HOUSEHOLD CATASTROPHIC HEALTH EXPENDITURES AND ITS DETERMINANTS IN PAKISTAN

Syeda Anam Fatima Rizvi
Cerdi-UCA-CNRS

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 expenditures exceeds a defined threshold of Household's non-food expenditure consumption expenditure then the Household face financial catastrophe. This research will shed light on the features that can make households in Pakistan more vulnerable to catastrophic health expenses and will fill the gap by analyzing the determinants of Catastrophic health expenditures of Pakistan and discussing about 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[1] for 24,238 households. It contains household's information including education, income, consumption expenditure and health expenditures. As anticipated, some determining factors significantly increase the risk of facing catastrophic health expenditures.

Keywords: catastrophic health expenditure, out-of-Pocket Payments, Non-food consumption expenditure

JEL Classification: I19, I10, H51

1. INTRODUCTION

Investment in the health sector can lead to a long-run beneficial outcome. It is useful in promoting health outcomes, decrease poverty, and help to 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 pocket, which has been persisted as the main way of health financing. Globally, 32% of health spending was out of pocket expenditure on ordinary in 2015. Out of these, World Health Organization evaluates that out-of-pocket expenses on health care facilities impel 4100 million individuals into poverty each year. However, nearly 150 million persons bear monetary calamity due to out-of-pocket health expenditures (WHO, 2015). Catastrophic health spending 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 yearly. Based on a 2010 WHO report, a nation's public health expenditure of around 6% of GDP will restrict Out of pocket expenditures and make the occurrence of calamitous health expenses negligible. On the contrary, the average value of

[1] Latest consumption data available for Pakistan.

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 on extreme of 3.34% in 2007. In 2016, Pakistan being a lower-middle income country has health expenditure per capita of US$ 40 with the out-of-pocket expenditure of 65.2 (% of current health expenditures) and 2.8 % of total health expenditures (%GDP)[2].

The health Indicators of Pakistan indicate 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. It is 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%[3] (% of current health expenditures) of the total financing in 2015-2016, which is extremely high in global terms (where average is 18.5).

Berki (1986) was the first one 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 methord 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 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 general public. Some other studies like Flores et al. (2008) and Pal (2012) have proposed reviewed measure of calamitous OOP health expenditures.

Considering bigger portion of the population of Pakistan being poor, we need to understand the determinants of the CHE for designing better policies. The present study used Pakistan health and non-food expenditures from HIES 2015-2016 dataset, Wagstaff and Doorslaer (2003) methodology is used, and three different thresholds to estimate the incidence, intensity and determining factors of catastrophic health expenditures of Pakistan.

1.2 Objective of the Study:

In Pakistan, limited research exists on healthcare expenses, and among those, the emphasis is kept on the government's health expenditures (Siddiqui et.al., 1995; Akram and Khan, 2007). One research is presented on OOP health spending but restricted to one period of the survey (Muhammad and Syed, 2012). Moreover, we could not notice any research that has examined the catastrophic health expenses of Pakistan. This study will focus on the factors that can make families in Pakistan more in danger of catastrophic health expenditures and will fill the gap by investigating the factors of catastrophic health expenditures of Pakistan and talk over the occurrence and Intensity of these catastrophic health payments.

[2] World Health Organization Global Health Expenditure database (apps.who.int/nha/database)
[3] World development indicators, World Bank

1.3 Organization of Paper:

The paper is structured as follows: Section 1 is the introduction of the paper. Section 2 provides discussion on 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 discussion on the Occurrence 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: HEALTH EXPENDITURES OF PAKISTAN

2.1: HEALTH SPENDING OF PAKISTAN VS OTHER REGIONAL COUNTRIES

According to UNDP, Pakistan is confronting huge challenges including illiteracy, poverty, poor health facilities and a continuously rising population. Pakistan being the 6th most populous country with a growth rate of 2.05% per annum and a total population of 200.2 million[4], is at major intersection in terms of relation between health and development. Despite having a per capita income of current US$1472[5] (India:$2015, Bangladesh:$1698) in 2018, Pakistan has weak health outcome across the globe. On Human Development Index (HDI) Pakistan is positioned at 150[6] (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 is always being able to allocate less than or around 2% of GDP to health, which is very low as a required prepaid component of a health financing system and not as much as the other lower-middle income countries as well as very far away from global average of 5.3%. Comparative position of Pakistan in health expenditure and health outcomes among other regional countries is given in Table below.

