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ABSTRACT

Corruption in the Health Sector: Evidence from Unofficial Consultation Fees in Bangladesh

We study the incidence and extent of bribes paid to the doctors in the public health facilities which are cleverly identified using a nationally representative survey. The survey asks households about the fees paid to public doctors, not about the bribe, which makes it less prone to reporting bias. We find that though consultations are free in the public health facilities, 41% of the patients who visited them paid about US$2 as a consultation fee, which is about 16% of their total medical expenditure. Three interesting generalized results that we find on the determinants of incidence and extent of bribe payment are: First, bribe givers and non-givers are different in terms of observed characteristics. Second, the same doctors, when sit in a private facility, charge more, setting an upper limit of bribes at public facilities. Third, travel time of the service seekers is used as a price discriminating device by the public service providers. Results have important implications for combating corruption, especially in developing countries.

JEL Classification: D73, I18, L11

Keywords: corruption, public health, price discrimination, Bangladesh

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1. Introduction

In this paper we study the incidence and extent of bribes paid to doctors in public health facilities and explore the possible reasons behind those payments. Public officials in the health care and other sectors in the developing countries often charge unofficial prices in the form of extortion and bribes for the service they render.[1] Since such illegal practices hamper governments' redistributive efforts and are often inefficient, it is important to understand the factors affecting these types of unofficial payments. One strand of empirical literature on the economics of corruption suggests that it depends on the relative bargaining power of the bureaucrats and the institutional set up at which they operate as well as the market structure and the pricing strategies adopted by them (Olken and Baron 2009, Hunt 2010). It can be expected that there are other types of pricing strategies that can be observed in other environments including price discrimination where citizens may pay more to receive a perceived 'premium' service or the amount of bribe paid is determined by prices of similar services in the market, for example.

However, finding an unbiased measure of unofficial payments is inherently intricate.[2] Whereas, surveys can be run to collect data on amount of unofficial payments made to public officials, questions about such payments are sensitive in nature. The respondents therefore, may not truthfully report the actual amounts or may avoid answering such questions altogether. Hence, absent unbiased measures of unofficial payments, researching on such payments, analyzing factors that may determine such payments and finding ways to combat them are difficult. Above all, finding a service provided by both public and private sectors in the same institutional setting is even rarer.

[1] The Annual Report 2006 of Transparency International illustrates numerous instances of corruption from developing countries in varied dimensions in the health care sector. A chapter on informal payment in health sector reveals that 84% of total health expenditure in Georgia can be attributed to informal payments constituting half of the total out-of-pocket expenditure, the major component (70% – 80%) in health expenditure. Similar practices exist in countries like Russian Federation, Poland, Tajikistan and Albania.

[2] See, for example, the review paper by Olken and Pande (2012) that discusses the difficulty of measuring bribes, leading to very few papers that do so. See also Banerjee, Hanna and Mullainathan (2012) that mentions measurement of bribe as the primary challenge on the empirical side.

In this paper, we are able to use data on the unofficial payments with minimal reporting bias in the public health care services in Bangladesh. The nationally representative Household Income and Expenditure Survey (HIES) 2010 conducted by Bangladesh Bureau of Statistics (BBS) collected detailed information on, among others, health and health expenditures. In particular, the health module includes information on whether the patient visited public or private doctors and the expenditure module includes information on the amount of money spent for doctor consultation. We combine these two modules to identify the consultation fee paid to public doctors at public facilities (and at private facilities). Since the consultation to public doctors is free in public health facilities in Bangladesh, any payments made can be regarded as a bribe. Since no reference to bribery was made during the survey, we believe that our measure has minimum reporting bias.

The data show that bribe constitutes a significant share of patient's medical expenditure; 41% of the patients who visited public health facilities paid about US$2 as consultation fee, which is about 16% of their total medical expenditure. Given this, we investigate three aspects of it. First, the incidence of corruption: why do some patients bribe and other don't? Second, the extent of corruption: conditional on bribe payment, why do some patients end up paying more than the others? Third, even though we expect the reported unofficial consultation fee to be minimally biased, can we test the reliability of the data and if yes, what does the test say?

We find the bribe payers and non-payers are different in a number of observable characteristics. Two factors stand out: First, bribe payers come from farther places compared to non-payers, which is reflected in the time and money spent to reach the public health service points. Second, consistent with earlier findings in the literature, service seekers who are economically better-off have a higher incidence of bribe payment. In addition, bribe payers are more likely to visit a public facility for a better quality service than non-payers. Bribery then seems to be attached to a better quality service and indicates a potential patient self-selection.[3]

If we consider bribe-payers only, how does it vary? This is an important question as it will indicate whether any sort of price discriminatory practice exists. We find two similar results here: First, distance that a patient needs to

[3] This is very much similar to the concept of "grease money" found in Bertrand et al. (2007) in the case of obtaining a driver's license in India.

travel to reach a public facility was again found to be important: patients spending more time and money also pay a larger bribe. Second, richer patients pay more.

Finally, we make an attempt to provide a test on the reliability of our data. It is important first to recognize that our data on bribery is identified from two different questions: one on service provider type and the other on health expenditure. Since we were able to get bribe data without referring to 'bribe', 'unofficial payment' or 'illegal payment', we believe our data has minimum reporting bias. Nevertheless, the particular structure of the market allows us to provide a test of the reliability of the bribe data as well. The public doctors in Bangladesh are allowed to practice privately as well where they are free to charge consultation fee legally. The HIES 2010 collected that information as well allowing us to compare the two fees. Since private fee is legal and private provision may involve some cost, it is likely that this fee will be higher than a bribe. As expected, we find the private fee to be significantly higher than bribes charged in a public facility. Surprisingly, however, we do not find any difference in patient characteristics choosing between public doctors at public and at private facilities.

