Corruption in Health Sector:
Evidence from Unofficial Consultation fees in Bangladesh

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This Version: 30th September, 2009

Abstract

We study the incidence and extent of 'extortion' payment made to the doctors in public health facilities using a nationally representative Household Income Expenditure Survey (HIES) of Bangladesh. A key advantage of using HIES is that it is free from any reporting bias which otherwise occurs in surveys designed purposely for studying corruption. Though consultations are free in public health facilities, HIES data shows that a large number of patients visiting public health facilities have paid fees. We focus on three set of variables to explain incidence and extent of doctor's extortionary power: relation-specific expenditures of patients (transportation cost and travel time), ability of patients to pay (annual income and land ownership), and market power of doctors in public health facilities (proxied by number of total persons engaged in the major health facilities in a community). We found that all three sets of variables are statistically significant in explaining the incidence of corruption, even though travel variables have a negligible effect on incidence of corruption. Furthermore, travel variables and total persons engaged significantly explain the amount of extortion payments in the form of consultation fee whereas the income and wealth are not robust in explaining extortion payments. Consistent with the hold-up theory, high likelihood of extorting payment deter patients visiting public health facilities.

Keywords: Corruption, Public Sector, Public Health, Price Discrimination, Publicly provided goods, Hold-up problem

JEL Classification: D73, I18, L11, O17, H42

I. Introduction

What is the extent of corruption in public sectors and who pays how much of it remain important questions for policy makers in rich and poor countries (WDR, 2004). However, due to the inherent difficulty of measuring illegal activities such as corruption, the most evidences on the incidence and magnitude of corruption rely heavily on perception based indices, which are subjective by their nature and have obvious limitations.[1] Absent factual measurements of incidence and magnitude, there could be little consensus on how to reduce corruption and where to allocate efforts for corruption reduction. In this paper, we use objective measures of the incidence and determinants of corruption in public health services in Bangladesh using micro level data.

Public health services are important components of public services in general and health services in particular in Bangladesh. Like many other developing countries, most of the basic public health services including consultation with doctors at public health facilities are free in Bangladesh. However, charging fees for such services is very widespread (Transparency International, 2006)[2]. For instance, in Bangladesh about 44% patients who visited public health facilities had to pay consultation fee to the doctors in 2005 with mean payment of 44 taka and standard deviation of 103 taka[3]. Thus, questions arise: Who pays this 'fee' and who doesn't? Why some patients are paying more than others? Do fees deter (hold-up) patients from visiting public health facilities?

Using nationally representative Household Income and Expenditure Survey (HIES) of 2005 for Bangladesh, we address these two questions. 2005 HIES collected detailed information on expenditures on different goods and services including health. The section on health related expenditure includes the amount of money spent for doctor consultation,

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[1] See Rose-Ackerman for a survey of this literature. Svensson (2003), among others, discusses the shortcomings of perception based cross-country studies.

[2] The Transparency International (TI) made health sector as their main theme for their Global Corruption Report in 2006 where a whole section was devoted to informal payments. The report, for example, reveals that 84% of total health expenditure can be attributed to informal payments whereas it constitutes half of total out-of-pocket expenditure in Georgia, the major component (70% – 80%) in health expenditure. Similar practices exist in countries like Russian Federation, Poland, Tajikistan and Albania. The report also presented evidence this kind of payment is also quite prevalent in countries like Slovakia, Latvia, Bulgaria and Romania.

[3] Calculated from 2005 HIES. $1 = 69 Taka.

other related fees and information on whether the patient visited public or private doctors. These information allow us to identify unofficial payments made to the doctors which is free from any reporting bias. In this study we explain the factors that determine the incidence and the extent of these unofficial 'fees' made in public health facilities and if the likelihood of paying such fees deter some patients.

Our paper is related to the recent growing applied microeconomic literature that quantifies corruption using micro level data. The central issue of this new literature has been measuring leakages of public expenditure allocation, explaining the efficiency of public service providers and probing the incidence and extent of corruption based on the characteristics of recipient of the public services (e.g., household and firm)[4].

Svensson (2003) was perhaps the first to analyze unofficial payments on cross section of firms in Uganda where he found that firms on which public officials has more control (measured by indices developed by the author) has a higher probability to pay whereas firms with a higher ability to pay (proxied by current and future profitability) and lower refusal power (proxied by estimated alternative return on capital) had to pay more due to weaker bargaining power. Similarly, Hunt (2007) analyzed unofficial payments in health care sector in Peru and Uganda and found that richer patients are more likely to pay bribes as well as pay more. Both Svenson (2003) and Hunt (2007) use data set that contains quantitative information on bribe payments, where respondents were asked how much they had to pay to get access to services (customs, licenses, electricity, telephone etc in Svenson's case and healthcare in Hunt's case). While they are informative, the direct reporting on bribes can lead to under or over reporting depending on the bribe-payer's objectives, which our data is free from.[5] In addition, Svenson (2003) has a large number of missing bribery data (27.5%) where firms refused to report on bribes paid which raises the issue of selection bias (which confirms Bertrand et al (2006) observation quoted above).

[4] see Reinikka and Svensson, 2003 for detail

[5] In discussing about the need of micro data regarding corruption, Bertrand et al (2006, p.29) mention that "Had we ran a survey simply asking individuals who had obtained a license whether they paid bribes, we have had concluded that there was no corruption in the bureaucratic system."

Other relevant studies for the current purpose are Banerjee, Deaton and Duflo (2004), Bertrand et al (2006), and Olken and Barron (2007). Based on survey data collected from one district in rural Rajasthan in India, Banerjee, Deaton and Duflo (2004), who evaluated the impact of access to health care on well being, also reported incidences of informal payments in public health facilities. Bertrand et al (2006) in the context of obtaining driving license in New Delhi in India have focused on regulations and bureaucratic corruption and found that the bureaucrats respond to private needs; they (bureaucrats) however ignore socially important components of regulatory objectives. Olken and Barron (2007) using a survey in combination of a natural experiment have examined how the extent of corruption changes with a change in market structure and found that the market structure has an impact on the total amount of bribes charged. In addition, their findings also support the standard hold-up theory.

In this paper, unlike the existing literature, we have overcome biases created by the "direct reporting" on bribes and un-representativeness of samples by using a nationally representative sample that was collected for measuring living standard. None of these papers however have used a nationally representative as well as household survey as we did in this paper. Furthermore, our data are collected by Bangladesh Bureau of Statistics, the public organization responsible for statistical data collection in the country.