Table1: 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

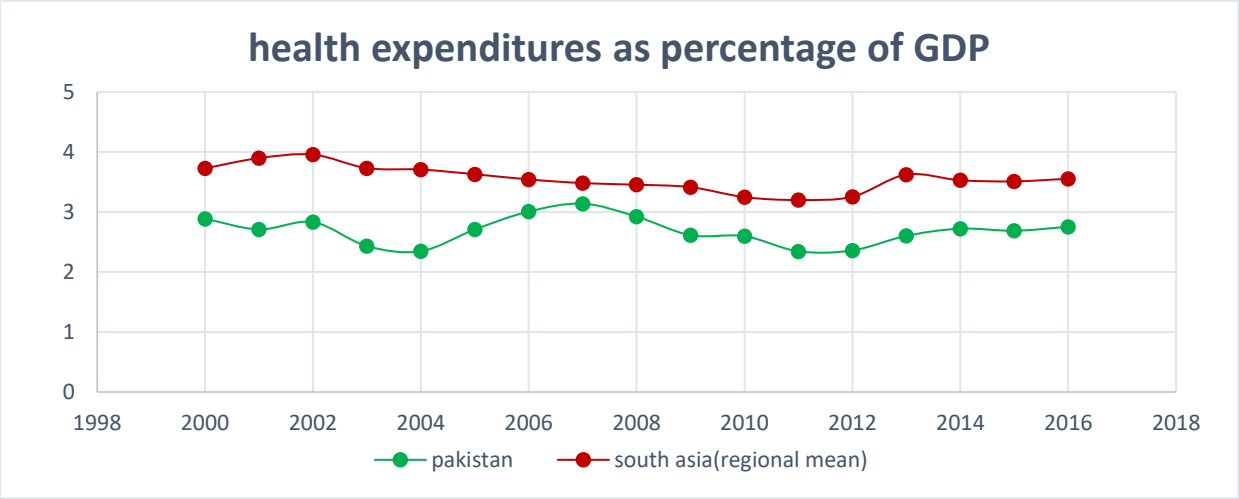
Source: World development indicators, World Bank

[4] Pakistan population statistics from World development Indicators (WDI)

[5] World Development Indicators (WDI)

[6] Human Development Indices and Indicators:2018 statistical update

Figure1: Current health expenditure (percentage of GDP) of Pakistan and mean of south Asian countries.

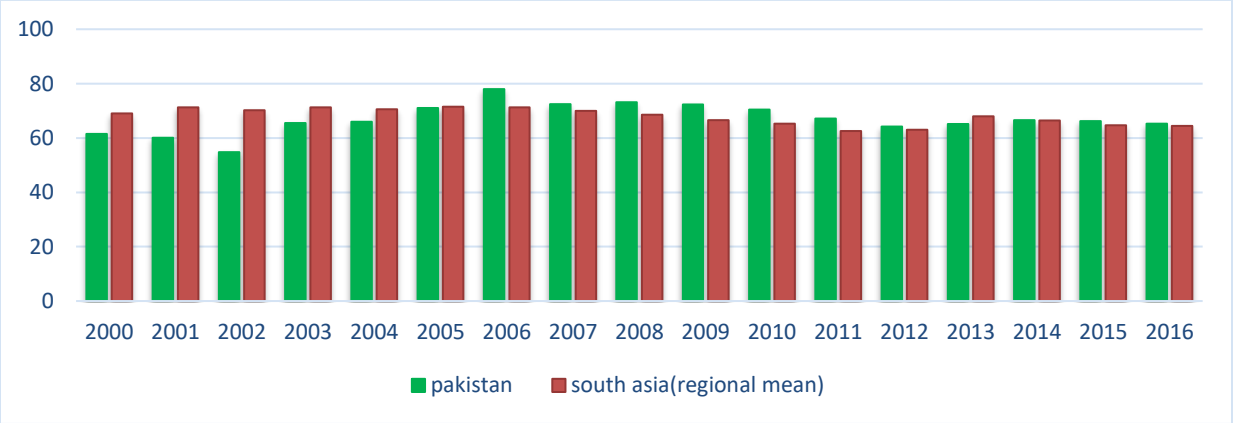


x-axis: years, y-axis: current health expenditures as % of GDP

Data Source: World development Indicators, World Bank

The share of OOP health expenditure out of the total expenditure is an important indicator in health financing research (Lavado R. et al., 2013 and Xu K. et al., 2009). In many countries, this figure is used to derive the national level estimates of health accounts (Lavado R. et al., 2013)[7]. 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 we have produced some comparative position in the region for Pakistan. Where we can see even if average allocation is similar outcomes are not. Thus, expenditure efficiency is also questionable (see for example Rizvi, 2019) for more discussion on institutional quality for health expenditures.

