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Household Catastrophic Health Expenditures and its Determinants in Pakistan

ABSTRACT

Pakistan being a lower-middle-income country, is always being able to allocate less than or around 2% of GDP to health due to which Out-of-Pocket payments have a very large share in Pakistan's total health financing. Hence, when this OOP health expenditure exceeds a defined threshold of the Household's Non-food consumption expenditure then the Household faces financial catastrophe. This research sheds light on the features that can make households in Pakistan more vulnerable to catastrophic health expenses and fills the gap by analyzing the determinants of Catastrophic health expenditures of Pakistan and discusses the incidence and intensity of these Catastrophic health expenditures. We have used survey data of Household Integrated Economic Survey (HIES) of Pakistan for the year 2015-2016 for 24238 households. It contains household information including education, income, consumption expenditure, and health expenditures. As anticipated, some determining factors significantly increase the risk of facing catastrophic health expenditures.

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Author's contribution in the article: 1- Conceived and designed the analysis, 2- Reviewed and compiled the literature, 3- Collected the data, 4- Contributed data or analysis tools, 5- Performed the analysis, 6- Wrote the paper, 7- Financial support for the conduct of the study, 8-Other

1. INTRODUCTION

Investment in the health sector can lead to a long-run beneficial outcome. It is useful in promoting health outcomes, decreasing poverty, and help stimulate economic growth. Despite the fact, the public health expenditure stayed squat in emerging nations and the overall public has no option but to bear health care expenditures from their pockets, which has been persisted as the main source of health financing. Globally, 32% of health expenditure was out of pocket expenditure in 2015. Out of these, World Health Organization evaluates that out-of-pocket expenditure on health care facilities impels 4100 million individuals into poverty each year. However, nearly 150 million people bear monetary calamities due to out-of-pocket health expenditures (WHO, 2015). Catastrophic Health Expenditure is health care cost or out-of-pocket outlay that surpasses a well-defined threshold level of a household's aggregate consumption or non-food consumption expenses per year. Based on a 2010 WHO report, a nation's public health expenditure of around 6% of GDP will moderate Out of pocket expenditures and make the occurrence of calamitous health expenses negligible. On the contrary, the average value of aggregate health spending as a ratio of GDP for Pakistan during the period 2000- 2016 remained 2.78% with the least 2.36% in 2011 and with the highest of 3.34% in 2007. In 2016, Pakistan being a lower-middle-income country has health expenditure per capita of US-Dollar 40 with an out-of-pocket expenditure of 65.2 % of current health expenditures and 2.8% of total health expenditures (% of GDP)[1].

The health Indicators of Pakistan as compared to the region, indicate poor health outcomes such as high infant mortality, high population growth rate, and lowest life expectancy among other regional countries. One possible reason is that the health expenditure of Pakistan is far lower than other regional countries. As also stated above that Pakistan has been allocating less than or around 2% of GDP to health on average. For instance, It has been projected from the comparatively low levels of public expenses, out-of-pocket expenditures played a great role in Pakistan at 65%[2] (% of current health expenditures), which is extremely high in a global context (where the average is 18.5% in 2015-2016).

Berki (1986) is the first to explore catastrophic health expenditures and defined them as the expenditures which covered a huge share of the household budget and interrupts the family's consumption. Also, according to Russell (1996), this method is linked to the opportunity cost of health expenditures. Contemporary studies have used this approach by using different measures, for example, Wagstaff and Doorslaer (2003) used the out-of-pocket health spending portion in the overall domestic budget to examine the occurrence, intensity, and factors of CHE. Plus, different thresholds were used to measure the sensitivity of incidence of CHE faced by households. Moreover, Wagstaff and Doorslaer (2003) assessed the prevalence of CHE by using health expenditure as a fraction of family income minus the food expenses. Although Xu et al. (2003) recommended an alternative method (ability-to-pay), in which he used the income left providing for food spending by an average household in the public. Some other studies like Flores et al. (2008) and Pal (2012) have proposed reviewed measures of calamitous OOP health expenditures.

Considering a large share of Pakistan's population is poor, we need to understand the determinants of the CHE for designing better policies. The present study uses Pakistan health and non-food expenditures from HIES 2015-2016 dataset, Wagstaff and Doorslaer (2003) methodology are employed to estimate the incidence, intensity, and determining factors of Catastrophic Health Expenditures of Pakistan.

In Pakistan, limited research exists on healthcare Expenditures, and among those, the emphasis is kept on the government's health expenditures (Siddiqui et al., 1995; Akram & Khan, 2007).

[1] World Health Organization Global Health Expenditure database (apps.who.int/nha/database)

One research (Malik and Syed, 2012) is found on OOP health spending of Pakistan. Besides, we haven't found any research that has examined the catastrophic health expenses of Pakistan. This study explores the factors that can make households in Pakistan more vulnerable to catastrophic health expenses and discusses the incidence and Intensity of these catastrophic health expenditures.

The paper is structured as follows: Section 1 is the introduction of the paper. Section 2 provides a discussion on the health profile and health expenditures of Pakistan. Section 3 is an overview of the literature. The methodology is presented in Section 4. Section 5 introduces the variables and data along with descriptive statistics and discusses the occurrence of Incidence and Intensity of Catastrophic Health Expenses. Estimation outcomes are introduced in Section 6. Section 7 concludes the study and suggests some policy implications along with limitations of the study.

2. DISCUSSION ON HEALTH PROFILE AND HEALTH EXPENDITURES IN PAKISTAN

2.1. Health Status

Along with numerous political, financial, social, and cross-boundary challenges, Pakistan must deal with some serious health issues. For example, the life expectancy of Pakistan is 66[2] which is the lowest among the regional countries and lower than other developing countries. Likewise, the infant mortality rate is 63 per 1000[3] births which are the highest in the region. Also, in youngsters, diarrhea and breathing problems are still major killers[4]. Maternal demises because of avoidable causes like sepsis, hemorrhage, hypertensive crises, and sepsis, are common. Pakistan is one of the three leftover nations where Polio is still widespread[5]. Furthermore, Pakistan has an endemicity of hepatitis B and C in the overall inhabitants with 7.6% affected individuals[6]; stands 5th highest for tuberculosis burden in the world[7], has a focal geographical area of malaria endemicity[8], and an established HIV concentration among high-risk groups[9]. Pakistan is ranked 7th highest in the world for diabetes prevalence[10]. One in four adults over 18 years of age is hypertensive, and smoking levels are high. Pakistan has one of the notable incidences of under-weight children in South Asia. Gender discrimination, Poverty, low literacy, joblessness, and enormous treatment gap have directed to an indistinguishable burden of psychological health complications.

The Health system faces challenges of vertical service delivery structures and low-performance accountability within the institutions, creating efficiency and quality issues. Largely unregulated for quality care and pricing, there is also duplication of services by the private sector[11]. Despite having the potential, the private segment pays the least. The public sector is inadequately staffed, job satisfaction and work environment need improvement[12]. The overall health sector also faces an imbalance in the skill mix and deployment of the health workforce, and inadequate resource allocation across different levels of health care i.e. primary, secondary, and tertiary.

