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Disease-specific Impoverishment Impact of Out-of-Pocket Payments for Health Care: Evidence from Rural Bangladesh

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Abstract

This paper examines disease-specific impoverishment impact of out-of-pocket (OOP) payments using a dataset of 3,941 households obtained from a survey conducted in 120 villages of seven districts in Bangladesh. We have estimated the poverty impact of OOP payments by comparing the difference between the average level of headcount poverty and poverty gap with and without health care payments. We find that OOP payments annually push 3.4 percent households into poverty in rural Bangladesh. The corresponding figures for those who had NCDs (non-communicable diseases), chronic illness, hospitalization and catastrophic illness respectively were 4.61, 4.65, 14.53 and 17.33 percent. Note that NCDs are the major part of the latter two situations (about 88% and 85% respectively). Looking into individual categories of NCDs we find that headcount impoverishment impact was immense for cholecystectomy, mental disorder, kidney disease, cancer and appendectomy. The impact on the intensity of impoverishment is the largest among the hospitalized patients and more individually among cancer patients. Hence, *NCDs particularly chronic NCDs and those requiring immediate surgical procedures should be given more priority for policy framing*. In addition to adopting some ex-ante measures (e.g. raising awareness regarding the risk factors causing NCDs), the paper argues for reforms to enhance efficiency in the public health care facilities and increasing quality of public health care.

Keywords: Disease-specific, Impoverishment Impact, Out-of-Pocket Payments, Health Care, Bangladesh

Disease-specific Impoverishment Impact of Out-of-Pocket Payments for Health Care: Evidence from Rural Bangladesh*

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1. Introduction

The poor in low income countries mainly finance health care from out-of-pocket (OOP) payments that severely affect their consumption during periods of major illness or forces them to forego treatment, which raises the chance of long-term deterioration of health and earning capacity (Kochar, 1995; Gertler and Gruber, 2002). Costs of health care is therefore claimed to be a major cause of poverty in low-income countries (Whitehead *et al*., 2001). This is also a cause of aggravating poverty (Wagstaff and van Doorslaer, 2003; Garg and Karan, 2005; van Doorslaer *et al*., 2006).[1] Hence, it seems that OOP payment is a major threat to the success of national poverty reduction initiatives of developing nations. However OOP outlays would plausibly vary across illness categories (e.g., between non-communicable diseases, NCDs, and communicable diseases, CDs), and accordingly one would expect the impoverishment impact of OOP payments to also depend on the type of illness.

A growing body of literature in the developmental context have documented the general impoverishment impact of OOP payments (van Doorslaer *et al*., 2006; Limwattananon *et al*., 2007; Garg and Karan, 2009; Somkotra and Lagrada, 2008; Flores *et al*., 2008; Sun, *et al*., 2010; Yardim *et al*., 2010; Shi *et al*., 2011). Although disease-specific impoverishment impact of OOP payments is crucial for priority setting in any informed policy discussion, there is hardly any evidence, particularly in the developmental context. Van Doorslaer *et al*., (2006), who analyzed the data of 11 Asian countries including Bangladesh, just measured the headcount impact of OOP outlays on poverty, not disease specific poverty using the Household Income and Expenditure Survey (HIES) data of Bangladesh Bureau of Statistics (BBS). Indeed, the lack of evidence in this arena, particularly in Bangladesh context, motivates the present paper.

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[1] Of course the choice of a coping strategy also has implications on the poverty outcome (Flores *et al*., 2008).

We examine disease-specific impoverishment impact of OOP payments giving a particular focus on NCDs and chronic illnesses using data of 3,941 households obtained from a survey conducted in 120 villages of seven districts in Bangladesh. We have estimated head count poverty and depth of poverty using the 'costs of basic need' (CBN) approach. Like earlier studies (van Doorslaer *et al*., 2006; Garg and Karan, 2009; Wagstaff and van Doorslaer, 2003), we have estimated the poverty impact of OOP payments by disease type by comparing the difference between the average level of head count poverty and poverty gap before and after health care payments. The results show that spending for health care annually pushes 3.4 percent households into poverty in rural Bangladesh while the corresponding figures for those who had NCDs, chronic illness, hospitalization and catastrophic illness respectively were 4.61, 4.65, 14.53 and 17.33 percent. Looking into individual categories of NCDs we find that the headcount impoverishment impact of OOP payments is immense for cholecystectomy (22.22%), mental disorder (18.75%), kidney disease (15.22%), cancer (12.5%) appendectomy (12.5%), and hysterectomy (9.84%). The impact on the intensity of poverty is the largest among the hospitalized patients. Individually this is the highest among the cancer patients.

The organization of the paper is as follows. Section 2 explains the methodology of the study including data collection and the analytical methods; Section 3 presents the findings; Section 4 provides a discussion and offers some conclusions.

2. Methodology

2.1 Data

This paper uses the data on OOP payments for health care obtained from the baseline survey of a longitudinal research project conducted in 2009, which successfully collected data from 3,941 (out of a target of 4,010) rural households (accounting for 19,424 individuals) from 120 villages spread over seven out of 14 districts in rural Bangladesh where Grameen Kalyan (GK), a social business company affiliated with the Grameen Bank (GB), had been operating a prepaid card-based micro health insurance (MHI) scheme. The survey used a program-control design such that ten health care delivery centers were selected purposively taking into consideration a suitable mix of old and new centers and the geographic variation among these locations. One comparable 'union' the smallest civil administrative unit in Bangladesh, adjacent to each GK program center was then selected purposively to serve as the 'control' area in question. The control areas lay wholly outside the radius of GK operational boundary but shared similar characteristics in all other aspects. A sample of 7 villages was randomly selected from each of the 10 program strata and 5 villages from each of the 10 control strata from a listing of all the villages in both these strata. Thus the survey covered 120 (70 program and 50 control) villages. In the next stage, a census was conducted in all the listed villages and about 30,000 households were thus listed. In the program villages, the listed households were divided into two groups: GK MHI card holders (CH) and non-card holders (NCH). In each program stratum 150 households were randomly selected from the NCH and 105 from the CH group except one area where only 65 CHs were available. A total of 2,510 households (1,010 CHs and 1,500

NCHs) were selected from the program areas. In each control stratum 150 households were randomly selected from the listed households yielding a total of 1,500 households for all control areas. Thus, the total target sample stood at 4,010 households (2,510 and 1,500 from program and control areas respectively).

