

Pattern and correlates of Out-of-pocket payment among older people in Bangladesh

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Abstract

In low- and middle-income countries, including Bangladesh, most older people neither receive pensions nor have public or private health insurance. In Bangladesh, health care financing in Bangladesh is highly inequitable due to the high share of out-of-pocket (OOP) payments for health. This disproportionately impacts the health of older people from low-income households who cannot afford to spend on health care. This OOP expenditure burden among older people could impact their morbidity outcomes and life expectancy in the absence of pensions and other social protective measures. However, there is little evidence on out-of-pocket health expenditure among older people in Bangladesh, mainly due to the lack of data exclusively focusing on older people. To fill this gap, we first carried out a literature review on out-of-pocket payment for health among older people in Bangladesh. In addition, using the 16th round of Household Income and Expenditure Survey (HIES) 2016/17 OOP among older people in Bangladesh was calculated. Older people in this study are defined as adults aged 60 and above. For comparative purposes, we also included younger people in our analysis. HEIS 2016 interviewed nearly 186054 individuals, including 15,268 older people aged 60 and above (8.2) % of the sample). Our results showed that OOP increased with age. The increase was highest for age groups 40-49 and 50-59 compared to younger people.

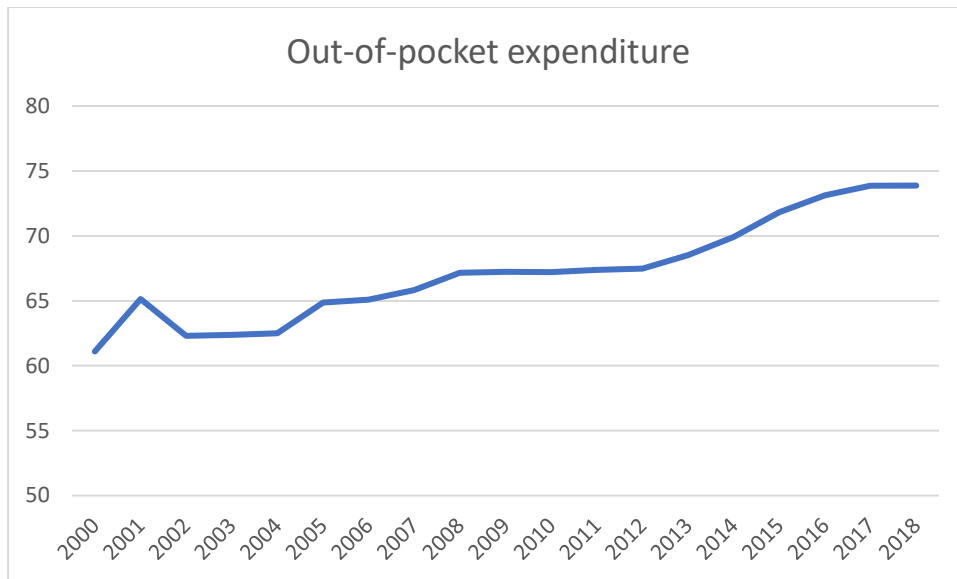
Introduction

In low- and middle-income countries (LMICs), including Bangladesh, most older people neither receive sufficient pensions nor have public or private health insurance. Despite an increasing number and share of older people, the policy measures tend to focus on maternal and child health and issues only, and older people's health issues are often ignored. To achieve Universal Health Coverage, health financing challenges faced by everyone, including older people, must be considered. Evidence in LMICs suggests that millions of people might reduce their use of health services as they can't afford the rising costs (WHO, 2021). This access challenge is exacerbated for older people who often are out of work due to retirement or ill-health. Besides, most of them might have meagre savings and pensions, forcing them to reduce their health usage or avoid using it fully.

In Bangladesh, healthcare financing is highly inequitable due to the high share of out-of-pocket (OOP) payments for health. As per figure 1, OOP in Bangladesh accounts for nearly 74% of total health expenditure and ranks 11 in the world and three in Asia after Afghanistan and Myanmar (World Bank, 2021). The OOP in Bangladesh is more than double the global average (32%).

Despite being a young country, Bangladesh has over 13 million people aged 60 and above, constituting 8% of the total population (Help Age International, 2019). Most of them receive meagre pensions and don't have health insurance to pay for health. Older women in Bangladesh are further poorer as they are more likely to be unemployed or work in the informal sector that does not provide social security, including pension payments. Research in Bangladesh and other LMICs (Molla et al., 2017, Mohanty et al., 2014) suggest that households with older people or households with an increase in the proportion of older people incurred higher health expenditure. The expenditure burden could be substantially among older people despite lower access to health care in this group. However, social protective measures related to older people

Figure 1: Share of out-of-pocket expenditure as a % of health expenditure in Bangladesh



Source: Out-of-pocket expenditure (% of current health expenditure) - Bangladesh | Data (worldbank.org)

Figure 1 shows the share of out-of-pocket payments as a share of total health expenditure in Bangladesh between 2000 and 2018. The data indicate that OOP relative to health care expenditure continued to increase from 2004 to 74%. This increase could be attributed to the epidemiological and nutritional transition in Bangladesh that has been an increase in non-communicable diseases in addition to a high prevalence of infectious diseases. This could also be attributed to an increase in the share of older people in Bangladesh.

