

# BMJ Open Patients' choice of healthcare providers and predictors of modern healthcare utilisation in Bangladesh: Household Income and Expenditure Survey (HIES) 2016–2017 (BBS)

Asif Imtiaz ,<sup>1,2</sup> Noor Muhammad Khan,<sup>3</sup> Emran Hasan,<sup>4</sup> Shanthi Johnson,<sup>5</sup> Hazera Tun Nessa<sup>6</sup>

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For numbered affiliations see end of article.

## Correspondence to

Asif Imtiaz;  
asifimtiaz.mis@du.ac.bd

## ABSTRACT

**Objectives** The number of modern healthcare providers in Bangladesh has increased and they are well equipped with modern medical instruments and infrastructures. Despite this development, patients seeking treatment from alternative healthcare providers are ongoing. Hence, this study aims to determine the underlying predictors of patients' choosing modern healthcare providers and health facilities for getting treatments.

**Setting** Data from the nationally representative Household Income and Expenditure Survey 2016–2017 conducted by the Bangladesh Bureau of Statistics were used.

**Participants** 34 512 respondents sought treatment for their illnesses from different types of available healthcare providers.

**Primary and secondary outcome measure** Patients' choice of healthcare providers (primary) and predictors of patients' choice of modern healthcare providers (secondary).

**Results** The study found that 40% of the patients visit modern healthcare providers primarily on having symptoms of illness, and the remainder goes to alternative healthcare providers. Patients living in urban areas (adjusted OR (AOR)=1.11, 95% CI 1.05 to 1.17,  $p<0.01$ ), and if the travel time was between 1 and 2 hours (AOR=1.11, 95% CI 1.00 to 1.22,  $p<0.05$ ) compared with travel time less than 1 hour, were positively associated to utilisation of modern healthcare facilities for their first consultation. The statistical models show that the predisposing and need factors do not significantly impact patients' choice of modern healthcare providers.

**Conclusions** The distribution of modern healthcare providers should be even across the country to eliminate the rural–urban divide in modern healthcare utilisation. Enhancing the digital provision of modern healthcare services could reduce travel time, omit transportation costs and save waiting time for treatment by the modern healthcare providers. Policymakers can think of introducing a national health insurance programme in Bangladesh as a potential policy instrument.

## BACKGROUND

Over the last three decades, Bangladesh has achieved considerable progress in many Millennium Development Goals, particularly

## Strengths and limitations of this study

- This study examined the most recent national-level Household Income and Expenditure Survey 2016–2017 data to analyse the first-choice healthcare provider of the patients. Previous similar studies primarily concentrated on specific zones or cohorts.
- Methodologically, this study used multilevel logistic regression to remove the cluster effect from the data set, while other related studies did not do so to our knowledge.
- The model did not pay enough attention to the cultural and social interaction of the patients as in the analysis of patients' health beliefs, and the structure of the society in which they live could not be captured in this study.
- This study could not assess the cause and effect between selecting the modern healthcare providers for the first treatment and underlying factors. Parents, at times, determine the healthcare provider to consult if any of the household members fall sick.
- Finally, this study did not attempt to conclude whether the modern healthcare service is better than alternative healthcare service.

relating to increasing life expectancy at birth, immunisation rate; reducing child and maternal mortality, malnutrition and spread of communicable diseases and improving access to healthcare facilities for women.<sup>1–3</sup> In addition, Bangladesh's health structure experienced significant institutional transformation to ensure the delivery of health services in an equitable manner.<sup>4</sup> The country formulated and implemented policies to concentrate more on primary healthcare through an integrated system at every level (ie, facility, community, households, etc) with the motto—'high health outcome with comparatively low cost'.<sup>5 6</sup> Despite these

notable successes, the healthcare sector continues to be plagued by several challenges.

Accessibility to quality healthcare for people from all social strata remains a concern. Various demand-side and supply-side factors impact access to healthcare facilities.<sup>7</sup> Lack of adequate human resources is the most critical supply side constraint in accessing healthcare. Evidence suggests that Bangladesh—among the South Asian countries, is burdened with an acute shortage of health-related human resources.<sup>8</sup> Demand-side factors include asymmetric information on existing health facilities, differences in income earnings and asset holdings, variation in lifestyles, lack of financial capability to pay for healthcare, inadequate opportunities resulting from lack of accessibility to community and health institutions and barring women from accessing healthcare from male health workers due to cultural practices, among others.<sup>5,7</sup> Due to significant demand and supply-side constraints, people, especially the poor and vulnerable, often access health services from alternative (non-qualified) providers.<sup>9,10</sup>

