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Inequity in Formal Health Care Use: Evidence from Rural Bangladesh

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Abstract

This paper analyzes inequity in health care use in rural Bangladesh using data from a survey conducted by Microinsurance Research Unit (MRU) of the Institute of Microfinance (InM) of 4,010 households drawn from 120 villages. The study focuses on formal health care use over the 12 months preceding the survey. We use both the 'need standardized' approach and 'decomposition analysis' for measuring inequity. The paper finds that the use of formal health care is incredibly low (40%); about two-thirds (65%) of which is private health care and only one-fourth utilizes public sector facilities. Inequity in formal health care use favors the better-off although the level of inequity is modest. Prevailing inequity resides mainly in the utilization of private health care while NCDs contribute significantly to this inequity. Thus, the main public health concern in rural areas of Bangladesh is the low utilization of formal health care (especially public health care), not inequity. From a policy perspective therefore, voluntary health insurance is not an answer so far as chronic NCDs are concerned; social insurance is not quite feasible either due to the large informal economy. Hope therefore lies in the public provision of health care although the latter is plagued by various supply side constraints including meager budgetary resources, daunting governance issues and hence the need for reforms to enhance efficiency.

Inequity in Formal Health Care Use:
Evidence from Rural Bangladesh*

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1. Introduction

Increasing the access to and the utilization of quality health care is each imperative for achieving universal health coverage as well as the due success in the poverty reduction measures adopted by many low-income countries.[1] The Government of Bangladesh has invested substantially for increasing access to and use of formal health care in rural areas targeting the poor.[2] Significant efforts have also been made by some not-for-profit organizations for expanding formal health care in rural Bangladesh. Various development programs (e.g., microfinance) taken up by both government and non-government organizations (NGOs) may also have contributed to promoting health care utilization by boosting demand, i.e., enabling the poor to purchase better health services via enhanced income. However, people with equal need may not have benefited equally. Unequal health care use partly contributes to health inequality (Marmot and Feeney, 1997; Marmot, 2005). Adverse health shocks are known to lead to poverty in low-income countries due to large out-of-pocket payments (Whitehead *et al.*, 2001) as well as inappropriate

[1] The two primary criteria for achieving the universal health coverage are (a) ensuring the use of health services by all and (b) prevention of financial hardship in paying for the health services (WHO, 2010).

[2] "There is a three-tier mechanism for providing health care in rural areas: (i) domiciliary services by a Health Assistant and Family Welfare Assistant at the household level; (ii) Health and Family Welfare Centers at the union level, and (iii) Upazila Health Complexes (UHCs) at the upazila/sub-district level. UHCs provide both outpatient and inpatient services including maternal and child health and family planning; they are the main units for implementing the Essential Services Package which was designed to attain Health for all" (Hamid *et al.*, 2011).

health care use (Wagstaff, 2002), which may create a vicious cycle of unequal health care use and poverty. It is therefore important to examine the level of inequality in health care use for an informed policy discussion.

While the literature on this issue mainly focuses on developed countries (e.g., Ohkusa and Honda, 2003; van Doorslaer *et al.*, 2004; Ourti, 2004; van Doorslaer and Masseria, 2004; Morris *et al.*, 2005; Lu *et al.*, 2007; Schneider and Hanson, 2006; Shin and Kim, 2010; Zhong, 2010), there are a few studies in the developmental context (e.g., Liu *et al.*, 2002; Hidayat *et al.*,; Onwujekwe, 2005; Yiengprugsawan *et al.*, 2011). These studies, as seen in the following text, typically examined the post-insurance outcome on equity and found some positive impact on equity in favor of the poor especially when it came to outpatient care or basic low-cost primary care delivery systems.

Liu *et al.*, (2002) investigated the effects of a pilot health insurance program on both horizontal and vertical inequities in health care use (out-patient care, hospital care, emergency care and expensive diagnostic procedures) in China. The study found that the poor had no advantage in access to expensive and advanced diagnostic technologies in response to the recent insurance reforms though the latter led to significantly decreased horizontal inequity in outpatient care. Hidayat *et al.*, (2004) measured the effects of a mandatory health insurance program on equity in outpatient care received from public and private providers in Indonesia. They found that insurance did not have any positive effect on income-related equity. Yiengprugsawan *et al.*, (2011) evaluated the impact of the 'Universal Coverage Scheme' on inequalities in primary health care use in Thailand and found positive impact favoring the poor. Onwujekwe (2005) evaluated the socio-economic inequities in the treatment of common communicable endemic diseases in Nigeria providing an emphasis on the use of primary health care centers where treatments are available for most of the common diseases. The study found income-related inequalities favoring the poor and the rich, respectively, in the use of health care provided by low-level (informal) providers (patented medicine dealers, shops and herbalists) and formal providers (primary health care centers and hospitals).

To date, however, there does not appear to be any scientific analysis of inequity on the broader dimensions of health care use in the developmental context.[3] Indeed, the lack of evidence, especially in Bangladesh context, motivates the present paper. This paper aims at examining the level of inequity (giving especial focus on the gender issue) in the use of *formal health care* (apart from obstetric care) in rural areas of Bangladesh; hence, contribute to the literature by providing such evidence. This paper also contributes toward resolving an important policy debate: what is more important, addressing the *inequality in or the poor utilization of formal health care* for policy discussions?

This paper measures horizontal inequity, based on a survey of 4,010 households drawn from 120 villages, using both *need-standardized and decomposition* analysis methods. We find incredibly low use of formal health care (40%) where inequity favors the better-off although the level of inequity is not substantial.

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[3] There are some studies on inequalities in maternal health care use in Bangladesh (Rahman *et al.*, 2008; Anwar e*t al.*, 2008: Amin *et al.*, 2010; Hossain, 2010). However, the focus of the present research is on broader dimensions of health care.

The remainder of the paper has been organized as follows. Section 2 explains the methodology of the study including the analytical methods and data collection; Section 3 presents the empirical findings; Section 4 provides a discussion and some conclusions.

2. Methodology

2.1 Definition of Formal Health Care

A wide range of therapeutic choices (varying from self-care to modern allopathic medicine) is available in a medically pluralistic society like that of Bangladesh. In this paper we have primarily classified health care providers following the relevant literature in the Bangladesh context (Nanda, 1999; BBS, 2007; Hamid *et al.*, 2011) as follows: (i) self-care, (ii) unqualified providers (quacks, drugstore salesmen, homeopathic healers, traditional healers and faith healers), (iii) private hospitals/clinics/chambers, (iv) NGO health centers/hospitals, and (v) government health centers/hospitals.[4] Like Nanda (1999) and Hamid *et al.* (2011) these can be further classified into: informal (i.e., summing (i) and (ii)) and formal (i.e., summing (iii) and (v)).

2.2 Measuring Inequity in Health Care Utilization

Horizontal inequity (HI) measures the extent to which health care use is related to income after controlling for need (Wagstaff and van Doorslaer, 2000). In measuring horizontal inequity we have used two commonly used methods: need standardization and decomposition analyses of the concentration index. A need standardized method, the difference between the concentration index for actual use (C_a) and the concentration index of need standardized use (C_n, which is the difference between actual and need expected health care use, plus the overall sample mean), has been used in measuring horizontal inequity in some studies (Ohkusa and Honda, 2003; Schneider and Hanson, 2006; Shin and Kim, 2010).[5] This can be expressed as:

$$HI_n = C_a - C_n \qquad (1)$$

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[4] In a series of papers Ahmed (2001) and Ahmed *et al.* (2000, 2003, 2005, 2006) broadly classified health care providers into five categories: (a) self-care, (b) para-professional village practitioners (who receive a one-year training comprising of diagnosis and treatment of common ailments, medical assistants who complete a 3-year medical program, and government and non-government community health workers), (c) qualified allopathic practitioners (licensed providers who have professional medical degrees), (d) unqualified practitioners allopathic (drugstore salesmen, quacks), and (e) traditional healers including homeopathy providers. Since the survey respondents may have limited knowledge about the detailed qualifications of the providers, use of such a classification in the survey questionnaire may lead to uninterpretable responses, which would necessitate conducting a detailed survey of providers prior to the household survey.

