Original Article

Determining the effect of aging on the burden of diseases in Vietnam

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Abstract

Background: In Vietnam, the aging of the population was known as an important factor contributing to the increase in medical expenses, as medical expenses per capita were higher than in other age groups. Objectives: This analysis exhibited a theoretic model to evaluate the aging rate, quantitatively determining the consequences of aging on disease configurations and clarifying how these effects were attained. This study aimed to explore how the burden of diseases fluctuates conferring to the medical infrastructure level and variations in the aging index using WHO disease burden data and aging data. Methods: In this analysis, health data on the worldwide disease burden of elderly people was analyzed from 2016 to 2019. The difference model (DID) was applied to investigate the aging effects. Results: The burden of the disease increased over time, especially in the middle-aged population and the premature death in the people of middle and old age has augmented expressively. Studying the econometric model after checking the relevant factors showed a substantial rise in the number of fatalities due to premature death and illness. Contrary to this, the group of piles at the aging level had an imperative optimistic impact on the year life lost (YLL). As an important variable that shows the effect of a double age difference, the interaction effect did not affect the disability-adjusted year of life (DALY) but exhibited a substantial optimistic consequence on year life lost. Conclusion: Consequently, the effect of populace aging on future medical spending or medical resources should take into account the changes in the disease burden by age group, population structure and the interaction of these 2 incremental factors.

Keywords: Burden of disease, Elderly, Theoretical model, Vietnam.

Introduction

In a study so far in Australia and 34 The Organization for Economic Co-operation and Development (OECD) countries, about 60 percent of respondents in a study by Smith et al. (2017) suffer from chronic illness among persons 65 years of age and older, which confirms the prediction of the frequency of chronic diseases among older people. This increase in the prevalence of chronic diseases can accelerate due to the aging of the population. There was an eight-year alteration between the average expectancy of life (81 years) and the life expectancy adjusted for disability (73 years). Since seniors are unprecedented part of the Pakistani population, the community should wage additional consideration to the health of the elderly than focus on changes in the structure of the population with a high life expectancy increase in the elderly population. [1, 2]

Factors with a significant impact on an individual's health can generally be divided into four groups such as demographic, socioeconomic, lifestyle and social factors.[3]

These factors can also be classified as internal factors (such as perceptions of personality deterioration and physical performance) and external factors (such as loss of social status by retirement, changes in the economic level and changes in the regional environment).[4] Many researchers focus particularly on the socioeconomic levels of individuals and classify the social class by occupation, level of education, and income. These studies confirmed that there are

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differences in mortality and morbidity among social classes that shed light on the importance of socioeconomic factors.[5]

Work status can also affect health. Compared to ordinary employees, involuntary normal employees had a low job and life satisfaction, which could harm the overall quality of life, including health.[6] Working hours also affected employees' health. Long working hours had a detrimental effect on employees' health. Hardworking employees had more hours of work than ordinary employees. Therefore, they were not able to ask for timely treatment, which causes stress at work and ultimately harms their health.[7]

The aging of the population was known as an important factor contributing to the increase in medical expenses, as medical expenses per capita were higher in other age groups. Vietnam is experiencing unprecedented aging. However, previous studies have shown that non-demographic causes account for a greater proportion of the increase in medical expenses, as opposed to the aging population.[8] The demographic index resulting from the increase in medical expenses in Vietnam was reported as 40%. Although population aging is a possible two-sided factor that increases and suppresses medical expenses. Few studies have used longitudinal data to confirm that the importance of antemortem costs has changed over time.

Therefore, the purpose of this study was to present and discuss a theoretical model for measuring the aging rate in Vietnam measuring the impact of aging rates on disease patterns and explaining these effects. WHO aging data and disease burden were used to analyze the differences in disease burden depending on changes based on the level of medical infrastructure (GDP, medical technology, medical aid) in the aging indicator using a quasi-experimental model known as DID. By measuring the impact of aging on disease burden, and checking the differences in health and economic conditions in countries with longitudinal data, this study attempted to analyze the pure impact of aging.

