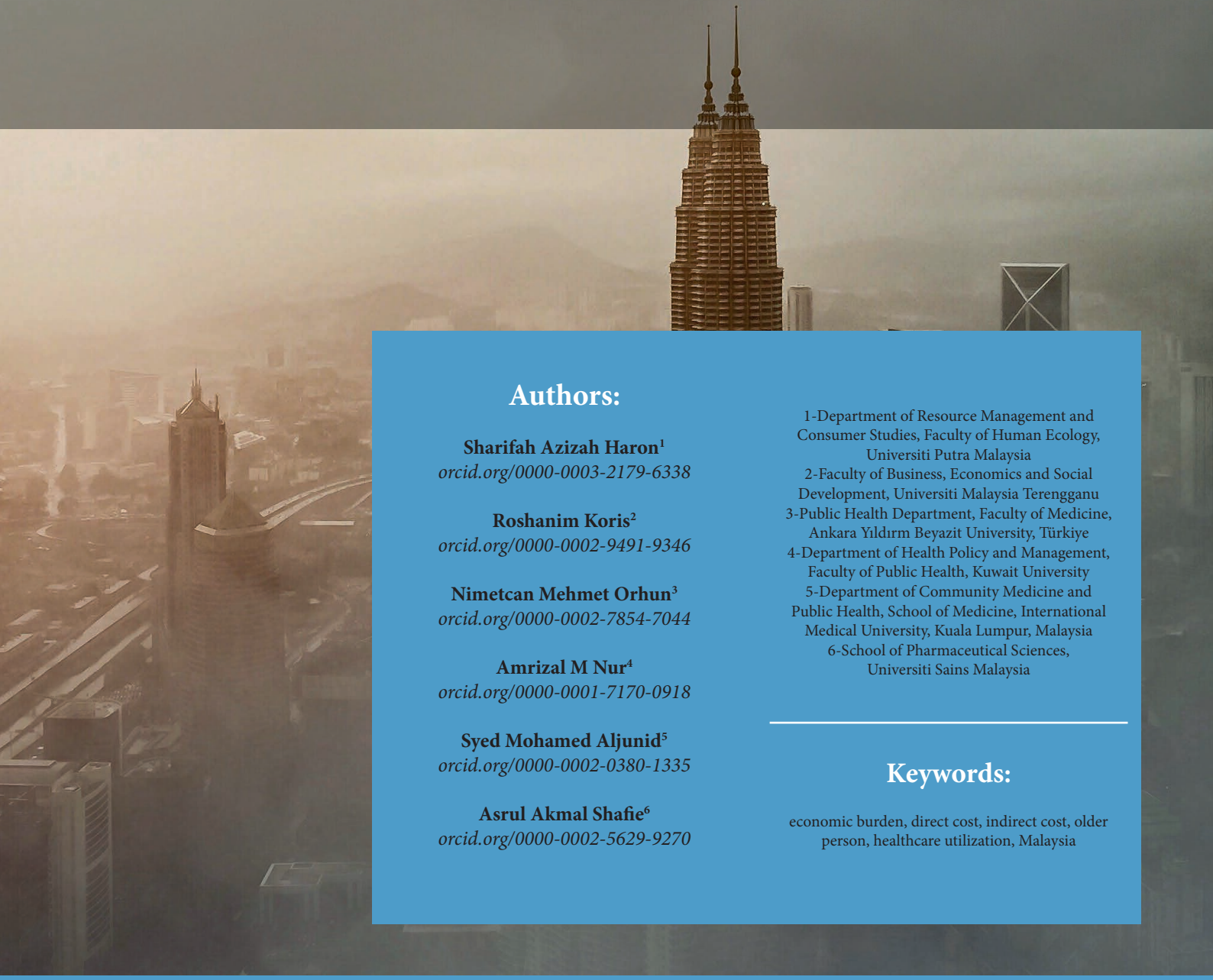
#01/2024
ISSN 2299-1247

JHPOR | Journal of Health Policy & Outcomes Research

Economic Burden of Healthcare Utilisation by Older Persons Living in the Community in Malaysia

DOI:10.7365/JHPOR.2024.1.1



Authors:

Sharifah Azizah Haron[1]
orcid.org/0000-0003-2179-6338

Roshanim Koris[2]
orcid.org/0000-0002-9491-9346

Nimetcan Mehmet Orhun[3]
orcid.org/0000-0002-7854-7044

Amrizal M Nur[4]
orcid.org/0000-0001-7170-0918

Syed Mohamed Aljunid[5]
orcid.org/0000-0002-0380-1335

Asrul Akmal Shafie[6]
orcid.org/0000-0002-5629-9270

1-Department of Resource Management and Consumer Studies, Faculty of Human Ecology, Universiti Putra Malaysia
2-Faculty of Business, Economics and Social Development, Universiti Malaysia Terengganu
3-Public Health Department, Faculty of Medicine, Ankara Yıldırm Beyazit University, Türkiye
4-Department of Health Policy and Management, Faculty of Public Health, Kuwait University
5-Department of Community Medicine and Public Health, School of Medicine, International Medical University, Kuala Lumpur, Malaysia
6-School of Pharmaceutical Sciences, Universiti Sains Malaysia

Keywords:

economic burden, direct cost, indirect cost, older person, healthcare utilization, Malaysia

How to cite this article?
Haron S., Koris R., Orhun N., Nur A., Aljunid S., Shafie A., Economic Burden of Healthcare Utilisation by Older Persons Living in the Community in Malaysia J Health Policy Outcomes Res [Internet]. 2024[cited YYYY Mon DD];. Available from: https://jhpor.com/article/2356-economic-burden-of-healthcare-utilisation-by-older-persons-living-in-the-community-in-malaysia

contributed: 2023-11-06
final review: 2023-12-22
published: 2024-03-07

Corresponding author:
Nimetcan Mehmet Orhun nametjan@gmail.com

Abstract

Objective: The aim of the study is to estimate the economic burden of healthcare utilisation by older persons in Malaysia at a national scale. The specific objectives are to: (1) identify the healthcare utilisation behaviour of older persons; (2) estimate the direct and indirect healthcare costs at the community setting, and (3) estimate the economic burden of healthcare utilisation by older persons.
Methods: The survey utilised multi-stage random sampling techniques to recruit a total of 2,274 elderly respondents aged 60 years and above. The economic burden of healthcare utilisation by an older person was estimated using multiple sources of data, namely administrative cost and healthcare cost from both institutional and community settings.