[5] Regression methods are used in calculating the concentration index measuring income-related inequalities in health care use:

$$\frac{2\sigma_R^2}{\mu} y_i = \alpha + \beta R_i + \varepsilon_i;\; i = 1,2,...,N$$

where y_i is the health care use by individual i, μ is the mean of y_i, R_i is the weighted relative fractional rank of the ith individual in the socio-economic distribution from the poorest to the richest, σ_R^2 is the weighted variance of R_i and N is the sample size.

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where C, takes a value ranging from -1 to +1.[6]

HI_n in equation (1), therefore, takes values in the range -2 to +2. No socioeconomic inequity corresponds to the zero value, pro-rich inequity (a higher share of health care use of higher income groups than their share of needs) for positive values and pro-poor inequity (a higher share of health care use of lower income groups than their share of needs) for negative values. The larger the absolute value of the index the higher is the inequity.

As HI in the above method is computed using only need variables, a potential bias may arise if non-need factors (income, education, supply side issues, etc.) correlated with health care use not included in the regression analysis (van Doorslaer *et al.*, 2004; O'Donnel *et al.*, 2008). Thus, decomposition analysis of the concentration index (where non-need factors are also included in the regression analysis) has also been used in the micro data (i.e., survey data where individual level of information is available) in measuring inequity in health care utilization (Wagstaff *et al.*, 2003; van Doorslaer *et al.*, 2004; Lu *et al.*, 2007; O' Donnel *et al.*, 2008; Shin and Kim, 2010).

Wagstaff *et al.* (2003) illustrate that the concentration index of health care use can be decomposed, in the context of a linear model, into the contributions of various factors such as need-standardizing variables and non-need variables to identify the sources of socio-economic inequality in health care use. A linear model of health care use can be expressed as:

$$y_i = \alpha + \sum_k \gamma_k x_{ik} + \sum_l \delta_l z_{il} + \varepsilon_i \qquad (2)$$

where x_k denotes the 'need-standardized' variables; z_l denotes non-need variables; and α is a constant. Based on the linear additive model the concentration index (which shows the overall inequality in health care utilization), can be re-written as:

$$C = \sum_k \lambda_k C_{xk} + \sum_l \lambda_l C_{zl} + \frac{GC_\varepsilon}{\mu} \qquad (3)$$

where, C_k and C_l are the concentration indices for the respective variables (*x* and *z*) and $\lambda_k = \frac{\gamma_k \overline{x}_k}{\mu}$ where $\overline{x}_k$ is the mean of the determinant k, μ is the mean of health care and analogously for λ_l.

In equation (3), the first term on the right hand side denotes the partial contribution of need variables and the second, that of non-need variables. The last term denotes the contribution of income inequality where GC_ε is the generalized concentration index for the error term. This can be computed as a residual, which is the difference between the concentration index and the sum of the factor's contributions (Wagstaff *et al.*, 2003; O'Donnell *et al.*, 2008).

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[6] A positive (negative) value of a crude concentration index signifies health care use favoring the rich (the poor). Similarly, a positive (negative) value of a need standardized concentration index implies that health care need is more concentrated among the rich (the poor). Health care use or need is equally distributed irrespective of income if the value of a concentration index is zero.

Since health care utilization is often a binary, categorical or count variable non-linear models (e.g., logit or probit model) are preferable. Thus, equation (3) can be estimated using the logit or probit model.

As *C* in equation (3) still includes valid socioeconomic differences in health care use for the variation in need, it presents the measure of socioeconomic inequality rather than the degree of inequity in healthcare use. Thus, the index of horizontal inequity (HI_d) can be obtained from the decomposition analysis using the indirect standardization method as follows:

$$HI_d = C - \sum_k \lambda_k C_{xk} \qquad (4)$$

According to decomposition analyses, horizontal inequity is the total inequality (the sum of the absolute contribution of both need and non-need factors and the contribution of the residual term) minus need-related inequality. HI_d also ranges from -2 to +2, with a positive (negative) value indicating pro-rich (pro-poor) inequity.

2.3 Data

This paper uses the data on health care seeking behavior obtained from a 2009 household survey, which successfully collected data from 3,941 rural households (accounting for 19,424 individuals) from 120 villages spread over seven out of 14 districts in rural Bangladesh where Grameen Kalyan (GK), a social business company affiliated with the Grameen Bank, had been operating its prepaid card-based micro health insurance (MHI) scheme. The survey used a program-control design such that ten health care delivery centers were selected purposively taking into consideration a suitable mix of old and new centers and the geographic variation among these locations. Each GK program area physically comprises of an approximate radius of 8 km around the respective health center. One comparable Union Council, the smallest civil administrative unit in Bangladesh, adjacent to each GK program center was then selected purposively to serve as the 'control' area in question. The control areas lay wholly outside the radius of GK operational boundary but shared similar characteristics in all other aspects. A sample of 7 villages were randomly selected from each of the 10 program strata and 5 villages from each of the 10 control strata from a listing of all the villages in both these strata, thus yielding a total of 120 villages, considered as primary sampling units (PSUs). Thus the survey covered 70 program and 50 control villages. The number of program hhs came to 2,477, of whom 935 were GK cardholders (CH) and the remainder 1,542 were non-cardholders (NCH), while the number of control hhs stood at 1,464.

A semi-structured household survey questionnaire along with a village survey questionnaire was used to collect data. The household questionnaire focused on many socio-economic variables including the demographic context (age, gender, education, etc.), occupation of the household head and that of all members, borrowing-lending behavior, food expenditure, non-food expenditure, income, distribution of operating land and non-land assets, experience with shocks, health status, health care choices and out-of-pocket expenses. A series of specific

questions regarding the health outcome were asked of the respondents including the type of illnesses, duration, severity and type of provider sought at the first contact and at the second contact (if any) separately for each episode of illness suffered by any member of the household.

It is important to settle the issue of the 'recall period' over which health care utilization data is to be collected. A detailed review of the literature suggests that various authors use anywhere from 15 days to 12 months for this purpose. In principle, however, choice of the recall period for healthcare utilization must satisfy the twin objectives: (a) minimizing the recall bias and (b) maximizing the sample of target subjects (O'Donnell *et al.*, 2008). In the literature some used 1 month (e.g., Hidayat *et al.*, 2004; Lu *et al.*, 2007; Yiengprugsawan *et al.*, 2011), some used 2 weeks (e.g., Schneider and Hanson, 2006; Shin and Kim, 2010 collecting information on outpatient care) while a growing number of studies have used 12 month recall for collecting information on inpatient procedures (e.g., Wagstaff and van Doorslaer, 2003; Lu *et al.*, 2007; Yiengprugsawan *et al*, 2011). Most authors use 12 months recall period in the study of inequity in health care (outpatient and/or hospital care) utilization (e.g., Liu *et al.*, 2002; van Doorslaer and Masseria, 2004; van Doorslaer *et al.*, 2004; Ourti, 2004; Morris *et al.*, 2005; Zhong, 2010). The present survey has collected information both over 90 days as well as 12 months; the analysis to be presented below, however, is based on 12-month data to reach the adequate number of observations.