[2] World development indicators (WDI), World Bank
[3] World development indicators (WDI), World Bank
[4] UNICEF. Child Survival: Under-Five Mortality. 2016. http://data.unicef.org/child-mortality/under-five.html
[5] Polio Global Eradication Initiative. http://www.polioeradication.org/Keycountries.aspx
[6] See Qureshi et al. (2010)
[7] World Health Organization. Global TB Report. Geneva: 2014.
[8] Global Fund. Pakistan 2014 Malaria Grant Concept Note. Islamabad: 2014.
[9] UNAIDS. Global AIDS Response Progress Report. Geneva: 2014
[10] World Health Organization. Global report on diabetes. Geneva: 2016
[11] World Health Organization. Analysis of the private health sector in countries of the Eastern Mediterranean: exploring unfamiliar territory. Regional Office for the Eastern Mediterranean, Cairo: 2014.
[12] See Hafeez et al. (2010)

A range of actions is needed, acting upon the social factors within the health and social sectors, if a wider impact is to be achieved[13]. But this strategy needs a careful understanding of underlying parameters at household levels which makes households face CHE.

2.2. Health Spending of Pakistan vs Other Regional Countries

According to UNDP, Pakistan is confronting huge socio-economic challenges including illiteracy, poverty, poor health facilities, and a continuously rising population. Pakistan is the 6th most populous country with a growth rate of 2.05% per annum and a total population of 200.2 million[14], is a major intersection in terms of the relation between health and development. Despite having a per capita income of current US$1472[15] (India: $2015, Bangladesh: $1698) in 2018, Pakistan has weak health outcomes across the region. In Human Development Index (HDI) Pakistan is positioned at 150[16] (India:130, Bangladesh:136) out of 189 countries. The health Indicators of Pakistan show a high population growth rate, high infant mortality, and lowest life expectancy among other regional countries. One reason could be that Pakistan's health spending is far less than other regional countries. Pakistan allocated less than or around 2% of GDP to health historically, which is very low. This also does not have the required prepaid component of the health financing system and also is not a match with other lower-middle-income countries as well as very far away from a global average of 5.3%. The comparative position of Pakistan in health expenditure and health outcomes among other regional countries is given in Table 1.

Table 1: Comparison of health expenditures and health outcomes in Pakistan with different countries in the region in 2016

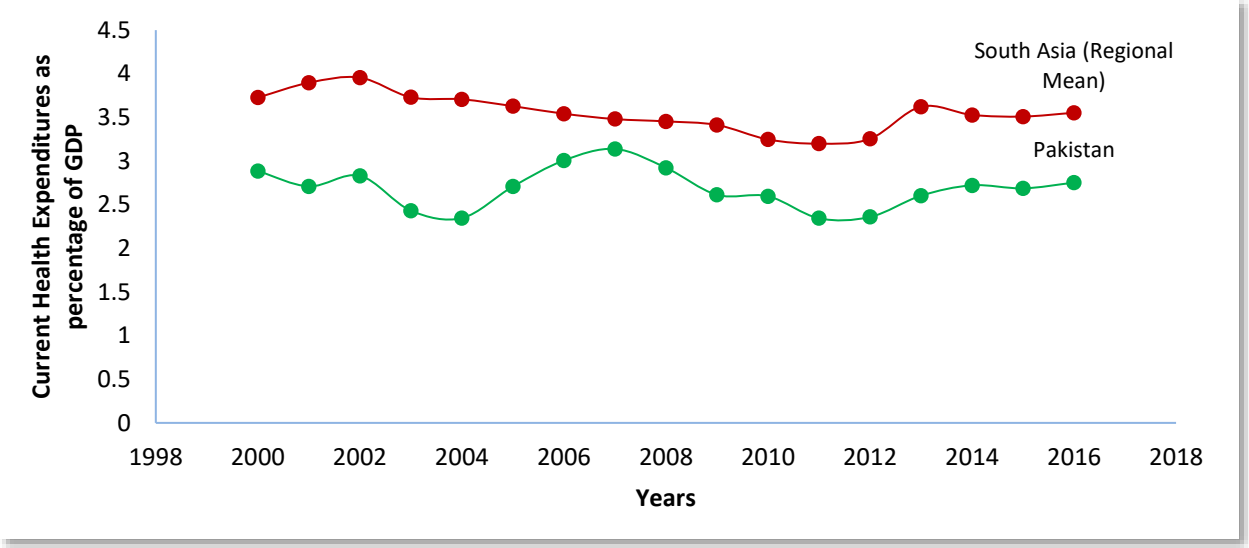
country	Current health expenditure (% of GDP)	Out-of-pocket expenditure (% of current health expenditure)	Life expectancy at birth, total (years)	Mortality rate, infant (per 1,000 live births)	Population growth (annual %)
Pakistan	2.7528	65.2279	66	62.9	2.0843
Bangladesh	2.3650	71.8888	72	28.3	1.0913
Bhutan	3.4541	20.1297	70	26.5	1.2062
India	3.6583	64.5778	69	33.6	1.0898
Maldives	10.6108	19.1006	77	7.1	4.4283
Nepal	6.2944	55.4400	70	28.8	0.9068
Sri Lanka	3.8932	50.1216	75	7.8	1.1049

Source: World development indicators, World Bank

The same picture emerges if we compare the average of South Asian countries with Pakistan. Historically it has been less and more volatile. Figure 1 presents the comparative picture. The share of OOP health expenditure out of the total expenditure is an important indicator in health financing research (Lavado et al., 2013; Xu et al., 2009). In many countries, this figure is used to derive the national level estimates of health accounts (Lavado et al., 2013)[17]. Within low-income countries, the average variation in this share is from 20% to 80%, and this share drops sharply for high-income countries. Below in figure 2, we have produced some comparative positions in the region for Pakistan. Although the average OOP of South Asian countries seems to be close to that of Pakistan but again given the base of total health expenditures,

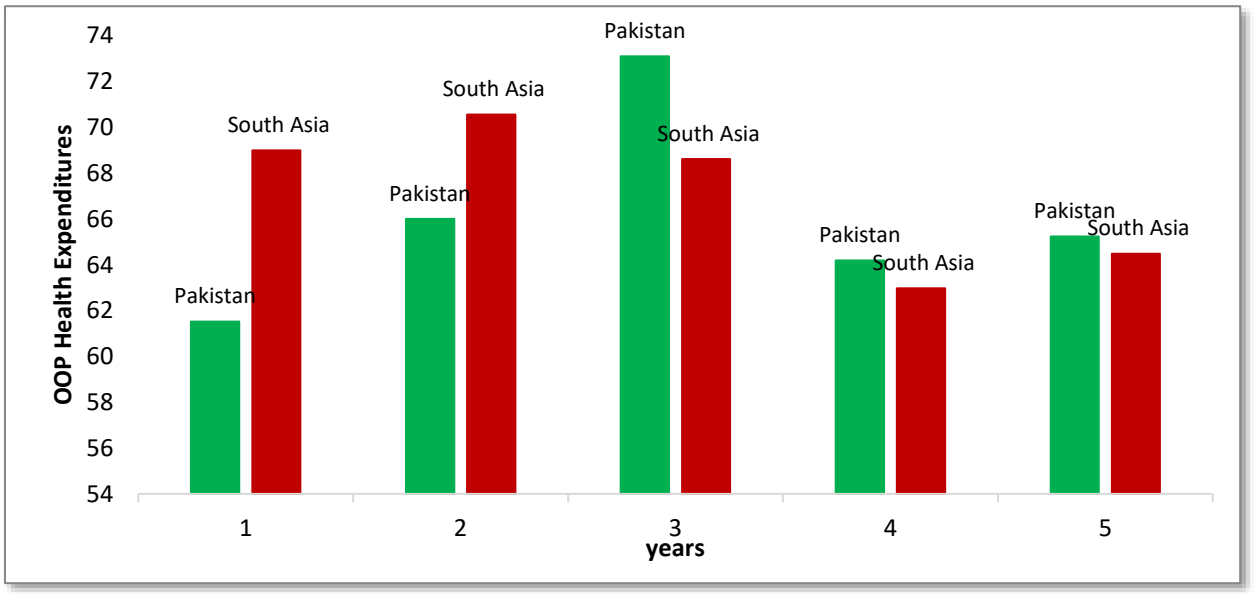
[13] See Bhutta and Hafeez (2015)
[14] Pakistan population statistics from World development Indicators (WDI)
[15] World Development Indicators (WDI)
[16] Human Development Indices and Indicators:2018 statistical update
[17] General statistical procedures used to construct WHO health expenditure database," World Health Organization, Geneva, 2012 and Guide to producing national health accounts with special application to low income and middle-income Countries," World Health Organization, Geneva, 2003

where the other countries have done more allocation, the Non-OOP would still be quite big in absolute value. Further in Pakistan. Thus, expenditure efficiency is also questionable see Rizvi (2019), for more discussion on institutional quality for health expenditures. Which reflected more on why the health outcomes such as the life expectancy (presented in Figure 3) is much low as compared to the region.



