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Self-reported health complaints and health-seeking behaviour among adult people in rural Bangladesh: results from a cross-sectional study

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1   **Self-reported health complaints and health-seeking behaviour among adult people in rural**

2   **Bangladesh: results from a cross-sectional study**

3

4   **Short title: Self-reported health complaints and health-seeking behaviour in rural Bangladesh**

5   Ashraful Kabir[1,*], Md Nazmul Karim[1], Baki Billah[1]

6   [1] Department of Epidemiology and Preventive Medicine, School of Public Health and Preventive Medicine,

7   Monash University, Melbourne, Australia

8

9   * Corresponding author

10   Ashraful Kabir

11   Department of Epidemiology and Preventive Medicine

12   School of Public Health and Preventive Medicine

13   Monash University, Melbourne, Australia

14   Phone: +61 3 9903 0160

15   Email: md.kabir@monash.edu

16

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18

19 **Abstract**

20 **Objectives**: To determine the self-reported health complaints and the health-seeking behaviours of a rural

21 population in Bangladesh.

22 **Design:** A cross-sectional survey was conducted from May to October 2021.

23 **Setting:** Four randomly selected administrative districts/regions of Bangladesh.

24 **Participants**: 1645 rural participants aged 18 years and above.

25 **Outcome measures**: The prevalence of self-reported health status, health-seeking behaviour and healthcare

26 seeking.

27 **Results**: Overall, 66% (1084/1645) of participants reported illness, while 80% sought care, and 20% sought

28 no care or performed self-care. Multivariable analysis confirmed that participants with formal occupations

29 (aOR = 0.609, 95% CI 0.396, 0.938, p = 0.025), those from the second (aOR = 1.742, 95% CI 1.014, 2.991,

30 p = 0.044) and fifth asset quintiles (aOR = 1.210, 95% CI 0.726, 2.019, p = 0.465), those with non-Non-

31 Communicable Disease (NCD)-related complaints (aOR = 5.299, 95% CI 3.673, 7.643, p = < 0.001), and

32 those living at a distance >5 km from the healthcare facility (aOR = 1.725, 95% CI 1.040, 2.861, p = 0.034)

33 were more likely to seek healthcare. Participants with the richest asset quintile (aOR = 1.963, 95% CI 1.080,

34 3.569, p = 0.027), non-NCD-related complaints (aOR = 5.299, 95% CI 3.673, 7.643, p = < 0.001) and a

35 distance > 5 km of from the healthcare facility (aOR = 4.615, 95% CI 3.121, 6.824, p = < 0.001) were more

36 likely to seek healthcare from skilled care providers/healthcare facilities.

37 **Conclusion**: A high prevalence of self-reported health complaints was observed, while a considerable

38 proportion was NCD-related. Among participants who reported self-reported health complaints, a

39 significant proportion sought no care. Necessary initiatives are needed to improve health-seeking behaviour

40 to optimise the use of healthcare services in achieving sustainable health outcomes.

41 **Keywords:** Bangladesh; Primary healthcare; Self-report health complaints; Health-seeking behaviour;

42 Health service utilisation; Multivariable analysis

Strengths and limitations of this study

- The survey was conducted in randomly selected four administrative districts, which cover the entire country to estimate the prevalence of self-reported health complaints and health-seeking behaviour among adult people in rural Bangladesh.

- A multi-stage stratified cluster sampling method was used to maximise the sample representativeness of the adult population in rural settings.

- Data collected were self-reported and there may be under-reporting or over-reporting of health complaints and health-seeking behaviour.

- As a cross-sectional study, it cannot make causal inferences from the data.

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64 **Introduction**

65 Bangladesh has made substantial progress in population health in recent decades (1). Reduced maternal and

66 child mortality and total fertility, effective population control and family planning, increased life

67 expectancy and broader immunisation coverage are considerable achievements in the health sector (2, 3).

68 However, the country is undergoing a demographic and epidemiological transition, posing new challenges.

69 The rise of non-communicable diseases (NCDs) will likely substantially pressure the health system (4).

70 NCD-related deaths and disabilities have gradually increased in Bangladesh from approximately 45% in

71 2000 to 70% of total deaths in 2019 (5). It is projected that the rising burden of NCDs, coupled with

72 infectious and neglected diseases, will pose substantial challenges to the health system in sustainably

73 delivering affordable, accessible and reliable health services for all segments of the population in the

74 coming years unless appropriate strategies and actions are in place (6, 7).