3. Findings

3.1. Sample Characteristics

A total of 3,941 households out of the 4,010 households were successfully interviewed. The overall response rate was about 98 percent. Household heads were the respondents in most (83%) and spouses in 15 percent of the cases (Table1). Most (about 88%) of the households were male-headed. Average education level of the household head was seen to be 3.2 years and the average age was about 46 years. The average household size was 4.45. The mean of per capita daily consumption (both food and non-food) is about BDT 66 equivalent to nearly one US Dollar. About 30 percent of the household heads were absorbed in the agriculture sector followed by day labor (about 16%) and small business (about 14%). The employment profile is however not shown in the Table.

3.2. Utilization of Formal Health Care

In the survey we asked about any acute or chronic condition suffered by any individual in the household over the 12 months preceding the interview. We also asked whether they received any treatment for their illnesses, and if so, what type of care they had received. About 88 percent (3,459 out of 3,941) households reported at least one episode of illness; about 55 percent of them had more than one episode in one year.

At the individual level, about 33 percent of the sampled individuals had some sort of self-reported morbidity over the preceding 12 months, and an overwhelming majority (about 98%) of them

Figure 1
A Schematic View of Self-reported Illnesses

Total number of individuals covered in the survey

	(n)
Total	19,424
Program	12,177
■ Card holder	4,745
■ Non card holder	7,432
Control	7,247

Self-reported cases of illness

	(%)	(n)
Total	33.33	6,474
Program	32.09	3,907
■ Card holder	33.17	1,574
■ Non card holder	31.39	2,333
Control	35.42	2,567

Self-reported ailments by major categories

	(%)	(n)
CDs	48.86	3,163
NCDs	49.00	3,172
A&I (accidents and injuries)	2.15	139
Total	100	6,474

Type of Care sought

	(%)	(n)
In-patients	4.94	314
Out-patients	95.06	6,038
Total	100	6,352

Self-reported (major) symptoms

	(%)	(n)
Fever, cough & cold	33.00	2,136
Gastro intestinal disorder	10.71	694
Pain	5.76	373
Diarrhoea	4.83	313
Typhoid	3.58	232
Headache	3.57	231
Blood pressure	2.27	147
Skin diseases	2.16	140
Dysentery	2.15	139
Influenza	1.93	125
Jaundice	1.82	118
Heart disease	1.76	114
Ear diseases	1.58	102
Dental disease	1.41	91
Breathing problem	1.41	91
Fracture	1.33	86
Eye disease	1.19	77
Anaemia	1.05	68
Diabetes	1.03	67
Asthma	0.97	63
Other	16.5	1,067
Total	100	6,474

Severity of illness (%)

- Bed-ridden (48.12)
- Inability to stand easily (1.79)
- Inability to sit easily (1.36)
- Inability to walk easily (4.80)
- Inability to do regular activities (30.99)
- Not much severe (12.94)

Yes

	(%)	(n)
Total	98.12	6,352
Program	98.64	3,854
■ Card holder	98.35	1,548
■ Non card holder	98.84	2,306
Control	97.31	2,498

No

	(%)	(n)
Total	1.88	122
Program	1.36	53
Control	2.69	69

Number of visits

	(%)	(n)
One time	81.36	5,168
Two times	16.78	1,066
Three times	1.24	79
Four times	0.62	39
Total	100	6,352

sought some kind of health care (Figure 1). Outpatient care was utilized by most of the patients (95%). It is further seen about 81 percent of all who sought care, had only one visit, about 17 percent had two and about 2 percent had three or more. The incidence of communicable diseases (CDs) and non-communicable diseases (NCDs) was mostly equal in the sample. About 80 percent of the patients had acute conditions and about 20 percent chronic conditions.[7] About 48 percent of the patients were severely ill (bed-ridden) and 39 percent moderately ill.[8]

Table 1

Basic Characteristics of the Respondents and Households

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

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

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

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[7] We used both WHO fact sheets and CMS (Council for Medical Schemes) guideline for defining chronic diseases.

[8] We asked a structured question to identify the severity of illness using the following options: (i) bed ridden, (ii) inability to stand properly, (iii) inability to sit properly, (iv) inability to walk properly, (v) inability to perform regular activities and (vi) not much ill. We classified the first one as severe, (ii)-(v) moderately severe and (vi) not much severe.

It is seen that self-reported cases of illness increases as one moves up the hierarchy of expenditure quintiles (Table 2). The difference is significant (*p< 0.01*) both between the poorest and the richest quintiles and between the poor and the non-poor (i.e., those below and above the poverty line, respectively).[9]

Table 2

Self-reported Cases of Illness and Utilization of Health Care by Expenditure Quintiles

Expenditure quintile / poor and non-poor	Self-reported cases of illness	Type of provider				
		Informal Provider Total % (n)	Formal provider			
			Government % (n)	Private % (n)	NGO % (n)	Total* % (n)
1st quintile (Poorest)	29.82 (1,236)	64.29 (792)	13.31 (164)	19.24 (237)	3.17 (39)	35.71 (440)
2nd quintile	32.25 (1,306)	63.36 (811)	11.02 (141)	22.89 (293)	2.73 (35)	36.64 (469)
3rd quintile	32.67 (1,271)	60.97 (764)	11.33 (142)	24.74 (310)	2.95 (37)	39.03 (489)
4th quintile	35.05 (1,321)	59.75 (775)	8.40 (109)	28.60 (371)	3.24 (42)	40.25 (522)
5th quintile (Richest)	37.56 (1,335)	51.83 (666)	10.35 (133)	33.46 (430)	4.36 (56)	48.17 (619)
Poor	31.10 (3,533)	64.50 (2,220)	11.77 (405)	20.69 (712)	3.05 (105)	35.50 (1,222)
Non-poor	36.48 (2,936)	54.66 (1,588)	9.78 (284)	31.98 (929)	3.58 (104)	45.34 (1,317)
Total	33.33 (6,469)**	60.00 (3,808)	10.86 (689)	25.85 (1,641)	3.29 (209)	40.00 (2,539)

Note: Non-health household expenditure was considered in computing expenditure quintiles

* Sum of all formal categories.

** Four households were dropped in computing expenditure quintiles because of missing expenditure data.

A majority of the patients seeking health care, as shown in Table 2, chose informal providers (60%) over private (about 26%), government (about 11%) and NGOs (about 3%). The latter three comprise the formal sector. The overall use of formal health care, thus, is 40 percent; the rate is even lower among the poorest (35.71%).

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[9] We estimated the poverty line expenditure by using CBN approach where we used, following Ravallion and Sen (1996), the cost of a normative food bundle (consisting of rice, wheat, pulses, milk, mustered oil, beef, fish, potato and both leafy and non-leafy vegetables) which provides the minimal nutritional requirement of 2,122 kcal per day per capita. We computed food poverty line, as done in the report of Bangladesh *Household Income and Expenditure Survey (HIES)-2005* (BBS, 2007), by adding the products of multiplications of the price of each item with the quantities given in the bundle. We computed "upper non-food allowance" by taking the median amounts spent on non-food items of those households whose per capita food expenditure is close to the food poverty line. We used the upper poverty line (BDT 61) by adding the food poverty line with the upper non-food allowances.

