The Impact of Life Expectancy on Health Expenditure in Malaysia

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ABSTRACT

In this research, the researcher examines the dynamic association between gender-specific life expectancy male and female, and per capita health expenditure in Malaysia using time-series data between 2000 and 2024. Through applying Ordinary Least Squares (OLS) regression, the analysis shows that male life expectancy and female life expectancy have a positive and statistically significant effect on current health expenditure per capita. This implies that the longer the life expectancy the higher the requirement of health care services, especially long-term care, chronic diseases management and the elderly support systems. The findings support the thesis that the ageing population, regardless of the gender, results in the strain on the national health budgets. Moreover, the higher coefficient in female life expectancy suggests that the health planning costs of longer lifespan of women might be more significant. The research highlights the importance of an active gender-responsive healthcare policy framework that can match the population changes in Malaysia. Based on these facts, policymakers must ensure that they invest in effective health infrastructure, prevention, and sustainable financing mechanisms of healthcare provision to meet future needs of a longer-living population.

Keywords: Health Expenditure, Life Expectancy, Malaysia, Gender, Public Health Policy

INTRODUCTION

Health spending is an important element of the development strategy of any country as it acts both as a driver and result of the population health improvement. Over the past decades, life expectancy has been increasing all over the world because of the improvement of medical technology, public health measures, and socio-economic growth (World Bank, 2023). Malaysia is not an exception and the country had recorded steady increases in life expectancy of both men and women, which are indicative of greater access to healthcare services, better living standards and effective health initiatives undertaken by the government (Haron et al., 2024). However, such demographic gains also place additional pressure on the healthcare system, as a longer-living population often requires more intensive and prolonged healthcare services.

The relationship between life expectancy and health expenditure has attracted significant scholarly attention. Previous studies suggest that an increase in life expectancy contributes to higher health spending, primarily because older populations have greater medical needs, including chronic disease management, hospitalization, and eldercare (Nixon & Ulmann, 2006). Notably, gender differences in life expectancy also matter. Women generally live longer than men, which may lead to higher cumulative lifetime healthcare costs for females, especially in the later stages of life (OECD, 2019). Despite the growing literature on health economics, few studies have disaggregated the effects of life expectancy by gender in developing countries, particularly in Southeast Asia.

In the context of Malaysia, understanding how gender-specific life expectancy influences health expenditure is crucial for effective policy-making. Malaysia's healthcare system operates through a dual public-private model, with significant government subsidies for public health services. As the nation transitions into an aging society, planning for sustainable health financing becomes increasingly urgent. The economic burden of aging is likely to differ between males and females due to biological, social, and behavioral differences. Hence, analyzing these gendered effects separately can offer more precise policy insights.

This study addresses this gap by conducting a time-series analysis from 2000 to 2024 to assess the individual impacts of life expectancy of males and females on current health expenditure per capita in Malaysia. Using Ordinary Least Squares (OLS) regression, the study finds that both male and female life expectancy exert a positive and statistically significant impact on health spending. The findings suggest that as Malaysians live longer—regardless of gender—there is an increased demand for health services, thus elevating public and private health expenditures. Moreover, the slightly higher impact associated with female life expectancy highlights the need for gender-sensitive healthcare financing strategies.

Our contribution lies in highlighting how gender-disaggregated life expectancy trends relate to health expenditure within the Malaysian context—a subject that has been understudied in local empirical research. By doing so, the study informs long-term health financing policies, especially in light of Malaysia's aging demographic profile and rising life expectancy for both genders

LITERATURE REVIEW

The relationship between life expectancy and health expenditure has long been a central topic in health economics, with considerable debate over causality and the direction of the relationship. Traditionally, life expectancy has been viewed as a consequence of health expenditure, with higher spending improving access to medical care, nutrition, and public health services, thereby increasing longevity. However, an emerging body of literature suggests that the reverse may also hold true—as populations live longer, health expenditures increase due to higher demand for healthcare, particularly for aging-related conditions.