Data Source: World Development Indicators, World Bank

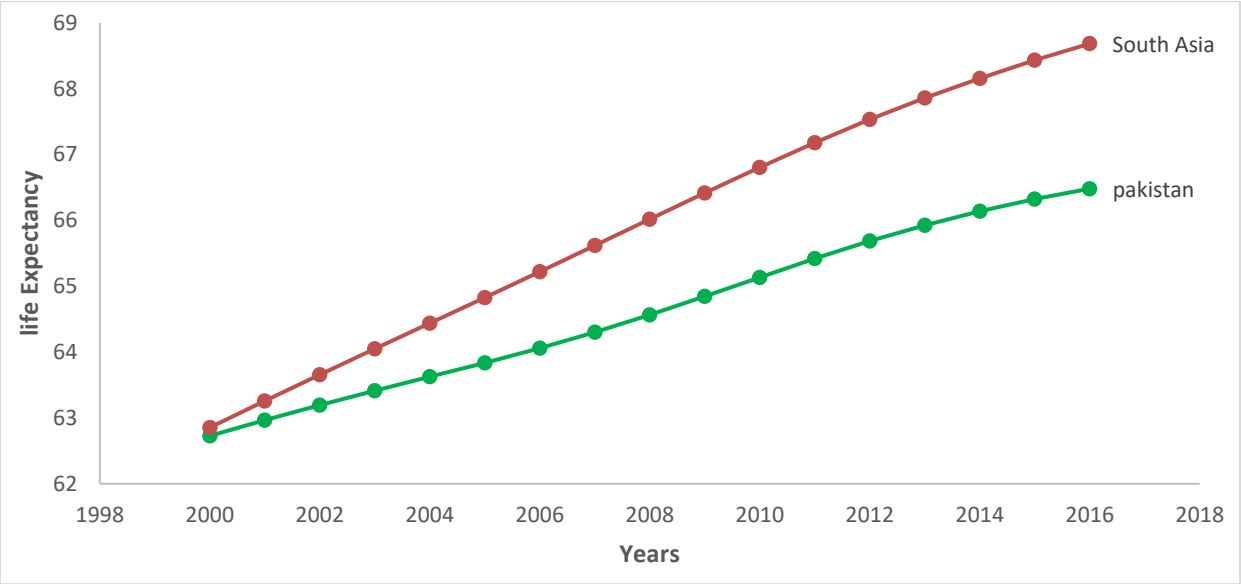
Figure 1: Current health expenditure (percentage of GDP) of Pakistan and mean of south Asian countries.



Data Source: World development indicators, World Bank

Figure 2: Out-of-pocket expenditure (percentage of current health expenditure) of Pakistan and mean of south Asian countries.

In figure 3 if we look at Pakistan vs. South Asian average, then it's evident that both the level of health expenditures being low and the efficiency of spending being questionable the health outcomes are poorer in Pakistan.

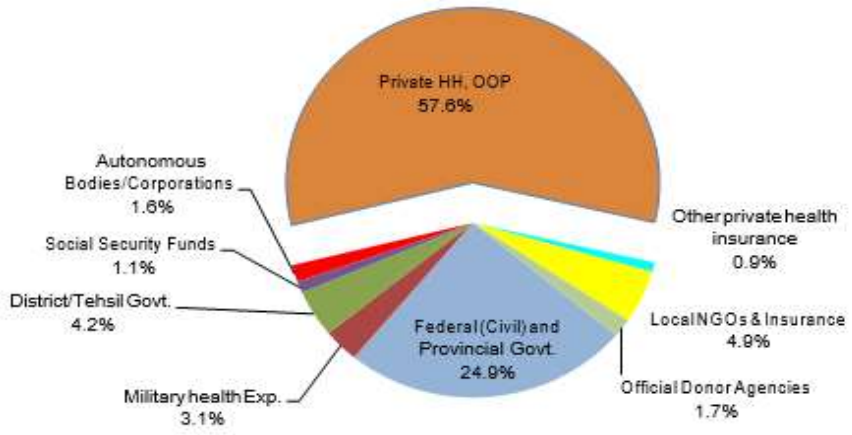


Data Source: World development indicators, World Bank

Figure 3: Life expectancy at birth, total (years) of Pakistan, and mean of south Asian countries.

2.3. Health Financing Sources in Pakistan

According to Pakistan National Health Accounts, Pakistan's total health expenditure in 2015-16 was Rs.908 billion (3.1% of GDP). As Figure 4 shows that out of total health expenditures in Pakistan, 35% are made by the government. Private expenditures constitute 63.4% of total health expenditures in Pakistan, out of which 91% are household's out-of-pocket (OOP) health expenditures. Development partner/ donor organizations have a 1.7% share in total health expenditures.



Source: National Health Accounts Pakistan 2015-2016.

Figure 4: Share of financing agents in total health expenditures of Pakistan for 2015-16

As mentioned in table 2 Funding sources have three main types, that is government financing, private financing, and the rest of the world financing. Out of the entire health spending in Pakistan, 34% of entire health expenditure is financed by the government sector. While 64.4% of the health expenses were financed through the private sector, out of this 64.4%, almost 89% are OOP health expenditures by households. As would have been projected from the comparatively low levels of public spending, out-of-pocket payments played a great role in Pakistan at 65% (% of current health expenditures) of the total financing in 2015-2016, which is tremendously high in worldwide comparative terms (where the average is 18.5). it is also greater than the 20% limit proposed by the 2010 World health report to ensure that financial catastrophe and impoverishment because of accessing health care become insignificant (World Health Organization, 2010). This warrants further study as to why these OOP expenditures are very high, given the health outcomes are not very promising. It leads to a hypothesis such as are these OOP mainly the catastrophic ones hence people end up in short financing and often end up in not the best health outcomes. We will explore these further in the sections below.