A series of questions regarding OOP payments were posed to the respondents for each episode of illness within the household over the 12 months preceding the survey. In addition, we collected information about morbidity, health care seeking pattern, demographic condition, occupation, education, income, expenditure, assets, borrowing, etc. from the household. Household heads were the main respondents.

It is important to settle the issue of the 'recall period' over which health expenditure data is to be collected. A detailed review of the literature suggests that various authors use anywhere from 15 days to 12 months for the purpose. The recall periods for healthcare utilization must be fixed to satisfy the dual objectives: minimizing the recall bias and maximizing the sample of target subjects (O'Donnell *et al*., 2008). Some appear to argue that subjects under-report expenditure if the recall period is long, especially for outpatient services (Clark *et al*., 1996; Neter and Waksberg, 1964), while most authors prefer the 12-month recall for collecting information on inpatient procedures (e.g., Flores *et al*., 2008; Wagstaff and van Doorslaer, 2003). It is also relevant to keep in mind that unless the sample size is very large, the latter type of events would not be fully represented in the short-duration data. In the literature on impoverishment impact of OOP payments, some used 12 months recall period for both inpatient and outpatient cases (Limwattananon *et al*., 2007) while some preferred 1 month recall for outpatient and 12 months for hospitalization cases (Somkotra and Lagrada, 2008; Shi *et al*., 2011). In a study of 11 Asian countries van Doorslaer *et al*. (2006) used different recall periods (varying from 1 month to 12 months) for different countries; for Bangladesh they used 1 month for both cases. Similarly, Yardim *et al*. (2010) used 1 month for both inpatient and outpatient care. However, the present survey has collected information both over 90 days as well as 12 months, the analysis to be presented below is based on 12-month data to get the adequate observed users.

2.2 Measurement of Out-of-Pocket Payments

In measuring out-of-pocket payments we have mainly considered the payments for direct medical inputs used by the sick. More precisely, out-of-pocket payments was constructed by adding the expenses that a household incurred for consultations, drugs, diagnostic tests, surgical operations, and bed charge for each episode of illness for the 12 months preceding the survey. This type of out-of-pocket payments may be termed as direct out-of-pocket payments. Total out-of-pocket payments may be constructed by adding the payments for transportation and other (food, lodging, accommodation and unofficial fees) with direct out-of-pocket payments. Out-of-pocket payments for CDs, NCDs, chronic illnesses, acute illnesses, hospitalization and catastrophic illnesses were constructed by adding the relevant expenses incurred for each episode of illness in each category.[2]

[2] We used both WHO fact sheets and CMS (Council for Medical Schemes) guidelines to define chronic diseases.

Financial catastrophe arises when payments for health care assumes a significant fraction of the household's financial resources. This burden may force the household to sacrifice both present and future consumption of non-health goods and services, and thus pose a threat to the living standard, particularly nutritional status both in the short and the long run. Ideally longitudinal data is required to estimate the extent of serious disruption in wellbeing caused due to unpredictable OOP payments. However, in the absence of such data, alternative threshold levels have been proposed in the literature. As per WHO, financial catastrophe arises while OOP payments exceed or equal 40 percent of the 'capacity to pay (Xu, 2005). A number of studies have used non-food expenditure as the capacity to pay and commonly considered the 40 percent threshold level (Xu *et al*., 2003; Su *et al*., 2006; Sun *et al*., 2009; Karami *et al*., 2009; Yardim *et al*., 2010).

However, yet other studies have used total household expenditure as the capacity to pay and commonly considered 10 percent as the threshold level (Pradhan and Prescott, 2002; Ranson, 2002; Wagstaff and Van Doorslaer, 2003; O'Donnell *et al*., 2005; Ekman, 2007; Flores *et al*., 2008; Vaishnavi and Dash,2009, van Doorslaer *et al*., 2006).[3] In this study we follow the latter stance and use 10 percent of total expenditure as the relevant threshold level.

2.3 Measurement of Impoverishment Impact of Out-of-Pocket Payments for Health Care

We have estimated the impoverishment impact of OOP payments for each category of illness by comparing the difference between the average level of head count poverty *(H)* or poverty gap (*G*, which is intensity of poverty or poverty deepening) with and without health care payments following earlier studies (van Doorslaer *et al*., 2006; Garg and Karan, 2009; Wagstaff and van Doorslaer, 2003).[4] Pre-payment headcount poverty (H^{pre}) was calculated by comparing per capita household expenditure *(including OOP payments for health care)* with a poverty line estimated by the authors.[5] Similarly, the post-payment headcount poverty (H^{post}) was measured by comparing per capita household expenditure (excluding direct OOP payments for health care) with the poverty line.[6]

[3] van Doorslaer *et al*. (2007) and Wagstaff and van Doorslaer (2003) considered both total household expenditure (income) and non-food expenditure as the capacity to pay while they commonly used 10% threshold for the former and 40% for the latter.

[4] Headcount poverty measures the percentage of individuals or households living below the poverty line, while poverty gap measures poverty deepening or intensity of poverty (the amount by which the poor households fall short of the poverty line).

[5] We used both food and non-food expenditure as a proxy for household income. For measuring food expenditure we considered expenditure on the food bundle consumed by the household for the week preceding the survey. We considered expenditure for non-food consumption against the following items: clothing, toiletries, cookware, blankets, furniture, lamp, torch light, candle, match, kerosene, electricity, transportation, fuel, maintenance and repair of household effects, taxes, donation and tolls, recreation, tobacco, tuition fees, stationeries, mobile and land telephone bills, festivals and traditional ceremonies, electronic equipments and health expenses (both direct and indirect). Note that we included health expenses (both direct and indirect) for pre-payment poverty measurement and excluded direct health expenses for the post-payment measurement.

[6] The pre-payment health care financing (insurance) mechanism usually does not cover expenses like transportation cost, and cost for food, lodging, accommodation and unofficial fees. In order to link policy discussion with the insurance mechanism we did not include such expenses. Thus we have meant 'direct out-of-pocket payments' as OOP payments in the remaining part of the paper.