Ageing in Bangladesh

Bangladesh is a young country with only 8% of the population aged 60 and above. But this proportion is expected to increase to 22% (approximately 37 million) by 2050. 3.9% of older people are women, and this proportion is expected to increase to 11.6%. Male life expectancy males is 70.48 years, whereas female life expectancy is 74.11 years. The majority of older people in Bangladesh reside in rural areas. (Ageing Asia, 2019). As most older people don't have sufficient income or pensions, this increasing number and proportion of older people will place a burden on the quality and quantity of older people.

As per the Global AgeWatch Index 2015 report, Bangladesh does not perform well and ranks 67. In the health domain, Bangladesh ranks further falls. The life expectancy at age 60 and healthy life expectancy in Bangladesh are lower than the regional average. Bangladesh's ranking further declined in the income domain as a majority of older people report income insecurity (Global AgeWatch, 2015). This suggests that despite slightly poorer health performance than the regional average, older Bangladeshi adults might not be able to afford

health care due to their income insecurity later on. At the same time, Bangladesh has reduced extreme poverty by 7.5 between 2005 and 2010, the extreme poverty of households headed by older people only reduced by 2.7 (Haque Khondker, 2013). This could directly impact the health expenditure among these households despite an increase in health care needs in later life.

Life expectancy increased steadily in Bangladesh in the past decades. Some of this improvement is due to improvement in health care and the overall economic wellbeing of the population (World Bank 2020). Bangladesh turned out to be one of the strongest performers in poverty reduction and stands out as a model country due to various initiatives, including several microcredit schemes. While the focus of the growth and policy environment is mostly on younger people, the health aspects of older people need further studying. Older people have to pay for expensive private care as the quality of government clinics continues to be poor. This forces people to pay out of pocket and reduce health care use. Patients in Bangladesh also incur high expenditure in purchasing medications in addition to medical consultations, which places a significant burden on older people who often face multiple morbidities.

Policy support

The Government of Bangladesh (GoB) released the first National Health Policy (NHP) in 2011. The NHP aims to establish universal health coverage and provide quality healthcare services to everyone at a low cost. The NHP advocates for equity-based health services and special programs for older people, such as health cards and insurance (MoHFW, 2011). Bangladesh's first Healthcare Financing Strategy was launched in 2012 to achieve universal health coverage by ensuring equitable and sustainable healthcare financing and financial protection against healthcare costs for the whole population. This strategy paper recommended community-based healthcare and micro healthcare insurance schemes for all, starting with the poor (MoHFW, 2012). Besides, GoB has introduced Old Age Allowances in 1998 (DSS, 2021), the Parent Care Act 2013 of Bangladesh (MINLAW, 2013), Public Service Retirement Act 1974 (MINLAW, 1974) to reduce the vulnerability of older people.

However, only 18% of formal workers in Bangladesh have pensions, and more than 80% of older Bangladeshis are out of pension facilities (Rahman, 2017). The government of Bangladesh launched the old age allowance programme in 1997. This means-tested cash transfer programme provided 100 Taka per month to those eligible. The old-age allowance provided by the government of Bangladesh has since increased. However, the amount provided is still meagre as it includes only 500 Taka per month to older women aged 62 and above and to older men aged 65 and above. The scheme continues to be means tested and

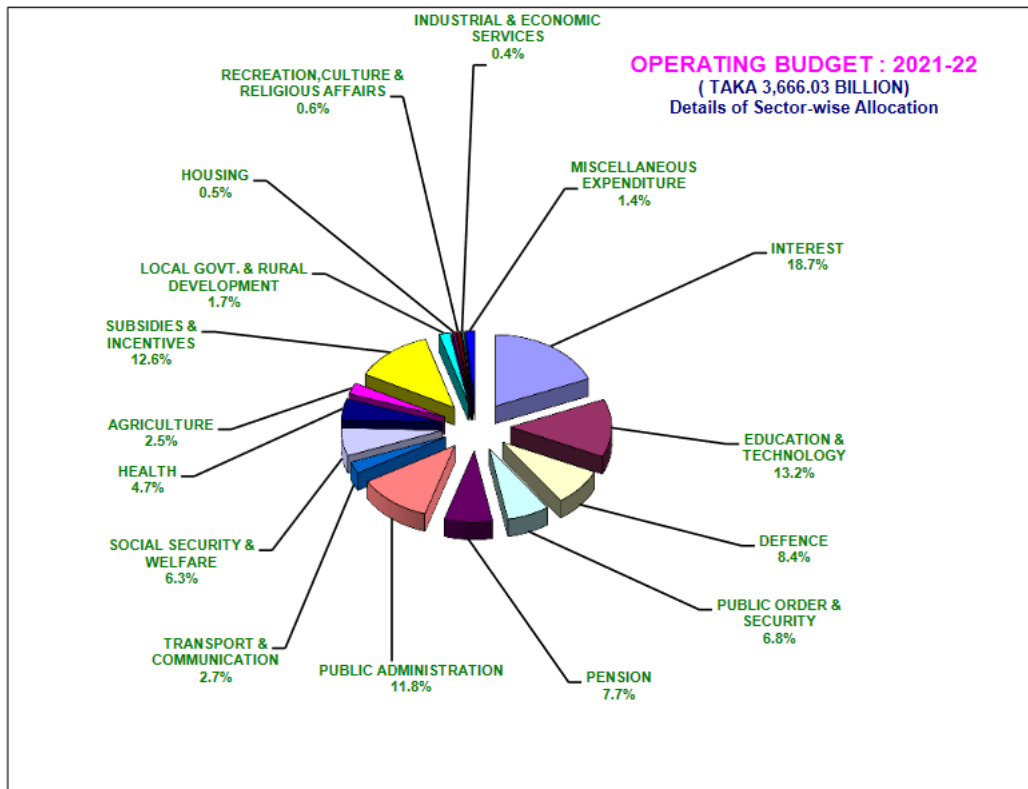
the qualification criteria is based on the socio-economic status of the household. Besides, only one pensioner per household would be eligible for this old age allowance which does not help poorer older couples without any income or pensions. As per the Ageing Asia report, only 27% of pensioners claim the pension (Ageing Asia, 2019). In the 2020-21 budget, the allocation for old age allowance was 29.4 billion takas, covering 4.9 million older people (DSS, 2021). Still, it covers only 38% of the elderly population among Bangladesh's 13 million older people aged 60 and above (United Nations, 2019).