Results: The prevalence of outpatient and inpatient care was 60.5% and 5.6%, respectively. Older persons generally chose government facilities for both inpatient and outpatient services. The average direct cost for outpatient and inpatient care were RM 141.24 and RM 2,527, respectively. The average indirect costs for outpatient and inpatient care were RM 31.44 and RM 524.07, respectively. The economic burden of healthcare utilisation by an older person was estimated at RM 3,807,481,491, which represent 0.34% of the total GDP in 2014 or 8% of the total health expenditure in the same year. By 2040, the burden is projected to reach a staggering RM 21 billion, or around 1.08% of the total GDP. The economic burden of healthcare utilisation by older persons is expected to increase as Malaysia is moving towards an aged nation by 2045.

Conclusion: The utilization of outpatient care for older persons was estimated at 60% and most of the sought-after services were heavily subsidized government facilities. This study highlights the needs for the government to embark on preventive health and comprehensive education to decrease the prevalence and severity of non-communicable diseases (NCDs) among both the future aged and existing elderly in Malaysia. Alternatively, health care reform may be timely to ease the burden of healthcare utilisation by an even bigger percentage of older persons, once we become an aged nation.

1. Introduction

Life expectancy indicates the average period a person may expect to live.[1, 2] Malaysia has made a significant progress in improving the life expectancy of its people. Malaysia's life expectancy is higher than that of upper-middle-income countries but below that of high-income countries .[3] In 2020, life expectancy for Malaysia was 74.9 years, indicating an improvement from 74.5 and 64.2 years old reported in 2014 and 1969, respectively.[3, 4] The prolonged survival of older persons accompanied by lower fertility rates, reaching below replacement of 2.1 in 2013, has led to population ageing. There has been a steady increase in the population of older persons from 3.4 million in 2019 to 3.5 million (10% of the total Malaysian population) in 20205 Malaysia is expected to become an aged nation in 2040 when 14.5% of the population will comprise an older population aged 65 years and above.[6]

Longevity comes with cost and tricky consequences. Obviously, a nation has to invest in longevity by improving public health. This is done by way of investing in human and infrastructural development indicated by factors such as better access to quality drinking water, sanitation, improvement in health and nutrition. Improvement in public health has also been seen in preventive medicine such as in childhood immunization and in the health care of older people.[7] The important health outcomes of these investments are better survival in infancy and childhood and at older ages, but investing in longevity is costly. For instance, in the United States and Germany, a 1% annual increase in their health expenditures was associated with a 0.020 and 0.121 per cent increase in life expectancy in each respective country8. In the same vein, longevity may prolong one's life, but it does not automatically imply that health status or quality of life has improved.[9] Malaysia's life expectancy at 60 grew substantially from 15.39 in the 1970s to 19.8 years in 2020[3,4]. However, the proportion of healthy years in life expectancy among Malaysians remained at 88.5% in 2016 since 2000.[2] Therefore, an average Malaysian born in 2016 is expected to live up to 75 years but can only expect to enjoy good health until the age of 67 years.[2] Old age is associated with several geriatric events such as multi-morbidity or multiple chronic conditions due to lower immunity and resistance to diseases, poor diet and less physical activities. These factors increase the vulnerability of older persons to chronic health problems and a high-risk group for non-communicable diseases (NCDs).[10, 11] Hence, the ageing population has been partly blamed for the rising prevalence of

NCDs in Malaysia. The most common NCDs in Malaysia are hypertension, diabetes mellitus and hypercholesterolemia[11] with a prevalence of 51.1%, 27.7%, and 41.8%, respectively[12] among the nation's elderly population. A synthesis from various studies indicated that the risk of dementia and vascular dementia is higher among older persons with comorbidities including diabetes mellitus, severe hypertension or heart disease.[13, 14, 15, 16]

The increasing prevalence of NCDs among older persons increases the demand and utilization of healthcare services. As a high proportion of the population ages, there is a higher prevalence of NCDs and morbidity, thus resulting in a corresponding increase in the number of older people requiring outpatient care, healthcare and hospitalization services.[10] Consequently, health financing becomes a burden not only to stakeholders but also to the ageing population. Malaysian health care system provides options for all citizens to seek highly subsidised care in the public sector.[17] Therefore, Malaysia was reported to still have the lowest medical expenditure risk among selected Asian countries.[18, 19] The public sector provides about 82% of inpatient care and 35% of ambulatory care, whereas the private sector provides about 18% of inpatient care and 62% of ambulatory care.[20] The spendings on health made up 3.3% of the GDP in 2000, reaching 4.0% of the GDP in 2010 and 4.24% in 2017. In addition, the majority of the total health expenditure (THE) was from public spending, which was estimated as 53.19% in 2000, 58.75% in 2010 and 51.15% in 2017. Despite the healthcare spending is still below the 7% benchmark recommended by the World Health Organisation (WHO), it has been on an upward trend in the last few decades. The main sources of THE in 2017 were the Ministry of Health (43.09%) and the household out-of-pocket expenditure (37.61%).[21]

Demographic and epidemiological transitions from communicable to NCDs are expected to put pressure on the government's resources. The Global Burden of Disease Study reported that 23% of the total burden of diseases is attributed to older people and chronic non-communicable diseases, with cardiovascular disease as the leading contributor [22]. In Malaysia, NCDs account for 67% of premature mortality, and over 70% of disease burden in 2014. In 2017, NCDs accounted for 72.4% of the burden of disease according to three selected NCD categories (cardiovascular disease, cancer and diabetes) and other NCDs (all other non-communicable diseases – cirrhosis, chronic respiratory disease, digestive diseases, neurological disorders and mental and substance use disorders). The outlook of younger age cohort health lifestyle and health condition suggests that NCD burden will likely remain high in the future.[23] Furthermore, with the ongoing ageing of the population, the increase in the costs of caring for the elderly population will also be a challenge for public health care systems.

The estimation of health care cost and the associated economic burden is important for planning services to meet the need of the older population, for planning promotive and preventive strategies related to health outcome across the life span, and for allocating more efficient resources to the older population. This study attempted to estimate the economic cost associated with the healthcare utilisation by older persons living in the community. The specific objectives of this paper are (1) to analyse healthcare utilisation behaviour of older persons, (2) to estimate the cost of healthcare utilization in public, private and alternative facilities; (3) to estimate the economic burden of healthcare utilisation by older persons in Malaysia.

2. Materials and Method

2.1 The data

Multiple datasets were utilised from the following sources: (1) Data from the providers and community survey component of a nation-wide study on "Identifying Psychosocial and Identifying Economic Risk Factor of Cognitive Impairment among Elderly". The data were employed to estimate the providers' and community costs associated with healthcare services, and the prevalence of inpatient and outpatient utilisation behaviours of older persons. The providers' surveys involved seven hospitals with memory clinics and the provider cost used in this study was adopted a related study[26] The focus of the present study was on data obtained from the nationwide community as detailed out in the following section. (2) The data on elderly population and national income were obtained from Department of Statistics Malaysia (DOSM) i.e., the National Population and Housing Census 2010 and the value of Gross Domestic Product (GDP) Nominal 2014 for the estimation the economic costs of healthcare utilisation by older persons on the national level.