A health care system is very crucial to an economy. Healthcare expenses increase and decrease with time and across countries in OECD countries (Baltagi & Moscone, 2010). Various comparative studies of various health care systems can be found widely in literature today. Part of these studies dwelt on the relationships between health care outputs, i.e., life expectancy and infant mortality and contributory factors like institutional, economical as well as social factors (Mohan & Mirmirani, 2007).

Oladosu et al. (2022) examined the impact of public health expenditure on health outcomes in Nigeria and Ghana, specifically focusing on infant, maternal, malaria, and HIV/AIDS mortality. Given low public health expenditure in both countries, a negative but insignificant relationship between health spending and health outcomes was observed in Ghana, while in Nigeria, the relationship was positive suggesting that other country-specific factors may influence the role of public expenditure. Jakovljevic et al. (2020) observed that the efficiency of healthcare spending in OECD nations was significantly influenced by governance quality and current health expenditure. Momoh et al. (2024) attributed increase in life expectancy in Sub-Sahara Africa to increased school enrollment and reduction in emission of carbon dioxide. Similarly, Ibrahim and Ditep (2022) indicated that health expenditure, GDP per capita, and reduction in carbon emission positively influenced life expectancy in Nigeria.

Also, examining the link among financial development, government health expenditure and health outcomes in Nigeria, Akintunde and Olaniran (2022) found a differential influence of public expenditure on life expectancy based on time periods, while the relationship was detrimental in the short-run, a significant improvement was found in the long-run. Similarly, in a panel study covering 28 EU countries from 1995 to 2018, Linhartova (2020) tested the relationship between public spending and human development. The analysis revealed that public spending has both positive and negative impacts on human development. Specifically, spending on health was positive, however, in terms of magnitude expenditure on recreation, culture, and religion contributed more to human development. Using a meta-analysis of 65 studies, Gallet and Doucouliagos (2017) found that healthcare spending has a more significant impact on mortality rates than on life expectancy. Also, the elasticity for life expectancy was found to be sensitive to the age at which it is measured and the control for endogeneity in the health production functions, thereby emphasizing the understanding of how different modeling choices affect reported results in this research area.

Linden and Ray (2017) used 34 OECD countries clustered into three groups based on the percentage size of the public health expenditure annually between 1970 and 2012 and applied econometric panel time-series techniques to examine the connections between life expectancy at birth and the expenditure of the public and

the private health sectors. The outcome indicated that public health spendings had a positive union with life expectancy. Besides, it was also revealed that private health expenditures are significant to life expectancy but depend on the amount of public health expenditures. Similar findings are provided in a panel study of Nigeria, India, Mexico, Ghana, Indonesia, and South Africa between 2000-2019, where Okeke et al. (2020) stated that life expectancy had a positive relationship with the amount of spending on public and private health care. Similarly, Radmehr and Adebayo (2022) studied the role of health expenditure, as far as life expectancy in Mediterranean countries is concerned between 2000 and 2018 and the findings of the method of moments quantile regression (MMQR), showed that health expenditure positively improved life expectancy.

METHODOLOGY

This study employs a quantitative, time-series design to investigate the impact of gender-specific life expectancy (male and female) on current health expenditure per capita in Malaysia. The central aim is to quantify how changes in life expectancy influence healthcare costs over time, thereby informing policy decisions on health financing in an aging society. The study uses annual secondary data for Malaysia covering the period from 2000 to 2024, obtained from internationally recognized databases including, World Bank World Development Indicators (WDI) and Datastream. Table 1 shows the operationalisation of variables used in current study.

Table 1 Operationalisation of Variables

Variable	**Definition**	**Source**
health expenditure	Current health expenditure per capita (USD)	World Bank
Life Expectancy Female	Life expectancy at birth – Female (years)	World Bank
Life Expectancy male	Life expectancy at birth – Male (years)	World Bank

RESULTS AND DISCUSSION

From 2000 to 2024, Malaysia's average health expenditure per capita was 308.59 USD, reflecting a moderate level of investment in healthcare services. The average life expectancy for females during this period was 71.78 years, while male life expectancy was slightly higher at 76.54 years, which is uncommon as females typically outlive males globally. This unusual pattern may point to country-specific health trends or potential data discrepancies. Overall, the increasing life expectancy in both genders suggests a growing demand for healthcare services and highlights the importance of sustainable health financing. Table 2 presents the descriptive statistics for all the variables used in this study, providing a foundational understanding of their central tendencies and variation over time.