We derive our testable hypotheses from an analytical framework provided in the next Section. Our results indicate the following scenario. A patient has to go through a series of decision making processes when a health shock strikes. First, s/he has to decide whether to seek for health care services or not. Second, if decided to seek for health care services, what type of health care provider to visit. Third, if the public doctor is chosen, what type of service to choose. A public doctor offers a menu of quality-price pairs – i. free service of lower quality at public facility, ii. service with (illegal) fees of higher quality at public facilities and iii. service with fees of highest quality at private facilities.[4] The patients are aware of these options and then self-select into one of the options based on their observed and unobserved characteristics. For patients who opt for option (ii) (public doctor at public facilities with illegal payment), doctors (or their agents) learn about the characteristics of the patients, particularly, their location and income, and charge according to those characteristics.

[4] The perceived quality differences are evident from patients' responses to why they choose a particular type of facility. The percentage of patients that choose public healthcare service for its quality are higher among the bribe payers than non-bribers suggesting that bribe payers should be receiving a better service than non-bribers.

A question arises: why do the public doctors not shut down the free window (option i) altogether? Recent literature on bureaucratic behavior (e.g., Dewatripont et. al., 1999; Leaver 2009) suggests that bureaucrats are often motivated by non-monetary factors such as career concerns. This may result in what is known as minimum squawk behavior for which bureaucrats behave in a way that will attract little attention. In this case where a doctor is required to see a patient for free, the doctor may still keep a service line free of charge in order to minimize complaints. The doctor, however, may manipulate the unverifiable quality and accordingly, lower his delivery cost (which is often the time spent with a patient). Indeed, about 59% of the patients visiting public health facilities in our data consulted the doctor for free.

Health care services in Bangladesh are provided by both public and private providers. The public health facilities are located based on the administrative layout. For administrative purposes, the country is divided into 6 divisions, 64 districts, 508 sub-districts, and 4,466 unions. All the divisions and district cities and sub-district towns, and some unions have public hospitals. The number of patients at each type of hospital is given in the Table A1 in the Appendix. The average number of patients is greater at larger hospitals (in terms of beds, for example). However, if we consider the total number of patients, then we see that 48.8% of all the patients visiting public health facilities visit Sub-district Health Complexes, and 32.5% go to Union (Health) Sub-Centers (USCs). One notable feature of public health care services is that consultation with doctors is provided for free at the public health facilities.

Besides public provision described above, services provided by the private sector for a fee are also available, especially in urban areas. An interesting aspect of the private health care market is that the public doctors are allowed to provide consultation services at private facilities after hours and can charge unregulated fees for their services. The other service providers in health care market consist of professional doctors as well as traditional healers, homeopaths and pharmacists. There is some medical health insurance operational, but it is almost non-existent. Section 3 sheds some light on access to health care services provided by these different private providers.

Our paper is related to the recent applied microeconomic research on corruption and extortion payments. A unique aspect of our study is the use of a relatively unbiased measure for bribe payments using a nationally representative survey. Most of the other papers on unofficial payments used datasets that ask the respondents to

report the amount of unofficial payments (See, for example, Svensson, 2003; Fisman and Gatti, 2006; Hunt, 2010; Fan et al., 2009, Alexeev and Song 2013, Niehaus and Sukhtankar 2013). Papers by Bertrand et al. (2007) and Olken and Baron (2009) are exception in this regard. In both of these papers, the experimental survey design allowed them to collect unbiased data on unofficial payments.

Banerjee et al. (2004) recognized the existence of unofficial payment in the health sector, but did not provide any economic analysis. Hunt (2010) is similar to our paper as she analyzed the incidence and the extent of unofficial payments paid to the doctors in Uganda and Peru. However, similar to many other papers, Hunt uses data that comes from a survey (Ugandan Second National Integrity Survey) that directly asked respondents to report the amount of bribes paid to public doctors. Another distinguishing feature of our work is that while Hunt focused on the bargaining power of the patient, we focused on patients' self-selection and the determination of bribes in the presence of perceived service quality differences.

Finally, we also contribute in terms of analyzing the IO aspect of the health care market. We show a particular approach of price discrimination practiced by doctors that was not considered in empirical literature before.[5] Olken and Baron (2009) is the only paper to our knowledge who also analyzed the IO aspects of bribe payments in Indonesia. They found that police in Indonesia practice price discrimination and showed that a reduction in the number of police check posts increases market power at other check posts resulting into higher bribe payments. Nagavarapu and Sekhri (2014) find that informal monitoring and enforcement services provided by social networks reduce leakages and improve public service delivery in the Targeted Public Distribution System in India. Bertrand, et al. (2007) investigate a case of obtaining driving license in India where private agents work as a facilitator to connect public officials and citizens. They show that extralegal payments speeds up the bureaucratic process as well as avoid legal requirements.

[5] In an earlier version, we considered the role of competition in determining bribe payments, and found that competition proxied by the number of public doctors reduces bribe. This also indicates the importance of adequate staffing (Chaudhury and Hammer, 2003) and lowering doctors' absenteeism in improving children's health (Dhailwal and Hanna, 2014). The results are available from authors.

The rest of the paper is organized as follows. We provide our analytical framework in Section 2, while in Section 3 we present the HIES 2010 data and describe the different health care services that patients availed in 2010, characteristics of patients who paid bribes in the public health care system, and explore the possible correlates of bribe payments. In Section 4, we discuss the empirical framework and the results on the incidence of corruption and the extent of corruption. In, addition, we also compare results from the HIES 2005 and HIES 2000. In Section 5, we provide a general discussion of the results and their implications for public policy, and we draw conclusion in Section 6.

2. Analytical Framework

Consider the standard buyer-seller adverse selection model analyzed in Bolton and Dewatripont (2005). Suppose there are two types of patients in terms of their willingness to pay fee, High type (H) and Low type (L) with preferences:

$$u(q, T, \theta) = \theta_i v(q_i) - T_i - k \; where \; i = H, L.$$

Where q is the quality of the consultation service from the doctor, T_i is the consultation fee, k is the transportation cost to the hospital and θ is private information to the patient with $\theta_H > \theta_L$. Note that both types of patients are located at the same location (same k). Also assume that v(q) satisfies $v'(q) > 0$ and $v''(q) < 0$ for all q. The doctor knows the distribution of θ where θ_L occurs with probability β. Everything else is common knowledge (including k).