2.2 Data collection and sample

The data were obtained from the community survey entitled "Identifying Psychosocial and Identifying Economic Risk Factor of Cognitive Impairment among Elderly" in Peninsular Malaysia. It was a cross-sectional study that utilised a multi-stage proportional cluster random sampling technique to obtain a representative sample of community-dwelling Malaysian older persons. The inclusion criteria for the sample were that they must be Malaysian citizen aged 60 years old and above, whereas the exclusion criteria were known psychiatric problem (Dementia and Alzheimer Disease), alcoholism, serious physical disability (bed-ridden, wheelchair-bound) and terminal illness. The selection process was as follows: (1) Stage 1: Selection of states. The 11 states and two federal territories in Peninsular were grouped into four zones or regions (i.e. South, North, Central and East). In the first stage, states with the highest numbers of older adults aged 60 years

and above in each region were selected. Hence, the following states were selected to represent each region: Johor (South Region); Kelantan (East Region); Perak (North Region); and Selangor (Central Region); (2) Stage 2: Selection of Census Circle (CC). The sampling frame was provided by the Department of Statistics Malaysia (DOSM). Based on National Population and Housing Census 2010, Malaysia was divided into Census Circles (CCs) which were geographically contiguous areas with identified boundaries. There were 10,822 CCs in Malaysia in 2010. In the second stage, only CCs with an elderly population of at least 10% of the total population (within the selected state above) were selected. A total of 35 Census Circle (CC) clusters were sampled from each state (3) Stage 3: Selection of Living Quarters (LQ). Each Census Circle contained about seven Enumeration Blocks (EBs) and each EB consisted of 80 to 120 Living Quarters (LQs). In the third stage, a total of 20 LQs were selected from each CC cluster of each state selected earlier. The elderly in these LQs were randomly interviewed. Specifically, only one resident aged 60 years and above from each household was interviewed. Should there be more than one older person in a household who were qualified to become the respondents, only one of them was randomly chosen. Data were collected through face-to-face interviews by trained enumerators using a set of pre-tested questionnaires. Before the interview, respondents were briefed on the purpose of the study and were assured of the privacy, anonymity and confidentiality of all the information. The interviews were conducted at places such as school halls, mosques, or community halls in their LQ area. A total of 2,322 older persons participated in the study, but only 2,274 were eligible for the analyses.

2.3 Research instrument

The research instrument consisted of a pre-tested questionnaire. The instrument was used to obtain data via a face-to-face interview with the respondents in the community. The questionnaire was adapted from the UNU-IIGH Malaysia, Universiti Kebangsaan Malaysia to estimate the direct and indirect costs for health care utilisation. Information contained in the instrument were as follows: socio-economic and demographic backgrounds, morbidity as diagnosed by medical practitioners, history of outpatient care and inpatient care.

2.4. Ethical approval

Ethical approval was obtained from the respective Institutional Review Board. Ethical approval to conduct research in the hospital settings was obtained from the Ministry of Health Malaysia (registration number, NMRR-13-1023-14660). For the community survey, approval was obtained from the Universiti Kebangsaan Malaysia's ethics committee. In addition, information sheets about the study and consent form for the participants were distributed before conducting the interview.

2.5. Method of cost calculation

Costs were divided into two categories: direct costs and indirect costs. The direct costs consisted of direct medical costs and direct non-medical costs. Direct medical cost comprised self-reported clinical and hospital charges including prescription, consultation, diagnostic and procedure charges from different types of healthcare facilities (i.e. government hospitals, government clinics, private hospitals, clinics etc.). Other costs in the category included were the costs of transportation, meal, accommodation, and other related expenditures (supplemental food or other alternative treatment) incurred by the elderly. The indirect costs consisted of the opportunity cost of the time of the respondents during the course the treatment. Informal care costs by the caregivers were not included for this study due to unavailability of data. Thus, the cost was estimated based on the expenditure incurred from receiving care from formal establishment service providers and out-of-pocket (OOP) expenses by older persons.

In this study, respondents estimated the cost they incurred in obtaining healthcare services in both inpatient and outpatient services. The valuation of resource utilization was done by incorporating the following for inpatient and outpatient services: the corresponding unit cost for each component of inpatient and outpatient care services; information on time spent in the facility; the length of stay; number of absent days from work after discharge. The transportation cost was estimated based on the self-reported fares paid or estimated or a mileage claim cost based on the government rate – i.e. (RM 0.50 x kilometres (distance from home)). The indirect costs consisted of respondents' "lost times" or cost of the time forgone. The indirect costs of individual time among those who currently employed or reported any sources of income, were estimated using respondents' self-reported wages. For the unemployed or reported not having any sources of income during the time of this study, the national minimum wage of RM 900 was used to estimate the cost of "lost time". Based on National Wages Consultative Council Act (Akta Majlis Perundingan Gaji Malaysia) (2011) effective from January 2013, the "lost times" was estimated at RM 34.62/day and RM 4.33/hour. The total economic impacts of healthcare utilisation by older persons at the community level were calculated as a summation of both total direct and indirect costs.

In this study, the estimated cost at institutional setting or providers' cost was obtained from the same research project as previously explained elsewhere.[26] The calculation utilized the Clinical Cost Modeling Software Version 3.0 (CCM Ver. 3.0). The total economic burden of healthcare utilization by older persons in Malaysia was calculated by summing up the estimated total cost at community level and institutional settings, aggregated to the national level. The formula to arrive at the estimation is as follows:

The projected healthcare cost of older persons was estimated by adjusting it to the average inflation rate between 2011 and 2016 for the following reasons: (1) the data collection year fell between this period; (2) Inflation rate during the period was reasonably reflecting the ordinary years. In addition, the current study utilised a more conservative estimate of GDP between 2020 and 2040. The inflation was compounded to reflect new inflation prices from each of the previous (annual) value.[27, 28]

3. Results

Background of older persons

The average age of the elderly in this study was 69 years old. The majority of the respondents were of Malay ethnicity (62%) and with a lower level of education as 58% attended primary schools, whereas 21% had no formal education. Of the total 2,274 respondents, 68% were currently married and 28% were widowed with an average of six children per respondent. Only about 10.5% were living alone and 35% were living with their spouse and children. Table 1 presents the background characteristics of the study population.

