FACTORS INFLUENCING DEMAND FOR HEALTHCARE SERVICES AMONG THE ELDERLY WOMEN IN SRI LANKA

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ABSTRACT
Population ageing is a common feature of many developed and developing countries in the world today. This phenomenon is occurring mainly due to the decline in fertility and mortality and resultant increase in the life expectancy which is accompanied by socio-economic developments of the country. The ageing of the Sri Lankan population will have a major impact on the organization and delivery of health care. Of particular importance, will be the shift from acute to chronic illnesses and the likely growing shortage of health care workers, especially nurses and para-professionals. As the length of life and number and proportion of older persons increase, a central question is whether this population ageing will be accompanied by sustained or improved health, an improving quality of life, and sufficient social and economic resources. Therefore, this study attempts to identify the factors influencing healthcare demand for the elderly population in Sri Lanka. This paper is based on widely used Michal Grossman's economic model for the demand of health where healthcare is treated as an input for the production of health. If health of the elderly has to be improved, then demand for healthcare of the elderly needs to be understood properly. For young-old female group, expenditure on drugs has been the most significant factor which influences the demand for health care same as in the case of young-old male group. Method of treatment, health status and cost per visit for medical treatment can be viewed as major determinants of demand for healthcare among old-old women. Amongst all, method of medical treatments of old-old females is having stronger relationship with number of visits for medical consultations. The present study adds another dimension to the Grossman Model by treating health status of the elderly and associated healthcare costs as two major significant variables that affect their demand for healthcare services. In Sri Lankan context, it appears that expenditure on drugs is the most concerned factor among the elderly when all the healthcare costs are taken in to account.

Key words: Healthcare, Ageing, Elderly women, expenditure on drugs

INTRODUCTION

According to the standard population projection, the elderly population in Sri Lanka will increase in the future in an extraordinary manner (Dissanayake, 2016). In 2012, the number of older persons was 2,520,573 and it is expected to increase this number to 5,118,094 in 2037, which is

103 percent increase during 25 years' time period. Populationageing is a common feature of many developed and developing countries in the world today. This phenomenon is occurring mainly due to the decline in fertility and mortality and resultant increase in the life expectancy which is accompanied by socio-economic developments of the country. The ageing of the Sri Lankan population will have a major impact on the organization and delivery of health care. Of particular importance will be the shift from acute to chronic illnesses and the likely growing shortage of health care workers, especially nurses and para-professionals. The ageing population will require a special focus on chronic diseases, such as Alzheimer's disease, heart disease, and osteoporosis, rather than acute illnesses. Hence, the type of medicine will need a shift from one-time interventions that correct a single problem to the ongoing management of multiple diseases and disabilities; doctors and patients will have to have an ongoing relationship designed to help patients cope with illnesses rather than curing them. As the length of life and number and proportion of older persons increase, a central question is whether this population ageing will be accompanied by sustained or improved health, an improving quality of life, and sufficient social and economic resources. The answer to this question lies partly in the ability of families and communities, as well as capabilities of modern social, political, economic, and health service delivery systems, to provide optimal support to older persons. However, while all modern societies are committed to providing health and social services to their citizens, these systems are always in flux, guided by diverse and evolving national and regional policy formulations.This leads to the question: what factors influence the demand for health care of the elderly? Therefore, this study attempts to identify the factors influencing healthcare demand for the elderly population in Sri Lanka. After reviewing the literature, it was found that Grossman Model of Health Demand[3] can be used with some refinements to explain healthcare demand of the elderly in Sri Lanka. Accordingly, this paper is based on widely used Michal Grossman's economic model for the demand of health where healthcare is treated as an input for the production of health. If health of the elderly has to be improved, then demand for healthcare of the elderly needs to be understood properly.

Data
This study is based on the data covering 300 households with elders, collected from three Divisional Secretarial Divisions[4] (DSDs) in Gampaha district, as population ageing in this district shows the second highest proportion of elderly population among all the 25 districts in the country. For the purpose of this study the DSDs in Gampaha district were divided into two groups based on the location, such as urban and rural. From each DSD urban and rural,two Grama Niladhari Divisions[5] (GND) were selected from each DS division, randomly. Form the total number of households in each GND, a list of addresses of households with elders was obtained for the study purpose and then from each household which consist of elders were selected with the use of simple random sampling technique.