The doctor's expected payoff is given by:

$$\pi = \beta(T_L - cq_L) + (1 - \beta)(T_H - cq_H)$$

Where c is the cost of increasing one unit of quality. The doctor's problem is to maximize his payoff given the following IR (normalizing reservation utility to 0) and IC constraints:

$$IR_L: \; \theta_L v(q_L) - T_L - k \geq 0 \Rightarrow \theta_L v(q_L) - T_L \geq k$$

$$IR_H: \theta_H v(q_H) - T_H - k \geq 0 \Rightarrow \theta_H v(q_H) - T_H \geq k$$

$$IC_L: \theta_L v(q_L) - T_L - k \geq \theta_L v(q_H) - T_H - k \Rightarrow \theta_L v(q_L) - T_L \geq \theta_L v(q_H) - T_H$$

$$IC_H: \theta_H v(q_H) - T_H - k \geq \theta_H v(q_L) - T_L - k \Rightarrow \theta_H v(q_H) - T_H \geq \theta_H v(q_L) - T_L$$

The standard non-linear pricing solution

It is easy to show that IR_L and IC_H will be binding conditions. Rewrite them to find expressions for T_L and T_H from IR_L and IC_H :

$$T_L = \theta_L v(q_L) - k \dots\dots\dots\dots\dots\dots\dots\dots IR'_L$$

$$\theta_H v(q_H) - T_H = (\theta_H - \theta_L) v(q_L) + k \Rightarrow T_H = \theta_H v(q_H) - \Delta\theta v(q_L) - k \dots\dots\dots\dots IC'_H$$

Where $\Delta\theta = (\theta_H - \theta_L) > 0$.

Substituting them into the objective function of doctor

$$\pi = \beta(\theta_L v(q_L) - k - cq_L) + (1-\beta)(\theta_H v(q_H) - \Delta\theta v(q_L) - k - cq_H).$$

The first order conditions in terms of q_H and q_L give

$$q_H: \theta_H v'(q_H^*) = c \qquad (1)$$

$$q_L: \theta_L v'(q_L^*) = \frac{c}{1 - \left(\frac{1-\beta}{\beta}\frac{\Delta\theta}{\theta_L}\right)} \qquad (2)$$

This result implies that the doctor does not distort the quality for the high type patient, but he does distort the quality for the low type patient. Furthermore, the high type patient earns informational rent as evident from non-binding IR for high type patient. This is the standard inefficiency outcome generated from the asymmetric information.

Shutting down of low type

The doctor may also shut down the low type. In that case, only IR condition of high type is binding. The first order condition now resembles equation 1 and the only one to satisfy. Since it is the same equation, q_H and therefore $v(q_H)$ are the same as above in this case. The doctor's expected payoff will be: $\pi = (1-\beta)(\theta_H v(q_H) - k - cq_H)$.

The doctor will find this solution optimal if

$$(1-\beta)(\theta_H v(q_H^*) - k - cq_H^*) \geq \beta(\theta_L v(q_L^*) - k - cq_L^*) + (1-\beta)(\theta_H v(q_H^*) - \Delta\theta v(q_L^*) - k - cq_H^*)$$

$$\Rightarrow (1-\beta)\Delta\theta v(q_L^*) + \beta k \geq \beta(\theta_L v(q_L^*) - cq_L^*) \qquad (3)$$

Note that if k (transportation cost) is high enough, the doctor will shut down the low type. In other words, the price discriminating doctor will serve both types of patients if the transportation cost is low. As the transportation cost rises, the doctor will find it optimal to shut down the low type.

We are interested in two regimes. It turns out that the conditional expected consultation fee, when both types are served, is: $\beta T_L^* + (1-\beta)T_H^* = \beta(\theta_L v(q_L^*) - k) + (1-\beta)(\theta_H v(q_H^*) - \Delta\theta v(q_L^*) - k)$.

When the low type is shut down, the conditional expected consultation fee is: $T_H^S = (\theta_H v(q_H^*) - k)$. Since $T_H^S > T_H^* > \beta T_L^* + (1-\beta)T_H^*$, the expected consultation fee is always larger under shut down policy than under the standard solution. Given that doctor will exercise the shutdown policy with higher transportation cost, consultation fee should be increasing in transportation cost, and in similar vein, travel time.

The intuition is very simple. Note that the quality of service received by the high type is the same under both the regimes. However, the high type patient earns an informational rent when both types are served, but does not earn any rent when the low type is shut down. This happens through a higher fee charged to the high type under the shut-down regime. As a result, the expected consultation fee, conditional on patient's visit, is higher when the transportation cost is higher.

3. Data and Descriptive Analysis

We have used data from the Household Income and Expenditure Survey (HIES) conducted by the Bangladesh Bureau of Statistics (BBS) in 2010. The HIES 2010 was conducted on 12,240 households comprising 55,580 individuals in 612 unions, 386 sub-districts and all the 64 districts of Bangladesh. HIES is a cross-sectional survey repeated every four to five years. We have also used two previous rounds, HIES 2005 and HIES 2000, to check the see the patterns over time. The survey contained detailed expenditure modules in addition to income, health, and other modules.[6]

In the health module, the households were asked about the type of illness suffered, type of doctors consulted (whether public or private), travel time spent and mode of transport used over the past one month. Subsequently, households were asked about the cost of getting the health service by simply asking "What was the cost of treatment during the past 30 days?" under which there were sub-sections where households needed to separately report the consultation fee, hospital/clinical charges, cost of medicine, cost of test/investigation, transportation cost, tips and other charges. These questions were asked irrespective of whether the patient went to a private facility or public facility or consulted traditional/spiritual health professionals. Since the recall period is just one month, the recall bias and measurement errors should be low. We identify a bribe by linking the facility choice and consultation fee.

It is important to note that the patients report experience and expenses faced over the past one month. This implies there are potential multiple visits for each observations. We believe this should not affect our analysis for the following reasons: First, we only consider patients who go only to public health facilities for our analysis. Second, patients that are rich and live close to the public health facilities would do that more often. This should not be a problem if a patient visits for the same illness. If a patient falls ill more than once over the past one month, this will be captured in types of different diseases that a patient reports to suffer over the past one month. Making use of types of illness takes care of one more factor. The severity of illness is an important factor that contributes towards consultation fees paid by the doctor. Controlling for types of illness takes care of severity of illness.