There have been deliberate policy attempts to lessen supply-side barriers to deliver quality health services in Bangladesh. As an outcome of those policy efforts, healthcare is currently being provided by more than 13 000 community clinics, including in remote areas.<sup>11</sup> Moreover, the introduction of telemedicine services has added a new dimension to the country's health services, especially in providing services to patients from remote areas of the country. In addition, anyone in the country can get information related to healthcare at any time by dialling 16263.<sup>11,12</sup> Despite all these initiatives in further development of the modern health service delivery, most of the patients in Bangladesh prefer using alternative healthcare to modern healthcare in recent years. The alternative healthcare sector in Bangladesh mainly comprises of traditional medicines (Ayurved, Unani), complementary medicines (Homeopathy), informal and unqualified allopathic providers like village doctors and drugstore salesman, traditional healing practices grounded on plant-based medicines or medicines extracted from animal substances.<sup>13–16</sup>

Previous literature has attempted to investigate the forces working behind patients' selection of the primary consultation point for seeking healthcare. One study noted that shortage and unequal distribution of qualified doctors had left the patients with no option to seek healthcare from modern formal healthcare providers.<sup>14</sup> Sultana and colleagues conducted an extensive qualitative study to find out why patients seek treatment from alternative healthcare providers in the presence of accessible modern healthcare facilities.<sup>13</sup> They outlined several points. First, there is a 'language and understanding' mismatch between the patients and modern healthcare providers, which triggers mistrust. Second, patients have time constraints as they face long travel times and waiting times to be consulted by modern healthcare providers.

Another study used national-level cross-sectional data to investigate the patients' healthcare-seeking behaviour but focused only on the rural patients.<sup>17</sup> They outlined low cost and instant accessibility offered by the alternative healthcare providers as the reasons why patients in rural areas ditch the modern healthcare providers in favour of the alternative healthcare providers.

However, these studies were either qualitative involving a small number of participants or primarily concentrated on a specific zone or cohort.<sup>17–19</sup> This limitation of the previous studies calls for a national-level study involving a large sample size across the country to understand better the issue of patients' choice of healthcare providers.

## OBJECTIVES

Given this backdrop, the current study attempted to determine the underlying predictors of patients' choosing modern healthcare providers and health facilities as their first choice for getting treatments using the nationally representative Household Income and Expenditure Survey (HIES) (2016–2017) Bangladesh Bureau of Statistics (BBS) data. Findings from this study will equip the policymakers with the latest information to devise pragmatic policies to increase accessibility to modern healthcare providers and facilities for better health outcomes as it is commonly perceived that the treatment of the modern healthcare providers is much more effective than that of the alternative healthcare providers.<sup>20</sup>

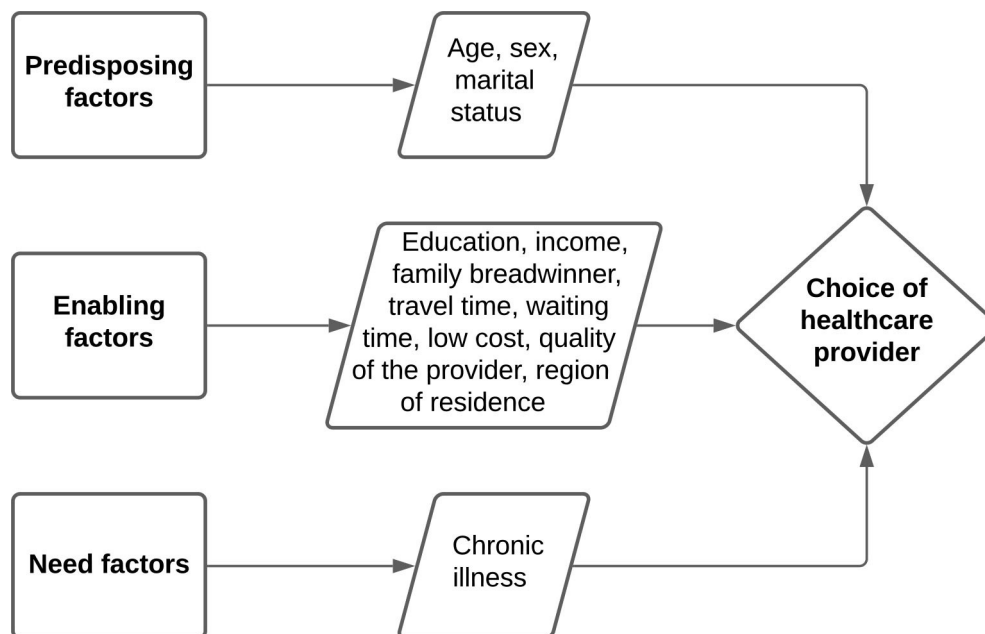
## METHODS

### Data source

The study used data from the 16th round of the HIES carried out by the BBS from April 2016 to March 2017.<sup>21</sup> The survey followed a two-stage stratified cluster sampling design and covered 46 080 households (containing 186 076 individuals) drawn from 2304 primary sampling units (PSUs). Enumeration Areas (EAs) of Population Census 2011 were used as PSUs for the sample design. Data from all the divisions in Bangladesh were included in the study. Out of the 186 076 respondents of all ages, 34 512 respondents (mean age=28.1 years) sought treatment for their illnesses and stated the type of healthcare provider they chose for consultation for the first treatment. In the case of children who could not respond independently, parents or guardians responded on their behalf. A total of 167 responses stating more than 24 hours of travel time needed to reach the provider or waiting time to be treated by the provider were omitted, assuming those are data entry errors and there was no way to remeasure that item.<sup>22</sup> Thus, the final data set consisted of 34 345 observations.