We have found that, relationship specific expenditures of patients – transportation cost to travel to health facility in this case – increase the unofficial consultation fee consierably. However, the travel variables do not explain incidence of corruption significantly. The positive effect of travel variables in explaining higher unofficial fees lends support for hold-up problem (Grossman and Hart, 1986).

We have also analyzed the effect of changes in market power of the public doctor on the unofficial consultation fee. It turns out that Reduction in doctors' market power, as captured by higher number of staffs in public hospitals, is found to reduce the incidence as well as amount of unofficial payment. Greater number of doctors and staff enhances competition and collusion becomes harder which reduces unofficial payment and the incidence of corruption.

The rest of the paper is organized as follows. Section II sets up the institutional background, Section III briefly discusses the conceptual framework for the factors determining the bargaining process and section IV presents the empirical model and data. Section V discusses the results on the incidence of corruption and the extent of corruption. Section VII draws conclusion.

II. Institutional Background

Government of Bangladesh aims to provide basic health care services that include reproductive health care, child health care, communicable disease control, limited curative care, and behavior change communication. A considerable amount of these services including consultation with doctors and provision of some essential medicines are provided for free at the public health facilities.

The public health facilities are located based on the administrative layout. For administrative purposes, the country is divided into 6 divisions, 64 districts and 508 sub-districts. At a lower level, there are 4466 unions in rural areas and 2300 wards in urban areas. All the divisional and district cities and sub-district towns have public hospitals. At a lower level, however, not all the unions have public health facilities. More specifically, there are only 1362 Union (Health) Sub-Centers (USCs) which mostly provide curative, preventive and family welfare services at the union level. These USCs have four sanctioned posts with one doctor. There are also 17 Rural Health Centers which are 10 bedded and has 20 sanctioned posts with two doctors. Finally, there are 35 20-bedded hospitals located at some unions, which covers only 0.7% of the unions.

At a higher level, the Sub-District Health Complexes (SHCs) at sub-district towns operate as a hub to the primary health care at the bottom tier of the health administrative layout. There are 153 50-bedded SHCs and 260 31-bedded SHCs with nine sanctioned posts for doctors including junior consultants and surgeons. These health complexes provide the first level referral services to the community.[6]

Beyond the Sub-district, there are District Hospitals located at the District cities that provide second level referral services. These are usually 100 bedded Hospitals, but some (nine) of these are also 250 bedded (these are called General Hospitals). A greater number and lines of consultative services are provided at these facilities. A few other districts also have public medical college hospitals and specialized hospitals as well. All these health facilities provide secondary as well as tertiary level health care.

At the divisional level, there are no public hospitals as such, but the divisional cities have at least one medical college hospital with some divisional cities even have specialized hospitals (these are chest, leprosy and infection disease hospitals) and institute (research) hospitals. Most of the Medical College Hospitals located at Divisional cities are at least 500 bedded and provide tertiary level health care services. There are also post graduate hospitals, school health clinics and urban dispensaries.

It is clear from the above that patients in large cities have better access[7] to the public health services than smaller cities and the smaller cities have better services than rural areas. Furthermore, most unions do not have a USC and therefore, the patients in those unions need to travel out of the unions if they wish to travel to a public health facility. In addition, evidence shows that the staffing norm in SHCs and USCs are much different from actual staffing situation: 68% of USCs do not have a doctor and the mean number of doctors at SHCs is 5.35.[8] This indicates that the access of patients in rural areas varies considerably and so does doctor's market power.

[6] Note that the total number of SHCs is less than total number of sub-districts. The reason is that each district head quarter, located in the city, also contains a sub-district and therefore, there is no SHCs in these district head quarters since they already have a Sadar or General Hospital.
[7] Not necessarily in per capita term.
[8] See Final Report of Social Sector Performance Survey: Primary Health and Family Planning in Bangladesh (2005).

The sub-districts in general are not very large geographically (the average size of a sub-district is 290 square km) and there are different forms of transportation available to an individuals. Anecdotal evidence suggests that commuters mostly use slow, non-motorized vehicles or simply walk to the sub-district towns from most unions. There are also motorized vehicles, both public and private, available to the individuals in many unions. As can be expected, the options of motorized vehicles are larger for unions that are located on the road linking two large cities..

The number of patients at each type of hospitals is given in the table in appendix 1. 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 hospitals visit Sub-District Health Complexes and 32.5% go to Union Sub-Centers. This indicates that SHCs and USCs serve a very large part of the health market and can have significant market power and associated consequences over a large population.

III Analytical framework

In this section we present an analytical framework that helps to understand the incidence and magnitude of corruption and the hold-up possibility. It should be seen as providing a background to our empirical investigation and the types of behavior that we are interested in investigating.

When an individual gets sick or injured, he faces a multitude of options such as consulting doctors in private health facility or in public health facility, or taking traditional medicines etc. We abstract from these, and focus on choosing between not seeking treatment and visiting a public health facilities. If the agent decides not to seek treatment, the expected utility is $u(l)$ while if the agent decides to visit a public health facility, the expected utility is $u(h)$. However, visiting a public health facility requires incurring a cost F.

Our analysis proceeds in several steps. We consider a two-period model where in period 1, the agent forms expectation about F based on his prior experience, and information available in the neighborhood. Based on these, the agent decides if to seek treatment in period 2. We treat $u(l)$ and F as given and consider the role of agent specific characteristics (income and type of sickness) in seeking treatment. Second, we informally discuss the role of bribe in our setting and argue that our empirical results imply patients' likelihood of visiting public health facilities decreases with bribe and increases with his bargaining power. Third, we consider the possibility of hold-up due to F and bribe.

Assume that in period 1, a patient can make a fixed, non-contractible investment at cost F, which is given by an indictor variable I, which equals 1 if the patient invests and 0 otherwise. In period 2, there is a potential gain $g(I)$ from going to a public health facility where g

$$(1) \qquad g = \begin{cases} G & \text{if } I=1 \\ 0 & \text{if } I=0 \end{cases}$$

We assume $G > F$ (otherwise, no patient will visit public health facilities).