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

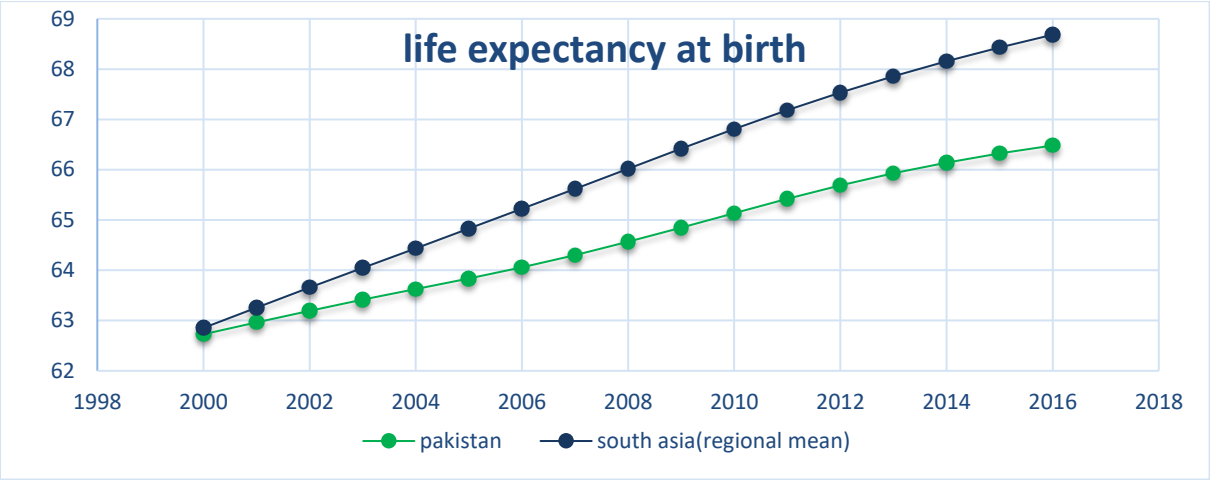


[7] General statistical procedures used to construct WHO health expenditure database," World Health Organization, Geneva, 2012 and Guide to producing national health accounts with special application to low income and middle-income Countries," World Health Organization, Geneva, 2003

x-axis: years, y-axis: OOP expenditures

Data Source: World development indicators, World Bank

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



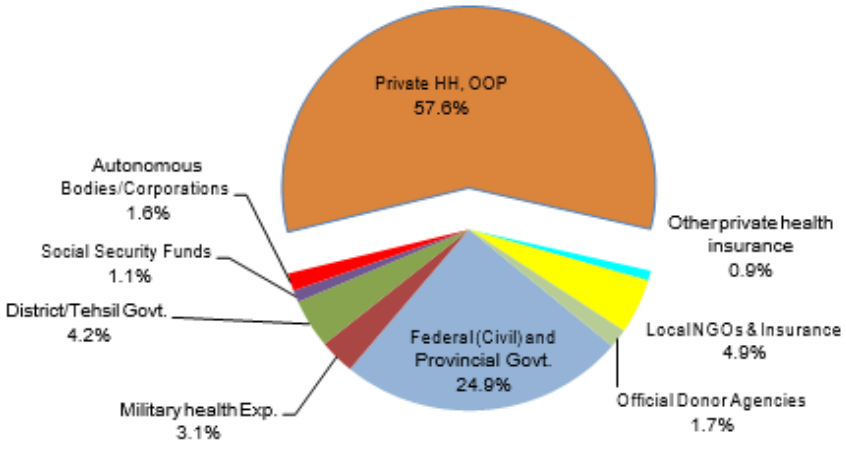
x-axis: years, y-axis: life expectancy at birth

Data Source: World development indicators, World Bank

2.2: HEALTH FINANCING SOURCES OF PAKISTAN:

According to Pakistan National Health Accounts, Pakistan's Total health expenditure in 2015-16 was Rs.908 billion (3.1% of GDP). out of total health expenditures in Pakistan, 35% are made by general 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 partners/ donors organizations have 1.7% share in total health expenditures.

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



Source: National Health Accounts Pakistan 2015-2016.

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

Funding sources have three main types, that is government financing, private financing and rest of the world financing. Out of entire health spending in Pakistan, 34% of entire health expenditure is financed by government sector. Out of 64.4% of the health expenses financed through private sector, 89% are OOP health expenses 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 terms (where 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 as a result of accessing health care become insignificant (World health Organization 2010).