75 Several strategies and programs have been designed in response to the current disease burden and future

76 predictions (8). Primary healthcare (PHC) services have been considerably mobilised as a common

77 approach. Increasing PHC services will likely improve sustainable, affordable, accessible, equitable and

78 quality healthcare (9). It is worth mentioning that Bangladesh has a pluralistic healthcare system where

79 several practitioners provide healthcare involving various treatment methods and approaches (8). This

80 pluralistic healthcare system allows individuals to seek healthcare services according to their needs and

81 preferences (9). However, studies reported disparities in accessing healthcare services due to the

82 individuals' household wealth, out-of-pocket expenses, and socio-demographic characteristics (10, 11).

83 Moreover, the perceived severity of illness significantly determines the health-seeking behaviour and use

84 of healthcare services (12).

85 Against this backdrop, a better understanding of morbidities, individuals' responses, choice of healthcare

86 services and health system factors are essential to reflect the rationale and effectiveness of health-related

87 policies, strategies and actions. With this viewpoint, self-reported health status, health-seeking behaviour

88 and the use of healthcare services can be the potential determinants and have increased importance in public

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89 health (13). Self-reported health status may integrate a range of individual (e.g. biological and mental states)

90 and system-level factors (e.g. socio-contextual) under which individuals' health is determined (14).

91 Therefore, self-reported health status may offer useful information about morbid conditions, care-seeking

92 patterns, estimated disease burden, health services demands and the need for better designing of health

93 services. Moreover, self-reported health status can be regarded as effective in resource-limited settings

94 because it enables the stakeholders to extract health-related information with little effort and resources.

95 There is a common assumption that self-reported assessment is less reliable and focused on contextual

96 aspects. However, self-reported health is increasingly important in public health (15).

97 Despite the growing importance of profiling self-reported morbidity and subsequent responses to seeking

98 healthcare, the use of healthcare services-related research in Bangladesh remains noticeably low (16). A

99 better understanding of self-reported health complaints, health-seeking behaviour and the use of healthcare

100 services is crucial for better responses to healthcare demands and gaps in the existing service delivery

101 mechanism. The complete profile of self-reported health complaints, health-seeking patterns, health

102 services utilisation and associated correlates in a given community are crucial to better planning and

103 managing disease burden (16, 17). Given the importance of profiling self-reported health complaints,

104 health-seeking behaviour and associated correlates, this study was conducted. The findings may help to

105 support public health actions in addressing the existing disease burden in Bangladesh and similar settings

106 elsewhere and to achieve health-related sustainable development goals.

107

108 **Materials and methods**

109 **Study time and settings**

110 This study was conducted in four administrative districts in Bangladesh: Cumilla, Jhenaidah, Rajshahi and

111 Sylhet, from May to October 2021. The pluralistic health system was reflected in the studied districts and

112 had multiple actors and healthcare providers, including the government (public-sector), private operators

Page | 5

113   (for-profit), non-governmental organisations, charities (not-for-profit), and donor agencies (development

114   partners/aid) are playing roles in applying a mixed system of medical practices (8). Apart from these major

115   providers, non-formal healthcare providers are widespread across Bangladesh and hence across the data

116   collection districts (i.e. traditional healers, faith healers, herbalists, quacks and homoeopathy). Although

117   the health system organisation and delivery across these districts were considerably uniform, distinctive

118   socio-demographic characteristics, geographic features, livelihood patterns and sociocultural practices were

119   noted (8, 18-20).

120   **Participants and sampling strategy**

121   A multi-stage stratified cluster sampling was used in this study (Fig 1). Bangladesh is divided into eight

122   administrative divisions (21). Each of these divisions is further divided into several districts, and each

123   district is divided into several sub-districts. The Bangladesh Bureau of Statistics divided the country into

124   2,96,718 enumeration areas (EAs) based on the latest 'Population and Housing Census enumeration map'

125   (22). On average, each EA has 120 households (22). This list of EAs was used as a sampling frame in this

126   study. As detailed in our protocol study, a step-wise procedure was followed in selecting the respondents

127   (21). In the first stage, four administrative divisions were randomly chosen. Then, four districts were