Table 1. Socio-demographic characteristics of older persons

Variable		n = 2,274
Age (Mean ± SD)		69.03 ± 6.229
Age Category	Young-Old (60-69)	1,305 (57.4%)
	Old - Old (70-79)	833 (36.6%)
	Oldest - Old (80 and above)	136 (6.0%)
Ethnicity	Malay	1,430 (62.9%)
	Chinese	725 (31.9%)
	Indian and others	119 (5.2%)
Years of education (Mean ± SD)		5.15 ± 3.981
Education level	No formal education	475 (20.9%)
	Primary education	1,316 (57.9%)
	Secondary education	372 (16.4%)
	Tertiary education	111 (4.9%)
Marital status	Single	37 (1.6%)
	Married	1,555 (68.4%)
	Separated / divorced	39 (1.7%)
	Widowed	643 (28.3%)
Number of Children (Mean ± SD)		5.4 ± 2.9
Number of Household (Mean ± SD)		3.61 ± 2.243
Living arrangement	Living alone	239 (10.5%)
	Living with spouse only	625 (27.5%)
	Living with children only	512 (22.5%)
	Living with spouse and children	796 (35%)
	Living with others	102 (4.5%)
Activity status	Employed full time	135 (5.9%)
	Employed part time	95 (4.2%)
	Self employed	289 (12.7%)
	Retired	1,309 (57.6%)
	Others (not working, housewives etc.)	446 (19.6%)
Individual Income (Mean ± SD)		RM904.86 ± RM1,785.68
Household Income (Mean ± SD) B40 M40 T20 Hardcore Poor Poor Non-Poor		RM1,325.71 ± RM2,362.46 2,145 (94.3%) 101 (4.4%) 28 (1.2%) 1,052 (46.3%) 195 (8.6%) 1,027 (45.2%)

A majority (58%) of the respondents were fully retired. Among those who continued working after the age of 60 years old, 13% were self-employed and 10% of them were either employed full-time or part-time. The average personal income of older persons was RM 904.86 per month. Meanwhile, the poverty line income for Peninsular Malaysia in 2014 was RM 950 per household per month6. The hardcore poor consisted of those with a monthly household income of RM 600 and below. As for the income category, the lower-income group or bottom 40% of the income percentile (B40) consisted of households with income RM 3,860. Therefore, these cut-off points were used to group the poor and hardcore poor segments. Middle-income

households (M20) consisted of households with a monthly income between RM 3,860 and RM 8,319, whereas households with monthly income above RM 8,319 were considered as the high-income segment. Almost half (46.3%) of the respondents belong to the hardcore poor category and 45.2% were from non-poor households. However, the non-poor households mostly under the low-income group.

Overall, older persons in this study were healthy. A similar proportion of the respondents claimed to be healthy most of the time (47%) and some of the time (43%). Other than self-rated health status, the mental and physical health of the respondent was examined as shown in Table 2.

Table 2. Physical, mental health status and diseases diagnosed for older persons

Variable	n=2,274	
	n	%
Activity Daily Living (ADL)		
No Functional Impairment	1,952	85.8
Moderate Functional Impairment	3	0.1
Severe Functional Impairment	319	14.0
Cognitive Health Status (MMSE Score)*		
Normal	552	24.3
Mild Cognitive Impairment (MCI)	1,318	58
Mild Dementia	247	10.9
Moderate Dementia	124	5.5
Severe Dementia	33	1.5
Geriatric Depression Scale (GDS)		
Normal	2,194	98.1
Mild Depressive	43	1.9
Severe Depressive	0	0.0
Number of Diseases Diagnosed		
No diagnosed disease	727	32.0
1 diagnosed diseases	570	25.1
2 to 4 diagnosed diseases	928	40.8
5 and more diseases	49	2.2
Lifesytle-related Disease		
Hypertension	1042	45.8
Diabetes Mellitus	540	23.7
Hypercholesterolemia	587	25.8
Heart Disease	199	8.8
Kidney Failure	31	1.4
Disability-related Disease		
Cancer	26	1.1
Stroke	28	1.2
Serious vision or hearing impairment.	110	4.8
Asthma	115	5.1
Cataract / Glaucoma	144	6.3
Tuberculosis	7	0.3
Osteoarthritis / Osteoporosis	240	10.6
Thyroid	32	1.4
Other diseases	109	4.8

**Shahar et al. (2015) and Clinical Practice Guidelines-Management of Dementia (MOH,2009)*

The activity of daily living (ADL) score indicated that 85% of respondents were categorized as fully functional with only 14% having severe functional impairments. Based on the Mini-Mental State Examination (MMSE) score, 24% were categorised as having normal cognitive status, while a majority (58%) were categorised as suffering from mild cognitive impairment (MCI), and 17% were diagnosed with dementia of different level of severity. Almost all respondents were not at risk of depression. Regarding physical health, 32% were not diagnosed with any disease, 25% were diagnosed with a single illness, while the majority (43%) of the respondents have been diagnosed with at least two chronic diseases. As shown in Table 2, respondents' diseases were grouped into lifestyle-related (e.g. hypertension, hypercholesterolemia and diabetes) and disability-related. The disability-related diseases refer to illnesses or conditions that could hinder one's functioning and movement such as stroke-related paralysis, osteoarthritis/osteoporosis, cataract/glaucoma, gout and serious vision and hearing impairment. Furthermore, the most common diseases under the "lifestyle" category were hypertension (45.8%), hypercholesterolemia (25.8%) and diabetes mellitus (23.7%). For the disability-related diseases, the top two were osteoarthritis/osteoporosis (10.6%) and cataract/glaucoma (6.3%).

Healthcare utilisation

A total of 1,419 (62.4%) older persons reported having utilised outpatient and/or inpatient care from various healthcare facilities available in Malaysia. The prevalence of outpatient care was 60.5% (Table 3). Out of 1,376 respondents who sought outpatient care services, 36.3% were obtained from government clinics and 16.9% were from government hospitals. Only a small number of older persons reported seeking care from private clinics (7.7%) and private hospitals (1.1%). The average number of visits per annum is 5.7 (± 3.4) indicated respondents' choice of healthcare facilities. Among the available healthcare facilities, government clinics had the highest number of average visits per annum (5.82 ± 3.30), followed by private clinics (5.62 ± 3.69), and government hospitals (5.56 ± 3.43). The ratio of the mean number of visits to government hospitals was 1.12 times higher compared to the private hospitals. Overall, the total average number of visits of all the respondents was 2.5 times per year. About one-third of older persons seeking outpatient care were for hypertension management, 20% seek for a combination of diseases, and 15% for other diseases.

Meanwhile, a total of 128 respondents (5.6%) received in-patient service at hospitals. The mean number of hospital admission was 1.29 in one year. Government and private hospitals were the two main facilities chosen for in-patient services. Almost all (n = 106, 82.8%) respondents were admitted to government hospitals with a mean length of stay of 8 days. Respondents spent twice as longer time in government hospitals compared to private hospitals (3.9 days). The majority of older persons sought inpatient services for other diseases.