Assume that both doctor (D) and patient (P) make a simultaneous claim, $u_i \in [0, G]$, and the gain G is divided through Nash bargaining, and the payoffs are given by:

$$(2) \qquad g = \begin{cases} u_i & \text{if } u_D + u_P \leq G; \\ 0 & \text{otherwise} \end{cases}$$

Here, any combination of $u_P + u_D = G$ is an efficient equilibrium. The normal form of the whole game can be described by the set of pure strategies $S_P = \{0, 1\} * [0, G]$ and $S_D = [0, G]$ and the payoff functions for the patient and the doctor are given by:

$$(4) \qquad s_P = \begin{cases} u_P - F & \text{if } I=1 \text{ and } u_D + u_P \leq G; \\ -F & \text{if } I=1 \text{ and } u_D + u_P > G; \\ 0 & \text{if } I=0 \end{cases}$$

and

$$(5) \qquad s_D = \begin{cases} u_B & \text{if } I=1 \text{ and } u_D + u_P \leq G; \\ 0 & \text{if } I=0 \end{cases}$$

The following two equlibria are of particular interest:

Equilibria I: A set of efficient equilibria is given by $I=1$ in combination with any pair of claims (s_P, s_D) such that $s_P + s_D$ = G and $s_P \geq F$.

Equilibria II: A set of inefficient equilibria is given by I=0 in combination with any claim by the doctor $s_D \geq G - F$ and a corresponding claim by the patient $G - s_D$.

Discussion of Equilibria I: Determinants of equilibrium s_D

In this case patients visit public health facilities and the pay-offs are allocated through bargaining between patients and doctors. The determinants of the bargaining power, more specifically, the equilibrium allocation of G between s_P and s_D, warrants further elaboration. In our analysis, we are particularly interested in explaining the determination of s_D, which is the unofficial payments made to the doctors.

The bargaining power of the patient typically depends on income, education, type of diseases, distance from health facilities, transportation cost and other unobservables, whereas, for the doctors, it depends on the competition from other doctors in the neighborhood, both private and public.

We first consider income and wealth of a patient as determinants of his/her bargaining. An increase in Income of the patients increases the willingness and ability to pay for fees and it may weaken their bargaining power. Though the doctors don't have the income or wealth information at the beginning, this information may be revealed through appearance and conversation, and repeated interactions. On the other hand, doctors may not ask for unofficial fee from a well-off person who can be socially well connected. Moreover, land rich persons in rural areas are often influential and may not be charged any fees because the local doctors may want to maintain good relationship with them. Therefore, income and wealth effect on the incidence and extent of unofficial payments made to the doctors are not very obvious.

Severity of health shock such as critical diseases and its extent of urgency can also affect patients' bargaining power. In case of emergency, patients can be expected to seek immediate attention of the doctors and therefore, may be less reluctant to bargain with doctors. On the other hand, some diseases by nature may result in lower bribe payment. For example, in case of chronic diseases which require frequent visits by the patients, doctors and patients may develop a relationship through frequent meetings and doctors may charge less, if not zero.

Every patient needs to make a certain amount of effort (e.g., time and cost to reach hospital), in order to reach the health facility for treatment. In the event a fee is charged for the service, a patient may disagree to do so since it is illegal. However, disagreeing to pay may also cost the patient by not getting the service. In that event, the patient not only loses the service but the effort made to reach the facility also becomes sunk. Furthermore, this cost is higher if the effort made is higher. Hence, the patient with greater effort will have a lower bargaining power and may end up paying more.

Individual characteristics such as patients' age, sex and religion may also play role in the bargaining process. Young, female and minority groups may have lower bargaining power and end up paying more. However, when young and female patients are accompanied by adult and male, which is very likely in developing countries, this argument will not hold.

The bargaining power of the doctors hinges heavily on their market power in their local health services market which in turn depends on availability of other health facilities, both private and public. Wilson (1989) in his celebrated work suggested that a greater number of service windows limit the ability of bureaucrats to charge extortion since individuals can always switch to a different window if such a charge is made. In our context, a larger number of doctors increases competition among the doctors in a public health facility and also makes it harder to collude. We can therefore expect that increased number of doctors should reduce consultation fee.[9]

Discussion of the equilibria II: Hold-up problem

In this case patients are deterred to visit hospital as their initial cost to reach the facility and the doctor's claim (unofficial fees) are too large to cover their benefit from the health care. Transportation cost incurred and time spent to reach a public health facility can make patients vulnerable to ex-post exploitation by health service providers. In rural areas where public health facilities are dispersed and private health facilities are limited in supply, patients after arriving in public health facilities can potentially be held up by doctors. If patients know it, we would observe too few sick people visiting public health facilities. This is an example of the standard hold-up problem (Grossman and Hart, 1986).

The information set available to the patients about the distribution of doctor's fees can be an important determinant of the hold-up problem. If the patients know about the higher fees of the doctors before visiting the public hospital, they may not visit at all. This information is typically gathered by previous personal experiences and from the neighborhood.

[9] Furthermore, non-doctor staffs in public health facilities often play an important part in the whole bargaining process, especially in organizing these payments. Assuming that these staffs get a share of the payment, a larger number of staffs increase competition among the staffs to serve the doctors. This reduces bargaining power of the staffs and hence, the share paid to the staffs. This lowers the cost of organizing the payment and doctors would charge patients less. Since doctor's consultation is now cheaper at this facility, doctors at other public health facilities in the same sub-district can be expected to face a lower demand and may lower their (unofficial) fees too.

IV. Empirical Framework

Following the two set of equilibrium described above, we first study the determinants of the incident and extent of corruption (Equilibria I) and the determinants of the hold-up problem (Equilibria II). We observe three outcomes in our data set for agents who get sick: 1) opt for public health care and pay bribe; 2) opt for public health care and do not pay bribe; 3) do not seek treatments. According to our analytical framework, outcomes 1 and 2 are linked to the first set of equilibria, and outcome 3 is linked to the second set of equilibria. We treat the outcomes in a discrete choice framework (McFadden 1974) and assume that patients make a choice from the above three outcomes *j*. The utility that the *i*th patient derives from choosing the outcome *j* consists of two components, a systematic component and a random component, and can be expressed as:

(6) $U_{ij} = G_{ij} + \varepsilon_{ij}$

Here G_{ij} is the systematic portion of the utility function, which can be viewed as the 'gain' discussed in our analytical framework. As discussed, the net gain is determined by *F*, healthcare specific characteristics (availability of alternative suppliers etc) and patient specific characteristics including income, demographic and sickness. ε_{ij} is a stochastic element.