The 2013 national policy on older persons has defined old age as 60 and above. The policy does not really focus on out-of-pocket expenditure or health care among older people. It focuses on introducing Geriatric care and medicine in the medical curriculum. However, the policy recommends prioritising older people, particularly females, in public hospitals.

Although almost ten years have passed after initiating health policy and health financing strategy, Bangladesh still lacks any mentionable health insurance program, especially not for older adults. In addition, it is visible that elderly health care lacks focus on its policies and programs, and the government's immediate attention is to initiate health programs for the poor and formal sector (MoHFW, 2011; MoHFW, 2012).

Bangladesh introduced the Parents care Act in 2013, which legally states that it is the duty of children to take care of older parents. The care children must include a focus on the provision of health facilities in addition to food, clothing, shelter and social support. The act also states that older people cannot be forced to live in care homes by their children. The law encourages older people to file a case on their children if they fail to meet these requirements, resulting in a fine of 100,000 Taka. Failure of payment would result in imprisonment of 3 months. As per the law, both male and female children have equal responsibility of taking care of parental needs, including health costs. However, it is not clear if this act has resulted in the improvement of health care or wellbeing among older people in Bangladesh (Serrano R, 2017).

Figure 2: Bangladesh 2021/22 budget allocation to pension and health



Despite the COVID pandemic, Bangladesh did not increase the share of health expenditure in the 2021/2022 budget. While 4.7 percent of the budget is allocated to health, pension received 7.7% of the budget (MOF, 2021). To achieve the Universal Health Coverage, it is important to look into the health expenditure of older people in addition to challenges faced by older people.

Literature review

In general, older people have fewer choices as they are not able to work as before. Their main priorities are food and medical expenses. In a developing country like Bangladesh, older people get support from the family, such as children and other relatives. However, better economic opportunities displace children from their joint or extended families, which emerges the nuclear families. These social changes like family fragmentation might increase the vulnerability of older people as families live apart and cannot realise the difficulties of their parents. Sometimes the children of the older cannot meet their own needs and fail to provide parents medical treatment expenses.

According to Kabir (2001), about 95% of Bangladesh's old people have health difficulties, with most of them having several issues. They are afflicted by weakness, deteriorating eyesight, hearing loss, high blood pressure, diabetes, heart disease, and other illnesses associated with old age, such as dementia and Alzheimer's disease. Khanom et al. (2011) analysed multimorbidity among older adults in rural Bangladesh. According to their findings,

multimorbidity was found to be prevalent in 53.8 percent of the sample population, with rates notably higher among women, illiterates, unmarried people, and those in the non-poorest quintile. It is found that, in most situations, they avoid consulting with a physician due to financial constraints (Biswas et al., 2006).

As elderly people are more likely to suffer from frequent and multiple diseases (Flores & Gillespie, 2001), they spend more on health care with rising age. For example, Sarker et al. (2014) found that males aged 65–69 years old and females aged 75–79 years old spend most on healthcare. Mahumud et al. (2018) also observed the positive association between age and OOP expenditure and highest among the elderly group. Similarly, according to Khan, Ahmed, and Evans (2017), elderly adults in the family elevated the catastrophic health expenditure incidence from 13% to 18%. Therefore, it is evident that healthcare spending is age-dependent, and older adults bear the higher total healthcare spending.

The high cost of health care for older adults can be a constraint on health-seeking behaviour. Seeking health care services vary with age, gender, and place of residence in Bangladesh. According to Young et al. (2006), older women, unmarried women, and Hindus were all less likely to see a doctor in Bangladesh, indicating poor health empowerment among these groups. They also found that getting health care services is inversely proportional to age for men. Not seeking health care services might be one of the strategies to minimise the health care cost and keep the money for survival.