### Research model

The variables on which data were collected in HIES 2016–2017 were best suited to fit Andersen's behavioural model to determine the type of patient's first choice for



**Figure 1** Andersen's behavioural model. Andersen's behavioural model was used as the research model to investigate patients' choice of healthcare providers in Bangladesh. The model comprised of three factors: predisposing factors, enabling factors and need factor. Age, sex and marital status were incorporated in the model as the predisposing factors. Enabling factors included the following variables: education, income, family breadwinner, travel time, waiting time, low cost, quality of the provider and region of residence. Chronic illness was the sole need factor that was inserted in the model.

healthcare. This model is comprised of predisposing, enabling and need factors.<sup>23</sup> Predisposing factors include the patients' primary attributes, including age, sex and marital status. Enabling factors refer to patients' means to access to the service,<sup>17</sup> including income, education, whether the patient is the family breadwinner, travel time to reach the healthcare provider, waiting time to get the treatment, quality of the healthcare provider and cost perception associated to the utilised treatment options. Need factors primarily include the type and severity of the illnesses. The presence of chronic illness among the patients was the only need factor considered in the study. **Figure 1** illustrates the research model of this study.

#### Measurement and description of the outcome variable

The outcome variable was the patient's/respondent's first choice of healthcare utilisation. Respondents were asked to state their first choice of healthcare provider for consultation on experiencing symptoms of illness. In the analyses, the first choice of healthcare utilisation was a dichotomous variable with 1 for Modern if the modern practitioners were consulted when symptoms of illness arose and 0 for Alternative if alternative healthcare providers were used for the same condition.<sup>17</sup> Modern healthcare includes allopathic doctors and educated healthcare workers serving in government, private and non-governmental organization (NGO)-directed hospitals and clinics. Alternative healthcare providers include non-qualified doctors, homoeopaths, Ayurved/kabiraji/hekim, traditional and spiritual healers, family/self-treatment and the salespersons of pharmacies/dispensaries.

#### Measurement and description of the independent variables

Chronic illness is described as a disease or illness persisting for the last 12 or more months.<sup>24</sup> In the analysis, chronic illness was a binary variable with 1 for suffering from chronic illness and 0 for not suffering from such illness. The time needed to reach the healthcare provider and the time patients needed to wait to be treated were measured in hours (1=less than 1 hour, 2=1–2 hours, 3=more than 2 hours). The region of residence of the participants was coded 1 for rural areas and 2 for urban areas. Survey respondents stated the reason for choosing the first healthcare provider, eg, proximity, cost, availability of doctors, availability of female doctors, equipment, treatment quality, reputation and referrals. We created two binary variables, namely, quality of the provider and low cost, from these responses. The responses were coded into binary with 1 for quality of the treatment and 0 for others,<sup>24</sup> and the variable was identified as 'Quality of the provider'. Similarly, if the healthcare providers were selected for consultation because of low cost, such response patterns were coded as 1 and 0 for other responses. The binary variable was named as low cost. The family breadwinner (the main earner of the family) respondents were coded as 1 and 0 otherwise. The education level of the survey participants was coded as 1 for graduate or postgraduates and 0 for others.<sup>24</sup> The sex of the respondents was modified as a binary variable (1 for male and 0 for female). The marital statuses of the participants were coded as a dichotomous variable with 1 for married and 0 for others. Respondents were divided into four age groups (less than 18 years, 18–35

**Table 1** Definition and summary statistics of the variables

Variables	Definition of variables measurements	Frequency (n=34 345)	Percentage
Choice of healthcare provider	0=Alternative	20 649	60
	1=Modern	13 696	40
Sex	0=Female	18 614	54
	1=Male	15 731	46
Age	1≤18	14 280	42
	2=18–35	7822	23
	3=35–60	9153	27
	4=60+	3090	09
Marital status	0=Others	17 017	50
	1=Married	17 328	50
Education	0=Others	33 839	99
	1=Graduate or postgraduate	506	01
Family breadwinner	0=No	25 717	75
	1=Yes	8628	25
Low cost	0=No	26 387	77
	1=Yes	7958	23
Quality of the provider	0=Others	26 373	77
	1=Yes	7972	23
Chronic illness	0=No	24 046	70
	1=Yes	10 299	30
Divisions (survey areas)	Barisal	3276	10
	Chittagong	5967	17
	Dhaka	5977	17
	Khulna	5708	17
	Mymensingh	1807	05
	Rajshahi	5353	16
	Rangpur	4022	12
	Sylhet	2235	07
Region of residence	1=Rural	24 368	71
	2=Urban	9977	29
Travel time	1=Less than 1 hour	Median=0.3 hour	SD=0.71
	2=1–2 hours		
	3=More than 2 hours		
Waiting time	1=Less than 1 hour	Median=0.2 hour	SD=0.44
	2=1–2 hours		
	3=More than 2 hours		
Income	1≤7202 BDT monthly	Median=73 000	SD=1 18 3140.1
	2≤28 044 BDT monthly		
	3≤86 872 BDT monthly		
	4>86 872 BDT monthly		