[6] A detailed description of HIES data can be found at www.bbs.gov.bd

Health Shocks and Choice of Health Facility

HIES 2010 shows that there were 16,316 individuals who were suffering from either chronic or non-chronic disease. Among them, 10,931 individuals reported to be suffering from some kind of illness or injury in the past 30 days, and among them there were 9,457 individuals who consulted someone in the past 30 days. However, not all the patients seeking treatment visited public hospitals; only 987 individuals out of 9,457 patients seeking treatment visited public health facilities for doctor's consultation.[7] Patients seemed to opt for other facilities more: 1,497 patients went to consult public doctors at a private facility whereas 2,308 patients went to other private doctors. Pharmacists are the ones consulted most often (3,956 patients).

[Insert Table 1 about here]

Table 1 presents the descriptive statistics of patient characteristics and other possible determinants considered in this study. We consider the non-bribing (column 1) and bribing patients (column 2) separately as well as other patients who went to public doctors at private facility (column 3) and other private doctors (column 4). Columns 5, 6 and 7 present the t-statistics of the mean differences of bribing patients from non-bribing patients, patients going to public doctors at private facilities, and patients going to other private doctors, respectively.

Bribery at Public Health Facilities

Table 1 indicates the incidence and extent of corruption in health consultation services. About 41% patients pay illegal consultation fees to see a public doctor. The patients who end up paying a fee on an average spend about 148 Taka (2.11 US$) in consultation. The fee is higher when the same public doctor sits in a private facility (205 Taka or 2.93 US$) but lower at other private facilities with private doctors (52 Taka or 0.74 US$). This is indicative of a perceived quality difference between public doctors, working either in public or private facilities, and the private

[7] There were an additional 72 patients who visited public health facilities. However, they visited other facilities too before or after visiting a public health facility and there is no way to separate the two consultation fees. Therefore, we dropped these observations for our analysis. Inclusion of them does not change the results. In addition, about 229 patients consulted a public health worker. This group is also dropped from analysis.

doctors. Whereas the differences could be resultant from income differences of patients choosing these options, there are also perceived quality differences as reflected in patients' responses to why they choose a particular facility. When faced with this question, proportion of patients choosing particular type of service/facility for its quality is 45%, 54% and 64% for non-bribing patients, bribing patients and patients of public doctor at private facility, respectively, whereas only 34% visits a private doctor for quality.

Who Bribes and Who does not?

There are four important differences between bribing and non-bribing patients apparent in Table 1. First, the income between the two groups is significantly different: average monthly income of the bribing patients is 14,913 Taka whereas it is 10, 315 Taka for non-bribing patients. Second and third, the transportation cost and travel time are also significantly different: A patient who pays consultation fees at the public facilities pays more for transportation (Taka 136 vs. Taka 74) and takes more time to reach the facilities (55 minutes versus 37 minutes) than those who do not pay fees. The mean differences are highly statistically significant. This could mean that richer patients may choose more expensive and faster transports and pay more too. However, since the mean travel time is also higher (74 minutes versus 136 minutes) while no difference in their locations categorized in rural and urban, it is possible that these patients are travelling farther distance. Fourth, there are a few demographic differences, e.g., the bribe payers are older and have significantly more patients from the same household.

Given the differences in the characteristics of bribing and non-bribing patients combined with perceived quality differences between for-bribe and for-free services, it is likely that price discrimination scheme is in play. The public doctors offer a menu of quality-price pair: patients may pay for a better service, or they may opt for a cheaper service for free. Faced with this, patients self-select. The above differences clearly indicate that which patients select the better service for a bribe. This is consistent with anecdotal evidence that patients, when reach a public facility, are often approached by 'agents' asking whether patients are interested on a thorough consultation in exchange for a fee.

Public Doctors at Private Facilities and a Test for Data Reliability

It is important to notice that public doctors charge a lower consultation fee (as a bribe) at public facilities than at private facilities. This difference is significant, both statistically and in magnitude. Given that these doctors are the same doctors with different locations, why would they differ? There are a few plausible explanations. First, it seems that public doctors offer a 'discount' on fees at a public facility for a given quality of service, possibly due to illegality of the fee at a public facility. The discount helps potential complaints at a low level. Second, patients may prefer to consult the doctors in private facilities than in public facilities due to factors such as shorter waiting hours etc. Finally, public doctors face some private costs, like location rentals, electricity and other utility bills, labor costs etc., in providing the service at private facility which may be reflected in higher private consultation fee. Importantly, it seems that the private provision of similar services set the bribe limit; the bribe in public facilities should not exceed the price charged in private facilities and our data supports that. This lends some reliability of our data.

How significant is the size of this bribery and consultation fee, in general? As Table 1 shows, proportion of consultation fee is moderately high for bribing patients: it constitutes about 16% of total medical cost. This is similar to the patients seeing public doctors at private facilities (17.5%) but more than double of that of patients going to other private doctors (7.8%). The share of the medical cost of monthly consumption expenditure and non-food expenditure is also higher for patients seeing public doctors compared to private doctors, irrespective of whether the patient bribes the public doctor or not or meets him in a private facility.

Travel time and Transportation Cost Revisited

Since travel time and transportation costs turn out to be important factors associated with the likelihood of paying a bribe (consultation fees) as well as the size of bribe, we probe further: who are these patients that are attending from distant places and paying bribes. We limit our focus only on the bribe payers. Table 2 divides all bribe payers into four groups – below 25 percentile, 25-50 percentile, 50-75 percentile and above 75 percentile with regard to transportation

cost and travel time and reports descriptive statistics of health related variables (cost, time, diseases, etc.) and socioeconomic characteristics of these four groups.[8]

[Insert Table 2 about here]

One clear pattern emerges. Patients who spend more on transportation, both in terms of money and time, pay more consultation fees and pay more on other medical expenses. They are also more likely to come from rural areas, signaling that they need to travel more to urban areas to reach the public health facilities. The other patient characteristics are very similar. One key observation is that income is not the highest of the patients who come from farthest. This probably suggests that patients who spend less time and money on travel also live in urban areas and therefore, have higher income.