As seen in Table 2, as one moves up the income hierarchy, the utilization of formal care (especially private care) responds positively. Overall, the poorest quintile shows a significantly lower (*p< 0.01*) utilization of formal care than the richer (fourth and fifth) quintiles. It is also seen that the non-poor has significantly (*p< 0.01*) higher utilization of formal care than the poor. However, there is no such difference between the poorest and the richest in the use of public health care. There is also little difference between the poorest and the richest in using NGO provided health care, a small segment of the market.

3.3. Inequity in formal health care utilization

The data has been primarily split into poor and non-poor and then to compare *HI*, each of these subsets have been further demarcated by gender (male vs. female), age-group (child vs. adult vs. elderly), borrowing status (MFI borrowers vs. others), type of MFI borrowers (GB vs. non-GB), Grameen Kalyan's (GK) micro health insurance placement status (program vs. control) andenrolment status in GK micro-health insurance (card holders vs. non-card holders). Each such category (if relevant) has been further split into male and female to understand clearly whether gender matters in the use of formal health care. Note that splitting the data into 5 expenditure quintiles (i.e., instead of a two-way grouping along 'poor' and 'non-poor') may have yielded a more detailed understanding of horizontal inequity. However, this would have left us with very few observations in each cell for meaningful analysis and estimation and hence the rationale for the choice of the breakdown of expenditure quintiles.

Weighted proportion of formal health care use: The weighted proportions reported in Table 3A show that the actual use of formal health care increases sharply as we move up the hierarchy of age groups among both the poor (27.6%, 38.4% and 42.8% for child, adult and elderly respectively) and the non-poor (35.5%, 47% and 50% for child, adult and elderly respectively) while there is no difference between the male and the female individuals. Hence, children are heavily deprived in actual use of formal health care. If we consider the gender differential among the age groups it is observed that female children are more deprived than male children in actual use of formal health care in both poor and non-poor groups; this deprivation is even higher *(p < 0.01)* among the non-poor. However, the female individuals use more formal care than the male individuals among the adult and the elderly, especially in the non-poor group.

If we focus on the participation behavior of the household in MFI interventions, it is seen that the utilization of formal health care is significantly (*p<0.01*) lower among MFI borrowers than others (either non-borrowers or non-MFI borrowers) irrespective of income (Table 3B). The male in MFI borrowing households appears to have a higher use of formal care than the female among both the poor and the non-poor. However, there is no such gender pattern among other poor groups, while the pattern persists significantly (*p < 0.01*) favoring the female persons in the non-poor group. Overall however, Grameen Bank (GB) borrowers enjoy significantly (*p<0.01*) higher use of formal care than non-GB borrowers in both income groups. Similarly the GK program areas, effectively signifying the placement of a basic, though formal, care program, boast significantly (*p<0.01*) higher use of formal care than control, again among all income groups. Finally, it is seen that the utilization of formal care is significantly (*p<0.01*) higher among members of

Table 3A

Weighted Proportion, Crude Concentration Indices, Need-standardized Inequities and Inequities Estimated Using Decomposition Analysis by Age and Gender

Economic status	Category			Weighted proportion	Concentration index	Horizontal inequity	
						Need standardized	Decomposition
Poor	Gender		Female	0.346	-0.006	-0.004	-0.004
			Male	0.348	0.005	-0.009	0.021
Non-poor	Gender		Female	0.440	0.041**	0.034	-0.049
			Male	0.446	0.014	-0.004	0.024
Poor	Age[†]	Child	Female	0.261	-0.038	-0.031	-0.036
			Male	0.290	-0.038	-0.031	-0.035
			Total	0.276	-0.036	-0.032	-0.030
		Adult	Female	0.385	-0.004	-0.01	0.003
			Male	0.382	0.008	-0.009	0.022
			Total	0.384	0.001	-0.01	0.011
		Elderly	Female	0.443	0.004	-0.028	0.021
			Male	0.416	0.139**	0.056	0.167
			Total	0.428	0.074	0.021	0.094
Non-poor	Age[†]	Child	Female	0.280	0.036	0.021	0.044
			Male	0.421	-0.007	0.004	-0.014
			Total	0.355	0.004	0.011	-0.004
		Adult	Female	0.480	0.027	0.011	0.030
			Male	0.454	0.031	0.005	0.041
			Total	0.470	0.028*	0.006	0.035
		Elderly	Female	0.543	0.055	0.025	0.058
			Male	0.470	-0.039	-0.091	0.015
			Total	0.503	0.010	-0.021	0.031

Dependent Variable: Receiving healthcare from formal providers (1= yes, 0= no)

Note: *** indicates significance at 1% level, ** at 5% and * at 10%.

[†] Age below 15 years has been defined as child, age 15-64 years as adult and age 65 years and above as elderly.

(i) In column 5, among the non-poor, the differences in actual health care use between the male and the female is significant at 1% level for all age-groups while among the poor this difference is significant at 1% level for children and 10% level for the elderly. The differences among the age-groups (children vs. adult vs. elderly) are significant at 1% level irrespective of the poor and non-poor.

Grameen Kalyan (GK) micro health insurance (MHI) scheme than among non-members in the non-poor group while there is no difference among the poor.

Crude concentration index: The positive sign of the crude concentration indices described in Tables 3A and 3B shows that the utilization of formal health care is concentrated among the better-off for most sub-categories (as discussed above) in the non-poor group. For the poor, the

negative sign indicates that this was concentrated among the worse-off for the female group, children (both male and female), adult female, male in the MFI borrowing-household, female in the non-MFI borrowing (including non-borrowing) household, GB borrowers, GK program areas and both MHI card and non-card holders. In Table 3A none of the negative values of the concentration indices, i.e., those along the gender dimension, happen to be statistically significant. However in Table 3B the negative values were indeed strongly significant among the poor in the categories of GB borrowers and respondents in the GK program area regardless of the MHI cardholding status. Moreover, for each of the latter categories, the concentration indices were significantly positive, indicating actual use of healthcare strongly concentrated among the non-poor.

The socioeconomic inequality in health care utilization as represented by the crude concentration index is different for different categories of variables; the higher the magnitude, the higher the inequality (Tables 3A and 3B). For instance, the inequality is substantially larger in absolute value for MHI cardholders than non-cardholders in both poor and non-poor groups (-0.034 vs. -0.025 for the poor and 0.054 vs. 0.030 for the non-poor) although here the inequality favors the worse-off among the poor but the better off among the non-poor. The inequality is also larger, again in absolute value, for the female individuals in general, female children, elderly female and the female in MFI borrowing households than their male counterparts in the non-poor group while for the poor, the inequality is substantially larger for elderly male and male in non-MFI borrowing households.