Table 2 Descriptive Statistics

Variable	**Mean**	**Std. Dev.**	**Min**	**Max**
Health Expenditure	308.59	123.474	111.838	476.944
Life Expectancy Female	71.781	.686	70.2	73
Life Expectancy Male	76.536	.719	75	77.8

Table 3 presents the Pearson correlation coefficients among the study variables. The results show a strong positive correlation between health expenditure and both female life expectancy (r = 0.873) and male life expectancy (r = 0.825), indicating that as life expectancy increases, health spending also tends to rise. Additionally, female and male life expectancy are highly correlated with each other (r = 0.956), reflecting

shared trends in public health improvements over time. All correlations are statistically significant at the 1% level (***), confirming a robust linear relationship among the variables. These findings suggest that longer life spans, regardless of gender, are associated with higher healthcare costs in Malaysia.

Table 3 Correlation Matrix

Variables	**Health Expenditure**	**Life Expectancy Female**	**Life Expectancy Male**
Health Expenditure	1.000		
Life Expectancy Female	0.873***	1.000	
Life Expectancy Male	0.825***	0.956***	1.000

Table 4 shows the Impact of Life Expectancy Male on Health Expenditure in Malaysia. The study finds a positive and statistically significant relationship between male life expectancy and health expenditure per capita in Malaysia over the period from 2000 to 2024. This means that as the average life expectancy of males increases, the government and individuals tend to spend more on healthcare. This observation is consistent with the wider trends across the world where gains in longevity are linked to an increased need of medical care, long term treatment and preventive services. In Malaysia, male life expectancy has increased and this can be attributed to a number of social and medical advances. These are the improved access to public health programs, minimization of occupational risks, improvement in chronic disease management as well as the increased awareness on the danger to male health like cardiovascular diseases and smoking-related diseases. The survival of more men in later years means they need more and in many cases costly medical care. These are outpatient appointments and visits, drugs, operations, rehabilitation, and even long-term elderly care. That is why the positive correlation between male life expectancy and health spending is not only a statistical finding, but a reflection of the changing demographic and medical landscape in Malaysia. What makes this finding particularly interesting is the magnitude and direction of the relationship, especially when compared to the impact of female life expectancy. Traditionally, females have had a longer lifespan and thus were assumed to be the primary drivers of long-term healthcare costs (OECD, 2019). However, in this study, the fact that male life expectancy is rising and significantly impacting health expenditure suggests that gender roles in healthcare demand are shifting. It also reflects successful efforts in closing gender health gaps, especially in preventive care, which historically favoured female-oriented programs such as maternal and child health.

Table 4 The Impact of Life Expectancy Male on Health Expenditure in Malaysia

Health Expenditure	**Coef.**	**St.Err.**	**t-value**	**p-value**	**[95% Conf**	**Interval]**	**Sig**
Life Expectancy Male	148.497	21.255	6.99	0	104.527	192.468	***
Constant	-10350.675	1525.802	-6.78	0	-13507.037	-7194.312	***
Mean dependent var	308.590		SD dependent var			123.474	
R-squared	0.680		Number of obs			25.000	
F-test	48.809		Prob > F			0.000	
Akaike crit. (AIC)	286.265		Bayesian crit. (BIC)			288.703	
*** p<.01, ** p<.05, * p<.1							

Table 5 shows the Impact of Life Expectancy female on Health Expenditure in Malaysia. This study finds a positive and statistically significant relationship between female life expectancy and health expenditure per capita in Malaysia for the period 2000 to 2024. This indicates that as Malaysian women live longer, the per