Rahman et al. (2021) analysed the health status of older adults living in the tea gardens of Bangladesh. They found that one-third of the most respondents (i.e., older people) did not receive any treatment even though they are suffering from chronic illness or morbidities. In addition, the older people delayed seeking treatment of their diseases and suffered severe consequences due to the delay. Their economic situation is very strongly linked to their chronic illnesses. The older persons with a weekly income of less than 500 taka are around three times more vulnerable than those with a higher weekly income to suffer from chronic disease. Moreover, older people are neglected by their family members. As a result, they cannot bear the healthcare costs even though they struggle with serious illnesses.

As people age, they need to seek healthcare due to the emergence of multiple chronic diseases, often accompanied by falls or other health issues, that might increase health expenses. To cope with the increased cost, the older adults in the rural areas of Bangladesh, firstly, decide whether to seek health care. In such cases, flexibility in health care cost, the distance from the health care facility, and familiarity with the health care provider play a critical role. If the practitioner understands the patient's financial problem and is flexible enough to accept whatever the patients give, the older adults take more care from that doctor. However,

if the elderly patient is female, many other critical factors include social stigma for not visiting an unknown male doctor decrease their health care use. Secondly, they make a trade-off between qualified doctors and traditional healers for various aspects, including costs, which are often a primary factor (Biswas et al., 2006).

According to Hamiduzzaman et al., (2018), healthcare for older women is currently counted under maternity and child healthcare in the national health policy of Bangladesh and so, health care services specific other than family planning and maternity are ignored. This results in poor health care for rural women. Such discrimination in health care towards older rural women leads to an increased state of health vulnerability.

According to Sarker et al. (2020), the poorest quintile pays a higher percentage of their income on healthcare than the wealthiest. Overall healthcare costs accounted for about 8% of monthly household income, whereas the poorest people pay around four times a higher portion of their income in healthcare. Although most households pay their health costs from their income and savings, poor people have to borrow or sell or mortgage their assets in Bangladesh to finance these expenditures.

The high OOP cost is related to the small allocation of government budget in the health sector (6.6% of development budget in 2021-22) [MOF, 2021] and heavy reliance on the private sector. Compared with other South Asian countries, Bangladesh is among one of the lowest health expenditures, even after Afghanistan (Hasan et al., 2016). In addition, due to the high dependence on private health care, the drug costs exceed 60% of the total healthcare cost. Moreover, the uncontrolled private market increases physician fees, constituting 14% of the health expenditure (Mahmud, 2017). As a result, many people seek treatment from local medical assistants, druggists, and traditional healers to avoid these high OOP costs (Rahman and Rahman, 2013).

The dependence on private health care creates an extra burden on older adults to meet their health care expenses. In addition, the insurance market for providing health service to the elderly are still immature in Bangladesh. Apart from this, high treatment costs from private service providers lead them to take health care from the informal health provider, which in turn might worsen the situation (Rahman and Rahman, 2013).

Older people are sometimes neglected by their family members or society as they are unproductive and unable to bring potential for the family and counted as a burden for them. The implementation of the Parent Care Act 2013 of Bangladesh might not work if the children are not capable of bearing the medical cost of children. Other health policies are not addressing elderly people appropriately. The absence of a robust health system specific to them is necessary to protect them from health vulnerability.

Data and methods

Data

The 16th round of Household Income and Expenditure Survey (HIES) 2016/17 that collected data on household income, expenditure, and consumption was used to calculate OOP among older people in Bangladesh. HEIS, a nationally representative dataset, is used by the Government of Bangladesh for planning policies in addition to the Five-year development plans. The Bangladesh Bureau of Statistics has conducted the survey. HEIS 2016 interviewed nearly 186054 individuals, including 15,268 older people aged 60 and above (8.2) % of the sample). Older people in this study are defined as adults aged 60 and above. For comparative purposes, we also included younger people in our analysis. We used the total sample, including the 15,268 older adults, to study OOP in Bangladesh.

HEIS data provides information on health, illness and injuries in addition to expenditure incurred for medical treatment. There are no particular datasets on older people in Bangladesh. Hence HEIS data was used to explain the OOP burden among Bangladeshi adults, including older people.

Methods

Bivariate analyses were carried out to report the OOP costs in Bangladesh for various groups. In addition, OLS regression was carried out to study the association between socio-demographic variables and OOP in Bangladesh. Weights were applied to adjust for household composition and the sampling strategy. STATA 15 was used to carry out the analysis, and the paper defines statistical significance as $P \leq 0.05$.

Outcome variable

OOP payment has been defined as the addition of expenditure incurred for treatment, diagnosis, medical care, transportation costs, and costs required to buy medicines and purchase devices. Hence, OOP was derived by summing up the direct health costs related to diagnosis and treatment, including drugs and medical fees and the indirect costs associated with travel and stay expenses. As detailed information was available, we were able to calculate outpatient, inpatient and total medical expenditure. Outpatient costs in the 30 days preceding the interview included consultation costs, medicines, investigation and transport. Outpatient costs also included regular medical visits, routine medication, immunisation visits and visits to procure contraception. Inpatient costs include hospital costs, doctor fees, bed or room charges, the cost for medicines, investigations, transport, tips and other formal charges. The

inpatient costs also included maternity and midwife costs. Both the inpatient and outpatient costs are measured and reported in Bangladeshi taka (Tk).

