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Micro Econometric Analysis Of The Demand For Health Expenditure In Pakistan

Muhammad Bilal[1], Dr. Abdur Rehman[2], Dr. Muhammad Niamat Ullah Khan Babar[3], Muhammad Ehsan Elahi[4], Malik Asfand Yar[5]

Abstract

The current study aims to investigate empirically the family expenditure of socio-economic and demographic determining factors of the demand for health expenditure in Pakistan. The study used cross-sectional data available in the Pakistan Social and Living Standard Measurement Survey (PSLM, 2018-19). An ordinary least squares method and regression analysis technique were used to estimate multiple regression models. This approach and methodology indicates a situation in which a model's dependent variable is quantitative. The study found that the household head's income, education, and family size were the positive and[1] significant determinants of the demand for health expenditure in Pakistan. Additionally, the study also found that households in rural areas and KPK province spent more on healthcare facilities than households in urban areas and other provinces, respectively. The study concluded that household head's income, education, family size, and housing condition factors are the most important variables affecting the health expenditure. The study recommended that efforts are needed to increase household income, education and improve housing condition that may lead to better health facilities. Estimation and results will achieve the policy and the aim of addressing all the issues that are described by the factors and the household health expenditures.

Keywords: *Health Expenditure, PSLM data, socioeconomic indicators, OLS, regression, Pakistan.*

1. Introduction

All humans depend on good health as a basic necessity for existence and overall well-being. For this reason, everyone's entitlement to health care is seen as basic, regardless of gender, caste, or color. Health is not only the basic need of many countries but also the basic component of development in many countries of the world. Health is a main constituent of life; it is a gift conceded by Allah Almighty. Health is of countless meaning at the workplace, in a general public at every step of life because a healthy environment would lead to fruitful results in every part of life. If an individual is healthy, he/she would get a better education and acquire a good job, which in turn gives better earnings. A healthy person would lead a happiness society. The majority of empirical studies conducted in this field have been cross-national ones.

[1,4,5] Institute of Social Sciences, Gomal University, Dera Ismail Khan, Khyber Pakhtunkhwa, Pakistan.
2. Assistant Professor, Institute of Social Sciences, Gomal University, Dera Ismail Khan, Khyber Pakhtunkhwa, Pakistan.
3. Professor/Director Institute of Social Sciences, Gomal University Dera Ismail Khan, Khyber Pakhtunkhwa, Pakistan.
Corresponding author: Muhammad Bilal (Email ID: aqibbilal1130@gmail.com).
Institute of Social Sciences, Gomal University, Dera Ismail Khan, Khyber Pakhtunkhwa, Pakistan.