capita spending on healthcare also increases. Such a correlation is part of a wider world trend, where, due to the growing longevity, particularly of females, the demand of healthcare and its expenditure is growing (OECD, 2019). The women population as a whole tends to outlive men and this demographic fact has significant effects on the national health spending. In Malaysia, the life expectancy of females has been rising because of the advancement in healthcare infrastructure, maternal and child health schemes, education accessibility, and preventive care. But, with longer life expectancy, more time is spent with age-related diseases, including osteoporosis, dementia, arthritis, and non-communicable diseases, including cancer and diabetes (WHO, 2021). These health situations usually need long-term, sustained medical treatment, which is a major cause of rise in per capita health expenditure. Moreover, older women are likely to use more services during their life. This constitutes not only formal medical care but also long-term care, assisted living and social health care. A large number of elderly women live single, widowed, or unmarried, which usually results in increased reliance on state healthcare services (OECD, 2019). The Malaysian health care system being a dual model of public-private has thus to allocate more resources to meet the longer life span and special health needs of women.

Table 5 The Impact of Life Expectancy Female on Health Expenditure in Malaysia

Health Expenditure	**Coef.**	**St.Err.**	**t-value**	**p-value**	**[95% Conf**	**Interval]**	**Sig**
Life Expectancy Female	143.215	19.785	7.24	0	102.286	184.144	***
Constant	-10652.527	1514.34	-7.03	0	-13785.178	-7519.876	***
Mean dependent var	308.590		SD dependent var			123.474	
R-squared	0.695		Number of obs			25.000	
F-test	52.396		Prob > F			0.000	
Akaike crit. (AIC)	285.047		Bayesian crit. (BIC)			287.484	
*** p<.01, ** p<.05, * p<.1							

Policy Implication and Conclusions

The results of this research have some significant policy implications on the healthcare system and long-term planning of Malaysia. The fact that there is positive and significant correlation between life expectancy of both male and female and health expenditure per capita raises the urgency to plan on the financial and institutional needs of the growing population of aging people. The longer life expectancy of Malaysians is likely to result in an increase in the cost of healthcare not only because of the increased use of services, but also because of the rising needs of chronic diseases, long-term care, and gender-related health issues.

First, gender-sensitive health policy should be formulated. The healthcare system should meet the different health profiles and needs of men and women since both male and female life expectancy is a major factor that determines health expenditure. As an example, an old woman is likely to live longer being morbid and needing a longer treatment period, whereas a man can have more urgent age-related issues. Specific policies like increased geriatric care services, preventive health screening, and community-based eldercare policies are likely to help address the problem of cost control without compromising on the quality of life.

Second, Malaysia should invest in prevention health care measures to lower the long-term economic cost. Investigating early diagnosis, lifestyle change, and education to the population, the nation will be able to reduce the downstream expenses of treating non-communicable diseases that overweight older adults. Preventive care is especially relevant to add healthy life years and cost-efficiency.

Third, the system needs to be reformed in regards to healthcare financing to provide sustainability. As life expectancy rises, Malaysia will need new models of health financing that will be accessible, affordable, and will not over-burden the government. Social health insurance, public-private partnerships and long-term care savings schemes are other alternatives that are likely to be more sustainable.

Lastly, health policy based on data is necessary. Demographic patterns and healthcare utilization trends should be monitored constantly by the government in order to make policy changes. The data which is gender-disaggregated like in this study is particularly useful in terms of population-wide trends as well as evidence-based decision-making.

This paper determined the correlation between life expectancy (male and female) and current health expenditure per capita in Malaysia based on time-series data between 2000 and 2024. The findings were that male and female life expectancy have a positive and significant impact on health spending. These facts imply that with the longer life of Malaysians, the expenditure of keeping the population healthy can only increase.

The research has added to the small pool of literature in Malaysian context since it has employed gender-disaggregated data on life expectancy to evaluate health spending trends. It gives important insight on the direct effects of demographic change especially longevity on the economic aspects of public health. The abnormal discovery of the larger average life expectancy of men is also an aspect that might be researched upon further to determine the local health dynamics and possible incompatibility of the data.

To sum up, Malaysia is at a demographic crossroad. Although an increase in life expectancy is a welcome effect of development and increased access to healthcare, it also creates a necessity to make strategic policy changes so that the healthcare system could be sustainable both financially and socially. Malaysia has an opportunity to turn the population aging into an opportunity by taking a proactive and gender-sensitive approach to health planning, and thus creating an equitable, efficient, and sustainable health care delivery.

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