Control variables

Wealth variable was calculated by combining land, property, and financial assets, including stocks and bonds. Quintiles of the wealth variable from poorest to richest were calculated which enables us to study if OOP coefficients differ significantly by wealth. Our model also controlled for sex, area of residence, education, religion, and current earning. In this study area of residence was divided into rural or urban. As health facilities are mostly located in urban settings, the area of residence variable will enable us to study the expenditure incurred by rural dwelling older people compared to urban dwelling older people. The variable education was used to capture OOP inequalities by education where as the religion variable used in the study aimed to capture OOP differences primarily between Muslims and others. As the sample of other religions including Hindu was very small, they were combined into the other category. We added 10-year age groups to the model to study the impact of age across various categories of age. All older people 70 and above were combined into one group as the sample was particularly low for people aged 80 and above. Hence, they were combined with 70+ sample.

Results

Figure 2 shows box plots for medical expenses, which combine inpatient and outpatient expenses for different age groups. The median medical expenses exhibit an increase from 40, and the distribution tends to become flattened with age. People aged 40-49 show the highest costs. From the age of 50, the expenditure declined a bit. However, from the age of 70 and above, expenditure increased again. It is important to note that selection effects, i.e., a survivorship bias, need to be considered when interpreting the analysis as only 13.3% of the sampled individuals are 60 and older. As healthier people are most likely to survive beyond 60 years, there could be decline in expenditure. Besides, more impoverished older people are likely to reduce their hospital visits due to affordability issues. They might seek help from medical shops for prescription of medicines compared to a trained doctor to reduce their costs. Hence, despite high comorbidities for older people that demands higher costs, the reported spending does not reflect the actual costs.

Figure 2: Medical expenses for different age groups

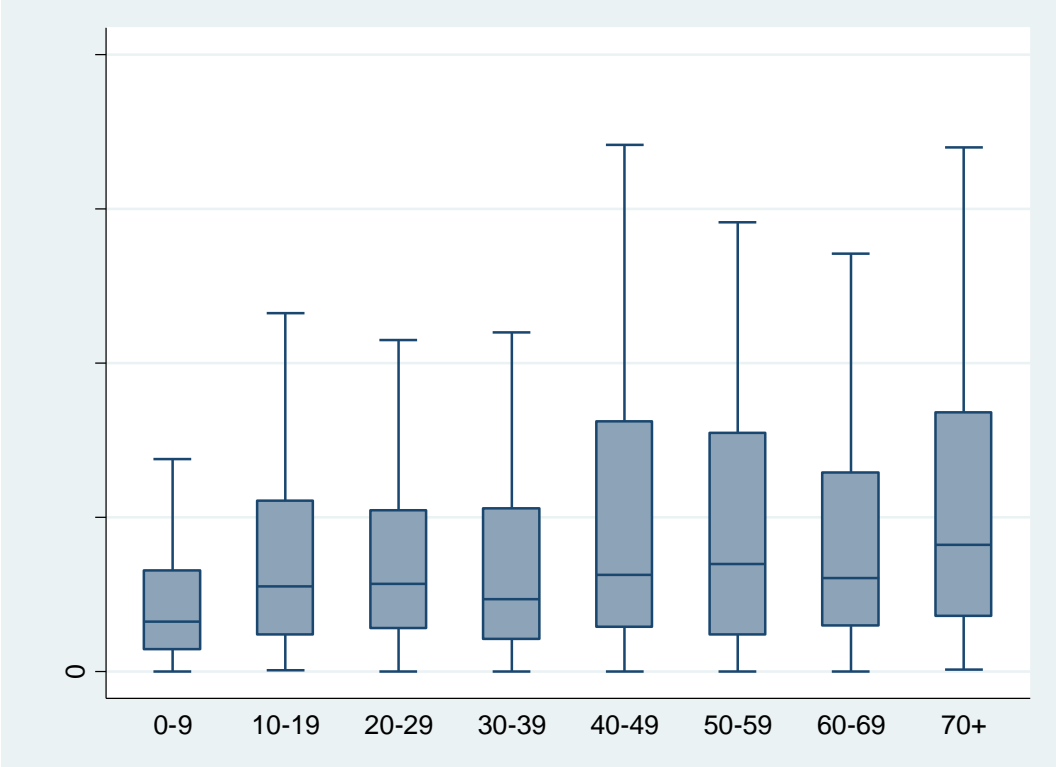


Table 1: Average medical expenses for younger and older populations by gender and area

	Medical expenses by gender			Medical expenses by area		
	Outpatient	Inpatient	Total	Outpatient	Inpatient	Total
Age	Male			Urban		
0-59	979	25,398	26,391	1,118	27,787	25,416
> 60	2,031	29,338	30,801	1,713	23,812	21,530
Total	1,098	26,218	27,302	1,172	27,239	24,942
Age	Female			Rural		
0-59	1,098	28,266	24,690	1,010	26,802	25,353
> 60	1,448	20,012	25,832	1,755	26,612	31,369
Total	1,133	27,459	24,819	1,094	26,774	26,369

Table 1 shows inpatient and outpatient treatment costs for older adults compared to others by gender and area of residence. Older rural residents and older women tend to have access issues to health care. However, their expenditure is seldom studied. On average, medical expenses increase in older adults, which is mainly driven by inpatient treatments (Table 1). There is a stark difference in gender, as medical costs for both in – and outpatient treatments are considerably higher for men. Older females spend less on inpatient care compared to their younger counterparts. The OOP outpatient costs for older females are much lower (20,012 Tk) than older men 29,338 Tk. Medical treatment seems to be higher in rural older people (31,369 Tk) than urban areas (21,530 Tk), suggesting that access issues to health increase their costs.