BDT, Bangladesh Taka.

years, 35–60 years and more than 60 years). Moreover, they were classified into four income groups based on monthly income BDT (Bangladesh Taka)—low, lower middle, upper middle and high (≤7202 BDT, ≤28 044 BDT, ≤86 872 BDT and >86 872 BDT, respectively) as per the guidelines issued by World Bank.<sup>25</sup> Table 1 describes

the definition of the variables along with the summary statistics incorporated in this study.

### Data analysis

Bivariate analysis using the  $X^2$  test evaluated the non-adjusted association between the selected factors and the

outcome variable. A clustering effect in the dataset was observed since this study used a data set collected using a multistage-stratified clustered sampling. Multivariate logistic regression was applied to find out the association between the outcome variable and independent variables while not considering the effect of the clusters in data like previous studies.<sup>26–28</sup> Nonetheless, a single-level statistical analysis could have been inappropriate for clustered or multilevel data.<sup>29</sup> The multilevel logistic regression model can remove the cluster effect from data and detect associations between outcome and independent variables at different stages of data hierarchy.<sup>30</sup> The intraclass correlation coefficient (ICC) was calculated to determine the appropriation of multilevel modelling. The value of ICC was 0.007 and had a 5% level of significance. This statistically significant value of ICC indicated the necessity of multilevel analysis of the data set.<sup>30</sup> Thus, a multilevel logistic regression was also applied to explore the relationship between the patient's first choice of healthcare provider and the selected predictors. This study considered individuals as level 1 and EAs as level 2 while designing the two-level logistic regression model.<sup>31</sup> We estimated three different models for each of the regression techniques employed. Model 1 incorporated only the predisposing factors, model 2 included both predisposing and enabling factors and model 3 consisted of predisposing, enabling and need factors. Adjusted ORs (AORs) with 95% CIs were reported to avoid confounding effects. Predictors with a p value of 0.05 or less were considered statistically significant.

### Model comparison

The Akaike information criterion (AIC) was used to detect the robust model by comparing the multivariate and multilevel logistic regression models. The usual practice is to select the model with a lower AIC value.<sup>32</sup>

### Patient and public involvement

This study analysed data from a secondary source. No patients were involved in the research question development, study design or data interpretation.

## RESULTS

### Selection of healthcare providers

Among the 34 345 participants who consulted with any healthcare provider at the presence of symptoms of illness, 13 696 individuals (40%) used modern healthcare while the remainder resorted to alternative healthcare to be served for the same condition (table 1).

Table 2 reveals that all the variables except gender and presence of chronic illness had significant relationships with the first choice of healthcare utilisation. People tend to seek healthcare from modern healthcare providers as they grow older ( $p<0.01$ ). The same relationship was genuine for married and graduate or postgraduate people ( $p<0.01$ ). Similarly, wealthier people were more likely to consult modern healthcare providers primarily

**Table 2** Selection of healthcare providers according to the individual characteristics

Variables	Choice of healthcare provider		P value
	Alternative (n=20 649) n (%)	Modern (n=13 696) n (%)	
Sex			0.368
Female	11 150 (60%)	7464 (40%)	
Male	9499 (60%)	6232 (40%)	
Age			0.000*
≤18	9170 (64%)	5110 (36%)	
18–35	4669 (60%)	3153 (40%)	
35–60	5200 (57%)	3953 (43%)	
60+	1610 (52%)	1480 (48%)	
Marital status			0.000*
Others	10 742 (63%)	6275 (37%)	
Married	9907 (57%)	7421 (43%)	
Education			0.000*
Others	20 429 (60%)	13 410 (40%)	
Graduate or post-graduate	220 (43%)	286 (57%)	
Family breadwinner			0.003*
No	15 346 (60%)	10 371 (40%)	
Yes	5303 (61%)	3325 (39%)	
Low cost			0.000*
No	14 745 (56%)	11 642 (44%)	
Yes	5904 (74%)	2054 (26%)	
Quality of the provider			0.000*
Others	18 600 (71%)	7773 (29%)	
Yes	2049 (26%)	5923 (74%)	
Chronic illness			0.225
No	14 508 (60%)	9538 (40%)	
Yes	6141 (60%)	4158 (40%)	
Region of residence			0.885
Rural	14 864 (61%)	9504 (39%)	
Urban	5886 (59%)	4091 (41%)	
Divisions (survey areas)			0.000*
Barisal	1807 (55%)	1469 (45%)	
Chittagong	3150 (53%)	2817 (47%)	
Dhaka	3256 (54%)	2721 (46%)	
Khulna	3512 (62%)	2196 (38%)	
Mymensingh	1116 (62%)	691 (38%)	
Rajshahi	3740 (70%)	1613 (30%)	
Rangpur	2816 (70%)	1206 (30%)	
Sylhet	1252 (56%)	983 (44%)	
Income (BDT)	Median=73 000	Median=80 300	0.000*