Horizontal inequity: The horizontal inequities estimated following the need-standardized method and decomposition analysis (as discussed in Section 2.2) are displayed in last two columns of Tables 3A and 3B. We run probit regressions encompassing both need and non-need variables for decomposition analysis while in the need-standardized method we included only the need variables such as age of the patient (in years), self-reported duration of illness (in days), type of diseases (CDs, NCDs and A&I), and self-assessed severity of the illness (extremely severe, moderately severe and not much severe). The latter two are multiple dummy variables where 'CDs' and 'not so severe' were respectively considered as the reference category. Although age and gender are used as need factors in most studies of this kind (e.g., Ohkusa and Honda, 2003; van Doorslaer *et al.*, 2004; Morris *et al.*, 2005; Schneider and Hanson, 2006; Lu *et al.*, 2007), we did not use gender as an explanatory variable since we split the subjects into male and female groups as stated above. Schneider and Hanson (2006) used self-assessed severity of illness and duration of hospitalization while we used total duration of illness for both outpatient and hospitalization. Instead of categorizing the type of illnesses into acute and chronic, as used in the earlier literature (e.g., van Doorslaer *et al.* 2004; Morris *et al.* 2005), we grouped these into CDs, NCDs and A&I since the duration of illness is strongly correlated with acute and chronic categories. The non-need variables are: education of the household head (in years), enrolment status in GK MHI (1 for yes, 0 otherwise), total number of illness episodes in the household and total number of children in the household.

The analysis shows that there are pro-poor need standardized horizontal inequities (see the negative sign) in using formal health care for most categories of interest among the poor while for the non-poor, there are pro-rich need standardized horizontal inequities (i.e., positive sign, Tables 3A and 3B). More precisely, the lower income households within the poor group used a

higher share of formal health care than their share of health care needs, while the higher income households among the non-poor group uses a higher share of formal care than their share of health care needs for most categories of variables (as depicted above).

Among the poor, the need standardized *HI* is considerably higher in absolute value for the elderly male than the elderly female (*HI: 0.056 vs. -0.028* where the former shows pro-rich and the latter pro-poor inequities) and in program areas than control areas (*HI: -0.026 vs. 0.013*). In the non-poor group, the inequity is noticeably higher in absolute value for the female than the male individuals (*HI: 0.034 vs. -0.004*), elderly male than elderly female (*HI: -0.091 vs. 0.025*), MFI borrowers than non-borrowers (*HI: 0.036 vs. -0.003*), the female than the male individuals in MFI borrowing households (*HI: 0.068 vs. 0.002*), non-GB borrowers than GB borrowers (*HI: 0.042 vs. 0.026*) and GK MHI card holders than non-card holders (*HI: 0.037 vs. 0.009*).

Horizontal inequity estimated through decomposition analysis in the last column of Tables 3A and 3B shows that, for most categories, inequity favors the better off irrespective of the poverty status. However, inequity favors the worse-off among the female individuals, both poor and non-poor, among male children in the non-poor group and among poor children (both male and female, Table 3A). Focusing on the poor, inequity appears to favor GB borrowers, GK program areas respondents, i.e., including both members and non-members of MHI (Table 3B).

There is however substantial difference in the pattern of inequity for the same set of variables between the 'need-standardized' and 'decomposition' approaches. Often the magnitude differs a lot, but the sign also reverses in some cases. For example, among the non-poor inequity in absolute value is substantially higher for the female vis-à-vis the male persons in both approaches, though the sign is different. For the elderly non-poor, the orders of magnitude as well as the sign differ between the two measurements of HI (Table 3A). Moving over to Table 3B inequity (favoring the rich) measured by decomposition analysis is substantially higher in program than in control areas (among the non-poor) while there is no such difference in the need standardized approach. The discrepancy in the direction of inequity between the two methods of conducting HI analysis however disappears for the set of variables when the 'concentration index' is highly significant ($p < 0.01$), as seen in the bottom half of Table 3B. The magnitudes however continue to fluctuate, though mostly over a modest range.

Contribution of the determinants to the total observed inequality: The contribution of each determinantis obtained by multiplying the marginal effect of the respective variable by its mean and the concentration index and then dividing the product by the mean or proportion of healthcare use.[10] Unadjusted percentage contribution of each determinant (i.e., the figures in parentheses in Tables 4A and 4B) is obtained by dividing the absolute contribution (absolute value of the deterministic contribution) by the total explained proportion of the concentration index.

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[10] *Marginal effect of the determinant:* The marginal effect of each determinant indicates its association with the likelihood of visiting a formal provider, while its magnitude implies the strength of the association.

Concentration index of the determinant: The positive or negative concentration index of each determinant refers to the concentration of individuals with the particular variable over higher or lower income groups respectively.

Table 3B

Weighted Proportion, Crude Concentration Indices, Need-standardized Horizontal Inequities and Inequities Estimated Using Decomposition Analysis by Borrowing, MFI Membership, GK Program and MHI Enrolment Status

Economic status	Category			Weighted proportion	Concentration index	Horizontal inequity	
						Need standardized	Decomposition
Poor	HH Borrowing Status	MFI Borrower	Female	0.295	0.029	0.029	0.027
			Male	0.310	-0.023	-0.029	-0.008
			Total	0.303	0.003	-0.002	0.009
		Others (Non-borrower including non-MFI borrower)	Female	0.392	-0.020	-0.018	-0.014
			Male	0.390	0.048	0.032	0.060
			Total	0.391	0.010	-0.003	0.021
Non-poor	HH Borrowing Status	MFI Borrower	Female	0.403	0.085***	0.068	0.070
			Male	0.431	0.028	0.002	0.040
			Total	0.416	0.057***	0.036	0.055
		Others (Non-borrower including non-MFI borrower)	Female	0.486	0.005	0.009	0.002
			Male	0.465	-0.001	-0.016	0.012
			Total	0.477	0.002	-0.003	0.006
Poor	Category of MFI borrower	GB borrower		0.323	-0.038***	-0.041	-0.023
		Non-GB borrower		0.284	0.037***	0.03	0.038
Non-poor	Category of MFI borrower	GB borrower		0.434	0.045***	0.026	0.044
		Non-GB borrower		0.400	0.063***	0.042	0.058
Poor	Area	Program		0.358	-0.026***	-0.026*	-0.018
		Control		0.336	0.024***	0.013	0.029
Non-poor	Area	Program		0.450	0.036***	0.016	0.040
		Control		0.435	0.020***	0.015	0.016
Poor	GK MHI enrolment status	Card holders		0.359	-0.034***	-0.02	-0.036
		Non-card holders		0.358	-0.025***	-0.026	-0.016
Non-poor	GK MHI enrolment status	Card holders		0.487	0.054***	0.037**	0.047
		Non-card holders		0.442	0.030***	0.009	0.037

Dependent variable: Receiving healthcare from formal provide (1= yes, 0= no)

Note: *** indicates significance at 1% level, ** at 5% and * at 10%.

i) In column 5, among the non-poor, the gender (male vs. female) difference in actual health care use is significant at 1% level for both MFI borrowers and the other (i.e., non-MFI borrowers and non-borrowers) while among the poor this difference is significant at 5% level for MFI borrowers only. The differences between the MFI borrowers and the other, GB and non-GB borrowers, program and control areas are significant at 1% level among both the poor and non-poor groups but this difference is significant (p < 0.01) between cardholders and non-cardholders only among the non-poor.