Figure 3: Medical expenses for wealth quintiles

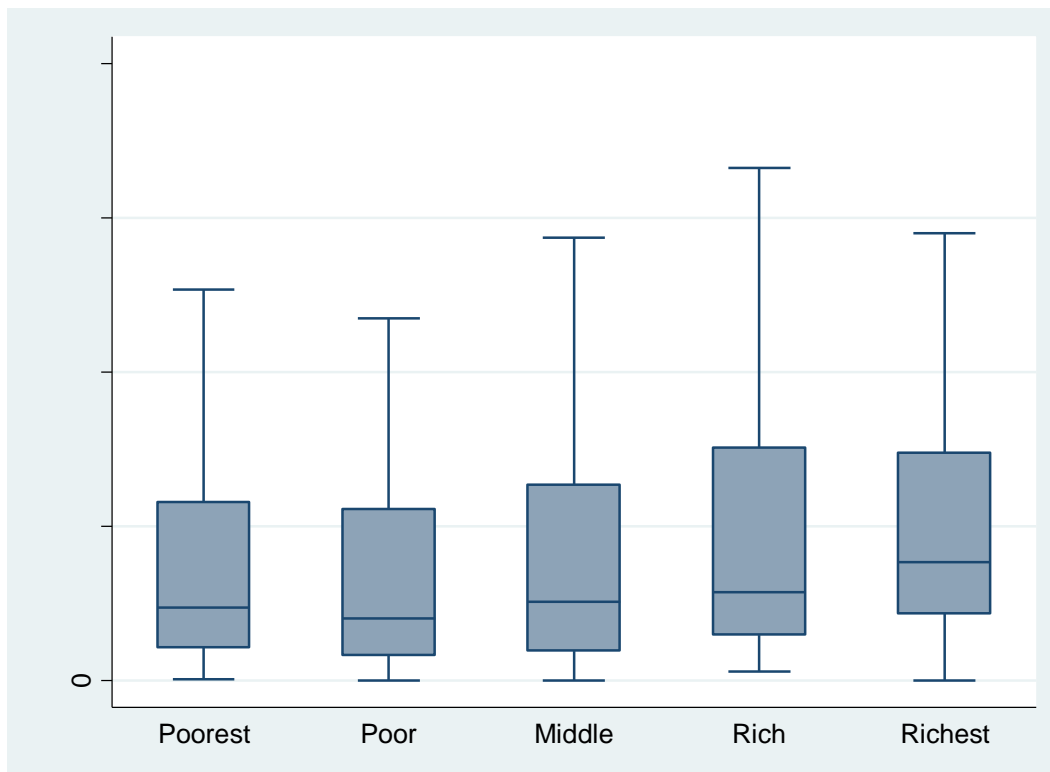


Figure 3 demonstrates a clear link between household wealth and medical expenses for all age groups. Medical expenses increase from the middle wealth quintile, and distributions exhibit more pronounced positive skewness, indicating very high spending. It is likely that poorer people, including 60 and above, do not spend enough as they cannot afford to pay for health care.

Figure 4 compares the outpatient health expenditure among the older and younger population. For comparative purposes, maternity and delivery costs were removed. As shown in the figure, in all categories of expenditure, older people incurred higher charges for outpatient health expenditure compared to younger adults. Both younger and older adults spend a majority of their outpatient health expenditure on medicines. It is very likely that these costs are higher as adults in Bangladesh visit pharmacies for medical prescriptions than visiting a doctor to reduce the doctor, investigation as well as transport charges. Older adults 30 days preceding the survey spent 8185 Taka on average on their medicines compared to 7446 Taka expenditure by younger adults. This suggests that a higher proportion of older adults rely on self-medication compared to younger adults. Both younger and older adults report a higher share of investigation charges followed by bed and transport charges. Despite meagre pension protection, older adults in Bangladesh report higher outpatient expenditure.

Figure 4: Average outpatient expenditure for older and younger adults in Bangladesh