\*P <0.01.  
BDT, Bangladesh Taka.

at the presence of symptoms of illness ( $p<0.01$ ). People who preferred the quality of the service provider over any other attributes of that provider sought treatment from modern healthcare providers ( $p<0.01$ ). Presumably,

people looking for less costly options were more likely to seek healthcare from alternative healthcare providers ( $p<0.01$ ). Family breadwinners had a propensity to use the services of alternative healthcare providers ( $p=0.03$ ). Divisions are the biggest administrative blocks of the country, and we found that people from Rajshahi and Rangpur divisions (30%) were the least inclined to consult first with the modern healthcare providers, while residents of Chittagong (47%) are ahead of residents of other divisions in terms of seeking service from the modern healthcare providers ( $p<0.01$ ).

### Multivariate analyses to determine the factors of first-choice healthcare utilisation

Table 3 describes the results obtained from all three models of multivariate logistic regression. We could not find any significant association of healthcare utilisation with predisposing and need factors. Among the enabling factors, the region of residence, travel time and income emerged as the significant predictors in models 2 and 3.

In model 2, we found urban dwellers to be around 15% more likely to have the first consultation from the

**Table 3** Determinants of choosing modern healthcare providers for first consultation (using multivariate logistic regression analyses)

Factors	Variables	Response categories	Model 1			Model 2			Model 3		
			AOR	95% CI	P value	AOR	95% CI	P value	AOR	95% CI	P value
Predisposing factors	Sex	Female	R			R			R		
		Male	0.992	(0.946 to 1.041)	0.736	1.009	(0.954 to 1.07)	0.739	1.009	(0.953 to 1.069)	0.739
	Age	18–35	R			R			R		
		≤18	1.003	(0.913 to 1.102)	0.957	0.987	(0.894 to 1.092)	0.807	0.967	(0.872 to 1.073)	0.536
		35–60	1.002	(0.937 to 1.073)	0.954	0.999	(0.934 to 1.07)	0.981	0.989	(0.923 to 1.06)	0.764
		60+	0.992	(0.905 to 1.089)	0.861	0.982	(0.895 to 1.079)	0.704	0.988	(0.899 to 1.086)	0.805
Marital status	Others	R			R			R			
	Married	0.976	(0.898 to 1.062)	0.576	0.972	(0.894 to 1.057)	0.508	0.971	(0.893 to 1.056)	0.506	
Enabling factors	Education	Others				R			R		
		Graduate or Post-graduate				0.997	(0.82 to 1.222)	0.981	0.995	(0.817 to 1.219)	0.966
	Region of residence	Rural				R			R		
		Urban				1.143	(1.085 to 1.206)	0.000*	1.143	(1.084 to 1.205)	0.000*
	Family breadwinner	No				R			R		
		Yes				0.959	(0.892 to 1.033)	0.268	0.957	(0.889 to 1.03)	0.245
	Travel time	Less than 1 hour				R			R		
		1–2 hours				1.181	(1.074 to 1.302)	0.001*	1.186	(1.078 to 1.307)	0.000*
		More than 2 hours				1.192	(1.046 to 1.363)	0.001*	1.2	(1.052 to 1.372)	0.007*
	Waiting time	Less than 1 hour				R			R		
		1–2 hours				1.065	(0.95 to 1.198)	0.282	1.068	(0.952 to 1.2)	0.263
		More than 2 hours				1.186	(0.986 to 1.437)	0.074	1.188	(0.986 to 1.438)	0.072
	Low cost	No				R			R		
		Yes				0.993	(0.937 to 1.053)	0.806	0.993	(0.936 to 1.053)	0.828
	Quality of the provider	Others				R			R		
		Yes				0.959	(0.904 to 1.019)	0.176	0.963	(0.906 to 1.022)	0.218
Income	≤7202 BDT monthly				R			R			
	≤28 044 BDT monthly				1.059	(1.01 to 1.112)	0.018*	1.058	(1.009 to 1.111)	0.019*	
	≤86 872 BDT monthly				1.243	(1.026 to 1.518)	0.029*	1.243	(1.024 to 1.517)	0.02*	
	>86 872 BDT monthly				1.089	(0.564 to 2.271)	0.808	1.091	(0.564 to 2.275)	0.803	
Need factor	Chronic illness	No							R		
		Yes							0.956	(0.901 to 1.014)	0.137

\* $P<0.05$ .