Model Specification
Utilization of health care services has become a topic of widespread interest among the health economists. The determinants of demand for health care are important for a number of reasons.

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[3]Grossman, M. (1972) On the concept of health capital and the demand for health, *Journal of Political Economy*80: 223-255.

[4]The districts of Sri Lanka are divided into administrative sub-units known as *divisional secretariats*. These Divisions are administered by a 'Divisional Secretary', and are known as 'D.S. Divisions

[5]A Grama Niladhari ("village officer") is a Sri Lankan public official appointed by the central government to carry out administrative duties in a grama niladhari division, which is a subunit of a divisional secretariat.

For example, quantification of these factors is necessary to assess medical care needs of the community and potential impact of utilization on health. Demand analysis can also indicate to the policy makers the role of consumer awareness and knowledge that can play in improving the utilization of highly cost-effective health interventions or health services. Grossman (2000; 1972) has developed inter-temporal utility model, which is based on the household production framework. The model introduces the concept that consumers do not demand medical care per se, but it is a derived through the demand generated for healthcare. According to this model, the stock of health capital depreciates over time and the consumer can produce gross investments by using medical care and their own time as inputs. It is assumed that the efficiency of the production process depends on individuals' stocks of other forms of human capital, especially education. The rate of depreciation of the health stock rises with age. This implies that the stock of health falls with age. The optimal gross investment in health is positive until the last period of life. The marginal product of the stock of health diminishes as the stock increases.

'Stock of health', which is fundamental to the Grossman's model, is equated here in this study to the health status of the elderly population. Although Grossman (1972) relates health as a human capital, which improves productivity of people, it shows that good health is produced by individual through adaptation of different behaviors. In other words, good health of a person is a commodity produced by the individual. Therefore, it is quite clear that good health is important to any person irrespective his/her age. In order to achieve good health, Grossman (1972) presented a model where all individuals are born with an initial 'stock of health capital' and has two important features: first it depreciates over time and second, it can be increased by acts of investment in health. In the case of the elderly as in the present study, it is quite clear that their health depreciates as age advances. The main parameters in Grossman's model are depreciation rate (represented by age), cost of health investments (price of medical care), wage rate and education. Since our study is about the healthcare demand of the elderly, our analysis is controlled for age and gender. At the same time, wage rate is irrelevant to this study since we deal with elderly who are outside the normal labour force ages. Therefore, we use cost of health investment or price of medical care variables to determine our modelin the present study. In this study, we assume that price of gross investment in health can be equated with many variables such as expenditure on drugs, cost of drugs per visit, expenditure on medical treatment and cost per visit for medical treatment.

According to the Grossman model, age and other factors make health stock to depreciate which will in turn decrease the demand for health, because the marginal benefits of investment into health will decrease. This is where, the present study deviates from Grossman model because our study assumes that age and gender differentials will make health stock to depreciate at different magnitudes. This will in turn increase the demand for health because the marginal benefits of investment into health will increase as a result of expectation of improving survival chances in the context of health conscious behavior.

Determinants of Demand for Healthcare Services of elders

Explanatory Variables
A set of explanatory variables used in our analysis is listed in Table 1. As mentioned earlier, it is quite clear that age and gender play a significant role in determining healthcare demand for the elderly. Therefore, they will function as control variables in the analysis. It is reasonable to assume that the old-old group (age 75 and over) will be suffering from more chronic diseases

than the young-old (age 60-74 years) elderly and thus they will need different type of care and the cost of the care also will be comparatively high, accordingly. Gender, on the other hand, will also show different types of morbidity levels as women have better health status than men even at elderly ages[6] (Dissanayake, 2014). Research on sex differences in health has brought to light an important paradox. Studies from a large number of countries find that women use more health services and report worse self-rated health than men. However, women are less likely to die than same-aged men throughout life, indicating that they may in fact be healthier (Case and Paxson, 2014). It has been shown that better educated people have lower morbidity rates from the most common acute and chronic diseases. Self-reported- health status, type of disease, number of diseases suffering from, duration of the disease, show the health status of any individual. Distance to place of medical treatment, cost per visit, cost of drugs, cost of transport, and treatment method are mainly related to the expenditure for health treatment(s). There has been a great deal of research on the relationship between socioeconomic status (SES) and health (Feinstein, 1993; Smith 1999). This relationship is of interest for several reasons; first, there is increasing recognition that in assessing living standards and well-being in a society, and its distribution among members, measures such as health may represent appropriate indicators explaining demand for healthcare. Second, understanding the relationship between SES and health is important because it can shed light on what may be a self-reinforcing cycle of poverty; low SES leads to worse health, which in turn reduces earnings capacity[7].