3. BRIEF REVIEW OF LITERATURE

There are a number of studies available internationally on the determinants of CHE and OOP. We here 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 leads to financial hardship. For this reason, 116 countries survey data have been used which covered 89 countries by analyzing Gini coefficient, population characteristics under age five year 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, less affected than middle income countries, and problem get adverse in low-income countries. The ratio of population below the age five years remained insignificant to cause financial catastrophe in all income group which may result of provision of free of cost immunization to the children. On the other side in middle income countries ratio of population above age sixty years enhance the occurrence of financial catastrophe but not in low- and high-income countries. Prepayment mechanism either by health insurance in high income group or tax-based system in low and middle-income group kept protected individuals from financial catastrophe. On the other side out of pocket expenses have positive correlation with financial catastrophe in all income groups.

Some studies have used different thresholds for analyzing catastrophic health expenditures and its determinants for different countries for example, Ibukun and Komolafe (2018) studied the incidence, intensity and determinants among the Nigerian Households. The study showed the existence of high intensity and occurrence of catastrophic health expenses in Nigeria but

although it varied in accordance with thresholds used. Also, the determinants like socio-economic status, age, dwelling, employment and health status of family members are allied with the catastrophic health expenses in Nigeria. Like wise, Buigut et al. (2015) examined the same for Kenya slum communities and results indicated that considerable percentage of households in Kenya face catastrophic health expenditures. Also, a core set of variables were found to be the factors of catastrophic health expenses. 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 the 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".

Naga and Lamiraud (2008) narrated that in the UK some people with 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) in china 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, 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, Roslani, Su (2019), conducted systematic research to find out the determinants of CHE in less to high-income countries. The study showed Household Financial condition, the prevalence of hospitalization, the family having old age, 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 healthcare financing policies should be revised to support the people who have to 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 expenditures is considered as catastrophic if it reduces the non-health expenditure to a level where 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 multi country analysis, like Xu et al. (2003) did cross country enquiry for 59 states and defined expenditure to be catastrophic if health spending exceed 40% of income. Catastrophic spending rates varied widely among countries, but households can be safe by catastrophic health expenses by improvement in financial risk protection and less depending on out-of-pocket spending. Also, Mohanty et al. (2017) Used 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 increase in public health spending and introducing health insurances can reduce the catastrophic health spending. While, Wagstaff et al. (2018) have used 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, Sex of household head and employment are significant determinants among households. Similarly, Attia- Konan et al. (2020) worked on 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 findings were almost the same. Older people, chronic illness and geographical location were found significant.

All the studies mentioned above, along with Saksena et al. (2010) and Lara and Gómez (2011) discovered 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, household with more elderly people, type of health care facility, in-patient events etc. Similarly, Li et al. (2012) inquired 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 number of illness spells, hospitalizations, household member with chronic illness and type of medical care were important factors that are responsible for catastrophic health expenditures.

Research Gap:
Several studies including mentioned above in both developing and developing countries have investigated the determinants of catastrophic health expenditures and listed a number of variables such as; type of employment for household head, socio demographic conditions, health insurance purchase, elderly dependence, health care facility availability, rural/urban, number of illness spells, hospitalizations, 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 in order 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

4.1: Model

Following the methodology proposed by Wagstaff and Doorslaer (2003), Aregbeshola and Khan (2018), Ibukun and Komolafe (2018), Attia-Konan et al. (2020) and others, present study estimated determinants of Catastrophic health expenditures by Out-of-Pocket approach and using Probit and Quantile Regressions. According to this OOP approach, Catastrophic health expenditure is the medical expenditure or out-of-pocket spending that surpasses a defined threshold of a family's overall consumption or non-food consumption spending yearly. Since there is no universally agreed thresholds defined in the literature, this study used thresholds of 10%,25% and 40% to capture the best possible sensitivity. As a matter of fact, income is often misreported especially in developing countries household surveys; therefore in this study Total non-food expenditure is taken as a proxy of household's relative income. Which is in fact a better measure of household's health care affordability (WHO World Health Report,2000).

In 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 threshold value, then it means HH has faced catastrophic health expenditures.

Household Doing CHE= If (health expenditures/non-food expenditures) * 100 if > 10% / 25% / 40%

Probit Model:

Once the household is identified to incur CHE on the basis of threshold analysis then Probit Model was used to analyze the relationship between the CHE and independent (determinants) variables to identify significant reasons which push individuals towards poverty due to CHE.

The standard Probit Model is defined as:

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

In the above equation P is the dependent variable i.e occurrence of CHE defined as 1 when HH have catastrophic health spending and 0 otherwise. X_1, X_2, X_3, X_n are explanatory (determinats) 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 Martial status, HHH employment and HHH education.