Assume z_i to be per day per capita expenditure (including OOP payments for health care), y_i is per day per capita OOP payments, P_L is the poverty line and n is the number of individuals. Pre-payment and post-payment headcount poverty measures can be expressed respectively as

$$H^{pre} = 1/n \sum_{i=1}^{n} \alpha_i, \text{ such that } \alpha_i = 0, if\ z_i \geq P_L \ \& \alpha_i = 1, if\ z_i < P_L \quad (1)$$

$$H^{post} = 1/n \sum_{i=1}^{n} \beta_i, \text{ such that } \beta_i = 0\, if\ (z_i - y_i) \geq P_L \ \& \ \beta_i = 1 \text{ otherwise} \quad (2)$$

Similarly, the pre-payment and post-payment poverty gap can be defined respectively as

$$G^{pre} = 1/n \sum_{i=1}^{n} \gamma_i (P_L - z_i); \quad (3)$$

$$G^{post} = 1/n \sum_{i=1}^{n} \gamma_i \{P_L - (z_i - y_i)\}, \quad (4)$$

where, $\gamma_i = 1$ (i.e., the household is poor) if $z_i < P_L$ and $\gamma_i = 0$ (i.e., the household is non-poor) if $z_i \geq P_L$.

The headcount poverty is higher in equation (2) compared to equation (1) if OOP payments is positive. Similarly the poverty gap is higher in equation (4) compared to equation (3). Thus, the difference between equation (2) and equation (1) depicts headcount impoverishment impact of OOP payments. Similarly, the difference between equation (4) and equation (3) illustrates the intensity of poverty on account of OOP payments. More precisely, headcount and poverty gap impoverishment impact of OOP payments can be expressed respectively as ($H^{post} - H^{pre}$) and ($G^{post} - G^{pre}$). It is often helpful to use normalized poverty gap (the size of poverty gap in relation to poverty line, ($G^{post} - G^{pre}$) / P_L, for a comparative analysis.

2.4 Poverty Line Expenditure

We estimate upper poverty line expenditure by using the CBN approach as it is commonly used in estimating the national level poverty in Bangladesh and elsewhere. In this approach the sum of the cost of a normative bundle of food needed to meet one's minimum nutritional requirement together with the cost of non-food basic need items is termed as poverty line expenditure. Following Ravallion and Sen (1996) we calculated the cost of a normative food bundle (consisting of rice, wheat, pulses, milk, edible oil, beef, fish, potato and both leafy and non-leafy vegetables) that provides the minimal nutritional requirement of 2,122 kcal per day per capita.[7] The price of each item in the bundle was calculated from those faced by households in the reference group where the poverty line is to be expected. These prices were obtained from the household survey described above. Following the Bangladesh HIES 2005 (BBS, 2007) report,

[7] As per Ravallion and Sen (1996) the required amount of calorie intake (in kcal) from each food item respectively is 1,386, 139, 153, 39, 180, 14, 51, 26, 36, 82 and 6. The associated amount of food (in gram) respectively is 397, 40, 40, 58, 20, 12, 48, 27, 150, 20 and 20.

households belonging to the second to sixth deciles of per capita consumption expenditure were taken as the reference group in question. Thus we estimated the 'upper non-food allowance' by taking the median amount spent on non-food items by households whose per capita food expenditure is close to the food poverty line. The estimated poverty line expenditure per day per capita turned out to be BDT 61 (i.e., equivalent to 0.88 USD using 2009 exchange rates).

3. Results

3.1 Sample Characteristics

A total of 3,941 households, out of a target of 4,010, were successfully interviewed in this study. The overall response rate was 98.28 percent (98.66% in program areas and 97.60% in control areas). Household heads were the respondents in most cases (83%) and spouses in 15 percent cases (Table1). Most households (about 88%) were male-headed. Average education level of the household head was 3.2 years and the average age about 46 years. The average household size was 4.45. The mean per capita daily consumption (both food and non-food) was about BDT 66. About 30 percent of the household heads were engaged in agriculture followed by day labor (about 16%) and small business (about 14%).

3.2 Pattern of Morbidity and Care-seeking

The survey enquired whether any individual in the household suffered any acute or chronic condition during the 12 months preceding the interview. They were also asked whether they had received any treatment for their condition and the type of care they received, if any. The survey covered 19,424 individuals of which about 33 percent had experienced some form of self-reported morbidity over 12 months. About 88 percent households reported at least one episode of illness; and about 55 percent of them (or 48% of the sampled households) had more than one (about 35% had 2 episodes and about 20% had 3 or more) in one year. About one-third of the ill suffered from 'general cough and fever'. Other major symptoms were gastrointestinal disorder, abdominal pain, diarrhoea, typhoid, headache, blood pressure, skin diseases and dysentery. The incidence of communicable diseases (CDs) and non-communicable diseases (NCDs) was about equal in the sample, while about 80 percent of the patients suffered from acute conditions and the remaining 20 percent faced chronic conditions. The overwhelming majority (about 98%) of the ill sought some kind of care; though most (95%) of the care-seekers went for outpatient services (Figure F1 in the Appendix).

3.3 Out-of-Pocket Payments

In the present dataset it is seen that out-of-pocket payments and OOP costs on account of drugs for all episodes of illnesses during the 12 months preceding the survey stood at BDT 4,200 and BDT 2,512 respectively per affected household (Table 2).[8] The cost of drugs thus

[8] Out-of-pocket payments and OOP costs on account of drugs for all episodes of illnesses over 12 months, when averaged over all sampled households, decline to BDT 3,639 and BDT 2,173, respectively (not shown in the table).

appears to be the major component (about 60%) of OOP payments. In terms of annual expenses, total OOP payment is about 4 percent of the value of total household consumption (food and non-food) and about 8 percent of the value of food consumption (see Table 2).

Although the absolute values of OOP payments show a definite positive pattern as one move up the expenditure quintiles, there is no systematic variation across quintiles when considered both as a share of either total or of food expenditures. The share of drug costs in OOP payments however shows an unambiguous negative pattern across quintiles, and the difference (68 vs. 52 percent for the poorest and the richest quintiles, respectively) is significant ($p < 0.05$). Health care for the very poor therefore appears to be largely synonymous with 'accessing drugs'. Although there is a significant difference in both categories of out-of-pocket payments (at 5% and 10% respectively) between the program and control areas, the difference is negligible between GK card holders and non-card holders.