Table 1: Set of Explanatory Variables for Demand for Health Care

Dependent Variable	Explanatory Variables
Number of visits for medical consultations	1. Expenditure on drugs 2. Cost of drugs per visit 3. Health status 4. Expenditure on medical treatment 5. Time duration suffering from the disease 6. Distance to institute 7. Method of treatment 8. Cost per visit for medical treatment

Accordingly, the explanatory variables included in this study are the enabling factors relate to the ability of the individual to seek and be served by health services. Therefore, both are directly linked to economic conditions and the provision of services such as expenditure on drugs, cost of drugs per visit, health status, expenditure on medical treatment, time duration suffering from the disease, distance to institute, and method of treatment.

Expenditure on drugs
The demand for drugs can be modelled as derived demand, determined by the demand for the stock of health. Because of sickness, an individual's health may fall below his/her desired level, which is a function of income as well as the relative prices of health and other goods. Under the present study, assuming that health and medical care as normal goods and that constant return to scale production prevail, it is easy to show that the demand for prescribed drugs should rise as

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[6]https://www.cmu.edu/CSR/case_studies/women_live_longer.html
[7]http://www.nber.org/chapters/c10347.pdf

their price falls. The demand for drugs will also rise with increases in the prices of inputs that substitute for drugs in producing health. Conversely, the demand for drugs will fall with increases in the price complements to drugs. In illustrating the type of health care expenditure, cost of drugs, cost of medical testing, cost for medical consultation and transport cost have been considered as the determinants of the demand for health care. Therefore, it is important to consider the total expenditure on drugs for last three months as an independent variable.

Cost of drugs per visit

Cost of drugs is defined as how much an individual spends on drugs prescribed by a healthcare provider. As elderly people are often suffering from non-communicable diseases, expenditure on drugs may vary according to the type of diseases that they are suffering from. Similarly, cost of drugs per visit can differ since medical consultation can take place at government or private healthcare provider. In this model, cost of drugs is defined as the average cost of drugs associated with a visit for medical consultations during the reference period.

Health status

Health status is one of very crucial determinants of demand for health care. In this model health status has been identified as a significant variable. The present study collected information on many indicators of health status. A measure of the self-rated health status is used in the study and measured into three levels as good, average and poor. A self-report is a method, which involves asking a participant about their feelings, attitudes, and beliefs and so on. In this study, we assume that elderly people are having proper understanding about their health status. Self – reporting methods, which are validated, can feasibly be used in survey methodologies (Hawkshead, 2007). It is quite important to note that health status also depends upon the type of disease as well as number of incapacitates associated with a particular disease.

Expenditure on medical treatment

The present model also includes expenditure on medical treatment as a determinant of demand for health care services. Expenditure on medical treatment is defined as the cost incurred for treatment excluding the cost on drugs. More specifically, expenditure on medical treatment is considered as the total health expenditure, which includes consultation fee, cost of medical testing and equipment and cost of transport other than expenditure on drugs for the last three months. Income is another economic variable that affects the demand for medical services and there is a correlation between income and nature of expenditure on medical treatment of the elderly. Medical care is generally assumed to be a normal good, any increase in income, which represents an increase in purchasing power, should cause the demand for medical services to rise. Especially, income may be one of most significant determinants of health seeking behavior because when there are changes in money income, patients are changing their treatments patterns of health care. As income increases, the patients may prefer to visit private physician to receive individual care rather than outpatient services. Therefore, it is very clear that there is direct relationship between patient's income and the expenditure on medical treatment.

Time duration suffering from the disease

Majority of diseases encountered by elders are long duration and they cannot anticipate a total recovery during a short period of time. In such instances, they have to receive continuous medication throughout the lifetime. Therefore, time duration suffering from diseases influences the healthcare demand of elderly people. According to the time duration suffering from a chronic disease, health-seeking behavior of old persons may be changing because elderly suffering from

chronic type diseases would be incurring more cost on health care. Under this model, time duration suffering from a disease is measured by years and if someone has been suffering from more than one non-communicable disease, only the longer time duration is considered.