Quantile regression

Most of regression models are concerned with examining the conditional mean of a dependent variable. Methods of modeling other characteristics of conditional distribution are growing in interest. An increasingly common approach, quantile regression, is modeling the quantiles of the dependent variable given a set of conditioning variables. Koenker and Bassett (1978) first recommended the 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 regressor variables influence the median, or even the

10th or 95th percentile of the response variable. The quantile model is expressed by the following equation.

$$Y_i = X_i \ \alpha_q + \ e_i$$

In this regression the dependent variable is log of health expenditures, while same independent variables were used. Here Y_i are the health expenditures of households who on the basis of health expenditures being higher than 10% of non-food expenditures are identified as CHE prone households. α_q is the coefficient of unknown variables linked with qth quantile. This study used 25^{th}, 50^{th}, and 75^{th} quantile to capture the effect of the independent variables on the dependent variable.

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 funding and determinants of health seeking behavior literature (Muhammad and Syed, 2012, and Marmot et al., 2008). Also, Michael Grossman also has some significant work on health 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[8] for 24,238 households. It contains household's 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 martial status, HHH employment status, HHH education
- **Dependent Variable:**
  Dummy for Catastrophic health Expenditures in Probit Regression and log of Health Expenditures in Quantile Regression

5.2 Descriptive statistics

Table 5 shows the population statistics of households surveyed in the research. The classification of households based on age in the sample population is between 11 – 33 years is 17.73%, between 34-65 (74.80%) and greater than 66 (7.47%). According to provincial population sample, 43.35% people are from the Punjab, 21.49%from the KPK, 25.48 % from the Sindh, and 9.67 % from the Balochistan. The majority of individuals 66.65% reside in urban region whereas 33.35% 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 household is married, 2.56% are unmarried, 6.97% are widows and 0.33% are divorced. Around 83.25% are Heads of household 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 share

[8] Latest consumption data available for Pakistan.

cropper, 1.23% are contract cultivator and 1.47% have livestock. About more than two third 67.33% of Heads of Household have education and 32.67% among them have no education.

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

5.3. Incidence and Intensity of Catastrophic Health Expenditures

Table 6 shows analysis of incidence and intensity of CHE. As mentioned before we have used ratio of health expenditure to non-food expenditures to estimate the occurrence of catastrophic health expenditures at 10%,25% and 40%. The results indicate that 21.21%, 22.14%, and 17.48% people belong to age group 11-33 years 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 greater than 66 years suffered from CHE at 10%, 25%, and 40% threshold correspondingly.

According to the region wise analysis; the incidence of CHE decrease in Punjab, Sindh, KPK and Balochistan at 10%, 25%, and 40% threshold correspondingly. However, the incidence of CHE is highest in KPk and lowest in Balochistan irrespective of these three thresholds. 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. The incidence of CHE in male-headed households is high as compared to the female-headed household at these thresholds. The incidence of CHE is highest in married headed of households 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 10 or more persons is 0.49%, 0.35%, and 0.00% at the threshold level 10%, 25%, and 40% respectively.

6: ESTIMATION RESULTS

Results of Probit Regression

Table 3 shows that 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. Whereas people above 66 years are 11% more likely to have CHE as compared to people having age 34-65 years at 10% threshold level. 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 25% threshold level. Whereas people above than 66 years are 4% more likely to have CHE as compared to people having age 34-65 years at 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 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 40% threshold level.

According to the region wise analysis, KPK is 10% more likely to have CHE as compared to Punjab at 10% threshold level. Sindh is 7% more likely to have CHE as compared to Punjab at 10% threshold level. On the other hand, Balochistan is not likely to CHE as compared to Punjab at 10% threshold level. At 25% threshold level KPK 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 25% threshold level. KPK is 1%, Sindh is 1% and Balochistan is 2% less likely to have CHE as compared to Punjab at 40% threshold level.

People living in a rural area are 18%,3% and 0% more likely to have CHE as compared to the urban area at threshold level 10%,25%, and 40% respectively. Female-headed households are no likely to have CHE as compared to male HHH at threshold level 10%,25% and 40% respectively. Unmarried and widows/widower are not likely to have CHE as compared to married at 10%,25%, and 40% threshold levels. Divorced individuals are 22% more likely to have to CHE as compared to married individuals at the threshold level of 10%. On the other hand, Divorced individuals are not likely to have CHE as compare to married at 25% and 40% threshold level. Unemployed headed households are not likely to have CHE as compared to Employed headed households at these three threshold levels.

In the Household head Employment category, employing less than 10 persons, are 7% less likely to have CHE as compared to a paid employee at 10% threshold level. In contrast, Household head Employer, employing less than 10 persons are not likely to have CHE as compared to paid employees at 25% and 40% threshold level. 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 level. 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 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 level. 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 level. On the other hand, sharecropper is not likely to have CHE as compared to paid employees at 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 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. 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.

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

Results of Quantile Regression

Table 4 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 sample identified as committing CHE under the

assumption of Health Expenditures being more than 10% of non-food 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 for 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.