Assuming that patients maximize their utility, the choice problem involves a comparison of utilities associated with each of the *j* alternatives, and a rational agent makes choices among different alternatives that yield the maximum utility. Let Y_i be a random variable that denotes the choice outcome, then the probability that individual *i* chooses *j* is given by:

(7) $\Pr(Y_i = j) = P(G_{ij} + \varepsilon_{ij} > G_{ik} + \varepsilon_{ik})$ for all k=1, …j; k≠j

The mapping from a probabilistic choice model to an econometric model of choice is conceptually straightforward. For the first set of equilibrium, we consider the two discrete outcomes and estimate a logit model. We consider the extent of bribe and estimate a tobit model. For the second set of equilibrium, all three possible outcomes and estimate a multinomial logit model.

We estimate several commonly-used models to estimate patients' choice among alternatives. The models vary in their ability to relax the independence of irrelevant alternatives assumption, in allowing for non-constant variances across varieties and subjects, and also in computational complexity.

Universal logit

In the universal logit model, the probability that patient *i* chooses alternative *j* is given by:

(8) $$\Pr(Y_i = j) = \frac{\exp(G_{ij})}{\sum_{j=1}^{J} \exp(G_{ij})}$$

Where,

$$G_{ij} = a_j + b_i' X_i + c_i' Z_i$$

Here j=1…3, i=1…n, a_j is choice specific constant, X_i is a vector of observed patient specific characteristics including *F* as well, and Z_i is vector of observed facility specific characteristics. A subject chooses U_{ij} if $U_{ij}>U_{ik}$ for all other *k* possible choices. It is assumed that ε_{ij} is independent and follows a type 1 extreme value distribution given by *exp[-exp(-* ε_{ij} *)]* which assumes that the omission of an irrelevant choice set should not change the parameter estimates.

Unlike multinomial logit model, the universal logit model specified above relaxes the multinomial logit's cross elasticity properties by including attributes of competing alternatives in the utility function for all alternatives in the choice set (McFadden, Train and Tye, 1978). The appearance of significant cross-effects of alternative *k* would imply that the utility of an alternative *i* depends on the attributes of other alternative(s); this is therefore a test of the independence of irrelevant alternatives (IIA) assumption.

Multinomial probit

The multinomial probit (MNP) model does not assume errors are independently distributed across alternatives. The probability that subject *i* chooses alternative *j* is given by:

(9) $$\Pr(Y_i = j) = \int_{-\infty}^{\varepsilon_j + G_j - G_k} ... \int_{-\infty}^{\infty} ... \int_{-\infty}^{\varepsilon_j + G_j - G_J} f(\varepsilon) d\varepsilon_j ... d\varepsilon_1$$

where J are the alternatives and $f(\cdot)$ is a J-variate normal density function with mean zero and $J \times J$ covariance matrix Σ (Louviere et al 2000).

Models specified above have been estimated by using maximum (simulated) likelihood (Train 2003).

For patient specific characteristics X_i, we use individual specific health shock and health endowment by including types of diseases (chronic, cardio-vascular or respiratory, infectious or communicable, physical problem, female disease), number of diseases (patient has two diseases, three diseases), age and gender. We also include household's income and land endowment, patient's status within the household (household head or not), whether head of household is female, and religion. Also there are no direct proxies available for initial health endowment and other health inputs. Income variables can partly capture these variables.

Community characteristics of the patient are captured by rural-urban dummy[10] and the percentage of patients visit public health facilities.

For variables that determine *F*, we include travel time and transportation cost. For patients who do not attend public health facilities, we use the relevant village averages.

Two variables are used to proxy market power of the doctors: Total persons engaged in a sub-district hospital and total number of persons seeking treatment in a union. Note that there is no data available for the quantity of medical services (e.g., time spent on a patient).

Data

We have used two sets of data in this paper: i. Household Income Expenditure Survey (HIES) conducted by Bangladesh Bureau of Statistics (BBS) in 2005, and ii. Directory of Health and Social Welfare 2005, published by the BBS. The HIES 2005 was done on 10,080 households and 48,969 individuals in 518 unions, 366 sub-districts and all the 64 districts. The survey contained income, employment and expenditure modules in addition to demographics, health and education modules.

In the Health module, the households were asked about type of illness, type of doctors consulted (whether public or private), travel time and mode of transport. In the health expenditure module, the households were asked about cost of getting the health service by simply asking "What was the cost of treatment during the past 30 days?" under which there are subsections where households need to 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

[10] In Bangladesh variations in terms access to water, sanitations, weather etc are negligible within rural and urban regions.

went to a private facility or public facility or consulted traditional or spiritual health professionals.

2005 HIES shows that there were 12,894 individuals who were suffering in either chronic or non-chronic disease. Among them, 8,573 individuals reported to be suffering from some kind of illness or injury in past thirty days whereas around 6,314 individuals were suffering from some sort of chronic illness or disability in past twelve months. However, not all these individuals sought treatment. In fact, the survey asked whether the individual had consulted anyone for the illness/injury only. It turns out that there were about 5,874 individuals who consulted someone for the illness/injury they suffered in past 30 days.

Not all the patients seeking treatment visit public hospitals. In fact, most patients do not visit public health facilities for consultation. Only 619 individuals out of 5, 874 patients seeking treatment visited public health facilities for doctor's consultation. However, some of these patients also visited other facilities too, before or after visiting a public health facility and there is no way to separate the two consultation fees. We therefore drop these observations for our analysis which left us with 484 observations.

Data on health facility specific characteristics came from the Health and Social Welfare Directory 2005 which includes all the health and social welfare organizations that employ more than 10 persons. The directory contains the name and address of the facility, total persons engaged, total female persons engaged and year of establishment. The data on Total persons engaged in public Hospitals beyond Union Health Centers are collected from here. The Union Health Centers were left out of this directory since these centers employ less than 10 persons.

How different are the patients visiting public health facilities from all the patients seeking treatment? Table 1 presents a comparison of these two types of patients on all the variables that we have considered in this paper. The table reveals that the two groups are very similar in their economic and demographic characteristics. The mean annual income for all patients, for instance, are lower than that of patients going to public health facilities, but these patients on average are wealthier since they have higher mean acres of land. Furthermore, proportion of all patients living in rural area is larger than that of all patients going to public health facilities.