128   randomly selected, one from each division, including Cumilla, Jhenaidah, Rajshahi and Sylhet. In the

129   protocol, the sample size was calculated as 1386. However, we decided to increase it to 1645 to allow for

130   the availability of resources and time and to improve the power of the study (21, 23). The required smallest

131   number of participants in any single EA was 63 in Jhenaidah. This figure was considered the maximum

132   sampling intensity in an available EA. A total of 26 EAs were randomly chosen. Following a systematic

133   random sampling procedure, 63 households were selected from each EA in the next stage. A single adult

134   was interviewed in the selected household following the 'Kish Grid' method using the inclusion criteria: age

135   ≥18 years, non-pregnant and no history of surgery in the last three months (24).

136

137   (Figure 1 to be inserted here)

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Data collection procedure

139   Eight field enumerators administered a structured questionnaire to the sampled households. The

140   enumerators received one week of training that covered the research topic, data collection instruments,

141   electronic questionnaires and RedCap software (25). The questionnaire gathered socioeconomic,

142   demographic and household-related information, self-reported health complaints, health-seeking

143   behaviours and utilisation of healthcare services. A plain English questionnaire was developed and then

144   translated into Bengali (the local language). The Bengali version was re-translated into English to check

145   the consistency of meaning between versions. A pilot test of the questionnaire was conducted, and the

146   necessary changes were made in the final version based on the feedback. The interview was conducted in

147   Bengali.

Outcome measures

149   The prevalence of self-report health complaints and health seeking were the outcomes of interest. Health

150   seeking was defined as the action taken by the individuals who reported themselves to have health

151   complaints. The survey collected self-reported health-seeking data for the past 30 days to minimise the

152   chance of recall bias, as reported in previous studies in Bangladesh and similar settings elsewhere (16, 26).

153   Previous studies reported that self-reported information in the last 30 days was likely to provide more

154   accurate information than a more extended period. Health-seeking was categorised as 'sought care' and 'did

155   not seek care'. When an individual reported no actions taken or received treatment of their own choice

156   without following the recommendation of the healthcare providers, it was categorised as 'sought no care.'

157   In Bangladesh, self-management has been a common practice for a long time, and individuals use various

158   home and herbal remedies to treat illness (8, 27) . The 'no-care' and 'self-care' were merged into one category

159   because of the low response rate. A likelihood ratio test was performed to test the feasibility of combining

160   these two variables.

161   Explanatory variables were chosen based on the available literature, relevant health-seeking models, the

162   researchers' expertise in the field of study and contextual factors (e.g. availability of healthcare providers

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163 and healthcare facilities in the study areas). Health-seeking behaviour was reported to be associated with

164 age, sex, education, religion and socioeconomic status of the respondents (28) . Aligning with the previous

165 studies and contextual factors, we included a range of explanatory variables: age in years (and categorised

166 them into three groups: < 40, $40–60$, ≥ 60), sex (male or female), education (no formal education, primary

167 school (I–V grade), secondary school and above), religion (Muslim or others), marital status (married or

168 unmarried), occupation (informal or formal), type of illness (NCD-related or non-NCD- related

169 complaints), location (as per administrative district), , distance from the facilities (≤ 5 km or > 5 km) and

170 socioeconomic status (as assets quintiles). Asset quintiles were obtained by combining household

171 belongings following a principal component analysis (16). The following household belongings were

172 factored in calculation of assets quintiles: land (yes, no), electricity/solar panel (yes, no), water source (yes,

173 no), sanitary toilets (yes, no), TV/radio/mobile phone (yes, no), refrigerator (yes, no), computer (yes, no)

174 furniture such as chair/tables/bed frame (yes, no), motorbike/easy bike (yes, no), van/rickshaw (yes, no)

175 and cooking fuel (wood, crop residue, dung cake, coal, charcoal, kerosene, electricity, liquid gas, biogas

176 and others).