The log of health expenditure decreases if a person belongs to KPK as compared to Punjab with a magnitude of coefficient 0.014, 0.102 and 0.161 for 25^{th}, 50^{th} and 75^{th} quantile respectively. 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 25^{th}, 50^{th} and 75^{th} quantile. The log of health expenditure decreases as a person belongs to Balochistan as compared to Punjab with a magnitude of coefficient 0.024, 0.036 and 0.171 respectively for 25^{th}, 50^{th} and 75^{th} quantile. The log of health expenditure decreases in case a person lives in the rural area as compared to an urban area with a magnitude of around 0.3 for all quantiles.

In case of household head gender difference there is no statistically significant difference in the health expenditures across all quintiles. However, in 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 25^{th} quintile and 0.098 for 50^{th}. Whereas in case of 75^{th} quintile the unmarried household head the household have insignificant difference with those households whose household heads are married. In 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 25^{th} quintile and 0.172 for 50^{th}. Whereas in case of 75^{th} quintile the widow/widower household head the household have insignificant difference with those households whose household heads are married. In case of household head being divorced difference is insignificant for all quantiles. The log of health expenditure does not show any significant difference with household head being unemployed as compared to employed HHH for all quantiles.

In the case of Household head employment status 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 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 25^{th}, 50^{th} and 75^{th} quintile respectively.

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 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 quintile 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, KPK 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 Balochistan, 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 33, individuals above 66 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 KPk have significant and more chances to get suffered at only a 10% threshold level. On the other hand, people living in Balochistan, 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, KPk 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 10% threshold level and fewer chances to have CHE at 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 case of younger age group of 11-33 the household health expenditures reduces whereas for higher age group it does not change significantly. This means the CHE does not significantly reduce after the mid-thirties.

Health expenditures decreases if for households belonging to KPK, Balochistan 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 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 household head being divorced difference is insignificant for all quintiles.

Similarly, there is no significant difference with 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 case of a household head being uneducated vs. 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:

1. Most importantly, the government's current spending on health is not sufficient. A sharp and immediate increase on health expenditures is recommended to achieve cost-effectiveness, efficiency and equity in the health care system.

2. Measurement of CHE is an important parameter to achieve CHE. Hence, it is essential to define a single method of defining CHE. To validate the two methods (capacity to pay and OOP health expenditure method), future studies should use both methods for identification of households with CHE. Similarly, there is need to identify universally agreed threshold to measure the intensity and incidence of households with CHE.

3.Government should protect 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.

4.CHE is an emerging debate in Pakistan and the fact is that it can be overcome by providing health care protection. So apart from health care financing policies, there should be legislations for health insurance in Pakistan. It will also pave the way to universal health coverage.

5. The poor and even middle-income group lack access to satisfactory health care services. It is therefore necessary to monitor the performance of public as well as private health care services.

6. policy makers and public researchers should upgrade household's survey instruments to better capture the household health spending e.g some health insurance related variables etc.

7.Catastrophic health expenditures calls for an affordable health insurance mechanism or some small-scale health insurance programs to protect people against health expenditure catastrophe.

7.3: Limitation of the study:

There are few limitations of the study. First, The HIES data set used in thus study only reports the direct health care cost of the Households. It doesn't capture the payments paid by 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 majority of previous studies were not available in the HIES dataset. Thirdly, some studies used household capacity to pay method for the identification of CHE but 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, current study used only non-food expenditure approach. Because the incidence of households with CHE was higher in non-food expenditure approach than the total expenditure approach.

REFERENCES

Abul Naga, R. H., & Lamiraud, K. (2008). Catastrophic health expenditure and household well-being. *LSE STICERD Research Paper No. DARP098*.

Adisa, O. (2015). Investigating determinants of catastrophic health spending among poorly insured elderly households in urban Nigeria. *International journal for equity in health, 14*(1), 79.

Ahmed, S., Ahmed, M. W., Hasan, M., Mehdi, G. G., Islam, Z., Rehnberg, C., ... & Khan, J. (2021). Assessing the incidence of catastrophic health expenditure and impoverishment from out-of-pocket payments and their determinants in Bangladesh: evidence from the

nationwide Household Income and Expenditure Survey 2016. *International Health*, (ihab015).

Akram, M., & Khan, F. J. (2007). *Health care services and government spending in Pakistan* (No. 22184). East Asian Bureau of Economic Research.

Aregbeshola, B. S., & Khan, S. M. (2018). Determinants of catastrophic health expenditure in Nigeria. *The European Journal of Health Economics*, *19*(4), 521-532.

