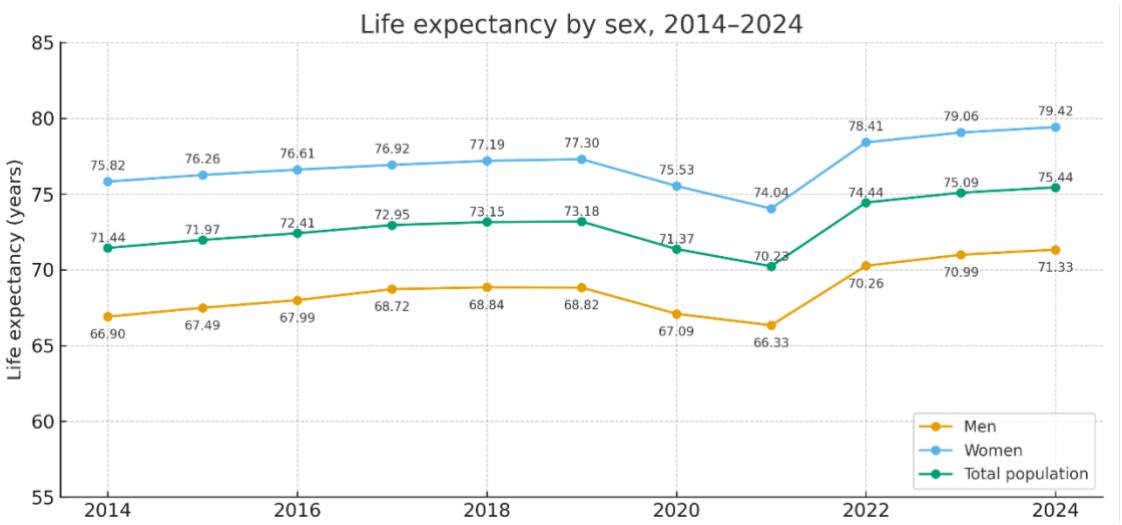

Figure 1. Life expectancy in Kazakhstan by gender

The 2020–2021 period accumulated a notable decline in life expectancy due to the effects of the COVID-19 pandemic, which disproportionately affected males mainly because of elevated mortality from accidents and injuries and cardiovascular disease. Life expectancy resumed growth between 2022 and 2024, reaching a total average of 75.44 years by the end of 2024, which indicates that the long-term trajectory has resumed its positive direction. However, significant geographical disparities remain evident: life expectancy remains the highest for the south regions—South Kazakhstan, Zhambyl, and Turkestan—averaging 73–74 years, while the lowest levels are realised in East Kazakhstan and Karaganda regions at around 69–70 years. These discrepancies highlight the persistent effects of the regional socio-economic conditions, healthcare access, and environmental factors on the population's health outcomes across the country (Table 2).

TABLE 2. Current life expectancy in Kazakhstan

Region	2023 (total)	Men	Women	Gender gap (years)
Kazakhstan	75.09	70.99	79.06	8.07
Abaya	74.14	69.74	78.30	8.56
Akmola region	74.25	69.77	78.81	9.04
Aktobe region	74.71	70.76	78.45	7.69
Almaty region	74.53	71.03	78.22	7.19
Atyrau region	75.29	70.96	79.33	8.37
West Kazakhstan region	74.08	69.51	78.69	9.18
Zhambyl region	75.25	71.13	79.36	8.23
Zhetysu region	74.64	70.55	78.64	8.09
Karaganda region	73.43	68.67	77.84	9.17
Kostanay region	73.65	68.99	78.12	9.13
Kyzylorda region	74.58	71.04	78.10	7.06
Mangystau region	75.84	71.58	79.90	8.32
Pavlodar region	74.33	69.63	78.71	9.08
North Kazakhstan region	73.13	68.21	78.10	9.89
Turkestan region	74.94	71.65	78.34	6.69

Ulytau region	72.41	68.04	76.95	8.91
East Kazakhstan region	73.20	68.60	78.00	9.40
Astana city	78.09	74.23	81.28	7.05
Almaty city	78.28	74.47	81.43	6.96
Shymkent city	76.32	72.60	79.56	6.96

Note: Compiled based on World Bank (2023); Bureau of National Statistics (2023)

This differentiation is explained by the level of urbanisation, environmental conditions (especially in the east and in industrial centres), and the availability of medical care. In cities of national importance (Astana, Almaty), life expectancy has developed above the national average due to the concentration of medical centres, educational institutions and jobs with a high level of qualifications. In industrially developed regions (Karaganda, Pavlodar regions), the impact of industrial risks associated with metallurgy, coal industry and chemistry is observed, which reduces life expectancy. In rural and agricultural regions (Zhambyl and Turkestan regions), indicators depend on the level of infrastructure, availability of medicine, and quality of working conditions in agriculture.