Fulop and Reinke (1983) emphasize that socioeconomic factors have both a direct and indirect impact on one's health. The changes in health resources as a result of changes in socioeconomic factors are the indirect effect. According to Kleiman's (1986) cross-country research, the measure of income inequality, the ratio of government to personal expenditures, and per capita nationwide profits are significant factors that influence public health spending. The analysis also shows that health spending by the public and private sectors is comparable, if not superior, to one another. Correa and Namkoong (1992) demonstrate how socio-financial and political circumstances play a significant role in driving changes in fitness policies (or health sources), as seen by changes in health personnel, infrastructure, and spending on fitness. Health is a fundamental human right and a precondition for every nation's social and economic advancement. We need a "healthy" healthcare system if we are to guarantee a healthy population. Ensuring universal access to high-quality healthcare and enabling everyone to afford these services in order to maintain and enhance their health condition are two of the core objectives of any healthcare system. Governments, legislators, regulators, providers, taxpayers, and numerous other organizations—many of whom have competing interests—must work diligently to implement this regulation. Putting money into the health industry can pay off in the long term. It helps to improve health outcomes, reduce poverty, and support economic expansion. The public is forced to pay for medical expenses out of their own pockets, which has continued to be the primary source of health finance, despite the fact that public health spending has stagnated in developing countries. Furthermore, studies by Hitiris and Posnett (1992), Gerdtham and Jonson (1992), and Murthy (1992) demonstrate the critical role that financial considerations play in deciding health care spending. According to Grossman (1972), when a person is unwell, their days result in disutility. This is the same old notion that analysis of fitness care is necessary. Despite being the sixth most populated nation in the world, Pakistan's healthcare facilities do not meet WHO criteria. The WHO recommended ratios of 1:1300 for doctors to patients and 1:120 for nurses to patients are not met in Pakistan. Compared to many other developing countries throughout the world, these percentages are lower. The infrastructure for providing healthcare varies from province to province and between rural and urban locations. Punjab province and the federal capital district of Islamabad provide noticeably better health care services than other regions in Pakistan. In a similar vein, health services are almost nonexistent in rural areas. Numerous socioeconomic and demographic factors influence the demand for healthcare facilities. A state of health is defined as complete physical, social, and mental wellbeing as well as the absence of disease or incapacity. Stated differently, health refers to the whole condition of an individual's mind, body, and spirit as well as the absence of illness, harm, and suffering. It also describes how well living things work. It's a helpful tool for day-to-day life and a positive concept that highlights physical ability. Every happy man's secret is good health. The proverb "Health is Wealth" is not new. Children must maintain their health in order to grow and develop properly in both their body and mind. This is because they need to be able to concentrate in class and give their all during field activities. It is imperative that parents take their kids to the doctor for regular checkups and consult with professionals regarding their growth in terms of weight and height, as these factors greatly affect the kids' overall effectiveness and performance. Being robust and well-maintained allows you to set a positive example for others and impart knowledge on how to attain vibrant health. Maintaining good health requires leading a disciplined and healthy lifestyle, which is a topic of significant concern. Drinking lots of water is one of the greatest strategies since it lowers the risk of infection, maintains good skin, lowers the chance of a heart attack, burns fat, and controls body temperature. Good sleep helps us de-stress and calm our bodies.

When evaluating living conditions, the effectiveness of a country's national development strategy, and economic progress, health can be a key indication. (Ercelik, 2018; Rajeshkumar, 2014; Cole & Neumayer, 2006). The wellbeing of a country’s population is lacking in the level

of its economic and social growth models. According to Cole & Neumayer (2006), health is not only important for development but also has a major impact on the development of human capital. World Health Organization (WHO) (2019): There is a correlation between health spending and a nation's degree of development. The productivity of labor is influenced by the population's health and education degrees.

Government spending on health care is a major factor in a nation's ability to develop human capital. Building up human capital is necessary for endogenous growth, which is necessary to increase capital accumulation for national health spending. (Gizem, 2018). Therefore, ensuring the provision of high-quality healthcare services in South Africa depends critically on stakeholder and government efficiency in healthcare spending.

The distribution and organization of healthcare funds are indispensable to confirm that impact corresponds with investment (Sorenson et al., 2008). If this is not the case, money could be distributed randomly, favoring urban healthcare over rural healthcare in greater proportion. Countries with elevated incomes tend to have better health conditions than lower-income countries; one factor influencing how health spending affects growth is the income levels of the various nations. Because of this, spending on the health system can be viewed as a consumer expense that has little bearing on the nation's ability to expand economically. Consequently, in these circumstances, health care costs may have a negative impact on economic development. There is pressure on the availability of clean fuel for domestic cooking and safe drinking water due to the expanding population and fast urbanization. These are becoming a major worldwide concern, particularly in low- and middle-income nations. (Aliyu and Amadu, 2017; Gates and Yin, 2018; Sambu, 2016; Vorosmarty et al., 2000; Zhang et al., 2017). There is a growing evidence that having access to clean cooking fuel and safe drinking water is essential for maintaining people's health and well-being. (Everard, 2019; Fukuda et al., 2019). According to a recent World Health Organization (WHO) report, 785 million people lack access to clean, safe water. Every two minutes, a kid passes away from water-borne illnesses, and over one million people die annually as a result of inadequate access to clean water and sanitary facilities. (Water, 2016). Furthermore, 3 billion people utilize biomass for cooking, including wood, charcoal, agricultural waste, and dung; the majority of these individuals reside in low- and middle-income nations. Likewise, the air pollution caused by indoor pollutants results in the premature death of approximately 4 million people annually. (WHO, 2018)