Table 1

Basic Characteristics of the Respondents and Households

Indicators	Total	Program Area			Control Area
		Card Holder	Non Card Holder	Total	
Category of respondent (%)					
- Household head	83.02 (3,272)	80.86 (756)	83.20 (1,283)	82.32 (2,039)	84.22 (1,233)
- Spouse	15.12 (596)	17.75 (166)	15.05 (232)	16.07 (398)	13.52 (198)
- Other members	1.85 (73)	1.39 (13)	1.75 (27)	1.61 (40)	2.25 (33)
Gender of the household head (%)					
- Male	87.67 (3,455)	91.66 (857)	85.47 (1,318)	87.81 (2,175)	87.43 (1,280)
- Female	12.33 (486)	8.34 (78)	14.53 (224)	12.19 (302)	12.57 (184)
Average educational level of the household heads	3.20 [4.04] (3,941)	3.18 [4.12] (935)	3.22 [4.10] (1,542)	3.20 [4.11] (2,477)	3.19 [3.92] (1,464)
Average age of the household head	46.16 [13.81] (3,941)	46.92 [12.51] (935)	46.07 [14.28] (1,542)	46.39 [13.64] (2,477)	45.77 [14.09] (1,464)
Average household size	4.45 [1.82] (3,941)	4.63 [1.78] (935)	4.33 [1.89] (1,542)	4.45 [1.85] (2,477)	4.45 [1.78] (1,464)
Male female ratio	52:48	52:48	51:49	51:49	52:48
Average per capita daily consumption*	65.74 [37.97] (3,937)	71.17 [40.43] (934)	63.49 [39.96] (1,540)	66.39 [40.30] (2,474)	64.64 [33.64] (1,463)

Note: Figure in round parentheses is the number of observations and squared parentheses is the standard deviation.

* Four observations were dropped due to missing data on household consumption.

For the broad category of illnesses, it is seen that OOP payments per episode of CDs, NCDs and AI (accidents and injuries) was BDT 845, BDT 3,596 and BDT 4,246 respectively (Table 3). Quite plausibly therefore, NCDs and AI involved significantly ($p < .01$) higher OOP costs than CDs per episode. Presumably a good part of the AI expenses would be for whatever 'emergency care' that was available at the time. Out-of-pocket costs per episode of chronic condition (BDT 5,312) was significantly ($p < .01$) higher than for acute conditions (BDT 1,493), and similarly for an episode of inpatient vs. outpatient care (BDT 15,360 and 1,578 respectively).

Insofar as drug expenses (as a share of OOP costs) are concerned, the pattern appears most stable (over 59%) for the disease nature (i.e., acute vs. chronic). However, when interpreted by the type of illness along the CDs/NCDs/AI orientation, drugs expense ratio rises to 74 percent for CDs, while staying at 56 and 60 percent, respectively, for NCDs and AI.

Table 2

Out-of-Pocket (OOP) Payments per *Affected* Household by Expenditure Quintiles

Consumption Quintile	Mean OOP costs (in BDT) over 12 months	Mean OOP costs (in BDT) on account of drugs over 12 months	OOP costs as % of total household (both food and non-food) expenditure	OOP costs as % of food expenditure	Payments for drugs as % of OOP costs
1st quintile (the poorest)	2,657 (4,574)	1,805 (3,115)	4.49 (664)	7.44 (664)	67.93 (664)
2nd quintile	2,931 (5,584)	1,871 (3,099)	3.69 (693)	6.52 (693)	63.83 (693)
3rd quintile	4,222 (8,094)	2,610 (5,088)	4.50 (672)	8.22 (672)	61.82 (672)
4th quintile	4,508 (8,881)	2,801 (5,671)	3.98 (696)	7.80 (696)	62.13 (696)
5th quintile (the richest)	6,629 (15,456)	3,448 (6,438)	4.06 (690)	10.00 (690)	52.01 (690)
Program	3932 (8695)	2,396 (4,913)	3.78 (2,121)	7.61 (2,121)	60.94 (2,121)
Control	4,641 (10,589)	2,702 (4,927)	4.69 (1,294)	9.14 (1,294)	58.22 (1,294)
Card holders	4,001 (9,634)	2,459 (5,621)	3.49 (818)	7.55 (818)	61.46 (818)
Non-card holders	3,888 (8,054)	2,357 (4,413)	3.99 (1,303)	7.64 (1,303)	60.62 (1,303)
Total	4,200 (9,462)	2,512 (4,920)	4.11 (3,415)	8.18 (3,415)	59.81 (3,415)

Note: 1. Consumption expenditure has been scaled up to 12 months.

2. Figures in parentheses are standard errors in columns 2-3 and number of observations in 4-6.

3. One US dollar was equivalent to BDT 69 while the survey was in progress (mid-2009).

Table 3

Out-of -pocket (OOP) payments by *per episode* of illnesses

Patient attributes		Mean OOP costs (in BDT) over 12 months	Mean Expenses (in BDT) on drugs	Expenses on drugs as % of OOP costs
Type of diseases	Communicable diseases (CDs)	845 (1,939) [3,120]	623 (1,409) [3,120]	73.73
	Non- communicable diseases (NCDs)	3,596 (8,796) [3,093]	2,028 (4,284) [3,093]	56.40
	Injury and accidental diseases (AI)	4,246 (7,814) [139]	2,531 (5,110) [139]	59.61
Condition of illness	Acute illness	1,493 (3,997) [5,078]	899 (2,056) [5,078]	60.21
	Chronic illness	5,312 (11,748) [1,274]	3,143 (5,826) [1,274]	59.17
Type of care	In-patient	15,360 (20,569) [314]	6,141 (8,188) [314]	39.98
	Out-patient	1,578 (3,698) [6,038]	1,100 (2,613) [6,038]	69.71

Note: 1. Figures in round parentheses are standard errors and in square brackets is the number of observations.