Table 2: Health Expenditure Financing Sources

Source	Total (Million Rs.)	Percentage
Federal Government	67,062	7.4
Provincial Government	187,096	20.6
District Government	39,405	4.3
Autonomous Bodies / Corporations	14,287	1.6
Employer Funds	15,369	1.7
OOP Health Expenditures	524,804	57.8
Local/National NGO's	44,271	4.9
Official Donor Agencies	15,210	1.7
Total	907,504	100.0

Data Source: National Health Account, 2015-16

3. REVIEW OF LITERATURE

There are many studies available globally on the determinants of CHE and OOP. Here we present some of them to understand the theoretical and empirical background. Xu et al. (2007) considered whether out-of-pocket expenses on health care can lead to financial hardship. For this reason, survey data of 116 countries have been used which covered 89 countries by analyzing the Gini coefficient, population characteristics under age five years and above 60 years, prepayment in form of tax and health insurance in high, low, and middle-income group countries. Results of this study indicate that all countries suffered from financial catastrophe. Nevertheless, high-income countries, are less affected than middle-income countries, and problems get adverse in low-income countries. The ratio of population below the age of five years remained insignificant to cause financial catastrophe in all income groups which may result in the provision of free-of-cost immunization to the children. On the other side, in middle-income countries ratio of the population above age sixty years enhances the occurrence of financial catastrophe but not in low- and high-income countries. Prepayment mechanism either by health insurance in a high-income group or tax-based system in the low and middle-income group kept protected individuals from financial catastrophe. On the other side out of pocket expenses have a positive correlation with financial catastrophe in all income groups.

Some studies have used different thresholds for analyzing catastrophic health expenditures and their determinants for different countries, for example, Cleopatra and Eunice (2018) studied the incidence, intensity, and determinants of CHE among Nigerian households. The study showed the existence of high intensity and occurrence of catastrophic health expenses in Nigeria which although varied under thresholds used. Also, the determinants like socio-economic status, age, dwelling, employment,

and health status of family members were allied with the catastrophic health expenses in Nigeria. Likewise, Buigut et al. (2015) examined the same for Kenya slum communities and results indicated that a considerable percentage of households in Kenya face catastrophic health expenditures. Moreover, a core set of variables were found to be the determinants of catastrophic health expenditures. In addition, the study suggested that small-scale health insurance programs are needed to protect households from catastrophic health expenditures. Similarly, Aregbeshola and Khan (2018) assessed the determinants of catastrophic health expenditures for households in Nigeria. They found that regardless of the thresholds, factors like age, education, health insurance status, geo-political zone, type of health facility, and type of illness suffered can raise the risk of facing catastrophic health expenditures among households. Su et al. (2006) has also used different thresholds to analyze the percentage of households suffering from catastrophic health expenditures in Burkina Faso and suggested that "different thresholds levels should be used for comparison".

Abul-Naga and Lamiraud (2008) narrated that in the UK some people from the high-income group, for the diversification of the risk against health catastrophe expenditures buy health insurance schemes and some people do not purchase health insurance they make out of the pocket spending. On the other side, individuals with low income do not purchase health insurance. Therefore, the overall effect of coverage of health insurance and the incidence of monetary catastrophe is unclear. The finding of this study is contradictory with Wagstaff & Lindelow (2008) who determined the same in China and found that health insurance has increased the extent of catastrophic health financing because when individuals get sick, they consume health insurance as well as extra resources on health.

Moreover, Yazdi-Feyzabadi et al. (2018) analyzed that urban families were less at risk to CHE than rural inhabitants and their ability to pay was high. Although, the occurrence of CHE is more in rural areas, individuals having inpatient and outpatient services, and families who have old age members in Iran. This research suggested that policies should be revised to enhance the health services coverage to target the underprivileged population.

Azzani et al. (2019), conducted systematic research to find out the determinants of CHE in low to high-income countries. The study showed households' Financial condition, the prevalence of hospitalization, the family with old age individuals, chorionic ill person, and disabled individuals were the mutual factors linked with Household CHE. However, socioeconomic disparity imparts a vital role in the occurrence of CHE all over the globe, where low-income individuals are at higher risk of financial suffering from health care payment. This study proposes that to decrease socioeconomic inequality and healthcare financing policies should be revised to support the people who must need more health care.

Pal (2012) used a new measure of catastrophic health expenses to inspect the occurrence and factors of catastrophic out-of-pocket in India. According to this new measure, "OOP health expenditure is considered as catastrophic if it reduces the non-health expenditure to a level where the household is unable to maintain consumption of necessities". The study suggested that the results are sensitive to the technique used and hence selecting the suitable measure of catastrophic OOP health spending is very important.

Some studies did the multi-country analysis, like Xu et al. (2003) did cross-country inquiry for 59 states and defined expenditure to be catastrophic if health spending exceeds 40% of income. Catastrophic health expenditure levels varied widely among countries, but households can be protected from catastrophic health expenditures by improving financial risk protection. Also, Mohanty et al. (2017) used a 40% threshold for the study of three countries and found that poor regions in those countries are at more risk to face health expenditure shock but an increase in public health spending and introducing health insurances can reduce the catastrophic health spending. While Wagstaff et al. (2018) have used a 10%

threshold for 133 counties and O'Donnell et al. (2005) used the same 10% threshold for Asian countries and found the same results.

Some recent studies like Shikuro et al. (2020) explored the catastrophic out-of-pocket health expenditure in Western Ethiopia and noticed a high ratio of people facing CHE. Further, the study also found that having members with chronic illnesses, the sex of household head, and employment are significant determinants among households. Similarly, Attia-Konan et al. (2020) worked on the Household Living standard survey of Côte d'Ivoire to investigate the factors associated with catastrophic Health Expenditures. Most households facing CHE were the ones with chronic disease and people over 65 years. Whilst households without health insurance were least affected. Likewise, Ahmed et al. (2021) studied the determining factors of Catastrophic Health Expenditures for Bangladesh and the findings were almost the same. Older people, chronic illness, and geographical location were found to be significant.

Liu et al. (2021) studied the determinants along with the incidence and intensity of Catastrophic health Expenditures among elderly Chinese individuals. He used 40% of non-food expenditures as the threshold for CHE. He found out the increase in both incidence and intensity of CHE. Whilst individuals with a spouse in the household, disabled, lived in middle and western zones lived in urban areas and fall in the lowest quantile were more prone to face CHE. Mulaga et al. (2021) also analyzed the incidence and determinants of CHE in Malawi. He also used 40% of non-food expenditure and 10% of total expenditure as thresholds for incidence of CHE. He found that 1.37% of households have faced CHE. In addition, some factors like hospitalizations, large household size, higher economic status, visiting health facilities, individuals who lived in rural and central regions had more chance to face CHE.

All the studies mentioned above, along with Saksena et al. (2010) and Lara and Gómez (2011) discovered a set of possible determinants that can raise the risk of experiencing catastrophic health expenses between families. Among them are characteristics and economic condition of household head, socio-demographic conditions, health insurance, a household with more elderly people, type of health care facility, in-patient events, etc. Similarly, Li et al. (2012) inquired about the features impacting catastrophic health expenditures in China. The significant factors include rural/poorer regions, households having hospitalized, chronically ill, and elderly members. Likewise, Mondal et al. (2010) studied the influential features of calamitous health expenditure in West Bengal, India. They defined the expenditures to be catastrophic if they were more than 40% of non-food spending. The analysis showed that many illness spells, hospitalizations, household members with chronic illness, and type of medical care were important factors that are responsible for catastrophic health expenditures.

Several studies including those mentioned above in both developed and developing countries have investigated the determinants of catastrophic health expenditures and listed many variables such as; type of employment of household's head, socio-demographic conditions, health insurance purchase, elderly dependence, health care facility availability, rural/urban, number of illness spells, hospitalizations, a household member with chronic illness, etc. However, there is no such research on the incidence, intensity, and determinants of catastrophic health expenditures among households in Pakistan. Our study will be unique to assess the incidence, intensity, and determinants of CHE in Pakistan by using Probit and Quantile regression. Plus, three different thresholds are used to get insights into the sensitivity of results to the threshold levels. The study provides evidence and contributes to the literature on factors associated with catastrophic health expenditures in Pakistan.