177 **Statistical analysis**

178 Data analysis was done using the statistical software SPSS version 24.0. Data was checked to fix the errors

179 and missing values before commencing analysis with the SPSS software. The prevalence of self-reported

180 health complaints, health-seeking behaviour and the use of health services was reported as percentages with

181 95% confidence intervals (CI). Multivariable logistic regression was performed to assess factors associated

182 with health-seeking behaviours and types of health service providers or facilities. The logistic regression

183 analyses reported adjusted odd ratios (aORs) with 95% CIs. The relationships between the predictor

184 variables were assessed and the two-way term interactions found significant at $p < 0.05$ were included in

185 the multivariable model. Similar to the backward elimination method, the predictors found non-significant

186 at $p < 0.05$ were dropped individually, and the resultant model was compared using the goodness-of-fit test

187 until further improvement was established. A similar process was followed to develop the final

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188 multivariable model for all outcome variables. Collinearity was checked and removed from the model if

189 the *R* value was 0.70. If the *p* value was 0.20 or more for an independent variable in a crude or unadjusted

190 model, it was removed from the final multivariable model. The final models were reported with aORs, 95%

191 CIs and *p* values.

192

193 **Results**

194 **Characteristics of the participants and self-reported health complaints**

195 Table 1 shows the characteristics of the sampled participants. Data were collected from 1645 participants.

196 Among the participants with complaints, 871 (80%) sought care, and 213 (20%) sought no care or

197 performed self-care. Among the participants, 41.4% were aged between 40 and 60, 52.9% were female,

198 34.2% had a secondary education and above, 91.2% were married, 84.4% were in non-formal occupations

199 and 92.0% were Muslim. Nearly two-thirds (36.7%) of the participants had NCD-related complaints, while

200 63.3% had non-NCD-related complaints. NCD-related complaints included diabetes mellitus, hypertension,

201 heart problems, stroke, cancer, kidney disease and chronic obstructive pulmonary disease/respiratory

202 problems. Any illness/health problems other than those mentioned above were regarded as non-NCDs.

203 Around 68.1% had access to healthcare facilities within 5 km. The bivariate analysis showed a positive

204 association between 'sought no care or self-care' and younger people (aged < 40 years) (*p* = 0.005), male

205 (*p* = 0.004*),* being married (*p* < 0.001), having NCD-related complaints (*p* < 0.001), availability of

206 healthcare facilities within 5 km (*p* = 0.013) and residence in Cumilla (*p* < 0.001).

207

208 *Table 1 Characteristics of the sample participants by healthcare-seeking status*

Characteristics	Overall (n =1084)	Sought care (n = 871; 80%)	Sought no care or self-care (n = 213, 20%)	*p* value
Age in years, *Median (IQR)*	43 (21)	45 (20)	40 (25)	0.118
Age group, *n (%)*				
< 40 years	424 (39.1)	323 (37.1)	101 (47.4)	0.005

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40–60 years	449 (41.4)	381 (43.7)	68 (31.9)	
≥ 60 years	211 (19.5)	167 (19.2)	44 (20.7)	
Sex, *n (%)*				
Male	511 (47.1)	393 (45.1)	118 (55.4)	0.004
Female	573 (52.9)	478 (54.9)	95 (44.6)	
Education, *n (%)*				
No formal education	366 (33.8)	305 (35.0)	61 (28.6)	0.210
Primary school (I–V grade)	347 (32.0)	274 (31.5)	73 (34.3)	
Secondary school and above	371 (34.2)	292 (33.5)	79 (37.1)	
Marital status, *n (%)*				
Married	989 (91.2)	810 (93.0)	179 (84.0)	<0.001
Unmarried	95 (8.8)	61 (7.0)	34 (16.0)	
Occupations, *n (%)*				
Non-formal	915 (84.4)	748 (85.9)	167 (78.4)	0.006
Formal	169 (15.6)	123 (14.1)	46 (21.6)	
Religious identity, *n (%)*				
Muslim	997 (92.0)	798 (91.6)	199 (93.4)	0.236
Others	87 (8.0)	73 (8.4)	14 (6.6)	
Wealth quintile (socioeconomic status), *n (%)*				
Q1 (poorest)	189 (17.4)	153 (17.6)	36 (16.9)	0.300
Q2	217 (20.0)	183 (21.0)	34 (16.0)	
Q3	222 (20.5)	169 (19.4)	53 (24.9)	
Q4	225 (20.8)	179 (20.6)	46 (21.6)	
Q5 (richest)	231 (21.3)	187 (21.5)	44 (20.6)	
Self-rated health complaints/illness, *n (%)*				
NCD-related complaints	398 (36.7)	253 (29.0)	145 (68.1)	<0.001
Non-NCD-related complaints	686 (63.3)	618 (71.0)	68 (31.9)	
District of residence, *n (%)*				
Cumilla	512 (47.2)	431 (49.5)	81 (38.0)	<0.001
Jhenaidah	128 (11.8)	88 (10.1)	40 (18.8)	
Rajshahi	242 (22.3)	182 (20.9)	60 (28.2)	
Sylhet	202 (18.6)	170 (19.5)	32 (15.0)	
Distance from the facilities, *n (%)*				
≤ 5km	738 (68.1)	579 (66.5)	159 (74.6)	0.013
> 5 km	346 (31.9)	292 (33.5)	54 (25.4)	