Pakistan is facing several serious issues as a result of its rapidly urbanizing population and growing population, such as obtaining clean fuel for cooking and safe drinking water. Pakistan comes in at number nine on the list of nations with the least amount of access to clean drinking water, where 21 million people live without it (Aid, 2019). Furthermore, natural gas is not readily available to 22% of the population as a clean cooking fuel. Given the correlation between financial situations and both wellbeing and the capacity to improve health, it is imperative to investigate the implications of shifting these variables for the organization of health care. Government involvement in the health industry is necessary because of externalities, market failures, and a large portion of the population's inability to pay. This study aims to investigate the alterations made to Pakistan's public fitness sources in response to changes in socio-economic factors. As was previously said, Pakistan's health care system is in disrepair, and socio-economic growth has a strong connection to good health. Workers' performance, efficiency, education, and income cannot improve if their health is poor. Investigating the factors that influence the demand for healthcare services is so important. Despite the fact that the subject has been looked at in various countries, the studies have some sort of flaw. To address empirical examination of the need for healthcare facilities in Pakistan, the current study will be a ground-breaking endeavor. Pakistan Social and Living Standard Measurement (PSLM) Assessment Round-VII/Household Integrated Economic Survey (HIES) 2018-2019 both provided cross-sectional data for the current study.

Furthermore, creating health policies and treatments that work requires knowledge of the factors

that influence health spending. You may purchase all the comforts in the world with money, but you cannot buy good health with it. Since you are the only one who can change it, it is best for your happiness and general well-being to adopt a healthy lifestyle.

Background and Significance of the study

The current study is related to factors that influence household outlay on health expenditure. Many researchers have prior done work on health, but no one has attempted the effect of environmental and housing condition factors variables on health expenditure because these variables have an indirect effect on the health of the household's head and their family members. It is also rarely studied the effect of employment status and marital status variables on the health expenditure. It will surely help researchers to quantify household expenditures on health care facilities. According to a review of the literature, numerous researchers have not yet examined this kind of expenditure on health with such variables and their types. It will really help the researcher to quantify household expenditures on health care facilities.

2. Literature Review

A lot of work has so far been prepared on such an important and burning issue of recent times, in the past.

Abbam (2019) utilized Ghana's cross 1293 sectional data to determine how much money households spent on healthcare. Age of the patient, home location, and family size were shown to have a favorable impact on household health care spending in Ghana, but education of the head of the household and poverty status had a negative impact.

Akbari et al. (2009) discovered that, in the instance of Pakistan, the demand for medical care is closely correlated with the presence of medical facilities in Pakistan Using time series data. Using cross-sectional data, it was found that the head's income and education had a beneficial impact on the demand for healthcare facilities. The findings of this study have also received support from Bour (2004), Malik and Syed (2012), and Ali and Noman (2013).

Hotchkiss (2003) studied how important socioeconomic factors affected the distribution of family health care spending in Nepal. They combined three different equation systems. Although the relationship was inverted, age and length of sickness had a considerable impact on one another. Their research revealed that household heads' years of education and health care spending in Nepal had a negative but substantial impact on one another.

Jochmann and Gonzalez (2004) noted the issue of utilizing panel data to estimate the demand for healthcare. The Markov Chain Monte Carlo (MCMC) method was used in their study to estimate the demand for the health care model. They discovered a direct correlation between the patient's age and the frequency of medical visits.

Karatzas (2000) looked at the connections between health spending and the US from 1962 to 1989 in terms of the economy, demography, and health stock. Its main conclusions were that health expenditures are influenced by the number of doctors, nurses, and income distribution; on the other hand, the number of hospital beds, the price index for health, and US cities with a population of more than 100,000 had a statistically significant negative impact on health expenditure performance.