It is worth noting that households who visited public health facilities and paid consultation fees are the ones who paid the largest share of their household income as medical cost (27%) followed by the ones who also consulted public doctors but at a private facility (25%). For the former group, the medical cost was about 43% of household non-food expenditure, and for the latter group, it was about 41%. Hence for these two groups, medical cost represented a substantial portion of their non-food outlays. Those who did not pay bribe at public facilities spent 16% of their household income as medical cost.

Among the bribe payers, the patients who travel a farther distance and pay more transportation cost are more likely the ones with chronic diseases. In case of transportation cost, there is a clear monotonicity of the share of patients with chronic diseases in transportation cost. In this case, the differences are statistically significant from others.[9] In the case of travel time, about 45 percent of the highest group suffers from chronic diseases, whereas this figure is about 33 percent for the 50-75 percentile group.

In short, patients who pay bribe more are more likely to travel to distant places. The patients who travel to the farthest distances and pay the highest transportation cost, also spend more on hospital charge, medicine, tests and

[8] The mean differences (t-stats) of the four groups that are not reported for brevity are available from authors upon request.

[9] The t-statistics of mean differences are for $t_{41} = 2.38$, $t_{42} = 1.27$ and $t_{43} = 0.88$ for transportation cost

tips. This group is more likely to have chronic diseases. However, the income of the bribe payers traveling to farther distances is not different from the ones traveling to the places near-by.

4. Empirical Estimation and Results

We estimate regressions of the following general form:

$$IllegalPayment_i = \alpha + \beta_1 TransCost_i + \beta_2 TravTime + \beta_3 OthCost + \beta_4 HHIncome_i + X_i'\gamma + \varepsilon_i$$

Where *IllegalPayment* is the incident or extent of corruption faced by individual *i*, with a vector of characteristics X_i. *TransCost* is the transportation cost that the individual *i* incurred to visit a public health facility, *TravTime* is travel time in minutes, *OthCost* is sum of other medical expenses and *HHIncome* is the annual household income. We first use OLS to estimate the model in order to get the sense of the magnitude of coefficients. We then estimate a logit model for the incidence of corruption and OLS to estimate the determinants of corruption conditional on corruption.

Incidence of Corruption: Who Pays Illegal Fees?

We consider only the patients visiting public health facility. Given that the patient has already chosen the public health facility, we analyze whether a patient pays the fee or not. Therefore the dependent variable (*IllegalPayment*) takes the value of 1 if a patient pays illegal fees and 0 otherwise. The OLS results on the incidence of corruption are given in columns 1 to 4 in Table 3.

[Insert Table 3 about here]

We consider the travel time first. Travel time is a proxy for the effort cost of reaching the public health facility. We find that a ten minute increase in travel time increases the incidence of fee payment by 1% (column 1) and the coefficient is statistically significant at the 1% level. Whereas travel time represents the distance and associated effort cost, transportation cost is important since for a given distance, a higher transportation cost would imply quicker transport and lower travel time. Furthermore, as richer patients have a higher opportunity cost of time, income needs to be controlled for as well. Controlling for transportation cost in specification 2 and additionally annual household

income in specification 3 neither alters the size of coefficient of travel time nor the degree of significance. In column 4, we additionally control for disease variables. The magnitude of the coefficient remains unchanged, and it remains statistically significant at the 1% level. In contrast, we do not find transportation cost to be statistically significant in any of the specifications.

Income is an important variable to define a person's ability to pay for bribes as found in the literature (see, e.g., Svensson, 2003; Hunt, 2010). We consider income as a control variable first in column 3 in addition to travel time and transportation cost. In column 4, we add disease variables as further controls. We observe in column 3 that a one thousand taka increase in household income increases incidence of fee payment by 0.6% and the coefficient is statistically significant at the 1% level. With additional disease controls in column 4, the coefficient remains that same and statistically significant at the 1% level. Based on the above, we find that income elasticity of paying illegal fee is 0.10.[10] These findings are consistent with those of Svensson (2003) and Hunt (2010), who also found that firms and households with higher ability to pay do in fact pay higher bribes.

One potential concern with the above estimation is that we do not consider patients' all available options. In order to do so, we also consider a more general multinomial choice framework where we incorporate patient's all choice of health facilities along with fee payment.[11] The results obtained from multinomial logit estimation are also found to be qualitatively similar to OLS and logit models: the coefficients of travel time and annual income remain statistically significant (Appendix Table A3).[12]

[10] Whereas the above results are obtained using a linear probability model, results obtained from a logit model are presented in the appendix Table A2. We find that the marginal effects of travel time and annual household income are slightly higher in logit models and the coefficients are statistically significant at 1% level in all specifications.

[11] The five options are: i) going to a public health facility and not paying consultation fee, ii) going to a public health care facility and paying consultation fee, iii) going to a public doctor at a private health care facility, iv) going to a private doctor at a private health care facility, and v) going to other private practitioners such as pharmacists, homeopaths and traditional healers.

[12] For the sake of brevity, we do not report the results here. These are available upon request.

Extent of Corruption: Who Pays More?

We now analyse the extent of corruption by using the amount of unofficial consultation fee paid to doctors at public health facilities, conditional on incidence of bribe payment. The OLS results are reported in columns 5 to 8 in Table 3.

Following previous section's organization, we start with discussing the effect of travel time. In column 5 of Table 3, we control for demographic variables only. We find that a 1 minute increase in travel time increases the consultation fee by 0.99 Taka and the result is statistically significant at the 1% level. Since travel time depends on the amount spent on travel, we control for transportation cost in column 6. We find that the effect of travel time going down to 0.59 taka, but the impact is still statistically significant at the 1% level. We additionally control for income and diseases in columns 7 and 8. We find that there is no significant change in the magnitudes and the coefficients are statistically significant at the 1% level. We introduced transportation cost in specification 2. We find that a one taka increase in transportation cost increases consultation fee by 0.14 Taka and the effect is statistically significant at the 10% level. Since richer patients may take more expensive transportation, we further control for income to distil the effect of distance. In column 7, we find that the coefficient of transportation cost has not changed much in magnitude and is still statistically significant at the 10% level. Adding further disease controls leaves the coefficient almost unchanged with statistical significance at the 10% level.