4. METHODOLOGY

Following the methodology proposed in the above-mentioned studies for example Wagstaff and Doorslaer (2003), Aregbeshola and Khan (2018), Cleopatra and Eunice (2018), Attia-Konan et al. (2020),

and others, the present study estimates determinants of the Out-of-Pocket approach by using Probit and Quantile Regressions. According to this OOP approach, Catastrophic health expenditure is the medical expenditure or out-of-pocket spending for health that surpasses a defined threshold of a family's overall consumption or non-food consumption spending yearly. Since there are no universally agreed thresholds defined in the literature, this study used thresholds of 10%, 25%, and 40% to capture the best possible sensitivity. Income is often misreported especially in developing countries' household surveys; therefore, in this study Total non-food expenditure is taken as a proxy of the household's relative income. Which is a better measure of a household's health care affordability (WHO World Health Report, 2000).

In the present study, the total health expenditures (out-of-pocket Expenses) as a ratio of non-food expenses are to be seen on different thresholds (10%, 25%, 40%). If health expenditure is more than the threshold value, then it means Household (HH) has faced catastrophic health expenditures.

CHE = (Health expenditures / Non-Food expenditures) * 100 if > 10% / 25% / 40%

Once the household is identified to incur CHE based on threshold analysis then Probit Model was used to analyze the relationship between the CHE and independent (determinants) variables to identify significant attributes of these households which push individuals towards financial poverty due to CHE. The standard Probit Model is defined as:

$$ln\left(\frac{P}{1-p}\right) = \beta_\circ + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots + \beta_n X_n + \epsilon \qquad (1)$$

In the above equation (1), P is the dependent variable i.e. occurrence of CHE defined as 1 when HH has catastrophic health spending and 0 otherwise. X_1, X_2, X_3, X_n are explanatory (determinants) variables, $\beta_1, \beta_2, \beta_3, \beta_n$ are coefficients of independent variables and ϵ is the error term. The independent variables used in this Probit regression equation are age, province, region, Household Head (HHH) gender, HHH marital status, HHH employment, and HHH education.

Most of the regression models are concerned with examining the conditional mean of a dependent variable. However, there is a growing interest in different modeling methods of conditional distribution an increasingly common approach, quantile regression is modeling the quantiles of the dependent variable given a set of conditioning variables. Koenker and Bassett (1978) was the first one to recommend quantile regression. It is responsible for assessments of the linear relationship between regressors X to a given quantile of dependent variable Y. A quantile regression models the relationship between X and the conditional quantiles of Y rather than just the conditional mean of Y. Therefore, Quantile regression permits for a further inclusive explanation of the conditional distribution than conditional mean analysis alone, allowing us, for instance, to elucidate how regressors influence the median, or even the 10th or 95th percentile of the response variable. The quantile model for τ^{th} quantile is expressed by the following equation.

$$Q_\tau(y_i) = \beta_0(\tau) + \beta_1(\tau)x_{i1} + \cdots + \beta_p(\tau)x_{ip} \qquad i = 1, \ldots, n \qquad (2)$$

In this equation (2), the dependent variable is the log of health expenditures, while the same independent variables were used. Here y_i is the health expenditures of households who based on health expenditures being higher than 10% of non-food expenditures are identified as CHE-prone households. While, the beta coefficients, instead of being constants are now functioning with a dependency on the quantile. This study used 25th, 50th, and 75th quantile to capture the effect of the independent variables on the dependent variable in these specific quantiles.

5. DATA AND VARIABLES

Individuals' access to health care facilities from OOP expenditures is dependent on several socio-economic characteristics of households. The role of environmental, socio-economic, and demographic factors is well documented in health financing and health-care literature. (Malik & Syed, 2012; Marmot et al., 2008). Also, Michael Grossman has some significant work on health care demand and production (Grossman, 1972).

Hence, to see HH level catastrophic health expenditure for Pakistan, we have used survey data of Household Integrated Economic Survey (HIES) for the year 2015-2016[18] for 24,238 households. It contains household information including education, income, consumption expenditure, and health expenditures.

- Main Variables: Health Expenditures, non-food expenditure
- Determinant Variables: Province, region, Household Head gender, HHH age, HHH marital status, HHH employment status, HHH education
- Dependent Variable: Dummy for Catastrophic health Expenditures in Probit Regression and log of Health Expenditures in Quantile Regression

5.1. Descriptive statistics

Table 3 shows the population statistics of households surveyed in the research. According to the age classification of households, the sample population of age 11–33 years is 17.73%, between 34–65 (74.80%), and older than 66 (7.47%). According to the provincial population sample, 43.35% of people are from Punjab, 21.49% from the Khyber-Pakhtunkhwa (KP), 25.48 % from Sindh, and 9.67 % from Baluchistan. Many individuals 66.65% reside in the urban region whereas 33.35% of individuals reside in rural areas. 90.56% heads of household are male on the other hand 9.44% female are the heads of household. The marital status of 90.14% Heads of households is married, 2.56% are unmarried, 6.97% are widows and 0.33% are divorced. Around 83.25% of household heads are employed on the other side 16.75% are unemployed. The employment status of 62.18% heads of household is paid employee, 1.77% are employer, employing less than 10 persons, 1.03% are employer, employing 10 or more persons, 21.23% are Self-employed non-agriculture, 0.24% are contributing family member, 7.66% are own cultivator, 3.20% are sharecropper, 1.23% are contract cultivator and 1.47% have livestock. Around 67.33% of heads of households are educated and 32.67% are not.

The Descriptive statistics show that on average yearly health expenditures are 12225.07 (Pak-Rs), with a minimum of 20 Rs and a maximum of 1160875 Rs. The non-food expenditures are on average 145458.1 Rs with minimum zero Rs and a maximum of 5582876 Rs. On average non-food expenditures are higher than health expenditures. The measure of dispersion such as standard deviation represents variation in health expenditures is 26306.21 Rs and the dispersion in non-food expenditures is 170544.7 Rs. The volatility of non-food expenditure is more than health expenditures.

[18] Latest consumption data available for Pakistan.

Table 3: Population statistics / Descriptive statistics

Variables	Population percentage
Age	
Between 11 and 33	17.73
Between 34 and 65	74.80
Greater than 66	7.47
Province	
Punjab	43.35
Khyber-Pakhtunkhwa	21.49
Sindh	25.48
Baluchistan	9.67
Region	
Urban	66.65
Rural	33.35
HHH Gender	
Male	90.56
Female	9.44
HHH Marital Status	
Married	90.14
Unmarried	2.56
Widow/Widower	6.97
Divorced	0.33
HHH Employed	
Yes	83.25
No	16.75
HHH Employment status	
Paid employee	62.18
Employer, employing less than 10 persons	1.77
Employer, employing 10 or more persons	1.03
Self-employed non-agriculture	21.23
Contributing family members	0.24
Own cultivator	7.66
Sharecropper	3.20
Contract cultivator	1.23
Livestock	1.47
HHH Educated	
Yes	67.33
No	32.67

Variable	Obs.	Mean	StdDev	Min	Max
Health expenditures	24168	12225.07	26306.21	20	1160875
Non-food expenditures	24237	145458.1	170544.7	0	5582876

5.2. Incidence and Intensity of Catastrophic Health Expenditures

Table 4 shows an analysis of the incidence and intensity of CHE. As mentioned, before we have used a ratio of health expenditure to non-food expenditures to estimate the occurrence of catastrophic health expenditures at 10%, 25%, and 40% thresholds. The results indicate that 21.21%, 22.14%, and 17.48% people belong to age group 11-33 years which incurred CHE at 10%, 25%, and 40% threshold levels correspondingly, whereas 69.06%, 65.23%, and 68.53% of the households between 34-65 years suffered CHE at these altered thresholds. 9.73%, 12.63%, and 13.99% individuals older than 66 years suffered from CHE at 10%, 25%, and 40% threshold correspondingly. This shows that the incidence of CHE is highest for the middle age group i.e. from 34-65 years. As at this age most are married and looking after the whole family hence their CHE can be detrimental. Whereas those who have made it up to 66 years of age being the household head would be fair in terms of responding to such challenge. However, still, a

significant portion of that population has suffered it and warrants policy action as elderly people are most vulnerable to such calamities.