2. One US dollar was equivalent to BDT 69 while the survey was in progress (mid-2009).

Table 4 shows the incidence of illness that leads to catastrophic health expenditure. We included all health expenditure (involving multiple members as appropriate) within the family in measuring the ratio of household consumption for the year. About 10 (12) percent of the sampled (affected) households (hhs), namely 404, incurred catastrophic healthcare expenditure at the 10 percent threshold level over the 12 months preceding survey.[9] As may be anticipated from the above discussion, the poorest quintile again emerges as the group having suffered the most from such high level expenses as a share of hh consumption (11.80 vs. 9.53% for the poorest and the richest quintiles, respectively), though the difference is not statistically significant).

[9] The actual number of hhs experiencing catastrophic healthcare expenditure at the 10 percent level comes to 404, which is about 10 percent of the sample figure (i.e., 3,937), but when expressed as a share of all hhs who actually sought medical treatment for illness (i.e., 3,419), the ratio rises to about 12 percent.

Table 4

Incidence of Catastrophic Health Expenses by Expenditure Quintiles

Consumption Quintiles	Incidence of catastrophic health payments among the *affected* households	Incidence of catastrophic health payments among the *sampled* households
	(At 10% threshold level)	(At 10% threshold level)
	% (n)	% (n)
1st quintiles	14.01 (93)	11.80 (93)
2nd quintiles	9.38 (65)	8.26 (65)
3rd quintiles	13.24 (89)	11.29 (89)
4th quintiles	11.78 (82)	10.42 (82)
5th quintiles	10.87 (75)	9.53 (75)
Total	11.83 (404)	10.26 (404)

Note: Figures in round parentheses are number of observations.

3.4 Impact on Poverty

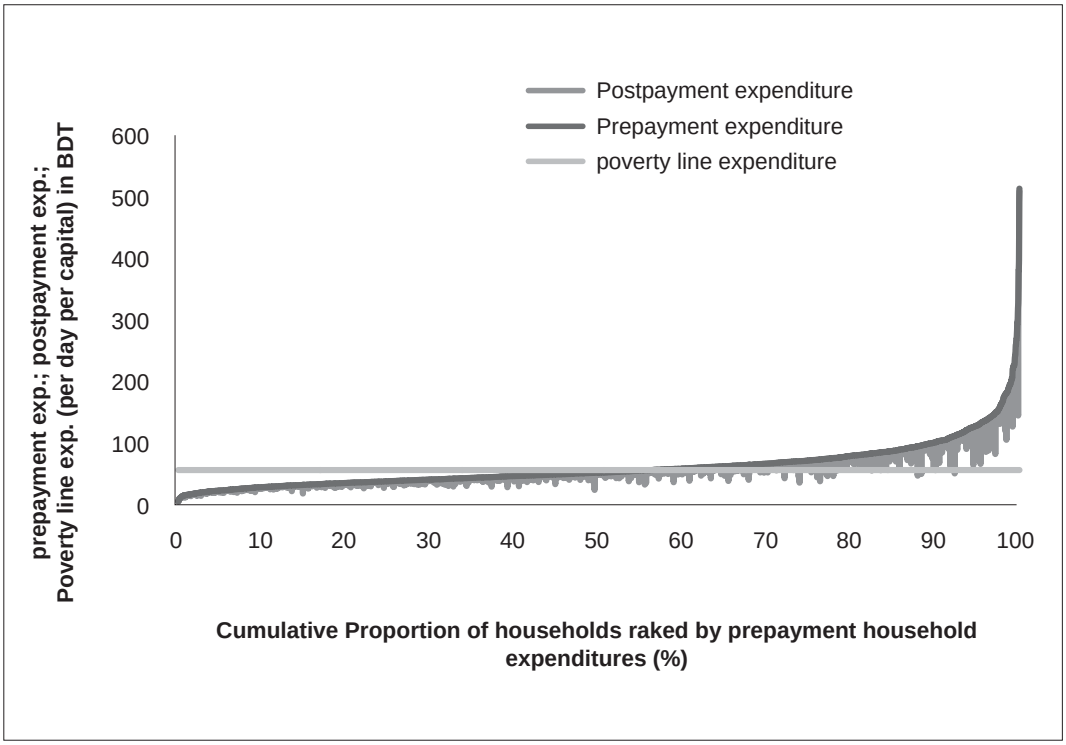
Headcount Impoverishment Impact of Out-of-Pocket Payments:

It is seen that overall pre-payment headcount poverty is 56.34 percent and post-payment (deduction of expenses for health care from total household expenditure) headcount poverty is 59.74 percent (Table 5). Thus, 3.4 percent households fall into poverty due to payments for health care annually.

The impoverishment impact of payments for health care can be observed by plotting pre-payment as well as post-payment consumption expenditure against cumulative proportion of the households ranked by pre-payment consumption expenditure (per day per capita) in Pen's parade graph (Wagstaff and Doorslaer, 2003). Figure 1 shows the Pen's parade graph for the pre-and post-payment consumption expenditure. The point at which the pre-payment parade intersects the poverty line measures the pre-payment headcount poverty which is about 56.34 percent. The 'paint drops' from the prepayment curve portray that payments for health care drag the consumption expenditure down the pre-payment level. The lower boundary of the 'paint drops' plots the post-payment curve. The post-payment headcount poverty (which is 59.74%) is depicted from the proportion below the poverty line. The difference of the two headcounts (3.4 percentage point) measured on the x-axis thus emerges as the headcount poverty impact of OOP payments.

Figure 1

Poverty Pen's Parade Graph for All Ailments



Source: Authors' own depiction based on Wagstaff and Doorslaer, 2003

Turning to the broad categories of illnesses we see that, after accounting for payment for health care, about 4.65 percent of those who had chronic illnesses fall into poverty while the corresponding figure for acute illnesses, NCDs, CDs and AI (accidents and injuries) is 2.66, 4.61, 0.95 and 4.48 percent respectively (Table 5). The number of poor increases by 14.53 and 2.74 percent among inpatient and outpatient care seekers respectively due to health care spending whilst the corresponding figure for those who incur catastrophic health expenses is 17.33 percent. The headcount poverty burden is thus much higher for hospitalization, chronic illnesses and NCDs than their respective counterparts. The Pen's parade graphs also attest to the same (figures not shown).