Gerdtham and Jonsson (2000) indicated health spending is a result of income or resources available in both the public and private sectors. Increased income suggests that there is more money available for medical expenses. Numerous studies in the field of health economics suggest that changes in per capita GDP may largely account for fluctuations in per capita health

care spending.
Raghupathi and Raghupathi (2020) showed that public health spending in the United States will improve human capital since it will increase access to healthcare, which will boost productivity and support economic growth.
According to Bloom, Canning, and Sevilla (2001; 2004), individuals in good health are more productive and have greater incentives to save money and develop their skills. But the degree of productivity and health among individuals depends in part on health inputs like the expenditures of health care and dietary consumption, which in turn affect economic development and growth.
To put it briefly, the majority of the research focused on the factors that influence the demand for health across various global regions. A number of the studies emphasized the socioeconomic factors that influence the decision of which medical facility to use for treatment. Determining the trend of out-of-pocket health care expenses in various research areas was the third and most discussed part of health care services. The latest research made a significant contribution to the existing literature related to health. The research has made use of the most recent PSLM, 2018–19 data set. Second, this study's investigation of the significance of major socioeconomic and demographic factors in Pakistan's demand for healthcare services is its most significant contribution. Very little effort has been done on this topic in the study area. The research gap has been addressed by the current study.

3. Research Methodology and Data

The foundation of research is based on data and methods. Without this idea, there is no way to achieve research objectives. The research path is provided by the data, and the methodology guarantees the estimation tools and techniques.

A. Sources of Data and Sample Size

This investigation is grounded in an examination of Pakistani households to find out how much each household spends on health expenditure. The Pakistan Social and Living Standard Measurement (PSLM) Assessment Round VII (2018-2019) provided the data for this analysis. The informational collection includes a multitude of four areas of Pakistan (KPK, Punjab, Sindh, and Baluchistan) and region (urban and rural). It is a cross-sectional review with a random sample extent of 24808 households as of all over Pakistan. Out of the total, 4484 households belonged to KPK, 11781 to Punjab, 6216 to Sindh, and 2327 to Baluchistan. Similarly, the number of rural and urban households were 15935 and 8873, respectively. The data from the survey provided information at the household level regarding health expenditure as well as various socioeconomic variables like age, education, family size, income, region, drainage system, employing position of the household head, housing condition, sex of the family head, and so on.

B. Data Analysis Technique

The equation is assessed using the Linear Regression and Ordinary Least Squares (OLS) methods. The kind of dependent Variables determines the estimation method. The OLS method and the regression analysis technique are used because the dependent variable in this case is quantitative. A variable is statistically significant if its probability or P value is less than 5% or 0.05, while a variable is statistically insignificant if it is greater than 5%. Furthermore, we evaluate the model's overall performance using the F-statistic. The power of the explanatory variable is sufficient to sustain the model if the probability value of the F test is less than 5%. Moreover, the significance of each variable can be evaluated using the T-test. The P esteem has the same case and circumstance as past examined. The outcome that the explanatory variables have on the dependent variable, which is the amount that a household spends on

health, will be calculated using estimated coefficients. The model's coefficient will describe the level of the effect on the dependent variable. A number of models were estimated, and the best ones were reported in this study.

Econometric Model

It is important to first form the structure of the model and identify its variables before starting the estimation and data analysis. The Model provides the basis and estimation methods by indicating the variety and nature of variables. The most effective models out of those that were calculated were reported in this study.

Following Gupta (2002) and Grossman (1972), this study used the following regression model:

$$Y\,i = C + B1\,X1 + B2\,X2 + B3\,X3 + B4\,X4 + \theta 1\,D1 + \theta 2\,D2 + \theta 3\,D3 + \theta 4\,D4 + \theta 5\,D5 + \theta 6\,D6 + \theta 7\,D7 + \theta 8\,D8 + \theta 9\,D9 + \varepsilon i$$

Dependent variable (Yi) = Per Capita Health expenditure

Constant = C

X_1 = Age of the head in years

X_2 = Education of the head

X_3 = Family size

X_4 = Household Income

D1 = Gender of the household head (Male & Female)

D2 = Province

D3 = Location of the household head (Urban & Rural)

D4 = Marital status of the household head.

D5 = Employment status of the household head

D6 = Housing condition (Kacha & Pacca)

D7 = Drainage/ sewerage system (Safe and Unsafe)

D8 = Sources of drinking water (Piped, Underground etc.)

D9 = Cooking sources (Clean & Unclean)

B = Partial regression coefficients of quantitative variables.

θi = Partial regression coefficients of qualitative variables

Ei = Disturbance term.