Table 4A
Deterministic and Unadjusted Percentage Contribution of the Determinants to the Total Observed Inequality

Economic status	Category		Determinants									
			Need variables						Non-need variables			
			Age	NCDs	I&A	Duration	Extremely severe ill	Moderately severe ill	Education of HH head	MHI enrolment status	No. of illness episodes in HH	No. of children in HH
Poor	Gender	Female	0.001 (2.62)	0.007 (31.61)	-0.003 (-13.95)	-0.005 (-24.44)	-0.005 (-21.70)	0.004 (18.52)	0.010 (47.17)	0.006 (26.76)	0.001 (5.51)	0.006 (27.91)
		Male	-0.001 (12.37)	0.000 (-1.90)	-0.006 (110.35)	-0.006 (115.89)	0.000 (5.69)	-0.002 (37.84)	0.011 (-202.24)	-0.001 (10.81)	0.001 (-12.03)	-0.001 (23.21)
Non-poor	Gender	Female	0.003 (9.08)	0.000 (0.23)	0.001 (4.08)	0.002 (6.07)	-0.008 (-23.00)	0.010 (28.53)	0.019 (57.76)	0.003 (8.36)	0.002 (5.44)	0.001 (3.44)
		Male	-0.001 (-26.11)	-0.005 (-183.49)	0.001 (30.10)	-0.002 (-80.48)	-0.003 (-116.17)	0.001 (23.90)	0.012 (418.69)	0.005 (179.64)	-0.002 (-83.68)	-0.002 (-62.39)
Poor	Age*	Child	0.001 (4.99)	0.006 (55.03)	-0.004 (-33.34)	-0.010 (-92.84)	0.001 (9.41)	0.000 (2.21)	0.015 (133.95)	-0.002 (-19.14)	0.003 (26.92)	0.001 (12.81)
		Adult	0.000 (3.36)	0.002 (25.04)	-0.004 (-52.39)	-0.005 (-60.87)	-0.004 (-53.54)	0.000 (2.76)	0.010 (125.45)	0.006 (84.12)	0.002 (28.50)	0.000 (-2.44)
		Elderly	0.000 (-1.25)	-0.009 (36.43)	-0.005 (18.57)	-0.007 (27.03)	0.000 (1.74)	0.001 (-2.49)	0.013 (-52.20)	-0.002 (6.22)	-0.016 (64.12)	0.000 (1.83)
Non-poor	Age*	Child	0.000 (-1.56)	-0.004 (-12.84)	0.000 (-1.63)	0.012 (41.82)	-0.006 (-22.15)	0.007 (25.74)	0.017 (59.67)	0.004 (14.82)	-0.001 (-4.43)	0.000 (0.57)
		Adult	0.000 (2.54)	-0.007 (-47.82)	0.002 (13.58)	-0.003 (-18.18)	-0.002 (-11.93)	0.002 (14.50)	0.016 (113.48)	0.004 (26.29)	0.001 (4.38)	0.000 (3.18)
		Elderly	-0.003 (9.39)	-0.014 (43.23)	0.002 (-5.20)	-0.005 (15.32)	-0.005 (16.31)	0.005 (-16.23)	0.003 (-9.39)	-0.001 (3.33)	-0.004 (12.24)	-0.010 (31.00)

Note: 1. Figures in parentheses are the unadjusted percentage contribution of the determinant to the concentration index. Positive (negative) values reveal pro-rich (pro-poor) orientation and zero is perfect equivalence.

2. We did not show the gender breakdown in this table to make the results presentable.

* Age below 15 years has been defined as child, age 15-64 years as adult and age 65 years and above as elderly.

Table 4B
Deterministic and Unadjusted Percentage Contribution of the Determinants to the Total Observed Inequality

Economic status	Category		Age	NCDs	I&A	Duration	Extremely severe ill	Moderately severe ill	Education of HH head	MHI CH status	No. of illness episodes in HH	No. of children in HH
					Need variables						Non-need variables	
Poor	HH's Borrowing Status	MFI Borrower	0.001 (2.54)	0.004 (16.26)	-0.003 (-12.93)	-0.007 (-32.70)	0.001 (4.08)	-0.001 (-3.68)	0.014 (63.80)	0.005 (23.02)	0.003 (11.98)	0.006 (27.64)
		Others (Non-borrower including non-MFI borrower)	0.000 (0.91)	0.004 (77.88)	-0.004 (-85.94)	-0.004 (-75.38)	-0.008 (-159.86)	0.002 (34.49)	0.010 (200.02)	0.001 (14.84)	0.004 (81.01)	0.001 (12.02)
Non-poor	HH's Borrowing Status	MFI Borrower	0.001 (1.82)	0.002 (5.10)	0.001 (4.46)	0.000 (-0.41)	-0.004 (-12.89)	0.003 (8.83)	0.021 (63.44)	0.009 (27.21)	0.001 (3.47)	0.000 (-1.03)
		Others (Non-borrower including non-MFI borrower)	0.002 (19.04)	-0.006 (-64.26)	0.001 (11.03)	-0.001 (-5.33)	-0.007 (-72.72)	0.007 (71.96)	0.011 (119.58)	-0.001 (-8.32)	0.000 (1.13)	0.003 (27.91)
Poor	Category of MFI borrower	GB borrower	0.000 (-0.49)	-0.006 (34.29)	-0.001 (5.51)	-0.012 (69.72)	0.001 (-6.27)	0.002 (-11.41)	0.008 (-46.48)	0.002 (-10.28)	-0.011 (66.22)	0.000 (-0.81)
		Non-GB (other MFI) borrower	0.000 (-0.69)	0.011 (16.26)	-0.006 (-9.29)	-0.003 (-4.06)	0.000 (-0.03)	-0.003 (-3.83)	0.023 (33.67)	0.000 (0.51)	0.028 (41.45)	0.018 (26.01)
Non-poor	Category of MFI borrower	GB borrower	-0.001 (-3.59)	0.005 (28.72)	-0.001 (-7.22)	-0.001 (-2.90)	-0.005 (-29.04)	0.004 (21.89)	0.017 (93.23)	0.011 (59.82)	-0.010 (-57.51)	-0.001 (-3.38)
		Non-GB (other MFI) borrower	0.003 (9.27)	-0.002 (-4.45)	0.005 (13.87)	-0.001 (-2.73)	-0.003 (-7.28)	0.002 (4.35)	0.026 (68.92)	0.000 (-0.34)	0.010 (27.16)	-0.003 (-8.76)
Poor	Area	Program	0.000 (1.32)	-0.001 (-16.96)	-0.003 (-38.61)	-0.006 (-80.30)	0.003 (41.54)	-0.001 (-8.28)	0.011 (138.20)	0.006 (79.95)	-0.004 (-50.89)	0.003 (34.04)
		Control	0.002 (15.95)	0.008 (69.78)	-0.004 (-36.03)	-0.005 (-46.41)	-0.008 (-73.11)	0.003 (24.26)	0.012 (102.33)	N/A	0.007 (58.57)	-0.002 (-15.34)
Non-poor	Area	Program	0.000 (0.96)	0.000 (0.93)	0.001 (6.24)	-0.001 (-5.54)	-0.009 (-62.88)	0.005 (36.62)	0.014 (93.88)	0.005 (32.52)	-0.001 (-7.48)	0.001 (4.74)
		Control	0.004 (17.15)	-0.003 (-14.90)	0.002 (9.73)	0.000 (-0.87)	-0.002 (-8.41)	0.004 (15.96)	0.019 (83.82)	N/A	0.003 (13.66)	-0.004 (-16.13)
Poor	GK MHI card holding status	Card holders	0.000 (1.79)	-0.002 (-30.65)	0.001 (7.59)	-0.002 (-23.32)	0.003 (38.20)	0.002 (27.19)	0.013 (163.85)	N/A	-0.001 (-7.72)	-0.006 (-76.92)
		Non-card holders	0.000 (-8.42)	-0.001 (39.60)	-0.005 (200.11)	-0.006 (244.21)	0.003 (-140.39)	-0.001 (49.30)	0.010 (-440.18)	N/A	-0.005 (210.33)	0.001 (-54.56)
Non-poor	GK MHI card holding status	Card-holders	-0.001 (-2.28)	0.007 (28.08)	0.000 (0.06)	0.002 (9.39)	-0.004 (-16.74)	0.002 (8.57)	0.017 (72.00)	N/A	0.001 (3.94)	-0.001 (-3.02)
		Non-card holders	0.001 (36.79)	-0.002 (-69.77)	0.001 (44.22)	-0.003 (-94.10)	-0.011 (-356.54)	0.007 (230.85)	0.012 (370.40)	N/A	-0.001 (-18.50)	-0.001 (-43.33)

Note: 1. Figures in parentheses are the unadjusted percentage contribution of the determinant to the concentration index. Positive (negative) values reveal pro-rich (pro-poor) orientation and zero is perfect equivalence.