Distance to medical institute
Generally in rural Sri Lanka, healthcare facilities are relatively low compared to urban areas. Consequently, for patients who are living in rural areas, travel expenses are usually higher compared to those living in urban areas due to longer distance to a healthcare provider. In addition, distance to medical institute implies the nature of physical access to a particular healthcare institute.   Therefore, in the health demand model, distance to medical institute is measured in terms of number of kilometers between home and the healthcare provider.

Method of treatment
Health care consists of multiple complex system, for instance, complex systems in health care delivery include primary care, specialists, outpatient facilities, hospitals (Public and Private) and long- term chronic care facilities. Many of the elderly people who have been suffering from chronic diseases are demanding medical heathcare for a longer duration of time. In developing countries, socioeconomic and cultural factors have been highly influencing the determination of method of treatment for elders. Even in Sri Lanka, it is a known fact that some elders use traditional medicine or treatment for chronic diseases. Therefore, in order to capture all these treatment methods, we consider all these combinations as follows:

1. Western medical treatment – Public
2. Western medical treatment – Private
3. Western medical mix – Public and Private
4. Indigenous (Ayurveda) – Public or Private
5. Western and Indigenous mix

Cost per visit for medical treatment
In the present study, cost of visit for medical treatment is assumed as the price of a particular health care service. The most important factor, which determines the demand for an ordinary good, is the price of that good. Demand theory was also developed on a negative functional relationship between price and quantity. However, health is different from other goods and services. Therefore, the theory of demand, which is applicable to other goods, cannot be applied to health care. Since price of health is dependent on the status of patients, type of the disease and the treatments recommended by doctor or health services do not have fixed prices. The main parameters in Grossman's model are depreciation rate (represented by age), cost of health investment (price of medical care), wage rate and education. Accordingly, cost per visit for medical treatment can be regarded as one of the most important parameters in health demand models.

In case of private sector, price of health services also include channeling fee of doctor, hospital fee, cost of medicine, cost of transportation and other miscellaneous costs. However, patients who choose government health services enjoy services free of charge. This actually does not imply that services are totally free. Patients will have to seek many supplementary services from private sector and thus those services will incur certain costs. Travelling expenses and value of time are some elements of unseen prices paid for governmental health services. For the present

study, all expenses that are associated for one visit for medical treatment are represented by cost per visit for medical treatment.

Dependent variable (Demand for Healthcare of the Elderly): Number of visits for medical consultations

In the current study, number of visits for medical consultation is representing the demand for health care since demand for medical services is derived from the demand for good health. On the other hand, the stock of health care can be treated as a durable good that generates utility and is subject to the Law of diminishing marginal utility. This means that each incremental improvement in health generates successively smaller addition to total utility. As explained above, medical services are an input in the production of health because a person consumes medical care for the purpose of maintaining, restoring or improving health.

The dependent variable of this study was self-reported medical consultations during the past three months. Old people are often suffering from any kind of chronic disease and hence choose different types of healthcare providers for treatment. According to this conceptualization, number of visits for medical consultations is a function of expenditure on drugs, cost of drugs per visit, health status, expenditure on medical treatment, time duration suffering from the disease, distance to medical institute, method of treatment and cost for visit for medical treatment.

Method of Analysis

For the present study, we assume that the most suitable statistical analysis for elder's health demand model is multiple linear regression analysis. Grossman's health demand model also was based upon multiple regression analysis. As health care utilization is influenced by multiple individuals and contextual factors, a reasonable starting point for analyzing health care utilization and costs is to define a theoretical framework. There are several explanatory frameworks identifying predictors of health care utilization. One of the most comprehensive and widely used frameworks is the behavioral model developed by R. Andersen and J.F. Newman in 1973 (Anderson and Newman, 1973). Andersen's behavior model of health care utilization was also based upon the multiple regression analysis (Anderson, 1968). Accordingly, linear multiple regression analysis is employed for extracting the inference of independent factors on demand for healthcare. Parallel to multiple regression analysis, analysis of variance (ANOVA) is also used to analyze the differences among group means and their associated procedures (such as 'variation' among and between groups), developed by statistician and evolutionary biologist Ronald Fisher. ANOVA provides a statistical test of whether or not the means of several groups are equal, and therefore, generalizes the t-test to more than two groups. ANOVAs are useful for comparing (testing) three or more means (groups or variables) for statistical significance. Therefore, analysis of variance (ANOVA) is very much useful for the present study in order to verify the statistical significance of the estimated health demand models for elders.