209

210   IQR: Interquartile Range, Km: kilometer

211   Test statistics and p values based on ANOVA for continuous variables, Chi-square tests (or Fisher's exact tests)

212   for categorical variables

213

214   Table 2 shows the results of the regression analysis and model specification. Respondents with formal

215   occupations (aOR = 0.609, 95% CI 0.396, 0.938, *p* = 0.025), from the second (aOR = 1.742, 95% CI 1.014,

216   2.991, *p* = 0.044) and richest asset quintiles (aOR = 1.210, 95% CI 0.726, 2.019, *p* = 0.465), non-NCD-

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217 related complaints (aOR = 5.299 95% CI 3.673, 7.643, $p \leq 0.001$) and a distance from the health centre >5

218 km (aOR = 1.725, 95% CI 1.040, 2.861, $p = 0.034$) were more likely to seek healthcare.

219 *Table 2 Predictors of healthcare-seeking status (n = 1084)*

Characteristics	Sought care adjusted odds ratio (95% CI)	*p* value
Education (ref: No formal education)		
Primary school (I–V grade)	0.892 (0.595, 1.338)	0.582
Secondary school and above (VI–X grade)	1.069 (0.696, 1.641)	0.761
Occupations (ref: non-formal)		
Formal	0.609 (0.396, 0.938)	0.025
Asset quintile/socio-economic status (ref: Q1)		
Q2	1.742 (1.014, 2.991)	0.044
Q3	1.076 (0.643, 1.803)	0.780
Q4	1.170 (0.699, 1.957)	0.551
Q5 (richest)	`	0.465
Self-rated illness/NCD status (ref: single NCD)		
Non-NCD-related complaints	5.299 (3.673, 7.643)	<0.001
Distance from the facilities (ref: ≤ 5 km)		
> 5 km	1.725 (1.040, 2.861)	0.034

220

221 Test statistics and p values based on ANOVA for continuous variables, Chi-square tests (or Fisher's exact tests)
222 for categorical variables

223

224 Table 3 shows the predictors for using skilled care providers/healthcare facilities. Respondents with fifth

225 asset quintiles (aOR = 1.963, 95% CI 1.080, 3.569, $p = 0.027$), non-NCDs related complaints (aOR = 5.299

226 95% CI 3.673, 7.643, $p = < 0.001$) and a distance > 5 km of from the healthcare facility (aOR = 4.615, 95%

227 CI 3.121, 6.824, $p = < 0.001$) were more likely to seek healthcare from skilled care providers/healthcare

228 facilities.

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234 *Table 3 Predictors of the type of facilities/providers (n = 871)*

Characteristics	Sought care from skilled providers/healthcare facilities adjusted odds ratio (95% CI)	*p* value
Education (ref: No formal education)		
Primary school (I–V grade)	0.970 (0.613, 1.533)	0.895
Secondary school and above (VI–X grade)	1.119 (0.704, 1.779)	0.634
Occupation (ref: non-formal)		
Formal	1.037 (0.603, 1.784)	0.894
Asset quintile/socio-economic status (ref: Q1)		
Q2	1.159 (0.669, 2.008)	0.598
Q3	1.209 (0.677, 2.160)	0.521
Q4	1.809 (0.994, 3.293)	0.053
Q5 (richest)	1.963 (1.080, 3.569)	0.027
Self-rated illness/NCD status (ref: single NCD)		
Non-NCD related complaints	4.615 (3.121, 6.824)	< 0.001
Distance from the facilities (ref: ≤ 5km)		
> 5 km	6.583 (3.123, 13.875)	< 0.001

235

236   Test statistics and p values based on ANOVA for continuous variables, Chi-square tests (or Fisher's exact tests)
237   for categorical variables