Table 2 gives some more descriptive statistics of the patients who go to public health facility as well as those patients who go to public health facility and also pay a consultation fee to the public doctor. A patient traveling to a public health facility spends about 57 taka and the trip takes about 38 minutes on average. If only the patients that made a payment are considered, these numbers go up to 85 taka and 45 minutes. Whereas this may indicate that these transport variables may have some explanatory powers of unofficial payments, patients making payments also have higher income and wealth. This could then mean that richer patients (with higher income and land) may choose more expensive and faster transports and pay more often too. Indeed, among the patients who make some kind of payments, a greater proportion choose some form of transportation (therefore, having positive transportation cost) instead of walking. Since the mean travel time is also higher, this may also imply that these patients are more likely coming from further distance.

We use Total Persons Engaged (TPE) in Sub-district Health complexes as an aggregated number of doctors and staffs working in those complexes which we collected from the Health Sector Directory 2005 compiled by Bangladesh Bureau of Statistics (BBS). Given that Sub-District Health Complex (SHC) operates as the local hub to provide the primary health care and indeed, 49% of all patients availing the public health services do so at these health complexes, SHCs play an important role[11]. Since the decisions for how many persons to work on these health complexes come from the government and not market, TPE can be thought to be fairly exogenous.

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[11] Table 2 reveals that the average number of staffs working in a Sub-District Health Complex is around 74, and even more important, the standard deviation is 65. This implies we have enough variation in total persons engaged to use it for our analysis.

We use aggregated number of treatment seeking patients in each sub-district in the survey as a proxy for the market size in each sub-district. Since the survey is a stratified-random sampled, we believe the proxy should perform well.

V. Results and Discussions

Incidence of Corruption: Who Pays Illegal Fees?

Results estimated through logit model are reported in Table 3. In column 1, 2 and 3, we consider annual income and total land owned separately and then together where we control for demographic characteristics. We then add transportation cost and travel time separately and then together in columns 4, 5 and 6 respectively. In column 7, we introduce disease related control variables. Finally, in column 8, 9 and 10, we include total persons engaged and percentage of households seeking treatment and then together respectively.

First consider the effect of income and wealth of the households on incidence of consultation fee. Column 1-3 of Table 3 shows that annual income or land-owned do not explain the probability of making a payment significantly. This pattern remains the same when all other variables are added in columns 4 through 10.

Second, consider the demographic characteristics. Columns 1 through 10 depict that both the female dummy and number of patients in a household are statistically significant at least at 5 % level in all specifications. The sign of the coefficients of these variables imply that it is more likely that a male patient and households with more patients are more likely to pay unofficial consultation fee. In addition, the dummy variable for patients living in rural areas is also statistically significant in most specifications (except in column 9) and the coefficient is positive. This suggests that patients living in rural areas have greater probability of paying consultation fee. Finally, the dummy variable for household head being patient has a negative coefficient which is also statistically significant in most specifications except the ones in column 4, 7 and 9.

We shift our focus next on travel variables. We consider transportation cost and travel time separately in column 4 and 5 and together in 6 in table 3. We found that a one taka increase in transportation cost increases the probability of payment by 0.06 percent and it is statistically significant at 5 percent level. It remained statistically significant at 5% level with similar magnitude in coefficient even when travel time, disease variables and percent of households seeking treatment are controlled for in column 6, 7 and 9. However, the significance of transportation cost vanishes once total persons engaged is considered in columns 8 and 10. We however find that the coefficient of travel time is not statistically coefficient in any specification.

Now, consider the disease variables. These include types of diseases, number of diseases or symptoms the patient is suffering from, whether the patient has a chronic disease and whether the patient is suffering from any 'other' disease. Table 3 shows that no disease variable has a statistically significant coefficient in all the relevant specifications. The dummy variable for patients suffering from two diseases or symptoms has a negative and statistically significant coefficient in three specifications. It is however not significant when all the variables are considered as in column 10. Furthermore, the dummy variable for patients having physical problems has a positive and statistically significant coefficient at 10% level in all specifications except specification 10. Chronic disease, as expected, has a negative coefficient which is also statistically significant in specifications whenever total persons engaged in Sub-district Health complex is considered. Dummy variable for female disease is also statistically significant at 1% level in these specifications with negative coefficients.

We now turn to the variables that reflect market power of the doctors. Columns 8 and 10 show that total persons engaged in a Sub-district Health Complex has a negative coefficient and it is statistically significant at 1% level even when the market size is controlled for. In particular, an additional engagement of one person in a Sub-district Health Complex decreases the incidence of corruption by 0.24% and 0.22% when market size is controlled for. Considering mean TPE in a Sub-district Health Complex is 74 and s.d. is 65, this exhibits a significant effect. Note that the inclusion of this variable reduces the sample size greatly.

The result regarding number of patients seeking treatment in a sub-district is presented in column 9 and 10 of table 3 with all other controls. The number of patients seeking treatment is also statistically significant at 1 percent with negative sign. The absolute magnitude of the coefficient goes up when total persons engaged is included in the analysis on column 10 whereas the coefficient is still statistical significant at 1% level.

Extent of Corruption: Who Pays More?

We now measure the extent of corruption by using the amount of unofficial consultation fee with a Tobit model; the results are reported in Table 4. For the ease of understanding, we follow the exact organization of table 3 in table 4 too.

Consider again income and total land first. Unlike the incidence of corruption, we see that income has a statistically significant coefficient with positive sign when only demographic variables are considered. This significance however vanishes when other variables are added. Total land owned also has a statistically significant coefficient with positive sign in specification 5 and 7 even though the coefficient is not significant for other specifications. This may suggest that there may be some income and wealth effect on determining the level of consultation fee through willingness and ability to pay for consultation fee.

As far as demographic variables are concerned, no demographic variable is statistically significant whenever percent of household seeking treatment is controlled for. For other specifications, it turns out that dummy variable with patients living in rural areas pay more consultation fee and the coefficient is statistically significant at least at 5% level. The dummy variable for patients who are Muslims is statistically significant with a negative sign for all specifications except when disease variables are controlled for.