Table 4: Incidence and Intensity of Catastrophic Health Expenditures

Variable Description		10%	25%	40%
Age				
	11-33	21.21	22.14	17.48
	34-65	69.06	65.23	68.53
	>66	9.73	12.63	13.99
Province				
	Punjab	30.17	8.44	2.51
	Khyber-Pakhtunkhwa	41.23	9.42	4.11
	Sindh	38.47	6.57	1.92
	Baluchistan	29.38	4.73	1.40
Region				
	Urban	53.46	54.19	57.76
	Rural	46.54	45.81	42.24
HHH Gender				
	Male	90.51	88.55	85.73
	Female	9.49	11.45	14.27
HHH Marital Status				
	Married	89.0	85.35	85.71
	Unmarried	2.71	3.13	2.94
	Widow/Widower	7.80	10.79	13.17
	Divorced	0.49	0.72	1.12
HHH Employed				
	Yes	81.78	77.27	74.27
	No	18.22	22.73	25.73
HHH Employment status				
	Paid employee	1.05	0.92	1.03
	Employer, employing less than 10 persons	0.49	0.35	0.00
	Employer, employing 10 or more persons	18.42	20.78	21.03
	Self-employed non-agriculture	61.56	59.08	60.82
	Contributing family member	0.39	0.50	0.41
	Own cultivator	9.92	9.86	8.45
	Sharecropper	4.53	3.40	1.65
	Contract cultivator	1.67	2.06	2.47
	Livestock	1.97	3.05	4.12
HHH educated				
	Yes	58.18	58.76	58.24
	No	41.82	41.24	41.76
Total		34.59	8.03	2.95

Percentage of Households with catastrophic health spending to household characteristics

According to the region-wise analysis; the incidence of CHE in Punjab, Sindh, KP, and Baluchistan decreases as the threshold rises from 10% to 25% and then from 25% to 40%. However, the incidence of CHE is highest in KP and lowest in Baluchistan irrespective of these three thresholds. This means KPK on average has a higher probability of households moving into a poverty status whereas in the case of Baluchistan it simply reflects the non-affordability of even such expenditures. Whereas Sindh and Punjab are relatively well off. At threshold levels of 10%, 25%, and 40% of non-food spending, the incidence of CHE is higher in urban areas as compared to rural areas.

Urban poverty is disguised and most of the households are subsistence living households. Assets and affordability for such risks are much lower as compared to Rural. Although options to avail risk financing

through loans and insurance are there but tend to opt for those is low both from the demand and supply side. The incidence of CHE in male-headed households is high as compared to the female-headed household at these thresholds. This points out that females enter the labor force and become major earners of the households only when better jobs and earnings are available. The incidence of CHE is highest for married household' heads and lowest in divorced-headed households at these three thresholds.

Employed-headed households have a high percentage of CHE than the unemployed-headed household at these three thresholds. The incidence and intensity of CHE in self-employed HHH are greater as 61.56%, 59.08%, and 60.82% at the threshold level 10%, 25%, and 40%. On the other side intensity of CHE is least in the Employer, employing less than 10 persons is 0.49%, 0.35%, and 0.00% at the threshold level 10%, 25%, and 40% respectively. This shows that the lower business-based entrepreneurs are less at risk for such catastrophic expenditures, which is convincing. Lastly, being educated increases the incidence of incurring CHE at the same intensity and all threshold levels.

6. RESULTS

6.1. Results of Probit Regression

Table 5 reports the determinants that can cause CHE in households. Regardless, of the threshold used, all the factors except HHH gender and HHH employed were found to be significant. The association between CHE and age is found to be significant and positive at both 10% and 25%. Considering the age group, people belonging to age group 11 to 33 years are 10% more likely to have CHE as compared to people having age 34-65 years at 10% threshold level. As explained above in descriptive analysis that the middle group of 34-65 is more vulnerable as they have to manage a bigger family and are more prone to have higher CHE. Whereas people above 66 years are 11% more likely to have CHE as compared to people having age 34-65 years at a 10% threshold level. The same reasons hold for those who have made it up to 66. People who belong to the age group 11 to 33 years are 3% more likely to have CHE as compared to people having age 34-65 years at a 25% threshold level. Whereas people above 66 years are 4% more likely to have CHE as compared to people having age 34-65 years at a 25% threshold level. People belong to the age group 11 to 33 years are not likely to have CHE as compared to people having age 34-65 years at a 40% threshold level. Whereas people above 66 years are 1% more likely to have CHE as compared to people having age 34-65 years at a 40% threshold level. As explained above in descriptive analysis that the middle group of 34-65 is more vulnerable as they must manage a bigger family and are more prone to have higher CHE. The same reasons hold for those who have made it up to 66.

Provinces have a significant and positive association with CHE at 10%, while Significant but negative at 25% and 40%. According to the region-wise analysis, KP is 10% more likely to have CHE as compared to Punjab at a 10% threshold level. Sindh is 7% more likely to have CHE as compared to Punjab at the 10% threshold level. On the other hand, Baluchistan is not likely to incur CHE as compared to Punjab at the 10% threshold level. At the 25% threshold level, KP is not likely to CHE as compared to Punjab. Sindh is 2%, and Baluchistan is 3% less likely to have CHE as compared to Punjab at the 25% threshold level. KP is 1%, Sindh is 1% and Baluchistan is 2% less likely to have CHE as compared to Punjab at a 40% threshold level. Again, Punjab and Sindh provinces are relatively more stable, whereas KP presents the most vulnerable province. The government in KPK has identified universal Health coverage and hopefully, this will be managed to an extent. Whereas for Baluchistan it appears to be an affordability issue.

Compared to people living in urban areas, people living in rural areas have significant chances to face CHE. People living in rural areas are 18%, 3%, and 0% more likely to have CHE as compared to the urban area at threshold levels 10%, 25%, and 40% respectively. Divorced individuals are 22% more likely

to have to CHE as compared to married individuals at the threshold level of 10%, which is obvious because of lack of resources and assets.