The positive (negative) value of the contribution suggest that if all other factors were equal, the total socio-economic inequality in formal health care use would be lower (higher) if that determinant had equal distribution among the socio-economic groups (instead of the magnitude of the concentration indices) or if that determinant had no association with the likelihood of accessing formal health care (instead of the marginal effects).

Contribution of the determinants to the overall observed inequality can be interpreted as follows. Among the poor, the contribution of NCDs, a need variable, for the female is 0.007 or 31.6 percent to the total observed inequality in formal healthcare use (Table 4A).[11] In other words, the total inequality in formal health care use favoring the better-off among the poor, *ceteris paribus*, would have been about 32 percent lower if formal health care use for NCDs were equally distributed across the socio-economic groups, or, if NCDs were not associated with formal health care use at all. Duration of illness had the negative inequality contribution (-0.005 or -24.44%). For the poor female individuals, among the non-need variables, education of the household head had a positive contribution (0.010 or 47.2%) to the total observed inequality in formal health care use. It can be similarly interpreted as stating that the total observed inequality in formal health care use favoring the better-off among the poor, other things equal, would be about 47 percent lower if all the household heads of the poor female group were equally educated irrespective of the income level or if the education of the household head had no association with formal health care use.

Among need variables, extreme severity, duration and NCDs were the major contributors among the need variables while education of the household head was the most important contributor among the non-need variables explaining the observed inequality in health care. Duration and extreme severity of illness however had mostly a negative inequality contribution to total observed inequality. Non-need factors contributed mostly to the pro-rich direction for most of the categories.

4. Discussion and Conclusions

This study delineates the level of utilization of and inequity in the use of formal health care, giving a particular focus on the gender factor in rural Bangladesh. In determining horizontal inequity we used both the need-standardized approach and the decomposition analysis. We split the data primarily into poor and non-poor and then allocate each group into different subgroups along the following lines: gender, age, borrowing status, type of MFI member, micro health insurance placement status and enrolment status in micro-health insurance. We also split each category (if relevant) into male and female fora clearer understanding whether gender matters.

The results show that the utilization of formal health care is very low (about 40%) and especially so among the poorest (36%). About two-thirds of the formal health care market has been

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[11] Note that NCDs for female had a higher likelihood of visiting formal providers and were disproportionately concentrated among the rich indicated by the positive marginal effect (0.196) and the positive concentration index (0.025) respectively (the magnitudes are not shown in Table).

supplied by private facilities and about one-fourth by Government facilities while NGOs played a small role (Table 2). Interestingly, the poorest and the richest have almost equal use of government and NGO care. Private sector however dominates the formal health care scene and thus the poorest are more deprived presumably due to their inability to meet the costs. This leads to a significant difference in the degree of formal care accessed by the richest & the poorest quintiles. The difference is also significant ($p < 0.01$) while comparing the poor and the non-poor (Table 2).

The need-standardized method reveals that there are pro-poor horizontal inequities in formal care use among the poor and pro-rich inequities among the non-poor while decomposition results show that in most cases the inequity favors the better off in both poor and non-poor groups. Non-need factors, especially education of the household head, mostly contribute to this pro-rich direction. However, surprisingly, the level of inequity is not prominent except in a few cases. Severity of illness, duration and the incidence of NCDs appear to be the main contributors amongst the need factors of the underlying inequities.

Both methods show that inequity is considerably higher for the non-poor female compared to the non-poor male even though both groups had about equal actual health care use. A similar pattern of difference is seen for the non-poor children, which however tallies with their actual use of health care. A very similar level of inequity prevails between both the poor female and male children (for all measurement methods) and in spite of that the former had significant less use of actual health care than the latter. Difference in inequity is also not prominent between the adult female and the adult male while there is some difference between the elderly female and elderly male in both poor and non-poor groups. There is also some variation in inequity among the age groups for both the poor and non-poor. Inequity exists by borrowing status of the household to some extent while this does not extend to the type of MFI membership, Grameen Kalyan's MHI placement status or the enrolment status in GK MHI in either poor or non-poor groups.

As we use 12-month recall period some minor illnesses may have gone under reported. However, this may not affect much the data of health care use. Moreover, the data analyzed in the paper does not represent Bangladesh as a whole or even all of rural Bangladesh. Future research may deal with the issue using a nationally representative sample and heterogeneous (by type of illness) recall periods.

Although 'informal' health care is often considered not 'proper health care' in many facets, its excessive use by all sections of population (especially the poor) is also a major concern in most developmental contexts. Hence, finding the reasons behind substantial use of 'informal' health care would be important from a policy perspective. As evident in the literature (Ahsan *et al.*, 2012) the major reasons behind substantial use of 'informal' health care are 'proximity' and the 'low cost of treatment'. Estimating the inequality in use of 'informal' care may also be important. The latter may however be seen to be the opposite side of the 'low access to formal care issue'. Hence focusing on formal care indirectly addresses the informal care issue as well, though a direct analysis would be in order since such an analysis would presumably reveal distinct insights even if the choice between the two is often a binary one (especially when both types are physically with reach of rural residents). However that latter challenge is left for another occasion.

Despite these limitations the analysis carried out above gives a clear indication that inequity may not be the topic of main public policy focus; low use of formal health care is the primary deficiency of the health system in rural Bangladesh. Noticeably, this low use has been mainly caused by low use of public care. As depicted in the literature (e.g., HEU, 2012; Andaleeb *et al.*, 2007), loss of faith in public facilities (due to various supply side constraints, e.g., appropriate skill-mix, input-mix, absenteeism of doctors, politicization in the posting of doctors, shortage of drugs) is one of the main reasons for low demand of public health care. Moreover, prevailing inequity resides instinctively in the utilization of private health care and NCDs is a significant contributor to this inequity. In terms of the burden of out-of-pocket payments the major part of NCDs is chronic ones (Hamid and Ahsan, 2014). Thus, Bangladesh needs to innovate upon means of increasing access to public health care as well as reducing inequity in the provision of private care. In the former context, the scope of rendering the government facilities more efficient is plagued by both budgetary limitations as well as by daunting governance issues in the face of reported endemic corruption.

Although developing appropriate risk-pooling modalities such as low-cost *voluntary* MHI schemes are gaining popularity in many contexts similar to that in Bangladesh, this is not a viable route for dealing with chronic NCDs and catastrophic illnesses. Moreover, there is little evidence of the replicability and scalability due presumably to both demand and supply side constraints. Introduction of social insurance is not quite feasible due to the large informal economy. Thus, access to formal health care can only be increased via enhancing the efficiency of government facilities as well as the quality of public health care. This requires some reforms, e.g., strengthening of local governments and involving them in the management of sub-district and rural hospitals and health centers; allowing all levels of hospitals to impose some user fees (combined with a proper safety net for the poor and the vulnerable) and retention of these fees on their part for smoothening the service delivery.