Demand for healthcare services of young-old females

According to the stepwise multiple regression method, for young-old females' three independent variables became significant as shown in Table 2. They are 'expenditure on drugs, cost per visit for medical treatment and health status'. Unlike the young-old males, time duration of suffering from the disease and distance to medical institute were not significant factors in determining demand for healthcare of the young-old females. According to the multiple regression analysis results, the adjusted R^2 is .482. This suggests that about 48% of the variance in number of visits

for medical consultation of young-old females during the three months period concerned are explained by the three explanatory variables, mentioned above.

Table 2: Model Summary – Yong-old Females

R	R Square	Adjusted R Square	Std. Error of the Estimate
.711	.505	.482	3.374

c. Predictors: (Constant), expenditure on drugs, cost per visit for medical treatment, health status
ANOVA results (Table 3) reveal that the ratio of the variance (mean square) explained by the regression (251.862) to the residual or unexplained variance (11.381), that is the F ratio, is F= 22.130, and P <.000 and is therefore, statistically significant by conventional standards. Hence, it is reasonable to conclude that the result of the regression analysis for Young-Old Female elders is not due merely to chance.

Table 3: ANOVA – Young-Old Females

Sum of Squares	df	Mean Square	F	Sig
755.585	3	251.862	22.130	.000
739.749	65	11.381		
1495.333	68			

Predictors: (Constant), expenditure on drugs, cost per visit for medical treatment, health status
The standardized coefficients derive for young-old female elders, after applying multiple regression, are shown in Table 4.

Table 4: Multiple regression analysis of young-old female elders

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	β	Std.Error	β		
(Constant)	1.246	1.487		.838	.405
Expenditure on drugs	.001	.000	.855	7.963	.000
Cost per visit for medical treatment	-.003	.000	-.625	-5.713	.000
Health status	1.715	.688	.224	2.491	.015

The regression equation for young-old female elders, taking the variables in descending order of their standardized coefficients, is obtained as follows:

$$NVmc \text{ (y-o f)} = 1.246 + 0.855 \text{ ED} - 0.625 \text{ CV} + 0.224 \text{ HS} +$$

Where,

NVmc (y-o f) is number of visits for medical consultations by young-old females
ED is expenditure on drugs
HS is Health status
CV is Cost per visit for medical treatment

In this model, all independent variables have achieved a significant level of P< .05 according to the t- test results (Table 4). According to the estimated coefficients of independent variables, number of visits for medical consultation of young-old females is positively influenced by variables expenditure on drugs and health status and negatively affected by the variable of cost per visit for medical treatment. For young-old female group, expenditure on drugs has been the most significant factor which influences the demand for health care same as in the case of young-old male group. In both models, health status of young-old males and females show the same direction of the relationship while the magnitude of the relationship is also very analogous. Older adults use far more health care services than do younger groups. Although older adults vary greatly in terms of health status, the majority of them have at least one chronic condition that requires care. Older adults have much higher rates of health services utilization than do non-elderly persons. It has been shown some important differences in the health status of and the health care service use by older adults in various demographic categories, including sex, race, and socioeconomic status (Institute of Medicine (US) Committee on the Future Health Care Workforce for Older Americans, 2008). Women and men face different challenges in maintaining their health and have different patterns of service utilization. Men have higher rates of heart disease, cancer, diabetes, and emphysema and have more inpatient hospital stays than women (Robinson, 2007). On the other hand, women have higher rates of osteoporosis, arthritis, asthma, chronic bronchitis, and hypertension, and women are more likely to report depressive symptoms (Federal Interagency Forum on Aging Related Statistics, 2006). Because women have longer life expectancy than men and greater age-adjusted dis ability rates (NCHS, 2007), women are more likely to live alone, and they use more post-acute care services and long-term care services than men. It was also mentioned that the health status of the elderly is fundamentally a multidimensional and dynamic concept and a rich set of indicators is necessary to capture this concept in full (Protrait et al, 1999). However, elder's health status is a prominent factor relating to their health seeking behavior. Further, variable expenditure on drugs is the most influential determinant of demand for health care of young-old females and health status is the least influential independent variable in this demand model. The following case study shows that expenditure on drugs negatively related with demand for health care of young-old females in Sri Lanka. According to the present study, when expenditure on drugs is increased, number of visits for medical consultations will be increased by the young-old females. It has been found that the elderly and chronically ill group, and the low-income population, user fees lowered the demand for prescription drugs (Gemmill, 2008). The following case study indicates that if young-old females are having financial issues, it is difficult to maintain the relevant treatment for chronic diseases. Even the public sector health facilities are available for free of charge, patients still need to bear some costs which are related with treatments.