Table 5
Impact of OOP Payments on the Incidence and Intensity of Poverty

Categories	Poverty Headcount (in %)				Prevalence/dist. of illness	Poverty Intensity (Poverty gap)			
	Pre-payment	Post payment	Poverty headcount impact (in percentage points)	Poverty headcount impact (in percentage) §	% (n*)	Prepayment Gap (per day per capita in BDT) Mean [SD] (n)	Post payment Gap (per day per capita in BDT) Mean [SD] (n)	Poverty impact (Average poverty gap in BDT)	Poverty impact (Normalized poverty gap in %)
All episodes of illness	56.34	59.74	3.4**	6.03	33.30 (6469)	9.80 [11.76] (3,937)	10.64 [12.07] (3,937)	0.84***	1
Catastrophic events	43.56	60.89	17.33***	39.78	11.83 (404)	7.03 [10.85] (404)	11.13 [12.62] (404)	4.1***	7
Acute illness	56.44	59.1	2.66	4.71	79.98 (5174)	9.72 [11.57] (2,966)	10.41 [11.84] (2,966)	0.69**	1
Chronic illness	52.28	56.93	4.65*	8.89	20.02 (1295)	9.05 [11.50] (1,140)	10.19 [11.99] (1,140)	1.14**	2
Communicable diseases (CDs)	58.75	59.7	0.95	1.62	48.83 (3159)	10.37 [11.92] (2,097)	10.76 [12.08] (2,097)	0.39	1
Non-communicable diseases (NCDs)	52.97	57.58	4.61**	8.7	49.02 (3171)	9.02 [11.30] (2,341)	10.03 [11.72] (2,341)	1.01***	2
Injury & accidental diseases (AI)	60.45	64.93	4.48	7.41	2.15 (139)	11.35 [12.57] (134)	12.58 [12.76] (134)	1.23	2
In-patient cases	33.45	47.97	14.53**	43.41	5.06 (321)	4.18 [7.89] (296)	6.93 [9.91] (296)	2.75***	5
Out-patient cases	56.75	59.49	2.74*	4.83	94.94 (6026)	9.84 [11.66] (3,281)	10.61 [11.99] (3,281)	0.77***	1

Note: n* represents the total number of individuals seeking health care in the sample.

***, ** and * indicates significance at 1%, 5% and 10% level respectively. § Percentage point change as a proportion of prepayment headcount. SD: Standard Deviation.

For the individual categories of NCDs as well as chronic illnesses we see that there are double-digit impact of health expenses on headcount poverty among households having cholecystectomy, mental disorder, kidney disease, cancer, appendectomy and hysterectomy (Table 6, Column 5). The impact of health care payment on headcount poverty is also large for households having paralysis, UTI, rheumatic fever, benign tumor and asthma patients. It is evident that cholecystectomy holds the highest rank in headcount poverty burden of health expenses followed by mental disorder, kidney disease, cancer, appendectomy, hysterectomy, paralysis, urinary tract infection (UTI), rheumatic fever, benign tumor, asthma, ulcer, hypertension, sexually transmitted diseases (STDs) and diabetes (Table 6).

Overall head count impoverishment impact is bit lower in the program compared to control areas (not shown in tables). This impact is even lower among the microinsurance CHs compared to NCHs. While focusing chronic illness and NCDs, a similar difference is evident between the CHs and NCHs. However, the difference is not substantial for any case. The underlying reason may be that GK micro health insurance scheme provides some basic primary health care and charges huge co-payments.

Average and Normalized Poverty Gaps:

The average pre-payment and post-payment poverty gap (per day per capita) is BDT 9.80 and BDT 10.64 respectively (Table 5, Columns 6-7). In other words, per day per capita income before paying for health care is less than the poverty line income by BDT 9.80 while after paying for health care it stands at BDT 10.64. Thus, out-of-pocket payments raise the average poverty gap per day per capita by BDT 0.84 or by 8.6 percent and normalized poverty gap by 1 percent (Table 5, Columns 8-9). In the Pen's parade graph the extent of poverty gap is measured by the area below the poverty line above each parade (Wagstaff and van Doorslaer, 2003). The graph illustrates that health care expenses increase the intensity of poverty (Figure 1).

Payments for health care raise the poverty gap (normalized poverty gap) for chronic illnesses by BDT 1.14 (2%) while it is BDT 0.69 (1%), BDT 1.01 (2%) and BDT 0.39 (1%) for acute illnesses, NCDs and CDs respectively (Table 5, Columns 8-9). Similarly, payments for health care raise the average poverty gap (normalized poverty gap) for inpatient and outpatient care respectively by BDT 2.75 (5%) and BDT 0.77 (1%) whereas the corresponding figure for those who incur catastrophic health expenses is BDT 4.1 (7%).

Out-of-pocket payments raise the average poverty gap (normalized poverty gap) for cholecystectomy, mental disorder, kidney disease, cancer, appendectomy, benign tumor and hysterectomy patients by BDT 1.73 (3%), BDT 2.36 (4%), BDT 2.77 (5%), BDT 4.72 (8%), BDT 2.33 (4%), BDT 1.05 (2%), and BDT 2.18 (4%) respectively (Table 6, Columns 8-9). The corresponding figure for paralysis, UTI, rheumatic fever and asthma patients is BDT 2.35 (4%), BDT 1.81 (3%), BDT 1.32 (2%) and BDT 1.25 (2%) respectively. In terms of poverty gap burden of health expenses cancer holds the highest rank followed by cancer, kidney diseases, mental disorder, paralysis, appendectomy, hysterectomy, UTI, cholecystectomy, rheumatic fever, heart diseases, STDs, ulcer, asthma, benign tumor, diabetes, and hypertension in that order.