BDT, Bangladesh Taka; R, reference category.

modern healthcare providers (AOR=1.14, 95% CI 1.08 to 1.21, p=0.00). People were about 20% more likely to visit modern healthcare providers if the travel time to reach the service provider was between 1 and 2 hours (AOR=1.18, 95% CI 1.07 to 1.30, p<0.01) and more than 2 hours (AOR=1.19, 95% CI 1.05 to 1.36, p<0.01) compared with travel time less than an hour. People receiving monthly income of less or equal 28 044 BDT (AOR=1.06, 95% CI 1.01 to 1.12, p<0.01) and less or equal 86 872 BDT

(AOR=1.24, 95% CI 1.02 to 1.52, p<0.01) tended to seek advice from modern healthcare providers compared with people receiving less than 7202 BDT monthly. Model 3 delivers identical results with similar effect sizes.

Table 4 highlights the results from the multilevel logistic regression models. Predisposing and need factors once again failed to register any association with the outcome variable. Among the enabling factors, region of residence and travel time appeared to be

**Table 4** Determinants of choosing modern healthcare providers for first consultation (using multilevel logistic regression analyses)

Factors	Variable	Category	Model 1			Model 2			Model 3		
			AOR	95% CI	P value	AOR	95% CI	P value	AOR	95% CI	P value
	Intercept		3.05	(2.095 to 4.439)	0.000*	2.977	(2.042 to 4.341)	0.001*	2.977	(2.039 to 4.345)	0.001*
Predisposing factors	Sex	Female	R			R			R		
		Male	1.002	(0.955 to 1.053)	0.941	1.001	(0.944 to 1.062)	0.964	1.001	(0.944 to 1.062)	0.964
	Age	18–35	R			R			R		
		≤18	0.968	(0.879 to 1.066)	0.498	0.976	(0.881 to 1.081)	0.639	0.976	(0.878 to 1.085)	0.651
		35–60	0.988	(0.922 to 1.059)	0.722	0.99	(0.924 to 1.062)	0.787	0.99	(0.923 to 1.063)	0.791
	Marital status	60+	0.965	(0.878 to 1.06)	0.448	0.96	(0.872 to 1.056)	0.4	0.96	(0.872 to 1.056)	0.402
Others		R			R			R			
Enabling factors	Education	Married	1.029	(0.945 to 1.121)	0.52	1.026	(0.942 to 1.118)	0.551	1.026	(0.942 to 1.118)	0.551
		Others	R			R			R		
	Graduate or postgraduate					1.004	(0.819 to 1.232)	0.967	1.004	(0.819 to 1.232)	0.967
	Region of residence	Rural	R			R			R		
		Urban	1.107	(1.048 to 1.169)	0.001*	1.107	(1.048 to 1.169)	0.001*	1.107	(1.048 to 1.169)	0.001*
	Family breadwinner	No	R			R			R		
		Yes	1.004	(0.931 to 1.083)	0.92	1.004	(0.931 to 1.083)	0.92	1.004	(0.931 to 1.083)	0.92
	Travel time	Less than 1 hour	R			R			R		
		1–2 hours	1.108	(1.004 to 1.223)	0.042*	1.108	(1.004 to 1.223)	0.042*	1.108	(1.004 to 1.223)	0.042*
		More than 2 hours	1.119	(0.977 to 1.281)	0.105	1.119	(0.977 to 1.281)	0.106	1.119	(0.977 to 1.281)	0.106
	Waiting time	Less than 1 hour	R			R			R		
		1–2 hours	1.055	(0.937 to 1.188)	0.377	1.055	(0.937 to 1.188)	0.377	1.055	(0.937 to 1.188)	0.377
		More than 2 hours	1.19	(0.982 to 1.442)	0.077	1.19	(0.982 to 1.442)	0.077	1.19	(0.982 to 1.442)	0.077
	Low cost	No	R			R			R		
		Yes	0.983	(0.926 to 1.044)	0.585	0.983	(0.926 to 1.044)	0.585	0.983	(0.926 to 1.044)	0.585
Quality of the provider	Others	R			R			R			
	Yes	0.963	(0.905 to 1.023)	0.223	0.963	(0.905 to 1.023)	0.224	0.963	(0.905 to 1.023)	0.224	
Income	≤7202 BDT monthly	R			R			R			
	≤28 044 BDT monthly	0.967	(0.921 to 1.016)	0.189	0.967	(0.921 to 1.016)	0.189	0.967	(0.921 to 1.016)	0.189	
	≤86 872 BDT monthly	1.136	(0.93 to 1.387)	0.212	1.136	(0.93 to 1.387)	0.212	1.136	(0.93 to 1.387)	0.212	
	>86 872 BDT monthly	1.007	(0.499 to 2.035)	0.984	1.007	(0.499 to 2.035)	0.984	1.007	(0.499 to 2.035)	0.984	
Need factor	Chronic illness	No							R		
		Yes							1.000	(0.941 to 1.063)	1

\*P<0.05. AOR, adjusted OR; BDT, Bangladesh Taka; R, reference category.