We now focus on annual income to investigate patient's ability to pay for consultation fee. In column 7, we first note that a one thousand taka increase in household income results in 1.21 Taka increase in consultation fee and it is statistically significant at the 5% level. With additional disease variables in column 8, we find that annual income's coefficient is now 1.206 and this effect is statistically significant at the 5% level.

Comparison with HIES 2000 and HIES 2005 Data

While our empirical results establishes that travel time, transportation cost, and household income are associated with high payment of illegal fees at public health care system, these findings may be specific to the particular survey year 2010. To see the patterns of bribery over time, we have redone the above analysis with the previous two rounds

of HIES data – HIES 2000 and HIES 2005 and compared them with the above results. We find that the results using HIES 2000 and HIES 2005 are qualitatively similar to that of HIES 2010.[13]

5. Understanding the Mechanisms

There are three results coming out of above the empirical analysis; we take each one by one.

First, patients that bribe are different from those who don't at least in two observable characteristics: the effort cost, measured by amount of time spent on travelling, and annual income. Given that the percentage of bribe-paying patients who chose the facility for quality is higher than that of non-bribing patients, there is a perceived quality difference between the two services as well. This indicates a potential second degree price discrimination scheme in place where the doctors offer a menu of price-quality pairs: low-quality free-service or higher-quality paid (bribed) service. Patients then self-select. In other words, the doctors maintain another service window which is illegal, but they make-it up with a better quality service and some patients actually opt for it.

The above result raises an important question: is the existence of bribery, coupled with quality improvement, efficient? It is not very obvious. On the one hand, the doctors, as low-paid public servants, are not expected to put in extra effort to improve service quality in the absence of any explicit incentive. Given that they have to sit in a public facility for a big-chunk of time throughout day, a patient in need of a high quality service and probably willing to pay for it does not get that. Bribery coupled with higher quality service solves that incentive problem. In that way, it is probably efficient. On the other hand, one may argue that if the laws are strict for which such bribery is impossible and there is no potential opportunity to extract money from the patients, the average service quality offered by public doctors for free may have improved, which would potentially benefit all patients, not only the one with higher ability and willingness to pay. However, it is also plausible to argue that unless a restriction on private practices of public doctors is imposed, patients with higher income and willingness-to-pay, in the absence of bribe-paid higher quality option in public health services, will consult public doctors in private facilities. Such a legal restriction imposed in the past that aimed at a similar outcome is discussed in the concluding section.

[13] The results are available upon request.

The finding is very similar to the concept of what is known as "grease money" or "speed money". If a citizen approaches a government agency for a service, (say a business permit or a driver's license), the citizens often are faced with two options: wait for a long time to get the service or make a bribe payment and get the service quicker. Hence, a public official tends to offer a price-quality pair from which a service seeker needs to select. Our findings suggest that service seekers, who spent relatively more time to arrive the agency, potentially travel far, and more often end up choosing the quicker service-positive bribe pair.

Our second result is that the public doctors, when at public facility, charge less compared to when they operate in a private facility. This is a very important result for a number of reasons. First, it provides a comparison between price determined in a free market and an illegal market. We should expect that the former price to be higher than the latter price and we do find it here, despite the fact the patients in all other respects are very similar. This in other words provides a test for the quality of our data. Since the bribe is less than the market determined fee, our data on bribery in most likelihood has low reporting bias. Second, it is possible the quality could be lower in public facilities. However, unlike the differences between bribing and non-bribing patients, the differences between bribing patients and patients seeing public doctors at private facility are insignificant. This suggests that the public doctors, when they charge a bribe, probably attract those patients.

Our third result uncovers a form of price discrimination strategy, to the best of our knowledge, not previously considered in the literature. Once patients decide to pay a bribe in exchange for a better service, public doctors seem to charge patients differentially according to their willingness to pay. To this end, the most interesting result is a pricing strategy based on effort and monetary cost spent on travelling to the facility. Given that the patient chose to pay for a service, they also pay more if they travel far, captured in their travel time and transportation cost. There are several reasons for this. First, a greater distance traveled indicates a greater willingness to pay for a higher quality service. Second, patients coming from far are probably traveling to a different city or a different part of the city, where they are less aware of the rules of engagement as well as alternatives available for them. This makes them more prone to pay a bribe and pay more.

5. Conclusions and Policy Implications

In this paper we investigated the factors that affect the incidences and the amount of bribes paid to the public doctors as consultation fees in Bangladesh. We find that bribe givers and non-givers differ in terms of a number of observable characteristics. We find a robust result that patients who travel farther approximated by travel time and transportation cost are more likely to pay a bribe to consult public doctors at public health facilities and pay more fees, holding other characteristics of the patients constant. In addition, richer patients in terms of higher annual household income have greater incidence of paying fees and also pay more. Our finding suggests that public doctors practice a discriminatory pricing policy, and it is likely that richer patients travel farther and self-select into fee paying services. However, patients who make payments to public doctors in public facilities are very similar to patients who visit public doctors at private facilities, and it is likely that private health care market sets the limit of bribe charged at the public health care system.

Findings of our study imply that in Bangladesh, patients consider doctors working in public health care system as of higher quality compared to other providers such as doctors working in private health care system. Whether the perceived quality difference is real or not is another issue. However, due to this perceived difference in quality, patients are willing to pay a premium for their services rendered either in public or in private hospitals, and it is not unlikely that such patients, many of them may travel far to avail it and pay a premium for such services.

Not surprisingly, whether to ban private practices of public doctors has been widely discussed by policy makers in Bangladesh. In fact, in late 1980s, there was a brief period when public doctors were not legally allowed to have private practices or consult patients outside public health system.[14] Anecdotal evidence and discussions with medical practitioners suggest that the then government gave way to the doctors lobby groups such as the Bangladesh Medical Association. However, given that patients perceive public doctors' service as a superior good, and are willing to pay a premium for it, such a ban would perhaps have resulted in higher illegal fees and more congestion at public facilities defeating the purpose of the policy.