Table 5: Determinants of Catastrophic health expenditure using Probit Regression

Dep. Var: Dummy			
Variables	**10%**	**25%**	**40%**
Age			
11-33	0.101***(0.008)	0.038***(0.005)	0.003(0.003)
34-65			
>66	0.112***(0.200)	0.043***(0.012)	0.014*(0.007)
Province			
Punjab			
Khyber-Pakhtunkhwa	0.110*** (0.009)	-0.002 (0.005)	-0.010***(0.003)
Sindh	0.074***(0.008)	-0.023***(0.004)	-0.016***(0.002)
Baluchistan	-0.002(0.011)	-0.039***(0.005)	-0.020***(0.003)
Region			
Urban			
Rural	0.180***(0.008)	0.036***(0.004)	0.007**(0.002)
HHH Gender			
Male			
Female	0.000(0.022)	-0.007(0.011)	-0.005(0.006)
HHH Marital Status			
Married			
Unmarried	0.007(0.021)	0.005(0.011)	0.005(0.008)
Widow/Widower	0.030(0.020)	0.015(0.012)	0.004(0.007)
Divorced	0.226***(0.066)	0.051(0.043)	0.022(0.027)
HHH Employed			
Yes			
No	0.139(0.125)	0.080(0.085)	0.162(0.100)
HHH Employment status			
Paid employee			
Employer, employing less than 10 persons	-0.073***(0.024)	-0.019(0.013)	-0.007(0.007)
Employer, employing 10 or more persons	-0.122***(0.030)	-0.038***(0.013)	
Self employed non agriculture	-0.008 (0.008)	0.001(0.004)	-0.002(0.002)
Contributing family member	0.123* (0.072)	0.043(0.044)	0.006(0.024)
Own cultivator	-0.009(0.013)	-0.004 (0.006)	-0.006(0.003)
Sharecropper	-0.033*(0.018)	-0.011 (0.009)	-0.013***(0.004)
Contract cultivator	0.027 (0.029)	0.013 (0.016)	0.007 (0.010)
Livestock	0.010 (0.027)	0.042**(0.017)	0.025** (0.012)
HHH Educated			
Yes			
No	0.092***(0.007)	0.017***(0.004)	0.007***(0.002)
No. of Observations	19526	19526	19325
Prob > Chi^2	0.0000	0.0000	0.0000
Pseudo R^2	0.059	0.028	0.024

delta method standard error in parentheses and Coefficients are Marginal effect dy/dx, ***p<0.01, **p<0.05, *p<0.1

The relationship found between household head Employment category and CHE is found significant but negative in most of the cases except contributing family members at 10% and people work for livestock at 25% and 40%. Employing less than 10 persons, are 7% less likely to have CHE as compared to a paid employee at a 10% threshold level. In contrast, Household head employers, employing less than 10 persons are not likely to have CHE as compared to paid employees at 25% and 40% threshold levels. Employers, employing 10 or more persons are 12% and 3% less likely to have CHE as compared to paid employees at 10% and 25% threshold levels. Self-employed non-agriculture employees are no likely to

have CHE as compared to paid employees at 10%, 25%, and 40% threshold levels. Contributing family members are 12% more likely to have CHE as compared to paid employees at a 10% threshold level. On the other hand, contributing family members are no likely to have CHE as compared to paid employees at 25% and 40% threshold levels. Own cultivators are no likely to have CHE as compared to paid employees at these three threshold levels. Sharecroppers are 3% and 1% less likely to have CHE as compared to paid employees at 10% and 40% threshold levels. On the other hand, sharecropper is not likely to have CHE as compared to paid employees at a 25% threshold level. Contract cultivators are not likely to have CHE as compared to paid employees at these three threshold levels. Individuals having livestock are not likely to have CHE as compared to paid employees at a 10% threshold level. On the other hand, individuals having livestock are 4% and 2% are more likely to have CHE as compared to paid employees at 25% and 40% threshold levels respectively.

Education has a significant and positive relationship with the CHE at all threshold levels. Uneducated-headed households are 9%, 1% and 0% are more likely to have CHE as compared to an educated-headed household at these three threshold levels. Finally, being uneducated has a positive and significant relationship with CHE because of lack of knowledge and awareness. Another reason could be that uneducated people won't be financially stable to bear high medical expenses.

Overall, the Chi-square with a probability of 0.00 shows that this model fits the data well and is significant at 10%, 25%, and 40% threshold levels. Pseudo R-square with values 0.05, 0.02, 0.02 indicates that this model is statistically significant, coefficients are significant and better than the model with no predictor at these three threshold levels.

6.2. Results of Quantile Regression

Table 6 reports the result of quantile regression We have used the 25^{th}, $50^{th,}$ and 75^{th} quantiles. This illustrates that for all the quantiles of the sample identified as committing CHE under the assumption of Health Expenditures being more than 10% of non-food expenditures.

Age has a significant but negative relationship with Health Expenditures. The person's age lies between 11-33 years as compared to 34-65 years the log of health expenditure decreases by the magnitude (for 25^{th} quantile it decreases by 0.304, for 50^{th} 0.272 and 75^{th} 0.244). When individuals' age increases to more than 66 years as compared to 34-65 years the log of health expenditure does not change significantly for all the percentiles. This means the CHE does not significantly reduce after the mid-thirties. Under the quintile regression dispersion regarding belonging to different groups has been controlled. So, it's the age group which is indicating that for relatively younger people the risks are less as compare to older both groups.

The log of health expenditure decreases if a person belongs to KP as compared to Punjab with a magnitude of coefficient 0.014, 0.102, and 0.161 for 25th, 50th, and 75th quantile respectively. This means people with high health expenditure will be more affected by living in KP. Whereas the log of health expenditure decreases if a person belongs to Sindh as compared to Punjab with a magnitude of coefficient 0.302, 0.472, and 0.681 respectively for 25th, 50th, and 75th quantile. The log of health expenditure decreases as a person belongs to Baluchistan as compared to Punjab with a magnitude of coefficient 0.024, 0.036, and 0.171 respectively for 25th, 50th, and 75th quantile. The log of health expenditure decreases in case a person lives in a rural area as compared to an urban area with a magnitude of around 0.3 for all quantiles. This means people living in a rural area and spending moderately will be more affected.

However, in the case of Household head marital status, unmarried household head-based families have lesser expenditure as compared to married household head households by 0.206 for the 25^{th} quintile and

0.098 for the 50th. Whereas in the case of the 75th quintile the household head household being unmarried have an insignificant difference with those households whose household heads are married. In the case of Household head marital status being widow/widower household, head-based families have lesser expenditure as compared to married household head households by 0.257 for 25th quintile and 0.172 for 50th. Whereas in the case of the 75th quintile the widow/widower household head the household have insignificant difference with those households whose household heads are married. In the case of the household head being divorced difference is insignificant for all quantiles. The log of health expenditure does not show any significant difference with the household head being unemployed as compared to employed HHH for all quantiles. The results are in line with the Probit estimations.

Table 6: Determinants of households facing catastrophic expenditures at 10% threshold using Quantile Regression

Dep. Var: Lnhexp			
Variables	**25%**	**50%**	**75%**
Age			
11-33	-0.304***(0.032)	-0.272***(0.029)	-0.244***(0.033)
34-65			
>66	-0.032 (0.065)	0.117***(0.059)	0.045 (0.068)
Province			
Punjab			
Khyber-Pakhtunkhwa	-0.014 (0.035)	-0.102***(0.031)	-0.161***(0.036)
Sindh	-0.302***(0.034)	-0.472***(0.031)	-0.681***(0.035)
Baluchistan	0.024(0.050)	-0.036 (0.045)	-0.171***(0.052)
Region			
Urban			
Rural	-0.298***(0.029)	-0.318***(0.027)	-0.269***(0.030)
HHH Gender			
Male			
Female	0.015(0.090)	0.018(0.082)	0.108(0.094)
HHH Marital Status			
Married			
Unmarried	-0.206**(0.081)	-0.098**(0.074)	0.003 (0.085)
Widow/Widower	-0.257***(0.078)	-0.172**(0.071)	-0.094 (0.081)
Divorced	-1.075***(0.199)	-0.621***(0.182)	-0.834***(0.208)
HHH Employed			
Yes			
No	0.510(0.352)	0.365 (0.321)	0.051(0.368)
HHH Employment status			
Paid employee			
Employer, employing less than 10 persons	0.907***(0.128)	0.852***(0.117)	0.634***(0.134)
Employer, employing 10 or more persons	0.940***(0.187)	0.914***(0.170)	0.658***(0.195)
Self employed non agriculture	0.238***(0.035)	0.231***(0.032)	0.305***(0.037)
Contributing family member	0.363*(0.213)	0.501***(0.194)	0.233 (0.222)
Own cultivator	0.363***(0.048)	0.365***(0.043)	0.343***(0.050)
Sharecropper	0.327***(0.065)	0.316***(0.060)	0.415***(0.068)
Contract cultivator	0.471***(0.103)	0.385***(0.094)	0.337***(0.108)
Livestock	-0.240**(0.095)	0.258***(0.086)	0.311***(0.099)
HHH Educated			
Yes			
No	-0.282***(0.027)	-0.348***(0.025)	-0.345***(0.028)
Constant	9.271***(0.030)	9.873*** (0.027)	10.451***(0.031)
No. of observations	6514	6514	6514
Pseudo R^2	0.103	0.124	0.132