Table 3. The annual outpatient and inpatient utilization and cost of care for older persons

Facility	n (%)	Direct Cost (RM) Mean ± SD	Indirect Cost (RM) Mean ± SD	Total Cost (RM) Mean ± SD	Average Number of Visit/ Admission Mean ± SD	Average Length of Stay (day) Mean ± SD
Outpatient Government clinics	825 (36.3%)	44.0 ± 112.85	28.6 ± 42.15	72.6 ± 127.87	5.82 ± 3.30	-
Government hospitals	384 (16.9%)	255.3 ± 2,600.53	45.2 ± 155.70	300.5 ± 2,606.83	5.56 ± 3.43	-
Private clinics	175 (7.7%)	234.0 ± 411.20	27.1 ± 49.10	261.10 ± 425.76	5.62 ± 3.69	-
Private hospitals	25 (1.1%)	1,114.3 ± 2,707.43	27.5 ± 29.01	1,141.8 ± 2,706.65	4.96 ± 3.56	-
Traditional medicine healers	11 (0.5%)	208.8 ± 212.28	15.8 ± 23.51	224.6 ± 222.51	5.09 ± 3.73	-
Alternative healthcare providers	3 (0.1%)	141.6 ± 92.49	20.0 ± 15.45	161.6 ± 106.78	5.33 ± 4.16	-
Others	35 (1.5%)	269.8 ± 327.94	22.3 ± 28.91	292.1 ± 331.40	7.83 ± 4.18	-
Total Outpatient	1,376 (60.5%)	141.2 ± 1,433.47	31.4 ± 89.41	172.7 ± 1,437.93	5.7 ± 3.40	
Inpatient Government hospitals	106 (4.7%)	404.4 ± 3,031.80	546.9 ± 1,593.21	951.2 ± 3,451.49	1.36 ± 0.90	9.97 ± 14.43
Private hospitals	22 (1.0)	12,755.5 ± 21,754.81	414.3 ± 564.61	13,169.8 ± 22,053.17	1.23 ± 0.53	4.59 ± 4.81
Total Inpatient	128 (5.6%)	2,527.2 ± 10,379.84	524.1 ± 1,467.59	3,051.3 ± 10,568.10	1.3 ± 0.80	9.05 ± 13.42

The cost of healthcare

As shown in Table 3, the total direct and indirect cost for outpatient care was RM 141.2 and RM 31.4. The total direct cost at private hospitals was the highest at RM 1,114.30 which was 4.5 times higher than that of government hospitals. The direct cost of outpatient care at private clinics was RM 234 and similar to the direct cost at government hospitals (RM 255), but more expensive (5.3 times) compared to government clinics. The total cost of outpatient care at government clinics was estimated at RM 72.6 per adult per annum, whereas the total cost at government hospitals was RM 300. Furthermore, the price ratio between seeking treatment at private clinics and hospitals were RM 261 and RM 1,141 which was 3.6 and 3.8 times higher than government clinics and government hospitals, respectively. Interestingly, charges for outpatient services offered by alternative medicine providers/healer were at least about twice as much expensive as government clinics. The total cost (± SD) for outpatient care (per older person annually) was RM 172.7 ± 1,437.93. For inpatient care, the average total cost for private hospitals was RM 13,169 which was 13.85 times more expensive than government hospitals (Table 3). The major reasons for the high costs included direct costs from medicine charges and physician consultation estimated at RM 12,755.5 In addition, the estimated cost was 31.54 times more expensive in private hospitals than the government counterpart. In this study, the total cost for inpatient care (per older adult annually) was RM 3,051.3 ± 10,568.10. Although the majority of respondents reported having utilised healthcare services, the cost of health care was driven up by the cost of ward admission in the facilities. Overall, regardless of the type of facilities and care, the total cost of healthcare utilization is RM 442.7 per older person per annum.

Economic burden of healthcare utilisation by older persons

Table 4 provides information on relevant administrative data and total economic cost at institutional setting (i.e. providers' costs). The data were combined with the total economic cost at the community data presented for the healthcare cost. The aggregated economic cost of healthcare utilisation was calculated using the formula described in Equation 1. Accordingly, the total economic burden of healthcare utilisation by older persons in Malaysia in 2014 was estimated at RM 3,807,481,491. This value represented 0.34% of the total GDP for that year. According to the Malaysia National Health Accounts report, the total health spending was 4.23% of GDP in 2014[21]. Therefore, the estimated value of treating older persons constituted 8% of the total health expenditure. In line with Malaysia's move to become an aged nation, the total percentage of health spending will continue to show an increasing trend.

Table 4. Sources of relevant information

No.	Description	Value	Source
1.	Total Malaysian population in 2014*	30,708,500	DOSM
2.	Total older person population in 2014 (≥60 years old)*	2,696,300	DOSM
3.	Total GDP, Nominal (RM million) (in 2014)*	RM1,106,443 mil	DOSM
4.	The estimated average cost per unit care utilized by older person per visit [for outpatient service]	RM181.00	Providers cost# [given data]
5.	The estimated average cost per unit care utilized by older person per day of stay [for inpatient service].	RM778.00	Provider cost# [given data]
6.	The estimated average cost of care utilized by older person [for outpatient service]	RM172.70	Community cost [current study]
7.	The estimated average cost of care utilized by older person [for inpatient service]	RM3,051.30	Community cost [current study]

**Department of Statistics Malaysia (DOSM)*
 # Amrizal et al. (2017)

Given population ageing, the current study extended the estimation on healthcare utilisation and the economic burden of healthcare utilisation by older persons for 2020, 2025, 2030, 2035 and 2040. Based on the population projection provided by DOSM, it is estimated that the population of older persons (aged 60 and above) will steadily increase from 8.78% in 2014 to 15.29% in 2030 and 19.83% in 2040[6], (see Figure 1). Hence, Malaysia will become an aged nation by 2030 when 15% of its population comprise older persons aged 60 and above. Consequently, the economic burden of the older population on healthcare systems was observed within the aforementioned periods. It is projected that the cost of healthcare utilisation by older persons will increase by four-fold to RM 12 billion or around 0.76% of the total GDP in 2030 from RM 3.8 billion (0.34% of GDP) in 2014. By 2040, when Malaysia is already super-aged, it is projected that the total cost of healthcare utilisation by older persons will reach a staggering RM 21 billion or constituting around 1.08% of the total GDP.