Ramya is 68 years old widow and lives in Gampaha. She is currently unemployed and depending on her children. She has two daughters and a son who are married. She has been living at her son's house but she doesn't have a regular income and she is economically depending on her children. However, Ramya has been suffering from diabetics and high blood pressure which are chronic diseases. Although, she does not have income source except the money given by children, she has to take medical treatments for those chronic diseases on regular basis. Further, Ramya says that she prefers to obtain medical treatments from the government hospitals than private hospitals because she is very upset to ask money from children who are also living with many financial issues. Therefore, she is regularly going to Gampaha General Hospital to obtain the treatments by using public transportation. Accordingly, cost per visit for medical consolations is not significant in her health budget but also cost of drugs and expenditure on

medical testing are crucial because even in the public hospitals, only the consultations are provided by free of charge. According to her, due to the overcrowded at public hospitals, there is a long queue for some low cost drugs and medical testing. Therefore, in order to have expensive drugs some testing which doctors recommend, she needs more money. Therefore, she has neglected recommended medical treatment and really disappointed with the health services provided by the government hospitals (Case 02, Respondent128).

Several studies undertaken in other countries have shown that the elderly have high rates of morbidity and thus higher demand to use healthcare services. In Sri Lanka until recently, the elderly were not specifically considered as a vulnerable group for health care. Instead, the focus was on infants, children, youth mothers and the middle aged. By observing the regression outcomes of young-old female group, it is very clear that expenditure on drugs is the most crucial determinant of demand for healthcare. In addition, cost per visit for medical treatment is significant in determining demand for health care of female elders but shows a negative relationship. It was also found in this analysis that the time duration of suffering from the disease and distance to medical institute were not significant factors in determining demand for healthcare of the young-old females.

Demand for health care of old-old female elders
Older women often have different physical and psychological health priorities compared to men, and health systems must strive to extend and improve health care delivery to meet older women's specific health care needs. It has been found out that elderly women feel that their physical health care needs are being usually met by health systems but that a number of issues relating to psychological health are inadequately addressed by health care professionals (Tannenbaum, Nasmith, Mayo, 2003)[8]. The multiple regression analysis performed in the present analysis shows that the adjusted R^2 is 0.170 for old-old female elders (Table 5). This suggests that about 17% of the variance in number of visits for medical consultation of old-old female elders during the three months period concerned is explained by the explanatory variables used in the analysis but only three predictors namely, method of treatment, health status, cost per visit for medical treatment are significant. It appears that only when women feel that they are being cared for in a comprehensive manner, one that includes attention to physical, psychological and emotional health, then only it is they feel that the healthcare system are delivering health care that optimally promotes successful healthy aging. Utilization of health services by women and men differs according to the health problem for which care is required. Research shows that all over the world older women are prone to osteoporosis, arthritis, cervical and breast cancers, anemia and most frequently but not realized severe depression. Point prevalence of depressive disorders in the older population of the world varies between 10% and 20%, depending on cultural situations[9].

Table 5: Model Summary – Old-Old Female

Model	R	R Square	Adjusted R Square	Std.Error of the Estimate
3	.448	.201	.170	3.390

Predictors: (Constant), method of treatment, health status, cost per visit for medical treatment

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[8]http://www.ncbi.nlm.nih.gov/pubmed/14750592
[9]http://www.helpage.org/silo/files/research-study-utilization-of-public-health-services-by-older-women-in-punjab-pakistan.pdf

ANOVA summarizes results of the analysis of variance relating to old-old females and shows that the ratio of the variance (mean square) explained by the regression (74.156) to the residual or unexplained variance (11.490), which is an F ratio, is F= 6.454, and the significance of this F ratio is P< .001, which less than P= .05 and is therefore statistically significant by conventional standards.