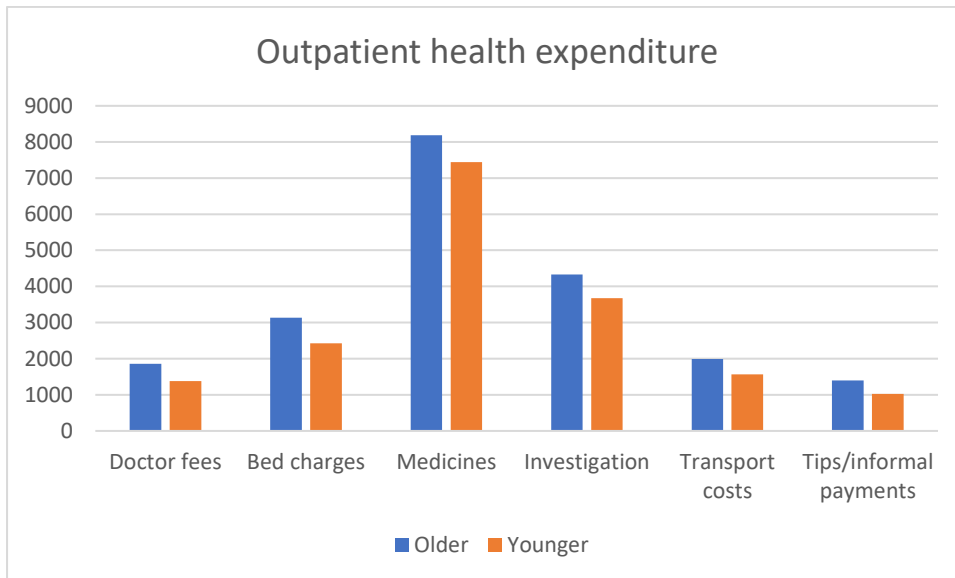
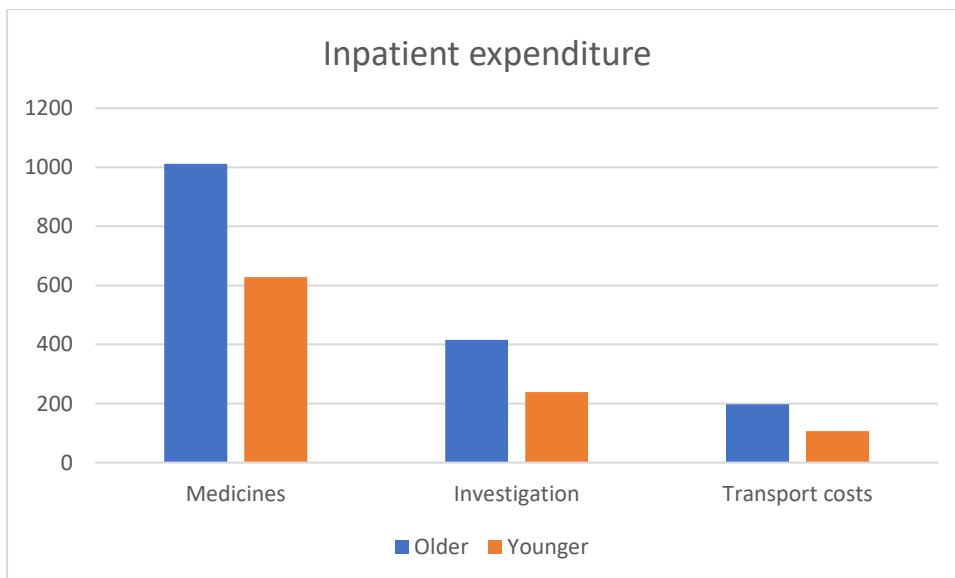


Figure 5: Average inpatient expenditure for older and younger adults in Bangladesh



Further analysis was done to see the source of health expenditure. Our analysis (not shown here) show that medical bills for all age groups are funded mainly by current income (35%) and savings (30%). Borrowing and support from friends and family account for 21.2%. Other funding sources such as informal lending are in the region of 5%. Table 3 shows that funding

sources do not seem to differ much by age,. We didn't observe any differences in funding source sex or other characteristics (not shown here).

Table 3: Source of medical expenditure for younger and older populations in Bangladesh

Source	Older adults	Younger adults
Regular income	32.2	35.4
Household saving	31.7	29.6
Assistance from friends & relatives	10.7	8.3
Borrowed from Friends/Relatives/Office	10.1	13.0
Borrowed from Money Lender	2.5	3.0
Sold Livestock	4.8	3.4
Sold permanent assets	1.5	1.5
Mortgage of Assets/Land	1.8	1.2
Sold Agricultural product/Tree	2.2	1.1
Sold personal belonging	1.3	0.7
Other	1.2	2.6

64% of older adults paid their health expenditure using household income or saving. A similar proportion of younger adults (65%) relied on income and savings to cover their health expenditure. As expected, a slightly higher proportion of younger adults (35%) relied on income compared to older adults (32%). Nearly 12% of older adults paid their health expenditure by selling livestock, permanent assets, agricultural products, personal belongings or by mortgaging assets compared to 8% of younger adults. Older adults reported a slightly higher proportion of assistance from friends and relatives. However, younger adults reported a slightly higher proportion of borrowing from friends or money lenders (16%) compared to older adults (13%). As the results only show the incurred expenditure of those who could afford it, the real demanded expenditure differences would be difficult to estimate.

Table 3 reports chronic disability reported by older and younger adults in Bangladesh. Older adults report a higher prevalence of chronic disability compared to younger adults. The percentage of older adults with non-communicable diseases, as expected, is larger than those reporting this condition in younger age. Nearly 51% of older adults reported arthritis, hypertension, heart condition and diabetes compared to 38% of younger adults. 22% of younger adults reported suffering from gastric problems or ulcers compared to 16% of older adults. However, older adults reported a higher proportion of respiratory conditions (14%) in the past 12 months compared to younger adults (9%). Due to poor screening, cancer is

reported by a very small proportion of older and younger adults. Liver disease and mental health issues also had very poor reporting.