4. Results and Discussion

This section of the study reports the main findings and discussion of the study. Table 1 gives the mean health expenditures of households by healthcare-accessed facilities.

Table 1: Average health expenditure of household based on healthcare accessed facilities

Type of healthcare accessed	Mean health expenditure (Rs.)	N	Std. Deviation
Inpatient	15006	962	49713.3699

Outpatient	2404	19527	5566.0278
Unrelated to illness	5194	868	10708.0299
Self-medication	261	3451	1453.8025
Total	2692	24808	11463.3608

Table 1 indicates that the mean health care expenditures of households were maximum on the inpatient health accessed, which was Rs. 1506 in Pakistan. The average healthcare expenditure on self-medicine was the minimum. The overall mean health care expenditures of households in Pakistan on the healthcare-accessed facilities were Rs. 2692.

Table 2: Average health care expenditures of household based on their province

Province	Mean health expenditure (Rs.)	N	Std. Deviation
Khyber Pakhtunkhwa	23036.7814	4484	51937.65057
Punjab	13989.6838	11781	23337.18605
Sindh	10731.7133	6216	26352.68774
Balochistan	10898.3078	2151	18740.54040
Total	14544.4943	24632	31231.87310

Table 2 indicates that the mean health care expenditures of KPK households were maximum in this study, followed by Punjab and Baluchistan. The average per capita expenditures in Sindh were the minimum. The overall mean health care expenditures of households in Pakistan were Rs. 14544. According to the above table, households belonging to KPK province were spending the maximum amount on health care facilities as compared to other provinces of Pakistan.

Table 3: Average health expenditures of household based on their region

Region	Mean health expenditure (Rs.)	N	Std. Deviation
Rural	15176.0214	8743	36714.02804
Urban	14196.9934	15889	27752.42655
Total	14544.4943	24632	31231.87310

Table 3 indicates the mean health care expenditures of the region in this study. According to the above table, households belonging to rural regions were spending more on health care facilities as compared to urban regions in Pakistan.

Table 4: Regression analysis of demand for health expenditure of overall Pakistan

Variable name	**Coefficient**	**Std. error**	**t-ratio**	**Sig**
(Constant)		0.230	22.953	0.000
Age in Complete Year	0.008	0.004	1.353	0.176
Education of the head	0.018	0.001	2.619	0.009
Family size	0.033	38.794	4.544	0.000
Ln_Income	0.056	0.580	8.074	.001
	Base	Male		

	category:			
Female	0.003	0.060	.517	.605
	Base category:	Punjab		
KPK	0.184	0.033	28.120	0.000
Sindh	-0.286	0.029	-44.266	0.000
Baluchistan	-0.118	0.043	-18.108	0.000
	Base category:	Urban		
Rural	0.074	0.002	23.128	0.000
	Base category:	Married		
Unmarried	-0.007	0.010	-2.291	0.022
Widow/ Divorced	-0.116	4.127	-17.778	.000
	Base category:	Paid employee		
Unemployed	0.007	0.033	1.126	0.260
Self employed	0.017	51.019	2.371	.018
Employer	0.006	0.003	1.968	0.049
	Base category:	Kucha		
Pucca	-0.033	0.028	-5.027	0.000
	Base category:	Unsafe drainage		
Safe drainage system	-0.017	140.581	-1.995	.046
	Base category:	Piped water		
Underground	0.016	0.027	2.280	0.023
Surface	0.007	0.056	1.130	0.025
	Base category:	Unclean fuel		
Clean fuel	-0.017	0.014	-2.564	0.010

F-stat =211.03 (p-value=0.000), R^2 = 31.453, No. of observation = 24808

Table 4 shows the regression result of many socioeconomic and demographic factors affecting the household's health. With p-value 0.000 and the estimated value of F statistics is 211.03 which indicates that the best fitting model overall is indicated. The exogenous variables in the model accounted for approximately 31 percent of the variability in a household's health expenditure, according to the coefficient of determination R^2. By looking at each variable separately, it is obvious from the table that some variables have inversely influenced the household's wellbeing quality while other positive effects.