We analyze the travel variables now. Table 4 shows that transportation cost is statistically significant at 1% level with positive coefficient at all specifications. The magnitude of the coefficient however declines a bit when total persons engaged in Sub-district Health Complexes are included. Travel time however is statistically significant only when transportation cost is not considered. Whenever transportation cost is included, the coefficient of travel time drops significantly and even becomes negative in some specifications.

Among the disease variables, number of diseases seems to play a key role in determining unofficial fee. In particular, the dummy variable with patients having two diseases or symptoms has statistically significant coefficient at least at 5% level in all the four specifications and has a negative sign. In addition, the dummy variable with patients having three diseases or symptoms has negative and statistically significant coefficient in specifications where total persons engaged in Sub-district Health Complex is not considered. Dummy variable with patients having physical problems also has a positive coefficient which is significant in most specifications (except column 8). Finally, the dummy variable with patients having infectious diseases has positive and statistically significant coefficient in specifications where total persons engaged in Sub-district Health Complex is not considered.

The market power indicator – TPE is significant at 1% level and robust with expected negative signs as shown in column 8 and 10. The market size proxy is also statistically significant at least at 5% level in all the specifications where it considered (column 9 and 10).

Hold-up: Does bribe deter patients?

Table 5, column 3 shows the determinants of hold-up; why agents being sick may not seek treatment at all.

Results show that the transportation cost is an important determinant of hold-up problem and patients who live far from public health facilities are more likely to under-invest.

This confirms that patients may consider the possibility that once they arrive in a public health facility, health providers may ask for bribe over and above the average bribe that patients pay. As one would expect, this would be more pronounced in rural areas where patients cannot switch to alternative providers where public health facilities are dispersed, and private health facilities are limited in supply. This is in fact the case here; the rural dummy is positive and the coefficient is statistically significant. As a result, two things are happening – patients who live far or need to spend more on travel are less likely to visit public health facilities and in addition, and this effect is more pronounced for patients living in rural area.

Information available to the patient either from his own experience or from the neighborhood is an important determinant of hold-up. Two variables confirm this finding: patients with chronic diseases are more likely to visit health facilities, more likely to be better informed about the likelihood of paying bribe, and more likely to pay less bribe. However, they are also more likely to decrease their visit frequency due to better information and more likely to under-invest as a result. Similarly, as more and more patients visit public health facility from a particular neighborhood measured as a percentage-sought-treatment increases, neighborhood gets more and more informed about illegal payments at public health facilities. This again decreases the likelihood of seeking treatment and leads to underinvestment.

VI. Conclusion

This paper is an important contribution to the growing literature of empirical micro studies of corruption. It investigates the factors that affect the unofficial payments made to the government doctors as consultation fees in Bangladesh. Consistent with hold-up theories, we find that patients having more relation-specific investments, represented by transportation cost, end up paying more unofficial consultation fees. Furthermore, an increase in number of total persons engaged in a Sub-District Health Complex, which imply lower market power of the staff in a public health facility, not only reduces amount of unofficial fees paid but also the incidence of corruption. However, income and wealth measured by amount of land owned do not significantly explain either incidence or extent of corruption.

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Table 1: Comparison of all the patients and patients going to public health facilities

	Full sample of Patients			Patients going to public health facilities			T statistic
	Mean	S. D.	n	Mean	S. D.	n	
Total Income (in thousand taka)	85.543	125.426	5580	95.494	137.34	484	-1.2965
Total land owned (in acres)	.895	1.756	5580	.669	1.224	484	0.9598
Age of the patient	24.413	21.662	5579	26.557	21.528	483	-1.9618
Dummy whether a patient lives in rural area	.62	.486	5580	.475	.5	484	6.3449
Dummy if the head of household is female	.034	.182	5580	.039	.194	484	-0.3083
Dummy if patient is female	.508	.5	5580	.519	.5	484	-0.6461
Dummy if household head is patient	.207	.504	5580	.231	.422	484	-1.0604
Dummy if the patient is Muslim	.9	.3	5580	.893	.31	484	0.4597
Consultation fee (in Taka)	37.781	92.758	5580	43.538	102.9	484	0.8608
Transportation cost (in Taka)	28.221	155.103	5580	56.932	171.652	484	-3.5624
Travel time (in minutes)	26.62	46.22	4739	37.623	54.599	406	-4.1212
Dummy whether patient availed a fast (motorized) transport	.092	.289	5577	.21488	.411	484	-7.5988
Dummy whether patient availed a slow (non-motorized) transport	.345	.476	5577	.5165	.500	484	-7.2493
Dummy whether patient availed any other type (not defined) of transport	.087	.282	5577	.01	.101	484	5.4329
Dummy whether the patient has a chronic disease	.223	.416	5580	.205	.404	484	0.0771
Dummy whether the patient is suffering from a cardio-vascular or respiratory disease	.084	.277	5580	.114	.318	484	-2.8059
Dummy whether the patient is suffering from a infectious or communicable disease	.164	.37	5580	.147	.354	484	0.5175
Dummy whether the patient is suffering from a physical problem	.247	.431	5580	.246	.431	484	1.1818
Dummy whether the patient is suffering from a female disease	.009	.094	5580	.012	.111	484	-0.8781
Dummy whether the patient is suffering from any other disease	.087	.282	5580	.159	.366	484	-1.8862
Dummy whether the patient is suffering from two diseases	.219	.414	5580	.147	.354	484	3.0389
Dummy whether the patient is suffering from three diseases	.044	.205	5580	.027	.162	484	0.7201

Note: We omit education of, say, head of household is a partially ordinal variable and therefore, omitted. More specifically, for numbers 0 to 10, the number represents number of years studied. But above it, it becomes categorical.

Table 2: Descriptive statistics of patients going to public health facilities

Variable name	Mean	S. D.	n
Dummy if a unofficial payment is made	.44	.497	484
Payment made as consultation fee (in taka)	43.538	102.9	484
Payment made as consultation fee if only positive payments are considered (in taka)	98.93	136.447	213
Transportation cost (in taka)	56.932	171.652	484
Transportation cost of patients who made positive payments (in taka)	85.005	237.586	213
Travel time (in minute)	37.623	54.599	406
Travel time of patients who made positive payments (in minute)	44.56	64.189	168
Annual Income (in thousand taka)	95.494	137.336	484
Annual income of patients who made positive payments (in taka)	99.849	90.755	213
Total Land owned (in acres)	.669	1.224	484
Total Land owned (in acres) of patients who made positive payments (in taka)	.8615	1.395	213
Total persons engaged in a Sub-District Health Complex	73.979	65.067	194
Dummy whether patient availed a fast (motorized) transport	.21488	.411	484
Dummy whether patient availed a slow (non-motorized) transport	.5165	.500	484
Dummy whether patient availed ‘other’ (not defined) type of transport	.010	.101	484

Note: Fast (motorized) transport includes private car, taxi, bus, auto rickshaw, ambulance, and engine boat. Slow (non-motorized) transport includes rickshaw, non-motorized van, cart, non-motorized boat. The base for all the transport dummies is walking.