[14] For a recent reference, see, for example, Dola (2010).

As discussed in Section 3, travel cost and travel time pick up the effect of distance, a patient has to travel to reach public facilities. The finding that patients living far from the public facilities pay more underscores the importance of greater penetration of public health facilities in the rural areas. It is worth noting that currently the health facilities at the union level are short in supply - among 4,466 total Unions, only 1,312 unions have USCs. Among the patients who sought some kind of treatments in 2010, only 10.4 percent went to public health facilities. While the government of Bangladesh is spending 6.2 percent of its national budget on health (in 2010-11 fiscal year), it indicates very low return of public health expenditure.[15]

[15] Budget in Brief (2007-08), Ministry of Finance, Government of Bangladesh.

Appendix

Table A1: Total and average number of patients at different public hospitals

Type of hospitals	Number of hospitals	Total number of patients	Average number of patients	Estimated total number of patients	Percentage of patients
Medical College Hospitals	10	2,764,824	276,482	3,592,466	7.8%
General Hospitals	2	209,892	104,946	944,514	2.1%
District Hospitals	41	3,552,924	86,657	4,072,879	8.8%
Sub-Districts Health Complexes	350	19,075,504	54,501	22,508,913	48.8%
Union Sub-Centers	1,362	14,979,600	10,998	14,979,600	32.5%

Source: Director General of Health Services Website

Note: Number of hospitals in each category represents the number of facilities from which this data was available. The total and average number of patients represents number of outpatients in those facilities. The estimated total number of patients is computed by average number of patients × total number of facilities.

Table A2: Determinants of the incident of corruption – Logit regressions

Variables	(1)	(2)	(3)	(4)
Travel time (in minutes)	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Transportation cost (in Taka)		0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)
Annual income (in 000 Taka)			0.007***	0.007***
			(0.002)	(0.002)
Age (in years)	0.002*	0.002*	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Household lives in rural area (rural=1)	-0.059	-0.058	-0.044	-0.044
	(0.043)	(0.043)	(0.043)	(0.044)
Observations	987	987	987	987
Pseudo-R2	0.0315	0.0317	0.0500	0.0600
Log-likelihood	-646.4	-646.3	-634.1	-627.4

Numbers in the parentheses are standard errors. ***, **, * indicate significant at 1%, 5%, and 10% level respectively. All regressions control for the age of patient, household head, religion, whether household head is female, total number of patients from a household. Additional controls in column 4 include if the patient has chronic disease, cardio-vascular and respiratory diseases, infectious and communicable diseases, female diseases, other diseases, disability, and number of symptoms (patient has two symptoms or diseases, and patient has three symptoms or diseases).

Table A3: Multinomial logit with five options; (base outcome: patients going to public facility and making no payments)

VARIABLES	(1) Public doc at Pub. Facility, w/ payment	(2) Public Doc at Pvt. Facility	(3) Other Pvt. Health professionals	(4) Other Pvt. practices
Transportation Cost	0.0002***	0.0008***	0.0011***	-0.0024***
	(0.0000)	(0.0002)	(0.0003)	(0.0004)
Travel Time	0.0001**	0.0005**	0.0000	-0.0007*
	(0.0001)	(0.0002)	(0.0003)	(0.0004)
Annual Income	0.0003***	0.0013***	0.0004	-0.0012*
	(0.0001)	(0.0003)	(0.0006)	(0.0007)
Age	-0.0001	-0.0005*	-0.0001	0.0010***
	(0.0001)	(0.0003)	(0.0004)	(0.0004)
Patient is female	0.0002	0.0144***	-0.0049	-0.0081
	(0.0023)	(0.0044)	(0.0073)	(0.0070)
Household head is patient	0.0095	0.0111	0.0061	-0.0312**
	(0.0063)	(0.0108)	(0.0138)	(0.0142)
Household is Muslim	0.0117	0.0186	-0.0234	-0.0180
	(0.0085)	(0.0179)	(0.0283)	(0.0323)
Head of Household is female	0.0004	-0.0000	0.0003	0.0002
	(0.0009)	(0.0018)	(0.0024)	(0.0024)
Household lives in rural area	-0.0253***	-0.0779***	0.0572**	0.0775***
	(0.0080)	(0.0163)	(0.0251)	(0.0292)
Number of patients from the household	0.0029**	-0.0022	-0.0010	0.0033
	(0.0014)	(0.0024)	(0.0035)	(0.0032)
Patient has a chronic disease	0.0143**	0.0905***	-0.0218	-0.0918***
	(0.0065)	(0.0131)	(0.0182)	(0.0176)
Patient has a cardio-vascular and respiratory disease	0.0131	0.0820***	-0.0227	-0.1168***
	(0.0110)	(0.0216)	(0.0286)	(0.0274)
Patient has infectious disease	0.0206**	0.0191	0.0291	-0.0738***
	(0.0099)	(0.0168)	(0.0216)	(0.0225)
Patient has physical problems	0.0117	0.0907***	-0.0253	-0.0771***
	(0.0076)	(0.0160)	(0.0169)	(0.0188)
Patient has a female disease	0.0306	0.1617***	0.0001	-0.1907***
	(0.0305)	(0.0460)	(0.0489)	(0.0406)
Patient has other diseases	0.0277***	0.0879***	-0.0194	-0.1285***
	(0.0097)	(0.0178)	(0.0203)	(0.0231)
Patient has two symptoms/diseases	-0.0097	-0.0164	0.0563**	-0.0298
	(0.0068)	(0.0148)	(0.0247)	(0.0243)
Patient has three symptoms/disease	-0.0140	-0.0608**	0.1882***	-0.0635
	(0.0127)	(0.0245)	(0.0611)	(0.0676)
Observations	9,454	9,454	9,454	9,454
Pseudo R-squared	0.0684	0.0684	0.0684	0.0684
Log-likelihood	-11371	-11371	-11371	-11371

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

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Table 1: Mean comparisons and differences of key variables across comparable health care facilities