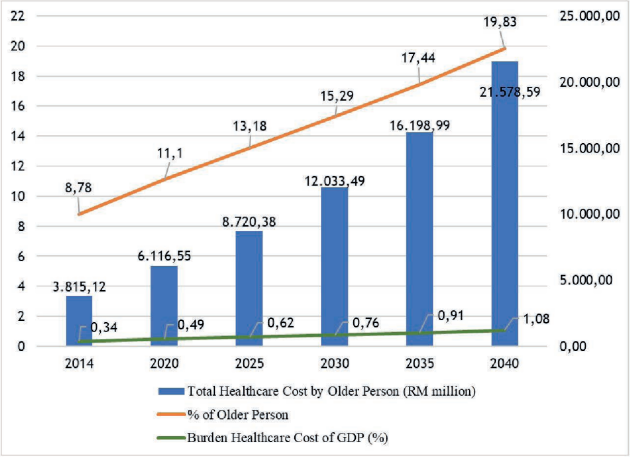


Figure 1. Projection of total healthcare cost and the burden heathcare cost of Malaysia GDP by older persons 2020 – 2040

4. Discussion

Profile of older persons. The current cohort of older persons was mostly born before Malaysia's Independence in 1957 when educational opportunities were still limited and considered a luxury to most people. This might explain the low educational level among older persons participated in this study. Consequently, it affects their economic opportunity to secure employment with high pay. This was also reflected by the economic status of the respondents as most of them belong to the low-income groups (i.e. below 40% income percentile). In terms of health status, almost half of the respondents claimed to be healthy most of the time. For older persons, self-rated health status is equally important as the actual state of their health due to the influence on decision-making to be actively involved in the community, or otherwise. This is in line with the functionality test score (IADL) which indicated that a high percentage of the respondents was categorised as being physically fully functional. However, the MMSE score indicated that almost 60% of these older people had mild cognitive impairment (MCI). Older persons in the MCI category were considered to be between normal ageing and dementia, as well as at a higher risk of developing dementia. If there is no early intervention, at worst, the cognitive disorder will affect older persons' quality of life and may require long-term care. Hence, mentally impaired older persons are at higher risk of depending on a caregiver which would contribute to the rising healthcare costs.[29] Such caregiving function may be performed by family (informal) or non-family (formal) members. As most of the older persons live together with their spouses and children, family members may serve as caregivers to older people. However, several studies have reinstated the potential negative effects of informal caregiving such as a loss of productivity, compromised quality of life and poor health status.[30, 31, 32] The burden of informal caregivers is more costly than the direct costs as evidenced by the positive relationship between the time spent caring for an older adult and the incurred cost.[33, 34] Consequently, more efforts must be invested in preparing future caregivers with knowledge to ensure the wellbeing of both older person and caregivers.

Health care services utilisation. The average annual number of visits to outpatient healthcare facilities was 5.7 times, or around once every two months. As the majority of older persons in this study claimed to be healthy, outpatient services were mostly sought from clinics and the main reasons were either for routine check-ups or treating minor illnesses. This was reflected in the overall physical health of the respondents as 40.8% of them suffered from multiple NCDs such as hypertension, hypercholesterolemia, diabetes mellitus, osteoarthritis, and heart disease. These conditions might contribute to their frequent visits to clinics. For the inpatient care utilisation, apart from NCDs, the other two main causes of hospitalisation were road accidents and falls. Consequently, the respondents simultaneously suffered from body injuries and various chronic diseases, culminating in long stays at hospitals (i.e. as long as nine days). This is in line with a study which report higher utilisation of healthcare facilities among older persons compared to the younger population.[35] Inevitably, older people are more susceptible to illnesses, thus have no choice but to spend more money on healthcare services for treatment purposes.

Findings indicated that older people flocked to government facilities to seek either inpatient or outpatient services. Possible explanations for such behaviours are as follows: First, Malaysia's public healthcare system is heavily subsidised by the government. It is almost practically free and accessible to all citizens. Older persons could easily receive treatment from outpatient service by only paying RM 1 (USD 0.25). Second, most of the aged population come from low-income households (i.e. B40); thus, government facilities offer a comparative advantage and are easily affordable. Third, government clinics and hospitals are available in both urban and rural areas in contrast to private hospitals that are mostly available in urban areas. This makes government healthcare services and access more convenient to older adults. Nevertheless, government healthcare services are not without limitations. For instance, older persons are expected to wait longer to be attended to in public compared to private facilities. This might not be a serious issue in older persons that are generally healthy. However, a long waiting time is an issue for older adults with severe health conditions. They would not have to spend five to seven hours to get treatment and consultation at government healthcare facilities if they could afford the treatment from private facilities.[36]

The cost of healthcare utilisation. The cost of healthcare utilisation consists of direct cost and indirect cost. In this study, non-prescribed supplements and meals for both patients and caregivers constituted a significant part of the total cost of healthcare utilisation, whereas the indirect cost included only the opportunity cost of the time forgone by the respondents during treatment. These findings are consistent with previous studies which concluded that direct non-medical cost contributed almost 50% of the total direct cost.[37,38] The studies also highlighted the significant impact of illness on direct non-medical cost and indirect cost.[37, 38] As direct non-medical cost is one of the OOP cost components, it will remain high despite low medical charges in Malaysian government facilities. It was reported that non-medical cost led to consistent high OOP costs among older persons irrespective of insurance coverage.[39] Additionally, when OOP payments are unavoidable, households with the elderly, handicapped, or chronically ill members are generally more likely to be trapped with catastrophic health expenditure (CHE) than other households.[40, 41, 42]

Around 2% of older persons in Malaysia were found to have incurred CHE at a 10% threshold43. Meanwhile, the incidence of CHE by cognitive status among older persons with mild cognitive impairment (MCI) was 2.4% at a 10% threshold – the highest among other cognitive status43. Accordingly, the prevalence of MCI was estimated at 58%, which was the highest considering the cognitive status of older persons. MCI is the condition between normal cognitive status and dementia. Persons with MCI are at higher risk of developing dementia or its subtypes if early treatment is not provided, thus resulting in higher costs.

Based on the reports from Malaysia's Ministry of Health, private household OOP spending constitutes 38% share of total health expenditure (THE) and remains the second-highest source of THE financing after the public funds from the nation's Health Ministry. The OOP in Malaysia also shows an increasing trend from 30% in 2010 to 38% in 2017. However, the international comparison of the OOP health financing scheme ranked Malaysia fifth after Bangladesh, India, the Philippines and Sri Lanka in 2016, but Malaysia ranked higher than Thailand (12%) and Singapore (31%). The OOP health financing scheme is based on the percentage of current health expenditure.[21]

The heavily subsidised health care system in Malaysia has provided its citizens an access to quality healthcare services at an affordable rate. As such, a bulk of the healthcare utilisation cost among older persons was due to costs other than direct medical costs such as medical and pharmaceutical charges. Thus, the Ministry of Health had the biggest share of and listed as the financing source. The projected cost of healthcare utilisation shows an increasing trend, which insinuates the government's economic burden in treating older persons.[44] Therefore, there is a concern regarding the sustainability of the system, especially with the projected ageing Malaysian population. Policymakers must come up with strategies and policies to lessen the economic burden of healthcare utilisation by older people. This includes early interventions across the lifespan to ensure a significant reduction in the prevalence of NCDs. Simultaneously, the public must be adequately educated on health and self-care to promote healthy ageing, prolonged active participation, and productive contributions to society.[45] In summary, the cost of not being healthy in old age is burdensome making an early intervention of utmost importance.