238

Discussion

240   This study investigated self-reported health complaints and health-seeking behaviour, and use of health

241   services in rural Bangladesh. Many participants (1084/1645, 66%) reported some illness. A previous study

242   in Bangladesh reported around 75% self-reported illness among the older population (65 years or above),

243   which is higher than our study (29) and is probably due to people with advanced age having an increased

244   risk of morbidities (30). Among the reported illnesses, over one-third of the participants had NCD-related

245   complaints. Previous studies have shown an increasing trend of NCDs and associated risk factors in recent

246   years in Bangladesh, with varying prevalence based on age, income, sex, ethnicity and geographical

247   location (31, 32). Studies reported the prevalence of hypertension to be between 15.9% and 30%, diabetes

248   between 5% and 34.9%, cardiovascular diseases between 1% and 21% and chronic kidney diseases from

249   12.8% to 26.0% (31, 33-36). Our study showed that more than one-third of the complaints were NCD

250 related. Although each NCD was not reported separately, it is assumed that its combined prevalence is

251 likely to be consistent with these previous studies.

252 This study showed that a participant with a non-NCD-related complaint was more likely to seek care

253 compared to one with an NCD-related complaint. Due to the scope of this study, the reason for this pattern

254 of health-seeking could be adequately explained. However, a few studies have reported that health seeking

255 is influenced by a range of factors, including supply-side factors (e.g. health facility, care providers, cost),

256 severity of disease, psychosocial and individual characteristics (37). NCD-related illness often requires

257 continued medication support, well-equipped healthcare facilities and trained healthcare providers, which

258 may not be readily available in rural settings and involve high treatment costs, leading to an avoidance of

259 health-seeking (17, 38). Furthermore, the severity of illness determines health-seeking behaviour, showing

260 that people may not be prompt in seeking care until their daily lifestyle is disrupted (12). NCD-related

261 conditions may not significantly impact a person's daily activities initially and may lead to a delay or

262 avoidance of health seeking (39).

263 Unlike earlier studies in a similar context, this study found no association between educational status and

264 health seeking in Bangladesh (40, 41). A qualitative study is required to investigate how educational status

265 influences health decision-making. Socioeconomic position (asset quintile) was not significantly associated

266 with the type of complaint and health seeking. It is generally assumed that people from the affluent segment

267 of society are more likely to develop NCD-related illnesses and seek healthcare. Our findings showed that

268 more than one-third of conditions reported were NCD-related. Possibly, due to the epidemiological and

269 demographic transition, a higher proportion of people from relatively lower socioeconomic positions are

270 getting NCD-related illnesses (42) . However, the study showed that the wealthiest group with NCD-related

271 complaints and greater distance from the healthcare facilities had higher odds of seeking skilled

272 providers/facilities. People from the most affluent quintile can likely afford better private healthcare

273 facilities in the urban centre or local township. People from the low-income group often rely on unskilled

274 care providers, including drug outlets (pharmacies), or practice self-medication (43). The NCD-related

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275 services and trained providers are less likely to be available in rural settings. Thus, people with NCD-related

276 health complaints were more likely to seek quality care from privately operated facilities in townships or

277 district headquarters.

278 **Limitations of the study**

279 This study has certain limitations. This was a cross-sectional study. Therefore, it was unable to establish a

280 temporal relationship between the prevalence of self-reported health complaints and the health-seeking

281 behaviour of the participants. Another possible limitation is that self-reported data may be subject to recall

282 bias. The findings of this study were based on data from rural settings and, therefore, may not be

283 representative of other populations. Notwithstanding these limitations, the results offer important insights

284 into self-reported health complaints, health-seeking behaviour and use of healthcare services, which have

285 specific implications for better planning of healthcare services.

286

287 **Conclusion**

288 The current study provided insights into the self-reported health complaints, health-seeking behaviours, an

289 duse of health services among the people living in rural Bangladesh. Many participants had self-reported

290 health complaints, and a considerable proportion were NCD-related, indicating that NCDs are rising. A

291 significant proportion of participants sought no care despite the increased efforts in mobilising services at

292 the primary healthcare level, probably reflecting a lack of access to healthcare facilities, affordability,

293 awareness and poor quality of care. Necessary initiatives are needed to address these issues to optimise the

294 use of healthcare services to achieve sustainable health outcomes.