Table 3: Determinants of the Incidents of Corruption – Logit model; Dependent variable: Visited public health facility and made illegal payment=1, visited public health facility and did not make illegal payment=0

	1	2	3	4	5	6	7	8	9	10
Annual Income	-.0005		.0001205	.00003	.00006	-5.73e-06	-.00003	.0003	-.0001	-.0004
	(.0014)		(.00031	(.0003)	(.0003)	(.0003)	(.0003)	(.0008)	(.0003)	(.0008)
Total Land Owned		.0328	.0329794	.031	.0357	.0339	.0417	.0859	.0427	.09138
		(.0295)	(.02946	(.0297)	(.0303)	(.0303)	(.0314)	(.0573)	(.0375)	(.0801)
Transportation Cost				.0006**		.0005**	.0005**	-.0002	.0006**	-.0003
				(.0003)		(.0002)	(.0002)	(.0007)	(.0002)	(.0006)
Travel Time					.0096	.0006	.0005	.0013	.0005	.0011
					(.0006)	(.0006)	(.0006)	(.0009)	(.0007)	(.0009)
Total Peresons Engaged								-.0024***		-.0022***
								(.0008)		(.0008)
Percentage seeking									-1.056***	-1.7881***
treatment									(.3757)	(.7162)
Age of Patient	-.0005	-.0006	-.0006856	-.0011	-.0007	-.0007	-.0006	.0053	-.0005	.0063
	(.0014)	(.0014)	(.00139	(.0014)	(.0015)	(.0015)	(.0017)	(.0034)	(.0017)	(.0038)
female	-.118522**	-.1201**	-.1179453**	-.1122**	-.1237**	-.1228**	-.1299**	-.2278**	-.1126**	-.248***
	(.0557)	(.0560)	(.05593	(.0558)	(.0562)	(.0563)	(.0576)	(.0997)	(.0576)	(.1012)
Head of Household	-.126*	-.1240*	-.1217064*	-.1161	-.1384*	-.1426**	-.1163	-.3896***	-.1138	-.4084***
	(.0704)	(.0713)	(.07181	(.0720)	(.0724)	(.0715)	(.0736)	(.0997)	(.0748)	(.1073)
Muslim	-.1603	-.1700	-.1686099	-.1422	-.1708	-.1498	-.1393	-.1164	-.1099	-.0226
	(.1088)	(.1081)	(.10822	(.1121)	(.1099)	(.1140)	(.1109)	(.2692)	(.1058)	(.257)
Head of Household is	.0600	.0682	.0671672	.0707	.0708	.0713	.0697	.2583*	.0603	.2955**
female	(.110)	(.1106)	(.11012	(9.1096)	(.1133)	(.1139)	(.1164)	(.1591)	(.1225)	(.1332)
Rural Area	.1659**	.1506**	.1539858**	.1478**	.1397**	.1388**	.137*	.2618***	.1215	.2775***
	(.0687)	(.0685)	(.06985	(.07)	(.0707)	(.0708)	(.0725)	(.0914)	(.0758)	(.0965)
Number of patients from	.0357***	.0329***	.0312581**	.0341**	.0324**	.0341**	.0348**	.0597**	.0327**	.0665**
HH	(.0124)	(.0136)	(.0137)	(.014)	(.0141)	(.0143)	(.0153)	(.0294)	(.0156)	(.0315)
Chronic Disease							-.0983	-.2011**	-.0957	-.2450***
							(.0689)	(.0971)	(.0695)	(.0969)
Cardio-vascular or							-.0188	.1310	-.0262	.1311
Respiratory Disease							(.1251)	(.1907)	(.1329)	(.2175)
Infectious or							.0875	.0900	.0699	.0297
Communicable Disease							(.0772)	(.1371)	(.0775)	(.1350)
Physical Problem							.1324*	.2467*	.1406*	.2179
							(.0742)	(.135)	(.0753)	(.1378)
Female Disease							-.0859	-.5067***	-.0651	-.5093***
							(.1913)	(.0461)	(.1812)	(.048)
Other Disease							.0014	.1300	.0052	.1698
							(.0756)	(.1285)	(.0786)	(.1324)
Patient has two diseases							-.289***	-.2417*	-.2465***	-.1972
							(.0527)	(.1323)	(.0577)	(.1414)
Patient hs three diseases							-.2095	-.0188	-.2256	-.0577
							(.1451)	(.2486)	(.1485)	(.2805)
R-square	0.065	0.0683	0.0687	0.0838	0.0759	0.0847	0.1195	0.2185	0.1396	0.2583
# of observations	483	483	483	483	470	470	470	187	470	187
Log-likelihood	-309.8682	-308.7842	-308.6587	-303.6328	-297.0275	-294.1985	-283.0021	-101.2901	-276.5323	-96.1349

Numbers in the parentheses are standard errors. ***, **, * - significant at 1%, 5%, and 10%, respectively.