Conclusion

Longevity is not automatically accompanied by good health. In Malaysia's case, the prevalence of NCD is increasing and exacerbated by an increasing number of older population suffering from multiple NCDs. Consequently, there is an excess demand for healthcare services and pressure on the available facilities. This is important since older people prefer to be treated at affordable centres as obtainable in Malaysia's government healthcare systems that are heavily subsidised. Even though the government is obliged to ensure easy access to quality care at an affordable price, population ageing puts an extra burden on the system and lessens sustainability. The government had contemplated to move from tax-finance system to National Health Insurance (NIH). However, the health reform has not been implemented. Therefore, it is high time for the Malaysian government to seriously strategise and make changes in health insurance schemes to alleviate financial burden on the nation's health care system. Lifespan perspective of preventive health through education and other intervention must be intensified to ensure that future elderly will live longer and healthier. Ageing in good health will not only reduce healthcare cost and spending, but it will also address stereotyping of age whereby older persons often being depicted as frail, dependent and a burden to society.

Ethics Statement

The studies involving human subjects were reviewed and approved by Medical Research Ethics Committee of the Faculty of Medicine and Health Science, Universiti Kebangsaan Malaysia (UKM) (Ref: UKM 1.5.3.5/244/NN-060-2013) and also approved by the Medical Research and Ethics Committee, Ministry of Health on 16th December 2013 with the registration number, NMRR-13-1023-14660. The participants provided their written informed consent to participate in this study.

Conflict of Interest
All authors have declared that they had no conflict of interest.

Funding
This study was funded through "Long Term Research Grant Scheme" (LRGS), Ministry of Education Malaysia under research program entitled TUA-Neuroprotective Model for Health Longevity Among Malaysian Elderly (Project No. LRGS/BU/2012/UKM-UKM/K01).

References

1. World Health Organization (WHO). Regional Office for the Western Pacific. . 2012. Malaysia health system review. Manila: WHO Regional Office for the Western Pacific. WHO ; https://apps.who.int/iris/handle/10665/206911 (accessed 17 Nov 2020).
2. World Health Organization (WHO). Malaysia public health data at glance. Country Fact Sheet. WHO 2020; https://www.who.int/docs/default-source/wpro---documents/countries/malaysia/fact-sheet-malaysia/who-my-factsheet-fa-09042020.pdf?sfvrn=db2f8b32_2 (accessed 17 Nov 2020).
3. Omar, M. H., Asmuni, N. H., Shima, S. N. Healthy life expectancy vs health expenditure by sullivan method in Malaysia. Indonesian Journal of Electrical Engineering and Computer Science;2019, Vol. 14, No. 1 402-6.
4. Department of Statistics Malaysia (DOSM). 2020. Abridged life table, Malaysia, 2018-2020. ;https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=116bul_id=R0VPdE1mNEdRQms2S0M4M1ZsSlVEdz09&menu_id=L0pheU43NWJwRWVSZklWdzQ4TlhUUT09 (accessed 17 Nov 2020).
5. Department of Statistics Malaysia (DOSM). Current Population Estimates. Malaysia, DOSM 2020;https://www.dosm.gov.my/v1/index.php?r=column/pdfPrev&id=OVByWjg5YkQ3MWFZRTN5bDJiaEVhZz09 (accessed 17 Nov 2020).
6. Department of Statistics Malaysia (DOSM). (2016). Population Projection (Revised), Malaysia, 2010-2040. DOSM 2016; https://www.dosm.gov.my/v1/index.php?r=column/pdfPrev&id=Y3kwU2tSNVFDOWp1YmtZYnhUeVBEdz09 (accessed 17 Nov 2020).
7. Rau, R., Soroko, E., Jasilionis, D., & Vaupel, J. W. Continued reductions in mortality at advanced ages. Population and Development Review 2008; 34(4):747-68.
8. Barthold, D., Nandi, A., Rodríguez, J. M. M. & Heymann, J. Analyzing whether countries are equally efficient at improving longevity for men and women. American Journal of Public Health November 2014; Vol. 104(11):2163-9.
9. Palloni, A. Living arrangements of older persons. Center for Demography and Ecology, University of Madison-Wisconsin 2000.
10. Samsudin, S., Abdullah, N., and Applanaidu, S. D. The prevalence of diabetes mellitus and hypertension and its effects on healthcare demand among elderly in Malaysia. International Journal of Public Health Research 2016; Vol 6(2):741-9.
11. Institute for Public Health (IPH). National Health and Morbidity Survey (NHMS) 2019: Vol. I: NCDs – Non-Communicable Diseases: Risk factors and other health problems. National Institutes of Health, Ministry of Health Malaysia 2020.
12. Institute for Public Health (IPH). National Health and Morbidity Survey (NHMS) 2018: Elderly health. Vol. II: Elderly health findings, 2018. National Institutes of Health, Ministry of Health Malaysia 2019.
13. Xu, W. L., Qiu, C. X., Wahlin, Å., Winblad, B., & Fratiglioni, L. Diabetes mellitus and risk of dementia in the Kungsholmen project a 6-year follow-up study. Neurology 2004; 63(7):1181-6.
14. Strachan, M. W., Reynolds, R. M., Marioni, R. E., & Price, J. F. Cognitive function, dementia and type 2 diabetes mellitus in the elderly. Nature Reviews Endocrinology 2011; 7(2):108-14.
15. Sharp, S. I., Aarsland, D., Day, S., Sønnesyn, H., & Ballard, C. Hypertension is a potential risk factor for vascular dementia: Systematic review. International Journal of Geriatric Psychiatry 2011; 26(7):661-9.
16. Fan, Y., Zhang, C., & Bu, J. Relationship between selected serum metallic elements and obesity in children and adolescent in the US. Nutrients 2017; 9(2):104.
17. Yu, C. P., Whynes, D. K., & Sach, T. H. Equity in health care financing: The case of Malaysia. International Journal for Equity in Health 2008; 7(1):1-14.
18. Van Doorslaer, E., O'Donnell, O., Rannan-Eliya, R.P., Somanathan, A., Adhikari, S.R., Garg, C.C., Harbianto, D., Herrin, A.N., Huq, M.N., Ibragimova, S. and Karan, A. Catastrophic payments for health care in Asia. Health Economics 2007; 16(11):1159-84.
19. Flores, G., & O'Donnell, O. Catastrophic medical expenditure risk. The Lancet 2013; 381: S49.
20. Safurah J, Kamaliah MN, Khairiyah AM, Nour

Hanah O, Healy J, Kalsom M, Zakiah MS. Malaysia health system review. Health Systems in Transition 2013; 3(1):44.