Figure 2 shows life expectancy (in years) for each region, and the colour of the column reflects the primary industry that has the most significant impact on public health. The red dotted line shows the national average.

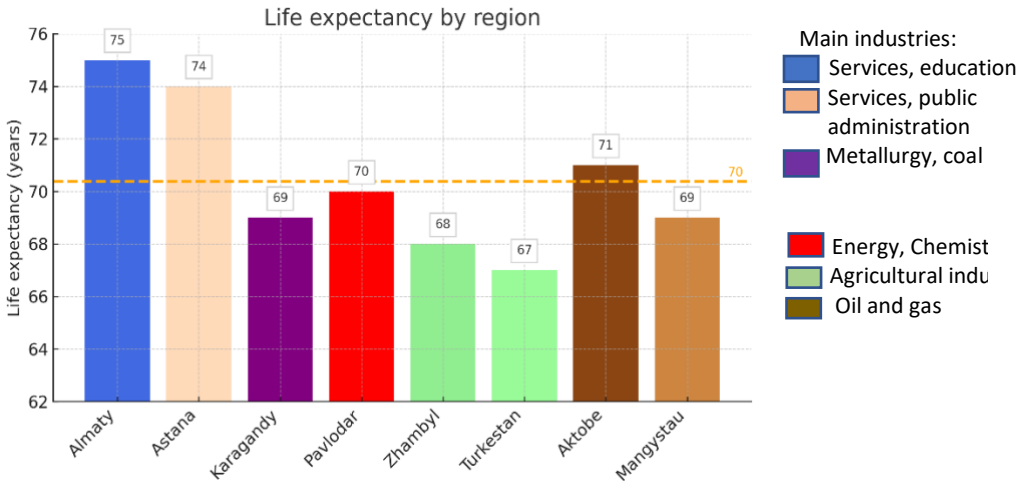

Figure 2. Life expectancy and primary industries affecting public health by region of Kazakhstan

Public health is an integral indicator of the country's sustainable development. In Kazakhstan, where the economy is primarily focused on the raw materials sector, the influence of the sectoral structure on demographic indicators, including life expectancy and morbidity, is particularly pronounced.

The sectoral structure of Kazakhstan's economy has a direct impact on public health. The specifics of industries form different production risks, social working conditions and environmental stress, which together affect the level of health. Thus, workers in the construction and manufacturing industries are at risk of injury due to exposure to building materials and chemicals. Harmful working conditions significantly impact health, encompassing chemical emissions, radiation exposure (such as in uranium mines), gas contamination of mines, a high level of occupational diseases (like silicosis, respiratory diseases, and skin diseases), and a risk of injury and premature mortality among

employees. High mortality rates from respiratory diseases and cardiovascular diseases are recorded in industrial regions (Karaganda, Pavlodar, and East Kazakhstan regions). These regions traditionally show lower life expectancy rates compared to the south of the country. Work in extractive industries (oil, gas, coal, metallurgy) is characterised by increased occupational risks, including air pollution, harmful working conditions, and high rates of occupational morbidity. This reduces the life expectancy of workers and residents of industrial regions (Atyrau, Mangystau, Karaganda regions).

It should be noted that Atyrau, Mangystau, and Karaganda regions record lower life expectancy (69-72 years for men), which is associated with the concentration of extractive industries.

The sectors of Kazakhstan's economy that have a negative and positive impact on public health are shown in Figure 3.