Table 4: Determinants of the Extent of Corruption – Tobit model; Dependent variable: Amount of ‘fee’ paid

	1	2	3	4	5	6	7	8	9	10
Annual Income	.1545*		.1439 (.0887)	.0448 (.0807)	.1105 (.09)	.0311	.0236	.1214	.0225	.0995
	(0882)					(.0835)	(.082)	(.1336)	(.082)	(.1334)
Total Land Owned		11.7316	10.6426	9.8911	12.6247*	10.361	12.1605*	9.3962	10.6147	7.965
		(7.6272)	(7.6427)	(6.6071)	(7.5285)	(6.6819)	(6.6343)	(6.5924)	(6.6664	(6.4696)
Transportation Cost				.3682***		.3911***	.4036***	.2642***	.4044***	.2676***
				(.0439)		(.0533)	(.0532)	(.0868)	(.0533)	(.0851)
Travel time					.4363***	.0585	-.0105	-.0385	-.0445	-.1025
					(.174)	(.1646)	(.1631)	(9.175)	(.1639)	(.1735)
Total Person Engaged								-.3907***		-.4242***
								(.1553)		(.1592)
Persons seeking treatment									-1.143**	-1.3541***
									(.4845)	(.5289)
Age of the patient	.1171	.05332	.0146 (.5664)	-.586754	-.2726	-.3212	-.3669	.521	-.4164	.4562
	(.5616)	(.5679461)		(.501064)	(.5843)	(.5211)	(.5474)	(.6007)	(.5513)	(.5897)
Female	-29.3451	-31.0528	-28.6902	-13.4465	-26.3824	-21.645	-22.1271	-18.6613	-17.8327	-17.1328
	(22.4964)	(22.4955)	(22.4778)	(19.5207)	(22.879)	(20.3135)	(19.982)	(21.1326)	(20.1645)	(20.8512)
Head of household	-8.8684	-8.8198	-4.5438	15.5424	1.1695	.435049	7.643	-44.2215	8.3048	-44.638
	(31.5508	(31.6556)	(31.6713)	(27.5757)	(32.2747)	(28.7247)	(28.3332)	(33.9727)	(28.5399)	(33.5153)
Muslim	- 79.3176***	-84.2327***	-81.2724***	-40.2644	-78.5405***	-44.5973*	-35.8203	-21.1806	-33.0092	-16.3865
	(29.3897)	(29.4719)	(29.4164)	(26.1159)	(29.5873)	(26.7557)	(26.3323)	(31.5988)	(26.4591)	(31.1155)
Head of household is female	39.8629	42.8338	43.5343	40.3245	39.9054	37.897	37.5054	46.8104	41.3751	60.4671
	(37.6183)	(37.7851)	(37.703)	(32.6095)	(37.9485)	(33.6069)	(33.026)	(40.6749)	(33.0753)	(39.7416)
Rural area	57.1646***	47.5816**	50.9526***	43.5367***	47.2488**	41.902**	39.3012**	41.5343**	29.0046	27.6947
	(19.1837)	(19.5412)	(19.6366)	(17.0385)	(19.7636)	(17.5434)	(17.4885)	(18.5005)	(18.1079)	(19.33)
Chronic disease							-22.8736	-26.9003	-24.2016	-28.0597
							(21.6806)	(22.762)	(21.7609)	(22.4709
Cardio-vascular or respiratory disease							41.8629	48.6702	45.8978	59.0355**
							(30.3561)	(30.1132)	(30.4639)	(30.0291)
Infectious or communicable disease							44.5468*	24.4375	43.7593*	26.4823
							(26.3124)	(28.0511)	(26.4299)	(27.6588)
Physical problem							41.9774*	34.2727	49.5322**	45.4385*
							(23.1058)	(24.3917)	(23.428)	(24.4449)
Female disease							-55.0245	-568.7599	-46.438	-575.5784
							(84.1786)	(missing)	(87.818	(missing)
Other disease							10.4529	20.5507	17.9539	35.9452
							(25.1431)	(27.0539)	(25.3697)	(27.093)
Patient has two diseases							-130.409***	-72.4465**	-126.0274***	-74.1187***
							(29.4113)	(29.5885)	(29.6759)	(29.1461)
Patient has three diseases							-116.4533*	2.3904	-132.0611**	-15.3441
							(60.996)	(59.1134)	(61.9043)	(59.3863)
R-square^2	.0067	.0065	.0073	.0273	.0092	.0255	.0336	.0392	.0356	.0454
Observations	483	483	483	483	470	470	470	187	469	186

Numbers in the parentheses are standard errors. ***, **, * - significant at 1%, 5%, and 10%, respectively.

Table 5: Determinants of hold-up – multinomial logit estimates

	Paid bribe		Not seeking treatment	
Annual Income	0.00001		-0.000013	
	(0.00001)		(0.000010)	
Total Land Owned	0.00083		0.000780	
	(0.00084)		(0.001960)	
Transportation Cost	0.00011	***	-0.000211	***
	(0.00002)		(0.000050)	
Travel Time	0.00006		-0.000157	
	(0.00006)		(0.000120)	
Percentage seeking treatment	0.02158		-0.151268	***
	(0.01872)		(0.032270)	
Age of Patient	-0.00007		0.000120	
	(0.00007)		(0.000120)	
female	-0.00349		0.000766	
	(0.00225)		(0.005260)	
Head of Household	-0.00344		0.000289	
	(0.00266)		(0.005930)	
Muslim	-0.00201		-0.003158	
	(0.00491)		(0.007510)	
Head of Household is female	0.00168		-0.001682	
	(0.00458)		(0.008050)	
Rural Area	-0.00321		0.021919	**
	(0.00343)		(0.006820)	
Number of patients from HH	0.00112	**	-0.000874	
	(0.00053)		(0.001050)	
Chronic Disease	-0.08401	***	0.169469	***
	(0.01927)		(0.026630)	
Cardio-vascular or Respiratory	0.08391	**	-0.252791	***
Disease	(0.04006)		(0.059790)	
Infectious or Communicable	0.04014	***	-0.093460	***
Disease	(0.01538)		(0.027410)	
Physical Problem	0.02524	**	-0.047401	**
	(0.01060)		(0.016910)	
Female Disease	0.01858		-0.075651	
	(0.02359)		(0.049790)	
Other Disease	0.03301	**	-0.089370	**
	(0.01411)		(0.028260)	
Patient has two diseases	-0.01061	***	0.015752	**
	(0.00197)		(0.004630)	
Patient hs three diseases	-0.01386	***	0.031833	***
	(0.00221)		(0.003500)	
r2	0.31		0.31	
N	5530		5530	
Log likelihood	-1352.998		-1352.998	

Numbers in the parentheses are standard errors. ***, **, * - significant at 1%, 5%, and 10%, respectively.

Appendix

Table A1: Total and average number of patients at different 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	2764824	276482	3592466	7.8
General Hospitals (250 bedded)	2	209892	104946	944514	2.1
District Hospitals	41	3552924	86657	4072879	8.8
Sub-Districts Health Complexes	350	19075504	54501	22508913	48.8
Union Sub-Centers	1362	14979600	10998	14979600	32.5

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.