Table 6: ANOVA – Old-Old Female

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	222.468	3	74.156	6.454	.001
Residual	884.742	77	11.490		
Total	1107.210	80			

The standardized coefficients derived for old-old female elders, after applying multiple regression technique, are as follows (Table 7). All predictors are significant and hence, method of treatment, health status and cost per visit for medical treatment can be viewed as major determinants of demand for healthcare among old-old women. Older women face a higher risk of chronic illness and disability compared to older men. Women's health risks such as osteoporosis, fistula, cervical cancer, and heart disease continue to disable older women and jeopardize their lives in many developing countries, including Sri Lanka. Lack of supplies, services, and trained staff to handle older women's health remains a large gap in the healthcare systems of developing countries. Because few medical professionals have geriatric training, older women struggle to get the care they need. Where health care or treatment is available, older women face obstacles to access such as affordability, transportation, and in some cases, institutional abuse[10].

Table 7: Multiple regression analysis of old-old female elders

Model	Unstandardized Coefficients B Std.Error	Standardized Coefficients B	t	Sig.
(Constant)	0.765 1.477		0.518	0.606
Method of treatment	0.881 0.282	0.326	3.125	0.003
Health status	1.411 0.563	0.256	2.506	0.014
Cost per visit for medical treatment	-0.001 0.000	-0.217	-2.083	0.041

For old-old female elders, after considering the variables in descending order of their standardized coefficients, the regression model can be written as follows:

$$NVmc \text{ (o-o-f)} = 0.765 + 0.326 \text{ MT} + 0.256 \text{ HS} – 0.217 \text{ CV} +$$

All variables in this model achieve a significance level of P< .05 according to the t-test results given in Table 7. Therefore, the number of visits for medical consultation (NVmc) of old-old female elders is influenced positively and strongly by the variables, namely method of treatment and health status and negatively influenced by cost per visit for medical treatment. It has been

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[10]http://www.helpage.org/helpageusa/what-we-do/older-women/older-womens-health/

observed that older women can somehow make independent decisions regarding their health care demand, which demand should ideally base on health status rather than no other factors (Abdullah et al, 2014)[11]. Amongst all, variable of methods of medical treatments of old-old females is having stronger relationship with number of visits for medical consultations (demand for health care) of old-old females.

CONCLUSION

This study examined the factors influencing the demand for health care services in Sri Lanka. It was found that number of visits for medical consultation of young-old females is positively influenced by variables expenditure on drugs and health status and negatively affected by the variable of cost per visit for medical treatment. For young-old female group, expenditure on drugs has been the most significant factor which influences the demand for healths care same as in the case of young-old male group. Method of treatment, health status and cost per visit for medical treatment can be viewed as major determinants of demand for healthcare among old-old women. Amongst all, method of medical treatments of old-old females is having stronger relationship with number of visits for medical consultations (demand for health care). Elderly patients who are suffering from non-communicable diseases receive medical treatments for a long period of time. However, the regularity of the treatments, number of visits for medical consultation increase even the expenditure on drugs are high because they have no any other option available. The Grossman model views health as a durable capital stock that yields an output of healthy time. Individuals inherit an initial amount of this stock that depreciates with age. It is also important to mention, that our study found that health status being regarded as an important predictor of the demand for healthcare. Although health status or 'health stock' is treated as an outcome variable in Grossman's model, we use health status as an exogenous variable which can have a significant influence in determining healthcare utilization. Since this study focuses upon the elderly population, productivity of the labour force through the advances in health status does not have a great significance but it is the status of health that the elderly has accrued over the years through various investment and current healthcare costs which matter significantly to influence the demand for healthcare services. Therefore, the present study adds another dimension to the Grossman Model by treating health status of the elderly and associated healthcare costs as two major significant variables that affect their demand for healthcare services. In Sri Lankan context, it appears that expenditure on drugs is the most concerned factor among the elderly when all the healthcare costs are taken in to account. It appears that the elderly are not very much worried about the cost of the health services as they are comparatively less expensive but regularity of taking medicine at old age for the NCDs have made them to experience that it is the cost of the drugs which matters the most. Conceptually, this explains that when the price of drugs increases, stock of health of the elderly decreases because demand for healthcare services mainly dependent on the cost of drugs prescribed by the healthcare providers. The price of drugs becomes more important at the elderly age because of the prevalence of the non-communicable diseases and continuity of use of drugs in a context of morbidity expansion.

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