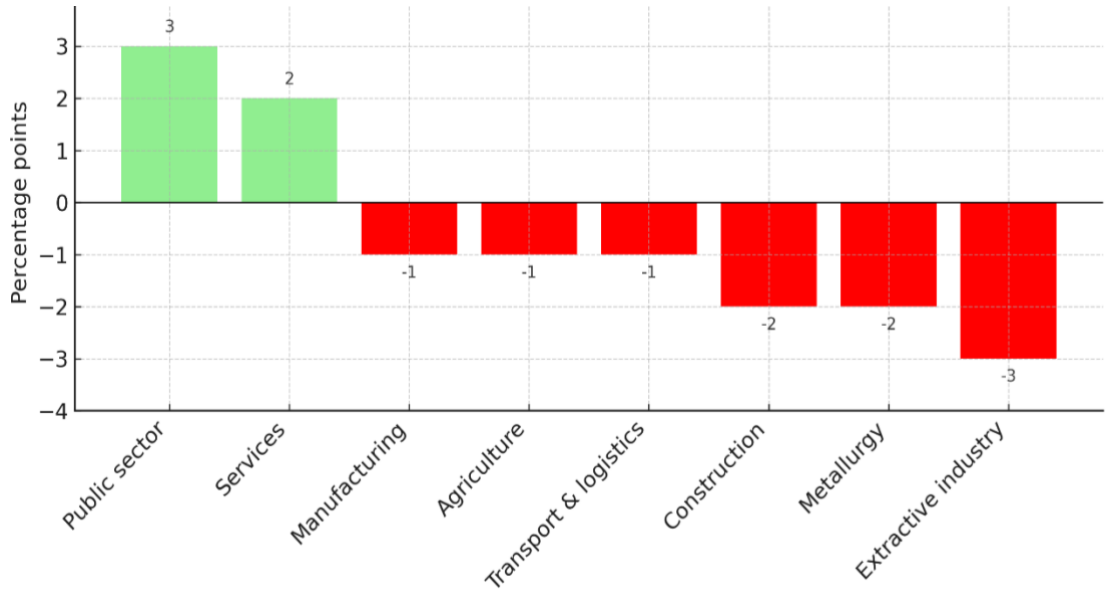

Figure 3. The impact of Kazakhstan's economic sectors on public health

In Figure 3, sectors of Kazakhstan's economy that are harmful to public health are colored red, while those that are beneficial are colored green. On average, women living in Kazakhstan have a longer life expectancy by 7–9 years compared to men, a gap that is mainly accounted for by differences in employment patterns, working conditions, and living style. Women are underrepresented in the sectors of mining and heavy industry and are concentrated in education, services, and healthcare sectors that are affiliated with working conditions that are comparatively safe, greater social participation, and a better work–life balance. Men, by contrast, are concentrated in the extractive industry, construction work, and transportation, where work-related accidents are disproportionately high and circulatory diseases are widespread. Additionally, higher levels of smoking and alcohol consumption in men further exacerbate the gender gap in longevity. Occupations that are labelled intellectual or knowledge-oriented, such as scientists, teachers, and civil servants, are aligned with longer lifespans. Occupants of physically strenuous or dangerous jobs have shorter life expectancies. Hence, the gender gaps in longevity evident from Kazakhstan are a marker of a complicated interaction between

biological, occupational, and socio-economic factors.

The principal obstacles that persistently impact life expectancy throughout the various regions of Kazakhstan encompass elevated morbidity rates among employees in heavy industries, inadequate career guidance and the prevention of occupational diseases, alongside a low level of investment in the development of human capital across numerous industrial and rural areas. To rectify these inequities and enhance public health outcomes, it is imperative to mitigate occupational hazards in the extractive and industrial sectors via technological modernisation, improved working conditions, and a progressive transition towards a green economy. The establishment of regional professional development and retraining programs will help reduce occupational risks and promote employment in safer sectors. Preventive medicine must be reinforced within enterprises through the advancement of occupational health services, the implementation of regular medical examinations, and the execution of awareness campaigns. Furthermore, the disease prevention framework should be broadened by enhancing screening initiatives, facilitating early diagnosis, and encouraging the adoption of healthy lifestyles. In remote and sparsely populated regions, such as Ulytau and the northern territories, the deployment of mobile healthcare and telemedicine services is vital to guarantee equitable access to medical care.