**Table 5** Comparison of models using AIC

Estimation technique	AIC		
	Model 1	Model 2	Model 3
Multivariate logistic regression model	40 490	40 451	40 450
Multilevel logistic regression model	39 095.2	39 087.5	39 086.5

AIC, Akaike information criterion.

the significant predictors in models 2 and 3. Unlike the multivariate logistic regression models, income became an insignificant predictor of seeking healthcare from modern providers in the multilevel logistic regression. In both models 2 and 3, patients living in urban areas were almost 11% more likely to visit the modern healthcare providers for their first consultation (AOR=1.11, 95% CI 1.05 to 1.17,  $p<0.01$ ), which is almost 3% less than that in the multivariate logistic model. The effect sizes of travel time were the same in both models. Patients tended to visit the modern healthcare providers if the travel time was between 1 and 2 hours (AOR=1.11, 95% CI 1.00 to 1.22,  $p<0.05$ ) compared with travel time less than 1 hour, which is almost half of the effect size in the multivariate logistic regression. Surprisingly, the models could not capture any significant difference in the effects of travel time more than 2 hours compared with travel time less than 1 hour on patients' selection of modern healthcare providers.

### Model selection

Table 5 outlines the values of the AIC derived for the multivariate logistic regression models and the multilevel logistic regression models. The multilevel logistic regression models possessed lower AIC value (39 095.2; 39 087.5; 39 086.5) than that of multivariate logistic regression models (AIC=40 490; 40 451; 40 450). The multilevel logistic regression model was better than the multivariate logistic regression model in predicting the factors associated with patients selecting the modern healthcare providers for the first consultation on having symptoms of illnesses. Among the three models, we estimated using the multilevel logistic regression technique, model 3 showed the lowest AIC value and was the best performing model of all the analysed models in this study. Hence, we used model 3 of the multilevel logistic regression analyses in discussing the results and drawing policy implications.

### DISCUSSION

This study explored the patient's first choice of healthcare provider across the country and the underlying predictors of the selection of modern healthcare providers instead of alternative healthcare providers in the light of Andersen's behavioural model.<sup>23</sup> About

40% of the patients sought treatment from modern healthcare providers and 60% of the patients visited alternative healthcare providers on feeling the symptoms of illness. The regression analyses showed that no predisposing and need factors could predict the choice of modern healthcare providers for the first consultation. Among the enabling factors, patients living in urban areas have been identified as potential healthcare seekers from modern providers. Besides, a high travel time to reach the healthcare provider was associated with selecting modern healthcare providers for the first consultation. We observed substantial heterogeneity in modern healthcare utilisation of the patients (30%–47%) across the divisions of Bangladesh.

An urban–rural difference in healthcare utilisation has been observed in this study. Patients living in urban areas were more likely to receive their first consultation from modern healthcare providers when having symptoms of illness. We reiterate the findings of the previous studies conducted across the globe.<sup>33 34</sup>

A study in 2005 revealed that almost 52% of patients of the study area in Bangladesh visited alternative healthcare providers for consultation,<sup>19</sup> and this status has not changed over the years. In 2010, using a national-level cross-sectional survey conducted in 2010–2011, Siddiquee and Ali reported that slightly over 50% of patients chose alternative treatment options over the modern treatment options.<sup>17</sup> However, the study was focused only on rural Bangladesh. With the finding that almost 60% of patients sought treatment from alternative healthcare providers (table 1), this study reveals that the healthcare-seeking behaviour of people in Bangladesh has been further leaning towards alternative healthcare providers.

An increase in travel time augments the probability of visiting modern healthcare providers. The opposite was reported by Hamid and his colleagues, where they stated that prolonged travel time and waiting time discouraged patients from going to the modern providers for being treated.<sup>19</sup> There might be a possibility that the modern treatment facilities are comparatively distant from the patients' residences on average. On the other hand, a patient may choose an alternative healthcare provider for convenient proximity. Therefore, a positive association between travel time and selecting modern healthcare providers for the first consultation has been observed. However, this association never guarantees any causality. Rather, it is a mere association indicating the modern healthcare facilities are, on average, situated in a more distant location than the alternative healthcare facilities from the patients' residences.