*** p<0.01, ** p<0.05, * p<0.1, standard error in parentheses

In the case of Household head employment status. At all quantiles results and significant and positively related to health expenditures. Which means irrespective of occupation, if people have some income then they will use it for medical purpose at all quantiles. being Employer, employing less than 10 persons, Employer, employing 10 or more persons, sharecropper, livestock and Contributing family member, the log of health expenditure does not show any significant difference as compared to paid employees for all quantiles. Whereas in the case of Self-employed non-agriculture, Own cultivator, and Sharecropper the log of health expenditure increases as compared to paid employees' case for all quantiles.

Lastly in the case of a household head being uneducated vs educated household head the log of health expenditure decreases by 0.282, 0.348, and 0.345 for the 25th, 50th, and 75th quintile respectively. This means uneducated people spend less on health as compared to educated people. Of course, Because if they wouldn't have much knowledge about the severity of the disease then they won't spend more or might go for short financing. It is totally in line with the Probit regression result.

To conclude, the results of the current analysis indicate that social and economic determinants are somehow responsible for the incidence of catastrophic health expenditures in Pakistan. Table 7 presents the comparison of these results with findings of the previous studies. The studies mentioned below have some similarities with the findings of the present study. For example, in the study of Aregbeshola and Khan (2018), common significant factors are age, education, geographical location, and socioeconomic status. Then again age and employment status in Cleopatra and Eunice (2018) are significant like the present analysis. Similar to this study, In Mulaga et al. (2021) economic status and area of residence are found significant too. Lastly, In Pal (2012) presence of children and elderly members, education, and rural area residents are similar significant factors.

Table 7: Comparison of empirical results

Author	Data	Significant Factors	Findings' Similarity
Aregbeshola and Khan (2018)	Harmonized Nigeria Living Standard Survey of 2009-2010	age, education, health insurance status, geo-political zone, type of health facility, and type of illness	Similar
Cleopatra and Eunice (2018)	Nigeria General Household survey 2015-2016	socio-economic status, age, dwelling, employment, and health status of family members	similar
Mulaga et al. (2021)	Integrated Household Survey of Malawi 2016-2017	hospitalizations, large household size, higher economic status, visiting health facilities, individuals lived in the rural and central region	Partially similar
Pal (2012)	Consumer Expenditure Survey 2004-2005	Family size, Presence of children and elderly members, education, people living in the rural area	Partially similar

7. CONCLUSION AND POLICY RECOMMENDATIONS

7.1. Conclusion

Catastrophic health expenditure is an escalating issue in Pakistan where many people cannot afford health care services when these expenditures increase up to a certain level. It should be the government's foremost objective to reduce the prevalence of CHE and to achieve this objective it is therefore important to analyze the determining factors of CHE in Pakistan. To find the determinants of CHE, we have used

the Probit and quantile models using different threshold levels and quintiles. We have also explored the incidence and intensity of CHE in Pakistan. The result of our research shows that individuals between age 34 to 65, KP province, people living in an urban area, Male HHH, Married HHH, Employed HHH, and individuals working as self-employed in the non-agricultural sector have high incidence and intensity to have CHE. On the other hand, people above age 60 years, individuals residing in Baluchistan, people living in a rural area, Female HHH, Unemployed HHH, Employer employing more than 10 persons have the least incidence and intensity to face CHE.

Specifically, the result of the Probit model shows that people between age 11 to 34, individuals above 65 years, individuals residing in rural areas, Educated HHH, people having livestock are significant and have more chances to suffer from CHE at these different thresholds. However, Divorced HHH and people living in KP have significant and more chances to get suffered at only a 10% threshold level. On the other hand, for people living in Baluchistan, Employer employing more than 10 persons and sharecroppers are significantly fewer chances to have CHE at these threshold levels. However, Employer employing less than 10 persons have significantly less chance to have CHE at only a 10% threshold level. Furthermore, KP is more likely to have CHE at a 10% threshold and less likely to have CHE at a 40% threshold. On the other side, Sindh significantly has more chance at the 10% threshold level and fewer chances to have CHE at the 25% and 40% threshold level.

The result of the quantile model shows the difference between households who have close to threshold health expenditures and those who are above in quantile references. The results show that in the case of the younger age group of 11-33 the household health expenditures reduce whereas for the higher age group it does not change significantly. This means the CHE does not significantly reduce after the mid-thirties.

Health expenditures decrease if for households belonging to KP, Baluchistan, and Sindh as compared to Punjab, but the difference is highest for Sindh. Rural areas present a case with lesser household health expenditures as compared to urban. There was no difference in health expenditures based on household head gender. However, in the case of Household head marital status, there are differences. Unmarried and widow/widower household head-based families have lesser expenditure as compared to married household head households. While in the case of the household head being divorced difference is insignificant for all quintiles.

Similarly, there is no significant difference with the household head being unemployed as compared to employed HHH for all quintiles. Almost similar results prevailed for Household head employment status in categories. Lastly in the case of a household head being uneducated vs. an educated household head the log of health expenditure decreases which may be a result of unattended medical conditions being lesser educated and lesser motivation to respond to a health issue.

7.2. Policy Implications and Recommendations

- Given that, the government's current spending on health is not sufficient. A sharp and immediate increase in health expenditures is recommended to achieve cost-effectiveness, efficiency, and equity in the health care system.
- Government should protect the poor from the health expenditure catastrophe but simultaneously it is also essential to protect non-poor or middle-income people from health expenditure shock. In this regard, some major reforms on health care financing and health policies are required to improve the efficiency and equity in the health care system of Pakistan.
- CHE is an emerging debate in Pakistan and the fact is that it can be overcome by providing health care protection. Catastrophic health expenditures call for an affordable health insurance mechanism or some small-scale health insurance programs to protect people against health

expenditure catastrophe. So apart from health care financing policies, there should be legislation for health insurance in Pakistan. It will also pave the way to universal health coverage.

- The poor and even middle-income groups lack access to satisfactory health care services. It is, therefore, necessary to monitor the performance of public as well as private health care services.
- policymakers and public researchers should upgrade household survey instruments to better capture the household health spending e.g. some health insurance-related variables etc.

7.3. Limitation of the study

There are few limitations of the study. First, the HIES data set used in this study only reports the direct health care cost of the households. It doesn't capture the payments paid by a third party. Secondly, some variables like Health insurance coverage, presence of a disabled person, HH member with chronic illness, etc. which were found significant in most previous studies were not available in the HIES dataset. Thirdly, some studies used the household capacity to pay method for the identification of CHE but a majority of the studies have used the same methodology (Out of pocket health expenditure method) to measure the presence of CHE in the households. Moreover, the current study used only the non-food expenditure approach. Because the incidence of households with CHE was higher in the non-food expenditure approach than the total expenditure approach.

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