Table 3: Chronic disability in the past 12 months preceding the survey in Bangladesh

Type of Chronic condition	Older	Younger
Arthritis/ Rheumatism	18.0	12.1
Gastric/ ulcer	16.1	21.6
Respiratory Diseases/ Asthma/Bronchitis	14.2	9.4
Hypertension	11.6	8.5
Chronic Heart Disease	8.7	6.9
Diabetes	8.3	5.9
Injuries / Disability	4.4	4.9
Other (specify)	4.1	9.4
Eye problem	3.8	2.7
Paralysis	2.8	0.9
Fever	2.2	5.2
Skin problem	1.3	3.5
Ear/ENT problem	0.9	2.8
Kidney Diseases	0.9	1.5
Mental Health	0.9	1.8
Diarrhoea/Dysentery	0.8	1.3
Liver Diseases	0.4	1.0
Cancer	0.3	0.4

Table 4 reports population-weighted regressions with the log of medical expenses as the dependent variable. Weights are derived from household weights adjusted for the size of households. Model A controls for SEX (female is the reference category), RURAL setting (urban is the reference category) and OLDER people, i.e., aged 60 and above (younger adults below 60 act as the reference category). In line with Table 1 and Figure 2, older people exhibit higher medical expenses; however, after controlling for wealth quintiles (poorest is the reference category), the partial impact of older people seems to have disappeared (see Model B). Model C adds age groups, which refer that the increase in medical spending is not linear. A sharp increase occurs in the age group 40 to 49, which declines in higher age groups. The wealth of households matters in all specifications in line with Figure 3. Education (EDU), measured as having any formal education, does not explain medical spending. The same applies to whether the individual is currently earning an income (EARN). This reflects the importance of resources at the household level and savings as an essential source of funding medical bills. Finally, being a member of the majority faith has a significant and positive impact on medical expenses. Our model explained only 9 per cent of the variation in health

expenditure, pointing to the need to collect more variables that can explain the variation in OOP in Bangladesh.

Compared to females, males have higher medical expenses in line with previous research that suggests that there are gender differences in the utilisation of health care in Bangladesh. Females might be not be availing health care due to discrimination. These gender inequalities will impact older females due to the accumulation of disadvantages across the life course. In addition, gender inequalities might be starker in later life if older women face ageism and are perceived as a burden to the family. The economic inequalities suggest that the rich and richest people in Bangladesh spend significantly higher OOP compared to the poorest. It is interesting to note that the poor and middle wealth quintiles did not have significantly different OOP compared to the poorest. The lack of significance does not indicate the lack of need for health care. As discussed earlier, those without a purchasing capacity will not be incurring costs despite needing them strongly. A similar lens is required when interpreting the age-specific OOP. People aged between 40-49 and 50-59 incur the highest costs with the strongest coefficients compared to 0-9 year old in Bangladesh. Older people also have significantly higher spending compared to 0-9 year old. These findings in the adjusted model don't differ much from the observations made when analysing the boxplot. The older people's expenditure data again has to be interpreted with caution. It is likely that older people, despite their needs, might not spend on health care due to insufficient pensions or support by family members. Also, it is important to note the possibility of selection bias. People surviving into their 60s are likely to be either healthy or those that can incur health care expenditure. Our analysis is not able to bias adjust for a possible selection bias. Besides, Bangladesh's epidemiological transition is likely to impact middle-aged adults' expenditure only due to the surge of NCDs in this group.

Table 4: Regression models to explain log of medical expenses

Variable	A	B	C	D
SEX	0.092	0.137	0.241	0.392**
RURAL	-0.081	0.043	0.016	0.006
Older	0.482***	0.299		
WEALTH QUINTILE				
POOR		-0.082	-0.059	-0.023
MIDDLE		0.310	0.249	0.238
RICH		0.541**	0.425*	0.431*

RICHEST		0.722***	0.675***	0.664***
EDU			0.224	0.246
REL				0.449*
EARN				-0.260
AGE				
10-19			0.234	0.276
20-29			0.401	0.506*
30-39			0.491*	0.624**
40-49			0.923***	1.070***
50-59			0.905**	1.046***
60-69			0.654**	0.700**
70+			0.878**	0.895**
Constant	9.259***	8.949***	8.403***	7.870***
N	1523	810	686	686
Adjusted R-Squared	0.021	0.072	0.113	0.121
AIC	4950.87	2639.772	2168.188	2163.84
BIC	4972.183	2677.349	2236.151	2240.865

Note: For SEX, the reference category is female. For RURAL, the reference category is urban. For wealth, the reference category refers to the poorest 20%, and for age groups, the reference category is 0-9 years old.

Conclusion

Our results show that older people have higher expenditure costs in Bangladesh compared to younger people. Inequalities in health expenditure showed that older women spent less on health costs than men, pointing to affordability inequalities. Rural older people had higher costs due to access challenges. Health care expenditure increased from the age of 40 and above. This increase could be due to costs associated with non-communicable diseases. Further research is required to study the costs of the disease.

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