Table 6
Impact of OOP Payments on Incidence and Intensity of Poverty for Major Categories of Illnesses

Categories	Poverty Headcount (in %)				Prevalence/dist. of illness	Poverty Intensity (Poverty gap)			
	Pre-payment	Post payment	Poverty headcount impact (percentage points)	Poverty headcount impact (percentage) §	% (n*)	Prepayment Gap (per day per capita in BDT) Mean [SD]	Post payment Gap (per day per capita in BDT) Mean [SD]	Poverty impact (Average poverty gap in BDT)	Poverty impact (Normalized poverty gap in %)
Diabetes	29.69	31.25	1.56	5.25	1.04 (67)	4.05 [7.30]	4.82 [8.47]	0.77	1
STDs	67.57	70.27	2.7	4.00	0.96 (62)	11.81 [11.62]	13.06 [12.27]	1.25	2
Heart disease	45.95	48.65	2.7	5.88	1.75 (113)	7.11 [10.63]	8.37 [11.54]	1.26	2
Hyper-tension	43.75	45.83	2.08	4.75	2.29 (148)	8.19 [11.63]	8.64 [11.93]	0.45	1
Ulcer (including peptic ulcer)	58.02	61.07	3.05	5.26	2.03 (131)	10.37 [12.14]	11.57 [12.6]	1.20	2
Short of breathing including asthma	57.84	63.73	5.89	10.18	2.38 (154)	11.75 [12.88]	13.00 [13.05]	1.25	2
Benign Tumor	44.00	50.00	6.00	13.64	0.77 (50)	6.92 [9.83]	7.97 [10.45]	1.05	2
Rheumatic fever	65.52	72.41	6.89	10.52	0.46 (30)	8.85 [9.83]	10.17 [9.81]	1.32	2
UTI	64.29	71.43	7.14	11.11	0.22 (14)	13.86 [13.72]	15.67 [14.26]	1.81	3
Paralysis	41.67	50.00	8.33	19.99	0.56 (36)	7.34 [12.57]	9.69 [13.6]	2.35	4
Hysterectomy	40.98	50.82	9.84	24.01	0.94 (61)	5.70 [8.14]	7.88 [9.85]	2.18	4

Categories	Poverty Headcount (in %)				Prevalence/dist. of illness	Poverty Intensity (Poverty gap)			
	Pre-payment	Post payment	Poverty headcount impact (percentage points)	Poverty headcount impact (percentage) §	% (n*)	Prepayment Gap (per day per capita in BDT) Mean [SD]	Post payment Gap (per day per capita in BDT) Mean [SD]	Poverty impact (Average poverty gap in BDT)	Poverty impact (Normalized poverty gap in %)
Appendectomy	43.75	56.25	12.5	28.57	0.25 (16)	9.24 [12.17]	11.57 [13.86]	2.33	4
Cancer	50.00	62.5	12.5	25.00	0.12 (8)	7.21 [11.21]	11.93 [11.68]	4.72	8
Kidney disease	50.00	65.22	15.22	30.44	0.74 (48)	8.33 [10.60]	11.10 [11.86]	2.77	5
Mental disorder	50.00	68.75	18.75	37.5	0.25 (16)	8.96 [10.97]	11.32 [11.94]	2.36	4
Cholecystectomy	22.22	44.44	22.22	100.00	0.42 (27)	2.49 [5.38]	4.22 [6.65]	1.73	3

Note: n* represents the total number of individuals seeking healthcare in the sample. § Percentage point change as a proportion of prepayment headcount. SD: Standard Deviation.

4. Discussion and Conclusion

This study measures the disease-specific impact of OOP payments for health care on poverty (both headcount and poverty gap) by comparing pre-payment poverty (where payments for health care are included) and post-payment poverty (where payments for health care are excluded). We find that *spending for health care annually pushes 3.4 percent households into poverty in the central areas of rural Bangladesh*. The corresponding figures for those who suffered from *NCDs, chronic illness, hospitalization and catastrophic illness respectively were 4.61, 4.65, 14.53 and 17.33 percent*. Looking into individual categories of NCDs we find that the headcount impoverishment impact of OOP payments is immense for cholecystectomy (22.22%), mental disorder (18.75%), kidney disease (15.22%), cancer (12.5%), appendectomy (12.5%), and hysterectomy (9.84%). The impact on the intensity of poverty is the largest among the hospitalized patients. Individually the intensity is the highest among the cancer patients.

The impacts would have been even higher if informal payments and quasi-formal payments were included in OOP outlays. However, the overall impact cited above is somewhat lower than what van Doorslaer *et al*. (2006) reported earlier for Bangladesh (3.8% for the international poverty line of $1.08 in PPP terms). Figures of similar order (3.2% and 5%) have also been found in India (Garg and Karan, 2009) and China (Sun *et al.*, 2010) respectively. We find a moderate impact on deepening poverty such that the average poverty gap is raised by BDT 0.84 per capita daily or BDT 306.60 per capita annually and the normalized poverty gap by 1%. Note that payment for drugs accounts for a major part of the impact because, as seen in Table 2, the former accounts for about 60 percent of overall OOP payments.

The impact (both poverty headcount and poverty deepening) is much higher for NCDs, chronic illnesses and hospitalization compared to CDs, acute illnesses, and out-patient care, respectively. AI has almost similar burden like NCDs. This impact is exceptionally high for catastrophic expenses and hospitalization, where most of the episodes were NCDs (about 88% and 85%, respectively). Although there is equal proportionate incidence of CDs and NCDs, the absolute impoverishment burden is about five times higher for NCDs than CDs. A closer examination reveals that the impact (especially headcount poverty) is excessively high for NCDs such as cholecystectomy, mental disorder, kidney disease, cancer, appendectomy, hysterectomy, paralysis, UTI, rheumatic fever, benign tumor, and asthma. Note that majority of these illnesses are chronic NCDs causing a major impoverishment burden. It is also noticeable that some non-chronic NCDs (e.g., cholecystectomy, appendectomy, hysterectomy) which usually require immediate surgical procedures cause substantial impoverishment impact (see Table 4). Hence, there is a clear indication that *NCDs particularly chronic NCDs and the illnesses which require immediate surgical procedures should be given more priority for policy framing*.

As we use the 12-month recall period, there is some potential recall bias. As far as OOP is concerned, the recall problem usually causes a downward bias. This is because respondents often cannot recall small expenses and more generally those related to minor illnesses. Thus, overall impoverishment impact found in the study may prove to be an under-estimate.

Moreover, as already cited, the data analyzed in the paper does not represent Bangladesh as a whole or even all of rural Bangladesh. Future research may deal with the issue using a nationally representative sample and more suitable recall periods.