21. Ministry of Health (MOH). Malaysia national health accounts health expenditure report 1997-2017. Malaysia National Health Accounts Section, Putrajaya, Malaysia 2019.
22. Prince, M. J., Wu, F., Guo, Y, Robledo, L. M. G., O'Donnell, M, Sullivan, R., Yusuf, S. The burden of disease in older people and implications for health policy and practice. The Lancet: Ageing 2015; 385(9967):549-62.
23. Ministry of Health (MOH). The impact of noncommunicable diseases and their risk factors on Malaysia's Gross Domestic Product. Putrajaya, Malaysia: Ministry of Health Malaysia 2020.
24. Shahar, S., Omar, A., Vanoh, D., Hamid, T. A., Mukari, S. Z. M. S., Din, N. C., ... & Meramat, A. Approaches in methodology for population-based longitudinal study on neuroprotective model for healthy longevity (TUA) among Malaysian older adults. Aging Clinical and Experimental Research 2016; 28(6): 1089-104.
25. Ministry of Health Malaysia (MOH). Clinical practice guidelines. Management of dementia (2nd Edition). CPG Secretariat, MOH Putrajaya 2009. Retrieved from www.moh.gov.my/attachments/4485.
26. Amrizal, M. N., Aljunid, S. M., Ismail, N, Haron, S.A, Shafie, A. A, Mohamed Nor, N, Salleh, M., Koris, R and Maimaiti, N. Provider costs of treating dementia among the elderly in government hospitals of Malaysia. Malaysian Journal of Public Health Medicine 2017; 17(2):121-7.
27. Creese, A., & Parker, D. Cost analysis in primary health care. A training manual for programme managers. WHO Publications Center USA, Albany, NY: NY. 1994.
28. Drummond, M. F., Sculpher, M. J., Torrance, G. W., O'Brien, B. J. & Stoddart, G. L. Methods for the economic evaluation of health care programmes third edition. Oxford University Press. United Kingdom. 2005.
29. Salthouse, T.A. "What and when of cognitive aging". Current Directions In Psychological Science 2004; 13(4): 140-4.
30. Kotseva, K., Gerlier, L., Sidelnikov, E., Kutikova, L., Lamotte, M., Amarenco, P., & Annemans, L. . Patient and caregiver productivity loss and indirect costs associated with cardiovascular events in Europe. European Journal of Preventive Cardiology 2019; 26(11): 1150-7.
31. Metzelthin SF, Verbakel E, Veenstra MY, van Exel J, Ambergen AW, Kempen GIJM. Positive and negative outcomes of informal caregiving at home and in institutionalised long-term care: A cross-sectional study. BMC Geriatrics 2017; 17: 232. https://doi.org/https://doi.org/10.1186/s12877-017-0620-3.
32. Bevans M.F, & Sternberg, E.M Caregiving burden, stress, and health effects among family caregivers of adult cancer patients. JAMA 2012; 307: 398–403. https://doi.org/https://doi.org/10.1001/jama.2012.29.
33. Maresova, P., Lee, S., Fadeyi, O. O., & Kuca, K. The social and economic burden on family caregivers for older adults in the Czech Republic. BMC Geriatrics 2020; 20: 1-12.
34. Ganapathy, V., Graham, G. D., DiBonaventura, M. D., Gillard, P. J., Goren, A., & Zorowitz, R. D. Caregiver burden, productivity loss, and indirect costs associated with caring for patients with poststroke spasticity. Clinical Interventions in Aging 2015; 10: 1793.
35. Cutler, D. M. Declining disability among the elderly. Health Affairs 2001; 20(6): 11-27.
36. Lau, B. Can elderly Malaysians afford to retire with the increasing costs of healthcare? MIMS Today 2016, September 28. [WWW document] Retrieved from https://today.mims.com/can-elderly-malaysians-afford-to-retire-with-the-increasing-costs-of-healthcare.
37. Kieu, T. T. M., Trinh, H. N., Pham, H. T. K., Nguyen, T. B., & Ng, J. Y. S. Direct non-medical and indirect costs of diabetes and its associated complications in Vietnam: An estimation using national health insurance claims from a cross-sectional survey. BMJ Open 2020; 10(3): e032303.
38. Ibrahim, N., Pozo-Martin, F. & Gilbert, C. Direct non-medical costs double the total direct costs to patients undergoing cataract surgery in Zamfara state, Northern Nigeria: A case series. BMC Health Serv Res 2015; 15: 163. https://doi.org/10.1186/s12913-015-0831-2.
39. Ma, C., Jiang, Y., Li, Y., Zhang, Y., Wang, X., Ma, S., & Wang, Y. Medical expenditure for middle-aged and elderly in Beijing. BMC Health Services Research 2019; 19(1): 360.
40. Xu, K. and World Health Organization. Distribution of health payments and catastrophic expenditures: methodology. World Health Organization (WHO), Geneva. 2005.
41. Wagstaff, A., & Doorslaer, E. V. Catastrophe and impoverishment in paying for health care: With applications to Vietnam 1993–1998. Health Economics

2003; 12(11): 921-33.

42. Somkotra, T., & Lagrada, L. P. Which Households Are at Risk of Catastrophic Health Spending: Experience in Thailand After Universal Coverage. Health Affairs 2009; 28(3): w467-w78.

43. Koris, R., Nor, N. M., Haron, S. A., Ismail, N., Aljunid, S. M., M. Nur, A, … & Maimaiti, N. Socio-demographic, cognitive status and comorbidity determinants of catastrophic health expenditure among elderly in Malaysia. International Journal of Economics and Management 2017; 11: 673–90.

44. Thomas, S., Beh, L., & Nordin, R. Bin. Health care delivery in Malaysia: Changes, challenges and champions. Journal of Public Health in Africa 2011; 2(2): e23. https://doi.org/10.4081/jphia.2011.e23.

45. Hahn, E. A., Cichy, K. E., Almeida, D. M., & Haley, W. E. (). Time use and well-being in older widows: Adaptation and resilience. Journal of Women and Aging 2011; 23: 149–59. https://doi.org/10.1080/08952841.2011.561139.