Attia-Konan, A. R., Oga, A. S. S., Koffi, K., Kouame, J., Toure, A., & Kouadio, L. (2020). Assessing Factors Associated with Catastrophic Healthcare Expenditure in Côte d'Ivoire: Evidence from the Household Living Standard Survey 2015. *Health Econ*, *6*(3), 006-010.

Azzani, M., Roslani, A. C., & Su, T. T. (2019). Determinants of household catastrophic health expenditure: a systematic review. *The Malaysian journal of medical sciences: MJMS*, *26*(1), 15.

Bassett Jr, G., & Koenker, R. (1978). Asymptotic theory of least absolute error regression. *Journal of the American Statistical Association*, *73*(363), 618-622.

Berki, S. E. (1986). A look at catastrophic medical expenses and the poor. *Health affairs*, *5*(4), 138-145.

Buigut, S., Ettarh, R., & Amendah, D. D. (2015). Catastrophic health expenditure and its determinants in Kenya slum communities. *International journal for equity in health*, *14*(1), 46.

Chuma, J., & Maina, T. (2012). Catastrophic health care spending and impoverishment in Kenya. *BMC health services research*, *12*(1), 413.

Cleopatra, I. & Eunice, K. (2018). Household Catastrophic Health Expenditures: Evidence from Nigeria. *Microeconomics and macroeconomics, 6(1): 1-8.*

Flores, G., Krishnakumar, J., O'Donnell, O., & Van Doorslaer, E. (2008). Coping with health-care costs: implications for the measurement of catastrophic expenditures and poverty. *Health economics*, *17*(12), 1393-1412.

Global Health Observatory GHO data. Retrieved from https://www.who.int/gho/health_financing/en/

Gotsadze, G., Zoidze, A., & Rukhadze, N. (2009). Household catastrophic health expenditure: evidence from Georgia and its policy implications. *BMC health services research*, *9*(1), 69.

Grossman, M. (1972). On the concept of health capital and the demand for health. *Journal of Political economy*, *80*(2), 223-255.

Health Expenditure. Special Theme-Commission on Macroeconomics and Health, Bulletin of the World Health Organization, 2(80), 134-142.

Household Expenditure Data. Results of the World Health Survey. *Health*

Human Development Indices and Indicators:2018 statistical update

Ibukun, C., & Komolafe, E. (2018). Household catastrophic health expenditure: evidence from Nigeria. *Microeconomics and Macroeconomics*, *6*(1), 1-8.

Khalid, M., & Sattar, A. (2016). Households Study on Out-of-Pocket Health Expenditures in Pakistan. *Forman Journal of Economic Studies*, *12*, 75-88.

Kim, Y., & Yang, B. (2011). Relationship between catastrophic health expenditures and household incomes and expenditure patterns in South Korea. *Health policy*, *100*(2-3), 239-246

Lara, J. L. A., & Gómez, F. R. (2011). Determining factors of catastrophic health spending in Bogota, Colombia. *International journal of health care finance and economics*, *11*(2), 83-100.

Lavado R., Benjamin, P., & Hanlon, M. (2013). Estimation of Health Expenditure Shares from Household Surveys. *Bull World Health Organ, No* 91, 519-524.

Li, Y., Wu, Q., Xu, L., Legge, D., Hao, Y., Gao, L., ... & Wan, G. (2012). Factors affecting catastrophic health expenditure and impoverishment from medical expenses in China: policy implications of universal health insurance. *Bulletin of the World Health Organization*, *90*, 664-671.

Malik, A. M., & Syed, S. I. A. (2012). Socio-economic determinants of household out-of-pocket payments on healthcare in Pakistan. *International journal for equity in health*, *11*(1), 51.

Marmot, M., Friel, S., Bell, R., Houweling, T. A., Taylor, S., & Commission on Social Determinants of Health. (2008). Closing the gap in a generation: health equity through action on the social determinants of health. *The lancet*, *372*(9650), 1661-1669.

Mohanty, S. K., Agrawal, N. K., Mahapatra, B., Choudhury, D., Tuladhar, S., & Holmgren, E. V. (2017). Multidimensional poverty and catastrophic health spending in the mountainous regions of Myanmar, Nepal and India. *International journal for equity in health*, *16*(1), 21.

Mondal, S., Kanjilal, B., Peters, D. H., & Lucas, H. (2010). Catastrophic out-of-pocket payment for health care and its impact on households: Experience from West Bengal, India. *Future Health Systems, Innovations for equity*.

Musgrove, P., Zeramdini, R. & Carrin, G. (2002). Basic Patterns in National health accounts, Pakistan 2015-2016. *No* 91, 519-524.