Despite these limitations *there is some indication that payment for NCDs is a visible threat to the poverty reduction initiatives of the country*. Thus Bangladesh stands to gain hugely if viable alternatives can be found to finance the provision of health care away from the OOP mode. Developing appropriate risk-pooling modalities such as low-cost *voluntary* MHI schemes are gaining popularity in many contexts similar to that in Bangladesh. We have also found some impact of a scheme (limited primary outpatient care run by Grameen Kalyan). However, this is not a viable route for dealing with chronic NCDs and catastrophic illnesses. Moreover, there is little evidence of the replicability and scalability due presumably to both demand and supply side constraints. Introduction of social insurance is not quite feasible due to the large informal economy. Thus, hope lies in the general taxation based public provision of health care. However, evidence shows that there is very low use of public health care (Hamid *et al*. 2014). As depicted in the literature (e.g., HEU, 2012; Andaleeb, 2007), loss of faith in public facilities (due to various supply side constraints, e.g., appropriate skill-mix, input-mix, absenteeism of doctors, politicization in the posting of doctors, shortage of drugs) is one of the main reasons for low demand of public health care. Thus, access to public health care can only be increased via enhancing its quality as well as the efficiency of government facilities. This requires some reforms, e.g., strengthening of local governments and involving them in the management of sub-district and rural hospitals and health centers; allowing all levels of hospitals to impose some user fees (combined with a proper safety net for the poor and the vulnerable) and retention of these fees on their part for smoothening the service delivery.

The high share of drug costs in OOP reflects in part the unrestricted dispensation of all drugs including antibiotics over the counter (Babu, 2007; Akter *et al*., 2012) as well as lack control of drug prices (Akter *et al*., 2012). Although Bangladesh National Drug Policy professes to ensure the rational pricing of essential drugs, the regulatory authorities have little control over actual drug prices (witness the large hike, 30% or more, in retail prices in early 2012).

Moreover, there is over-use of drugs in Bangladesh (Babu, 2007; Akter *et al*., 2012). Evidence shows that at least half of all drugs are not prescribed, dispensed or sold under guidance (Babu, 2007; Akter *et al*., 2012). Self-medication and purchase of all type of drugs without any prescription and the continuous proliferation of unlicensed (and possibly illegal) and unregulated drug stores are among the major reasons for the over-use of drugs (Babu, 2007; Akter *et al*., 2012). Thus *adoption of gradual measures for effective regulation of the price of essential drugs and restrictions in selling over the counter drugs may be long overdue*.

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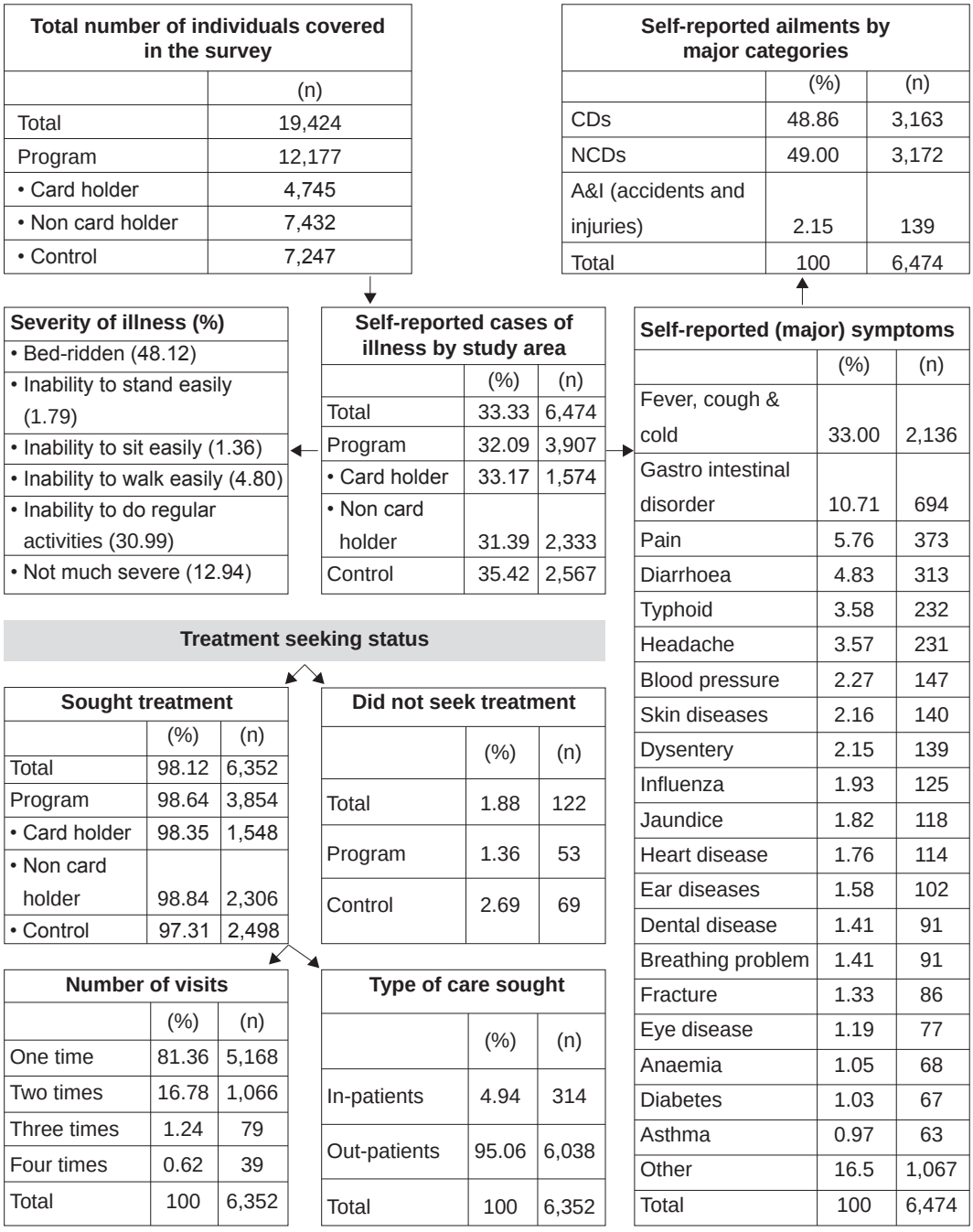
Appendix

Figure F1: A schematic view of self-reported illnesses



***Source:** Authors' own depiction

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