Variables	Public doctors w/o payment (1)	Public doctors w/ payment (2)	Public doctors at pvt. facility (3)	Other private facilities (4)	t statistics of mean differences $t_{x_1-x_2}$	$t_{x_3-x_2}$	$t_{x_4-x_2}$
Consultation fee (in Taka)	0.000	148.295	204.638	52.348	-16.688	3.309	-12.072
	(0.000)	(214.799)	(323.102)	(131.944)			
Travel time (in minutes)	37.217	54.826	56.498	30.357	-4.379	0.334	-5.876
	(44.096)	(81.402)	(91.311)	(76.369)			
Transportation cost (in Taka)	73.839	135.665	146.201	39.993	-2.680	0.431	-4.341
	(292.826)	(432.108)	(436.566)	(403.881)			
Monthly household income ('000 Taka)	10.315	14.913	15.751	11.603	-5.829	0.611	-3.402
	(9.560)	(15.197)	(26.385)	(18.468)			
Age (in years)	26.603	30.097	30.713	27.150	-2.452	0.484	-2.522
	(21.130)	(23.217)	(22.539)	(21.357)			
Households lives in rural area (rural=1, 0 otherwise)	0.606	0.593	0.608	0.731	0.413	0.540	5.682
	(0.489)	(0.492)	(0.488)	(0.443)			
Number of patients from household	2.860	3.288	3.096	3.047	-3.579	-1.719	-2.353
	(1.675)	(2.072)	(1.973)	(1.865)			
Patient has a chronic disease (yes=1, 0 otherwise)	0.281	0.342	0.388	0.240	-2.067	1.679	-4.343
	(0.450)	(0.475)	(0.487)	(0.427)			
Share of consultation fee in total medical cost (in %)	0.0%	16.3%	17.5%	7.8%	-21.338	1.400	-11.332
	(0.000)	(17.786)	(15.489)	(12.959)			
Share of medical cost in consumption expenditure (in %)	10.6%	18.6%	16.1%	6.8%	-2.450	-1.103	-6.441
	(35.106)	(66.690)	(29.292)	(24.300)			
Share medical cost in non-food expenditure (in %)	29.8%	44.4%	40.8%	18.4%	-1.949	-0.741	-6.158
	(110.939)	(122.181)	(75.643)	(67.730)			
Number of observations	584	403	1497	2308			

* Numbers in parentheses are standard deviations. Numbers of observations for education of household head are 140, 114, 403 and 543 for groups 1, 2, 3 and 4, respectively.

Table 2: Characteristics of households by the distribution of travel time and transportation cost for bribe-payers

Variable	Transportation cost for bribing patient				Travel time for bribing patient			
	< 25 pctile	25 - 50 pctile	50 - 75 pctile	75 pctile<	< 25 pctile	25 - 50 pctile	50 - 75 pctile	75 pctile<
Consultation fee (Taka)	102.374	64.938	115.981	328.651	88.586	108.566	147.927	297.553
Travel time (minutes)	30.952	20.703	42.915	135.709	10.910	25.822	52.182	165.753
Transportation cost (Taka)	0.000	18.375	63.840	543.372	33.252	41.579	140.218	434.706
Hospital/clinical charges (Taka)	36.020	0.000	36.840	1201.047	50.523	51.362	171.455	1878.176
Cost of medicine (Taka)	492.238	444.141	749.519	2562.407	644.856	615.724	823.200	2237.118
Cost of test/investigation (Taka)	71.088	43.906	74.104	757.558	208.784	68.750	193.636	494.000
Tips (Taka)	0.000	0.000	0.000	13.953	0.000	0.000	1.818	12.941
Monthly household income (000 Taka)	15.453	17.037	11.295	16.867	16.040	15.092	13.365	14.121
Age (years)	25.313	28.031	34.840	33.965	28.649	28.375	31.636	34.071
Household lives in rural area (rural=1)	0.483	0.438	0.726	0.733	0.405	0.533	0.764	0.835
Number of patients from household	3.258	3.219	3.132	3.581	3.207	3.303	3.982	2.918
Patient has a chronic disease (yes=1)	0.279	0.328	0.368	0.43	0.333	0.296	0.327	0.447

Table 3: Determinants of the incident of corruption and extent of corruption

	Incidence of bribe payment				Bribe amount, conditional on bribe incident			
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Travel time (in minutes)	0.001***	0.001***	0.001***	0.001***	0.989***	0.592***	0.585***	0.568***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.198)	(0.221)	(0.216)	(0.208)
Transportation cost (in Taka)		0.000	0.000	0.000		0.139*	0.135*	0.128*
		(0.000)	(0.000)	(0.000)		(0.075)	(0.074)	(0.072)
Annual Income (in 000 Taka)			0.006***	0.006***			1.210**	1.206**
			(0.001)	(0.001)			(0.468)	(0.488)
Age (in years)	0.002*	0.002*	0.001	0.001	0.830**	0.774*	0.707*	0.271
	(0.001)	(0.001)	(0.001)	(0.001)	(0.414)	(0.397)	(0.393)	(0.481)
Household lives in rural area (rural=1)	-0.055	-0.055	-0.042	-0.042	-14.025	-9.289	-7.385	-9.816
	(0.041)	(0.041)	(0.040)	(0.041)	(18.941)	(18.884)	(18.638)	(18.774)
Constant	0.232***	0.233***	0.179**	0.158*	9.367	21.319	9.414	2.740
	(0.086)	(0.086)	(0.085)	(0.087)	(44.781)	(40.747)	(40.222)	(46.123)
Observations	987	987	987	987	403	403	403	403
R-squared	0.042	0.042	0.064	0.078	0.164	0.220	0.227	0.248
Log-Likelihood	-678.4	-678.3	-666.8	-659.6	-2699	-2685	-2683	-2678

Numbers in the parentheses are standard errors. ***, **, * indicate significant at 1%, 5%, and 10% level respectively. All regressions control for the gender of the patient, household head, religion, whether household head is patient, whether household head is female, and the total number of patients from a household. Additional control in columns 4 and 8 include if the patient has chronic disease, cardio-vascular and respiratory diseases, infectious and communicable diseases, female diseases, other diseases, disability, and number of symptoms (patient has two symptoms or diseases, and patient has three symptoms or diseases).