Our study does not support several pieces of evidence arose from the previous pieces of similar literature. Many people in Bangladesh prefer visiting alternative healthcare providers to modern healthcare providers because the cost of visiting modern healthcare providers is higher.<sup>10</sup> Evidence suggests that patients seeking low-cost services prefer alternative



healthcare providers, while patients seeking good quality treatment go to modern providers.<sup>19</sup> However, our study showed no such impact of treatment cost on the selection of healthcare providers. There was evidence that age is a significant predictor of choosing any particular type of healthcare provider.<sup>17 35</sup> Older people are more prone to seek allopathic treatment from modern healthcare providers than their younger counterparts.<sup>9 36</sup> Our study did not support this claim as age could not significantly predict the selection of modern healthcare providers by the patients. Likewise, we could not endorse Hamid and colleagues' claim that more educated people go to the modern healthcare providers as education had no significant association with the outcome variable in our study.<sup>19</sup>

The role of income in determining the type of healthcare provider selection was ambiguous. Income appeared as the most significant predictor of health-seeking behaviour in the study of Ahmed<sup>9</sup> though Siddiquee and Ali<sup>17</sup> revealed that they did not find any significant influence of earning status on the selection of healthcare providers. This study adds value to this debate by echoing Siddiquee and Ali's<sup>17</sup> claim.

Income and cost of treatment had no impact on patients' selection between the modern and alternative healthcare providers bear substantial significance. For example, traditional rural healers have an advantage over modern healthcare providers because the folk healers might reinforce the cultural values and treat patients based on the social, psychological, cultural and moral dimensions of disease<sup>17</sup> whose advantage or disadvantage is yet to be judged. Informal allopathic providers share the same socioeconomic status as their patients and live in the same society, which in turn pulls out high trust and a strong sense of patients–providers kinship (Sultana *et al*; Sizar *et al*). Therefore, many affluent patients get their first treatment from alternative providers instead of from formal providers.

Our study is not free from limitations. First, the HIES 2016–2017 does not contain any question about how and who diagnosed the chronic illness. Therefore, there is a chance that the chronic illness variable captures both chronic illness and the faction of people who have used modern healthcare in the past. Second, we have put the types of illness for which the patients sought treatment out of the scope of this study. Third, as we only analysed the sample of the patients who sought treatment on having symptoms of illness, patients who did not seek any treatment fell outside of our analytical framework. Fourth, the model did not pay enough attention to the cultural and social interaction of the patients as in the analysis of patients' health beliefs and the structure of the society in which they live could not be captured in this study. Fifth, this study could not assess the cause and effect between selecting the modern healthcare providers for the first treatment and underlying factors. Parents, at times, determine the healthcare provider to consult if any of the household members fall sick. Finally, this study

did not attempt to conclude whether the modern healthcare service is better than alternative healthcare service. Future studies should aim to answer these questions.

## Conclusions

In analysing the results of the econometric estimation from different models and the prevalence of tendency of the patients to seek modern treatment, it became eminent that people in urban areas select the modern healthcare providers as their first point of contact while perceiving the need for seeking healthcare. Moreover, the positive association between travel time and modern healthcare utilisation indicates that the average distance between patients' residences and modern healthcare facilities is more extended than between patients' residences and alternative healthcare facilities. Enhancing the digital provision of modern healthcare services could reduce travel time, omit the transportation cost and save waiting time to be treated by the modern healthcare provider as almost 50% of the population can access the digital services using the internet.<sup>37</sup> In turn, less cost and time saving will make patients take services more from the modern healthcare providers. This research points to the importance of health education of people and capacity building training for the alternative or informal healthcare providers as their contribution to the health sector cannot be denied since they are serving around 60% of the patients. The distribution of modern healthcare providers should be even across the country to eliminate the rural–urban divide in modern healthcare utilisation. To supplement the policy mentioned above, removing user fees and introducing national health insurance can come into action. However, removing or reducing user fees from public health services usually increases the curative and preventive services but hampers the service quality.<sup>38</sup> Removing the user fees fully or partially from public health services without compromising the quality of the service is the biggest challenge to be faced in the pathway of achieving better quality treatment for everybody. For that reason, the government can think of introducing a national health insurance programme, which can be an excellent device to optimise the health outcomes given the budget constraint of the patients.

## Author affiliations

<sup>1</sup>Department of Management Information Systems, University of Dhaka, Dhaka, Bangladesh

<sup>2</sup>Department of Health Policy, The London School of Economics and Political Science (LSE), London, UK

<sup>3</sup>Department of Statistics, Mawlana Bhashani Science and Technology University, Tangail, Bangladesh

<sup>4</sup>Department of Economics, Bangladesh University of Professionals (BUP), Dhaka, Bangladesh

<sup>5</sup>School of Public Health, University of Alberta, Edmonton, Alberta, Canada

<sup>6</sup>Department of International Business, University of Dhaka, Dhaka, Bangladesh

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#### ORCID iD

Asif Imtiaz <http://orcid.org/0000-0002-6282-5863>

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