O'Donnell, O., van Doorslaer, E., Rannan-Eliya, R. P., Somanathan, A., Garg, C. C., Hanvoravongchai, P., ... & Vasavid, C. (2005). Explaining the incidence of catastrophic expenditures on health care: Comparative evidence from Asia. *EQUITAP (5)*.

Pakistan economic survey 2018-2019

Pal, R. (2012). Measuring incidence of catastrophic out-of-pocket health expenditure: with application to India. *International journal of health care finance and economics*, *12*(1), 63-85.

Policy, No. 91, 297-305.

Rizvi, S. A. F. (2019). Health expenditures, institutional quality and economic growth. Empirical Economic Review, 2(1), 63-82.

Rodriguez, R. N., & Yao, Y. (2017, April). Five things you should know about quantile regression. In *Proceedings of the SAS global forum 2017 conference, Orlando* (pp. 2-5).

Russell, S. (1996). Ability to pay for health care: concepts and evidence. *Health policy and planning*, *11*(3), 219-237.

Saksena, P., Xu, K., & Durairaj, V. (2010). The drivers of catastrophic expenditure: outpatient services, hospitalization or medicines. *World health report*, *1*, 21.

Shikuro, D., Yitayal, M., Kebede, A., & Debie, A. (2020). Catastrophic Out-of-Pocket Health Expenditure Among Rural Households in the Semi-Pastoral Community, Western Ethiopia: A Community-Based Cross-Sectional Study. *Clinicoeconomics and Outcomes Research: CEOR*, *12*, 761.

Siddiqui, R., Afridi, U., Haq, R., & Tirmazi, S. H. (1995). Determinants of Expenditure on Health in Pakistan [with Comments]. *The Pakistan development review*, *34*(4), 959-970.

Su, T. T., Kouyaté, B., & Flessa, S. (2006). Catastrophic household expenditure for health care in a low-income society: a study from Nouna District, Burkina Faso. *Bulletin of the World Health Organization*, *84*, 21-27.

Wagstaff, A., & Doorslaer, E. V. (2003). Catastrophe and impoverishment in paying for health care: with applications to Vietnam 1993–1998. *Health economics*, *12*(11), 921-933.

Wagstaff, A., & Lindelow, M. (2008). Can insurance increase financial risk?: The curious case of health insurance in China. *Journal of health economics*, *27*(4), 990-1005.

Wagstaff, A., Flores, G., Hsu, J., Smitz, M. F., Chepynoga, K., Buisman, L. R., ... & Eozenou, P. (2018). Progress on catastrophic health spending in 133 countries: a retrospective observational study. *The Lancet Global Health*, *6*(2), e169-e179.

World development Indicators (WDI), World Bank data base

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

World Health Organization. (2000). The World health report: 2000: Health systems: improving performance. World Health Organization.

Xu, K., Evans, D. B., Carrin, G., Aguilar-Rivera, A. M., Musgrove, P., & Evans, T. (2007). Protecting households from catastrophic health spending. *Health affairs*, *26*(4), 972-983.

Xu, K., Evans, D. B., Kawabata, K., Zeramdini, R., Klavus, J., & Murray, C. J. (2003). Household catastrophic health expenditure: a multicountry analysis. *The lancet*, *362*(9378), 111-117.

Xu, K., Ravndal, F., Evans, D. & Carrin, G. (2009). Assessing the Reliability of

Yazdi-Feyzabadi, V., Bahrampour, M., Rashidian, A., Haghdoost, A. A., Javar, M. A., & Mehrolhassani, M. H. (2018). Prevalence and intensity of catastrophic health care expenditures in Iran from 2008 to 2015: a study on Iranian household income and expenditure survey. *International journal for equity in health*, *17*(1), 44.

Annexure

Table 3: Determinants of Catastrophic health expenditure using Probit Regression.

Variables **Dep. Var: Dummy**	**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			
Kp	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)
Balochistan	-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)
Share cropper	-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)
Live stock	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 > Chi2	0.0000	0.0000	0.0000
Pseudo R2	0.0594	0.0288	0.0249

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

Table 4: 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			
Kp	-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)
Balochistan	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)
Share cropper	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)
Live stock	-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 R2	0.1031	0.1248	0.1327

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

Table 5: 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
Kp	21.49
Sindh	25.48
Balochistan	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 member	0.24
Own cultivator	7.66
Share cropper	3.20
Contract cultivator	1.23
Live stock	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

Table 6: 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
	Kp	41.23	9.42	4.11
	Sindh	38.47	6.57	1.92
	Balochistan	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
	Share cropper	4.53	3.40	1.65
	Contract cultivator	1.67	2.06	2.47
	Live stock	1.97	3.05	4.12
Total		34.59	8.03	2.95

Percentage of Households with catastrophic health spending to household characteristics