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299 **Acknowledgments**

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301 thankful to the data enumerators.

302 **Authors' contributions**

303 Ashraful Kabir (AK), Md Nazmul Karim (NK), and Baki Billah (BB) conceived and designed the study.

304 AK developed the data collection tools. AK, and the data collection activities and coordinated the field

305 operations. AK prepared the first draft of the manuscript. NK and BB revised the manuscript. BB provided

306 overall stewardship. The final manuscript has been read and approved by all the authors.

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309 **Competing interests**

310 The authors declare that they have no competing interests.

311 **Ethics approval and consent to participate**

312 The project has been approved by Monash University Human Research Ethics Committee (Project ID:

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314 study was performed in line with the principles of the Declaration of Helsink. All participant provided

315 informed written consent.

316 **Patient consent for publication**

317 Not required

318 **Availability of data and materials**

319 The data used and analyzed during this research are not publicly available due to ethical restrictions, and

320 data confidentiality. Data are available upon reasonable request from researchers who meet the criteria for

321 access to confidential data. Interested parties may contact the first author (md.kabir@monash.edu) for

322 further inquiries in this regard.

323 **References**:

324 1.   Chowdhury AM, Bhuiya A, Chowdhury ME, Rasheed S, Hussain Z, Chen LC. The Bangladesh
325 paradox: exceptional health achievement despite economic poverty. Lancet. 2013;382(9906):1734-45.
326 2.   Kabir A, Maitrot MR. Factors influencing feeding practices of extreme poor infants and young
327 children in families of working mothers in Dhaka slums: A qualitative study. PLoS One.
328 2017;12(2):e0172119.
329 3.   El Arifeen S, Christou A, Reichenbach L, Osman FA, Azad K, Islam KS, et al. Community-based
330 approaches and partnerships: innovations in health-service delivery in Bangladesh. Lancet.
331 2013;382(9909):2012-26.
332 4.   Kabir A, Karim MN, Billah B. The capacity of primary healthcare facilities in Bangladesh to prevent
333 and control non-communicable diseases. BMC Primary Care. 2023;24(1):60.
334 5.   World Health Organization. Noncommunicable Diseases Data Portal 2023 [Available from:
335 https://ncdportal.org/CountryProfile/GHE110/BGD.
336 6.   Sayeed MA. Is Bangladesh Ready to Cope with her Future Disease Burden? Ibrahim Med Coll J.
337 2008;2(1):1-2.
338 7.   USAID Bangladesh. USAID Bangladesh Health Strategy 2022-2027: USAID Bangladesh; 2022
339 [Available from:

340 https://www.usaid.gov/sites/default/files/2023-02/Bangladesh-Health-Strategy-Doc_2022-2027.pdf.
341 8.   Kabir A, Karim MN, Billah B. Health system challenges and opportunities in organizing non-
342 communicable diseases services delivery at primary healthcare level in Bangladesh: A qualitative study.
343 Front Public Health. 2022;10:1015245.
344 9.   Kabir A, Karim N, Billah B. Preference and willingness to receive non-communicable disease
345 services from primary healthcare facilities in Bangladesh: A qualitative study. BMC Health Serv Res.
346 2022;22(1):1473.
347 10.   Iqbal MH. Disparities of health service for the poor in the coastal area: does Universal health
348 coverage reduce disparities? J Mark Access Health Policy. 2019;7(1):1575683.
349 11.   khanam M, Hasan E. Inequalities in health care utilization for common illnesses among under five
350 children in Bangladesh. BMC Pediatrics. 2020;20(1):192.
351 12.   Peppa M, John Edmunds W, Funk S. Disease severity determines health-seeking behaviour
352 amongst individuals with influenza-like illness in an internet-based cohort. BMC Infectious Diseases.
353 2017;17(1):238.
354 13.   George PP, Heng BH, De Castro Molina JA, Wong LY, Wei Lin NC, Cheah JT. Self-reported chronic
355 diseases and health status and health service utilization--results from a community health survey in
356 Singapore. Int J Equity Health. 2012;11:44.
357 14.   Wuorela M, Lavonius S, Salminen M, Vahlberg T, Viitanen M, Viikari L. Self-rated health and
358 objective health status as predictors of all-cause mortality among older people: a prospective study with
359 a 5-, 10-, and 27-year follow-up. BMC Geriatrics. 2020;20(1):120.
360 15.   Bhandari A, Wagner T. Self-reported utilization of health care services: improving measurement
361 and accuracy. Med Care Res Rev. 2006;63(2):217-35.
362 16.   Rasul FB, Kalmus O, Sarker M, Adib HI, Hossain MS, Hasan MZ, et al. Determinants of health
363 seeking behavior for chronic non-communicable diseases and related out-of-pocket expenditure: results