Methods

Study Design and Ethics Statement

This is a cross-sectional study conducted in Ho Chi Minh City from January 2019 to October 2019 by using secondary data from a governmental source. The protocol approval was granted by The Ethics Committee and anonymity was strongly considered. No personal information was used beyond scientific purposes.

Data Collection

The disease burden data from 2016 to 2019 were used in this study. The Department of Health Service in Ho Chi Minh City selects key statistics from a variety of areas, including health, every year and asks local authorities to provide more. This index, also known as 'health data', covered health status, medical and health resources, and medical and health costs. In particular, these data contain information that can be used to, directly and indirectly, estimate the level of human and material resources related to medicine. Therefore, these data will be useful for checking the level of a particular country or health policy to measure the impact of aging on a country's disease model. In addition, the Vietnam health system provided information on the population aged 65 and older in 5-year that enable an analysis of aging indicators in each country. The purpose of this study was to compare changes in disease burden versus changes in the aging rate as an international standard. Therefore, the aging rate was calculated. In addition, the incidence load was distinguished in adults at an early age (65–69 years) and in middle and late age (70 years and older).

Data Analysis

In this study, a difference model (DID) was used to analyze the effects of aging. The DID model was a semi-experimental model that allows comparison of pre-test and post-test states. The pure effect of aging was determined by confirming the difference in the rate of aging between control groups with different disease loads. Based on previous research on variables affecting disease burden, the following variables were used as control variables: gross domestic product (GDP), total medical expenditure of the population, and expenditure on public health insurance. These variables were used to control social, medical and beneficial infrastructure, respectively. With more infrastructure qualifications, the costs of medical services and social assistance will increase. (**Table 1**).

Results

Disability-Adjusted Life Year (DALY)'s height was higher than YLL, and the increase in the group of older to medium and late people was higher than the group of older people. However, the differences in DALY in terms of aging or GDP were not significant. The disease burden in middle-aged adults is higher in countries with lower GDP than in older adults, while YLL is higher in middle-aged adults than in older people. GDP.

There were no significant differences YLL in terms of aging or total cost of treatment. However, DALY is higher among those in countries with low public health insurance costs, while DALY is highest among middle-aged and late adults in countries with low public health insurance costs.

Table 2 shows the results of DID regression analysis for differences in aging levels. In the analysis model with dependent variables such as DALY and YLL, DALY was positive and YLL was negative. This showed that even after controlling other variables, the number of deaths due to illness was significantly reduced compared to the past. Meanwhile, an imaginary group of aging levels had a significant positive effect on YLL. The term interaction is an important variable that shows the effects of DID level aging.

Although it did not affect DALY, it had significant positive effects on YLL. This showed that YLL increased significantly with increasing levels of aging.

Regarding control variables, there was no significant difference in DALY or DPA in terms of GDP or total medical expenditure. However, DALY and YLL have fallen significantly with the increase in public spending on health insurance.

Discussion

This study examined the impact of aging levels on disease burden using health data and examined changes in disease burden. The burden of the disease increased during the time with a more pronounced increase in adults from young to late age (65-69 years). The increase in YLL due to premature death is higher in middle and late older people than in older people.[9] In other words, the disease burden of the elderly has increased over time, and the increase in disease burden is greater in the elderly population.[10] When the econometric model was used after checking the appropriate variables, the results showed that YLL disease and YLL increased significantly due to premature death.[11] Meanwhile, an imaginary group of aging levels had a significant positive effect on YLL. The term interaction, which is an important variable showing the effects of DID level aging, had a significant positive effect on YLL, although it did not affect DALY.[12] This showed that YLL increased significantly with increasing levels of aging.