The promotion of retraining initiatives for employees in heavy industry is essential to support their transition into safer employment sectors, including services, construction that adheres to improved safety regulations, or the information technology field. It is imperative to enhance occupational safety and environmental management through compulsory audits and ongoing monitoring, especially in high-risk areas such as Atyrau, Mangystau, Pavlodar, and Karaganda. Social protection strategies should include targeted financial assistance for at-risk populations and elderly individuals in areas with low life expectancy. In formulating regional policies, it is crucial to prioritise the enhancement of medical service accessibility in rural and environmentally compromised locations. Furthermore, gender-sensitive health care policies must be established to mitigate premature mortality rates among males and to tackle behavioural health concerns linked to smoking, alcohol usage, and hazardous working environments.

To achieve sustainable improvements in public health and reduce inequities associated with area, sector, and gender in life expectancy, Kazakhstan needs to expand its investment in human capital by emphasising education, retraining programs, and the creation of environmentally secure and sustainable jobs. Further, it is imperative to extend assistance for established workers through flexible work arrangements so that their social engagement may be encouraged and their income security ensured. Finally, utilising the "Healthy Life Expectancy" index as a key indicator for assessing social policy effectiveness would lead to a more accurate evaluation of population health improvements and provide a sound analytical platform for deriving evidence-based policy at both regional and national levels.

5. CONCLUSION

The gender gap in life expectancy in Kazakhstan remains a significant challenge for public health policy and requires a comprehensive approach that addresses behavioural, medical, and regional determinants simultaneously. Reducing this disparity demands coordinated efforts aimed at preventing behavioural health risks, improving accessibility and quality of medical services, and strengthening regionally differentiated social and health policies. To achieve this, it is essential to identify industries and regions with elevated mortality rates to direct occupational safety initiatives, alcohol and tobacco prevention programs, and improve access to healthcare and emergency medical services. Interventions must consider gender-specific

employment characteristics, ensuring that preventive measures are tailored to the distinct risk profiles of men and women—for example, enhancing occupational safety and the prevention of noncommunicable diseases among men, and expanding access to preventive and reproductive healthcare services for women. Regionally targeted prevention programs should be developed and implemented, focusing particularly on the working-age male population, with an emphasis on regular medical check-ups, early diagnosis, and promoting healthy lifestyles. It is also crucial to strengthen measures to reduce alcohol consumption and prevent injuries, including through stricter enforcement of occupational safety standards and initiatives to reduce road traffic accidents. Improving the availability of primary and specialised healthcare in remote and sparsely populated areas is another important direction, which can be achieved through the expansion of telemedicine, mobile medical teams, and outreach services. Equally vital is the enhancement of the national health monitoring system, ensuring the collection and publication of detailed, disaggregated data by gender, age, and causes of death to enable timely assessment of the effectiveness of public health interventions. By implementing these broad-based measures, Kazakhstan can significantly reduce gender differences in life expectancy and work towards a healthier, more equitable society.

Moreover, achieving sustainable improvements in life expectancy requires a commitment to long-term investments in human capital and the creation of health-promoting environments. This endeavour requires the promotion of collaboration across various sectors, including healthcare, education, labour, and environmental agencies, to tackle the fundamental causes of health disparities. Initiatives aimed at raising public awareness should be broadened to promote responsible health practices, early disease prevention, and the maintenance of mental health. Educational institutions and workplaces hold significant potential to contribute by incorporating health education, stress management, and wellness initiatives into their operations.

Additionally, providing incentives from both corporate and governmental bodies for businesses that adopt innovations in occupational health and safety, support employee wellness, and shift towards cleaner, safer technologies will enhance working conditions. By integrating preventive healthcare with comprehensive economic and social reforms, Kazakhstan can establish a basis for equitable and inclusive development, ensuring that advancements in life expectancy are advantageous for all demographic segments equally.

AUTHOR CONTRIBUTION

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Conceptualization: Zaure K. Chulanova.
Formal analysis and investigation: Zaure K. Chulanova.
Development of research methodology: Zaure K. Chulanova.
Resources: Zaure K. Chulanova.
Software and supervision: Zaure K. Chulanova.
Data collection, analysis and interpretation: Zaure K. Chulanova.
Visualization: Zaure K. Chulanova.
Writing – review and editing: Zaure K. Chulanova.

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