As we glance over table 4, it indicates the relation of all variables with health expenditure. Age of the head shows an insignificant probability value which explains that the age of the household's head does not matter while accomplishing the health expenditure for his child. Education of the head plays a very important role in case of demand for health care facilities and its coefficient value indicated that an additional year of education of the head leads to an increase the per capita health expenditure by 0.018 units on average. As the family Size increases by one person, on average the household's health status was substantially declined

and health expenditure increases on average by 0.033 units. The income of the household was highly significant and positively influenced the household's health expenditure by 0.056 units with an increase of one percent income. The gender of the head in our model is statistically insignificant. It means that health expenditure is not only related to male-headed households, but both male and female-headed families were spending on health care facilities for their family members. The next variable is province, which will show how one province is dissimilar from another in terms of family expenditure for health. By taking Punjab province as the base, the spending level of people residing in KPK on average spends more than 0.184 units. However, families of Sindh and Baluchistan on average spend less 0.286 and 0.118 units, respectively, as compared to Punjab families. Location of the head is another variable, which was significant as well as a positive determinant of health expenditure, meaning as the location of the head changes from urban to rural area, the per capita health expenditure increases by 0.074 units on average. Then we have a variable termed the marital status of the family head. We can conclude that the unmarried household head in Pakistan spends, on average, 0.007 units less on health care than the married household head. The coefficient value of the widow/divorced category of marital status is also a significant but negative sign, which also shows that the per capita health expenditure of the widow/divorced head is 0.116 units less on average than the married household head in Pakistan. In a society like Pakistan, widows and divorced households face many problems in daily life, so it is difficult for them to maintain all aspects of life, especially the health of their children. The employment status of the household head will be the next factor to influence the type of expenses incurred in order to obtain good health for family members. This variable has a significant impact in influencing the health care costs incurred by families with varying professions. Although there are several subcategories of employment status in this situation, the base category used to calculate subcategory costs is paid employees. It is clear that the average wellbeing status of households whose heads are either employers or self-employed was significantly higher than that of households whose heads are paid employees. Because these categories of household heads are more conscious about their family members on health. The employer and self-employed spend more 0.006 and 0.017 units on health expenditure as compared to the base category. And the unemployed head has probability values greater than 5 percent, showing statistically insignificant results. It means that the unemployed head and paid employee head have no difference in terms of spending on healthcare facilities. The next variable that will determine the household expenditure on health is the housing condition. The estimated result in this table also shows that people who reside in Pacca house spend less on average 0.033 units as compared to kucha house-living people because they feel ill less. The next variable is drainage system. We can conclude the families belonging to the safe drainage system spend less than 0.017 units on health as compared to the unsafe drainage system. By looking at the water facility of households, the piped water was considered a source of safe and clean drinking water. It is clear from the results that on average, households having piped water facilities were significantly healthier and spent less on health care facilities as compared to those who were using underground water or surface water. The underground water and surface water on average spend more than 0.016 and 0.007 units, respectively. And the people who drink the underground and surface water fell ill more as compared to piped water. Finally, the household's health care statuses are compared based on the cooking fuel facility. On average, households using clean fuel were significantly healthier and spent less 0.017 units as compared to households using unclean fuel for domestic cooking practices.

Conclusions

The current study examined various factors determining per capita health expenditures through different socioeconomic and demographic variables. We have concluded that

household head's income, education, and family size were the most significant determinants of the demand for health expenditure and health care facilities in Pakistan. These variables had a significant effect on household per capita health expenditures. Regarding the comparison of urban and rural households, it was concluded that rural households spend more on health expenditure. In addition, the families belonging to KPK province spend more than the other provinces on health expenditure. The study recommends that policy needs to be made to increase the household incomes. Therefore, in order to improve the financial situation of Pakistani citizens, the government should raise GDP levels. Similarly, efforts to improve literacy status, housing conditions, and the standard of education also need to be increased. Further attention to employment status is necessary, as families with unemployed and paid employee household heads appear to be neglecting their health. The government should be giving attention to Widow/widower and divorced households who could not care for the health of their family members. It is necessary to guarantee the rural sector's growth and to give them access to basic healthcare facilities. The study suggests that the vast majority of people, in both urban and rural locations, should have access to health care services. Improved educational resources and income production will enable households to take better care of their health.

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