We use GDP and medical expenses as control variables to control the level of medical technology in the country and the desire to seek treatment for human diseases.[13] We also use the costs of public health insurance as a control variable, because access to medical facilities can also affect the purpose of treatment. The results of the analysis showed that YLL due to premature aging increases with increasing levels of aging. This suggests that an increase in YLL leads to an increase in disease burden.[14]

As the disease developed, it was easy for middle-aged and late adults to develop other co-morbidities because of the slow recovery and immunodeficiency states that increase the burden of morbidity compared to older adults. In the elderly group, the disease load, especially YLL, was about three times higher than the effect on the total disease load. After examining the moderate effects of aging based on the time of interaction, the results showed that aging has a significant effect on stress disease, especially YLL due to death.[15] As countries continue to develop, changes occur in their populations and this causes changes in the types of problems that healthcare systems and service providers face. Successful reduction in the number of deaths in early age and adulthood allows older people to become the majority part of the population by changing the age distribution. Reducing the number of deaths associated with childbirth, malnutrition, infectious diseases and injuries allows people to live longer and be more susceptible to chronic diseases. Although these diseases classified as global disease burden may be secondary to group 1 (infectious, perinatal and nutritional diseases) or group 3 (injuries), this chapter focuses on conditions. Group 2 is becoming more common (no infectious diseases [NCD]). Development as a nation increases access to world market products. As consumers, people often respond to amenities and marketing effects by changing their lifestyle. In general, as the economy develops, citizens provide greater access to calories from non-traditional sources, while trying to meet their life needs. Along with the negative effects of increased tobacco use and substance use, the increase in concomitant diseases associated with overweight and obesity contributes to the prevalence and younger occurrence of many chronic diseases. Although less developed countries have a hard time answering the double burden of communicable and non-communicable diseases, more developed countries face the challenges of chronic non-communicable diseases by allocating more resources, including labor. To meet these needs, qualified health professionals from less developed regions of the world are employed. Initially, chronic diseases can be remedied medically using these expensive resources, but over time, even these resources are not able to prevent functional impairment and death. Chronic diseases have recently become the dominant global cause of disability and death in most countries, and developing regions of the world are increasingly bearing this burden. Institutions and governments are increasingly focusing on the challenges that this transformation in the global disease burden will entail in promoting global health. It is widely accepted that age strongly influences poor health model and scope, both at the individual and population levels. It is therefore important to consider demographic and epidemiological changes in populations, as well as the responses of healthcare systems to the aging of individuals and populations.

If the increase in YLL due to death is relatively higher in older people compared to young people, the interaction between these two factors should be considered when determining changes in population structure, disease burden by age group, and the effects of population aging on future medical resources or medical expenses. In addition, policies should be developed that help stabilizes the burden of morbidity among older people, based on measuring the exact effects of aging.

Conclusion

The burden of the disease increased over time, with a more pronounced increase in the elderly population from mid to late. The increase in YLL due to premature death is higher in the middle-aged and late-adult population than in the elderly population. In other words, the disease burden in older people has increased over time, and the increase in disease burden is higher in the elderly population. Using an econometric model analysis which controls related variables, showed that YLL increased significantly due to premature death.

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Conflict of interest

The authors have no conflicts of interest to declare in this work.

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Table 1. Description of the variables

Variables		Description
Dependent variable	DALY	Lost year due to diseases + Lost year due to early death
	YLL	Lost year due to early death
Independent variable	Dummy of years	2016=0 2019=1
	Dummy of group	Early old age (year 65~69) =0 Mid and late old age (over 70 years old) =1
	Interaction variable	Interaction between year dummy and group dummy

Abbreviation: DALY, disability-adjusted life year; YLL, year life loss

Table 2. Different effects of aging on the burden of diseases.

		DALY		YLL	
		β	OR	β	OR
Constant		431.85		214.79	
Control variable	GDP	314.52	0.064	114.27	0.187
	Total health expenditure	419.14	0.021	217.3	0.217
Dependent variable	Year (A)	31.54	0.124**	86.66	0.214**
	Group (B)	198.71	0.007	168.29	0.231*
	A*B	107.22	0.076	98.17	0.115*
	Public insurance expenditure	-98.47	0.145**	-107.38	0.004*
Model fit	F/ χ^2	26.947		38.947	
	R^2	0.317		0.638	

Note: *significant at p<0.05, **significant at p<0.001
Abbreviation: DALY, disability-adjusted life year; GDP, gross domestic products; OR, odds ratio, YLL, year life loss