References

Ahmed SM. 2001. Differing health and health-seeking behaviour: ethnic minorities of the Chittagong Hill Tracts, Bangladesh. *Asia Pacific Journal of Public Health* 13(2):100-108.

Ahmed SM, Adams AM, Chowdhury M, Bhuiya A. 2000. Gender, socioeconomic development and health-seeking behaviour in Bangladesh. *Social Science & Medicine* 51(3): 361-371.

Ahmed SM, Adams AM, Chowdhury M, Bhuiya A. 2003. Changing health-seeking behaviour in Matlab, Bangladesh: do development interventions matter? *Health Policy and Planning* 18(3): 306–315.

Ahmed SM, Tomson G, Petzold M, Kabir ZN. 2005. Socioeconomic status overrides age and gender in determining health seeking behaviour in Rural Bangladesh. *Bulletin of the world health organization* 83(2): 109-117.

Ahmed SM, Petzold M, Kabir JN, Tomson G. 2006. Targeted intervention for the ultra-poor in rural Bangladesh: Does it make any difference in their health-seeking behaviour? *Social Science & Medicine* 63 (11): 2899-2911.

Amin R, Shah NM, Becker S. 2010. Socioeconomic factors differentiating maternaland child health-seeking behavior in rural Bangladesh: A cross-sectional analysis. *International Journal for Equity in Health* 9(9).

Andaleeb SS, Shiddique N, Khandkar S. 2007. Patient Satisfaction with Health Services in Bangladesh. *Health Policy and Planning* 22:263–273.

Anwar I, Sami M, Akhtar N, Chowdhury ME, Salma U, Rahman M, Koblinsky M. 2008. Inequity in maternal health-care services: evidence from home-based skilled-birth-attendant programmes in Bangladesh. *Bulletin of the World Health Organization* 86(4): 252–259.

Bangladesh Bureau of Statistics (BBS). 2007. *Report of the Household Income & Expenditure Survey 2005.* Dhaka: Bangladesh Bureau of Statistics, Ministry of Planning, Government of Bangladesh.

Hamid SA, Ahsan SM. 2014. Disease-specific Impoverishment Impact of Out-of-Pocket Payments for Health Care: Evidence from Rural Bangladesh. *InM working Paper,* No. 27 (forthcoming).

Hamid SA, Roberts J, Mosley P. 2011. Evaluating the Health Effects of Micro Health Insurance Placement: Evidence from Bangladesh. *World Development* 39(3): 399-411.

Health Economics Unit (HEU). 2012. *Expanding Social Protection for Health towards Universal Health Coverage: Health Care Financing Strategy 2012-2032*. Ministry of Health and Family Welfare, Government of Bangladesh, Dhaka.

Hidayat B,Thabrany H, Dong H, Sauerborn R. 2004. The effects of mandatory health insurance on equity in access to outpatient care in Indonesia. *Health Policy and Planning* 19(5):322-335.

Hossain MI. 2010. Inequality in the Utilization of Maternal Care and the Impact of a Macroeconomic Policy: Evidence from Bangladesh. *HEDG Working Paper No.* 10/08.

Lu JR, Leung GM KwonS,Tin KYK, Doorslaer EV, O'Donnell O. 2007. Horizontal equity in health care utilization evidence from three high-income Asian economies. *Social Science & Medicine* 64(1): 199–212.

Liu GG, Zhao Z, Cai R, Yamada Te, Yamada Ta. 2002. Equity in health care access to: assessing the urban health insurance reform in China. *Social Science & Medicine* **55**(10):1779-1794.

Morris S, Sutton M, Gravelle H. 2005. Inequity and inequality in the use of health care in England: an empirical investigation. *Social Science & Medicine* 60(6):1251-1266.

Marmot M. 2005. Social determinants of health inequalities.*The Lancet* 365(9464): 1099-1104.

Marmot M, Feeney A.1997. General explanations for social inequalities in health. *IARC Scientific Publications* 138: 207-228.

Nanda P. 1999. Women's Participation in Rural Credit Programmes in Bangladesh and their Demand for Formal Health Care: Is there a Positive Impact? *Health Economics* 8(5):415-428.

OhkusaY, Honda C. 2003. Horizontal Inequity in Health Care Utilization in Japan. *Health Care Management Science* 6(3): 189-196.

Onwujekwe O. 2005. Inequities in healthcare seeking in the treatment of communicable endemic diseases in Southeast Nigeria. *Social Science & Medicine* 61(2): 455-463.

O'Donnell O, van Doorslaer E, Wagstaff A, Lindelow M. 2008. *Analyzing Health Equity Using Household Survey Data: a Guide to Techniques and their Implementation.* World Bank: Washington DC.

Ourti TV. 2004. Measuring horizontal inequity in Belgian healthcare using a Gaussian random effects two part count data model. *Health Economics* 13(7): 705-724.

Rahman MH, Mosley WH, Ahmed S, Akhter H. 2008. Does service accessibility reducesocioeconomic differentials in maternity care seeking? Evidence from rural Bangladesh.*Journal of Biosocial Science* 40(1): 19–33.

Ravallion M, Sen B. 1996. When Methods Matters: Monitoring Poverty in Bangladesh. *Economic Development and Cultural Chang* 44(4):761-792.

Shin H, Kim J. 2010. Differences in income-related inequality and horizontal inequity in ambulatory care use between rural and non-rural areas: using the 1998-2001 U.S. National Health Interview Survey data. *International Journal for Equity in Health* 9(17).

Schneider P, Hanson K. 2006. Horizontal equity in utilization of care and fairness of health financing: A comparison of micro-health insurance and user fees in Rwanda. *Health Economics* 15(1): 19–31.

Van Doorslaer E, Masseria C. 2004. Income-Related Inequality in the Use of Medical Care in 21 OECD Countries. *OECD Health Working Papers* No. 14, OECD Publishing.http://dx.doi.org/10.1787/687501760705.

Van Doorslaer E, Koolman X, Jones AM. 2004. Explaining Income-related Inequalities in Doctor Utilisation in Europe. *Health Economics* 13(7); 629-647.

Wagstaff A. 2002. Poverty and health sector inequalities. *Bulletin of the World Health Organization* 80(2): 97-105.

Wagstaff A, van Doorslaer E. 2000. Measuring and testing for inequity in the delivery of health care. *Journal of Human Resources* 35(4): 716–733.

Wagstaff A, van Doorslaer E, Watanabe N. 2003. On decomposing the causes of health sectorinequalities, with an application to malnutrition inequalities in Vietnam. *Journal of Econometrics* 112(1): 207–223.

Whitehead M, Dahlgren G, Evans T. 2001. Equity and health sector reforms: can low-income countries escape the medical poverty trap? *The Lancet* 358 (9284): 833–836. DOI:10.1016/S0140-6736(01)05975-X.

World Health Organization (WHO). 2010. *Health Systems Financing: The path to universal coverage*. WHO, Geneva, Switzerland.

Yiengprugsawan V, Carmichael GA, Lim LLY, Seubsman C, Sleigh AC. 2011. Explanation of inequality in utilization of ambulatory care before and after universal health insurance in Thailand. *Health Policy and Planning* 26(2): 105-114.DOI:10.1093/heapol/czq028.

Zhong H. 2010. On decomposing the inequality and inequity change in health care utilization: change in means, or change in the distributions? *International journal of health care finance and economics* 10(4): 369-386.

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