364 from a cross-sectional survey in northern Bangladesh. Journal of Health, Population and Nutrition.
365 2019;38(1):48.
366 17.   Bhojani U, Beerenahalli TS, Devadasan R, Munegowda CM, Devadasan N, Criel B, et al. No longer
367 diseases of the wealthy: prevalence and health-seeking for self-reported chronic conditions among urban
368 poor in Southern India. BMC Health Serv Res. 2013;13:306.
369 18.   Fottrell E, Ahmed N, Shaha SK, Jennings H, Kuddus A, Morrison J, et al. Distribution of diabetes,
370 hypertension and non-communicable disease risk factors among adults in rural Bangladesh: a cross-
371 sectional survey. BMJ Glob Health. 2018;3(6):e000787.
372 19.   Khalequzzaman M, Chiang C, Choudhury SR, Yatsuya H, Al-Mamun MA, Al-Shoaibi AAA, et al.
373 Prevalence of non-communicable disease risk factors among poor shantytown residents in Dhaka,
374 Bangladesh: a community-based cross-sectional survey. BMJ Open. 2017;7(11):e014710.
375 20.   Khanam F, Hossain MB, Mistry SK, Afsana K, Rahman M. Prevalence and Risk Factors of
376 Cardiovascular Diseases among Bangladeshi Adults: Findings from a Cross-sectional Study. J Epidemiol
377 Glob Health. 2019;9(3):176-84.
378 21.   Kabir A, Karim MN, Billah B. Primary healthcare system readiness to prevent and manage non-
379 communicable diseases in Bangladesh: a mixed-method study protocol. BMJ Open. 2021;11(9):e051961.
380 22.   Bangladesh Bureau of Statistics. Bangladesh Population and Housing Census 2011: Urban Area
381 Report Dhaka, Bangladesh: Ministry of Planning, Government of the People's Republic of Bangladesh;
382 2014   [Available   from:
383 http://203.112.218.65:8008/WebTestApplication/userfiles/Image/National%20Reports/Population%20
384 %20Housing%20Census%202011.pdf.
385 23.   Kabir A, Karim MN, Karim J, Billah B. Challenges and Strategies in Conducting Population Health
386 Research during the COVID-19 Pandemic: Experience from a Nationwide Mixed-Methods Study in
387 Bangladesh. Int J Environ Res Public Health. 2023;20(9).
388 24.   Kish L. A procedure for objective respondent selection within the household. Journal of the
389 American statistical Association. 1949;44(247):380-7.
390 25.   Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture
391 (REDCap)—a metadata-driven methodology and workflow process for providing translational research
392 informatics support. Journal of biomedical informatics. 2009;42(2):377-81.
393 26.   Wang Q, Brenner S, Leppert G, Banda TH, Kalmus O, De Allegri M. Health seeking behaviour and
394 the related household out-of-pocket expenditure for chronic non-communicable diseases in rural Malawi.
395 Health Policy and Planning. 2015;30(2):242-52.
396 27.   Ahmed SM, Hossain MA, Chowdhury MR. Informal sector providers in Bangladesh: how equipped
397 are they to provide rational health care? Health Policy Plan. 2009;24(6):467-78.
398 28.   Ahmed SM, Tomson G, Petzold M, Kabir ZN. Socioeconomic status overrides age and gender in
399 determining health-seeking behaviour in rural Bangladesh. Bull World Health Organ. 2005;83(2):109-17.
400 29.   Hossain SJ, Ferdousi MJ, Siddique MAB, Tipu S, Qayyum MA, Laskar MS. Self-reported health
401 problems, health care seeking behaviour and cost coping mechanism of older people: Implication for
402 primary health care delivery in rural Bangladesh. J Family Med Prim Care. 2019;8(3):1209-15.
403 30.   Abad-Díez JM, Calderón-Larrañaga A, Poncel-Falcó A, Poblador-Plou B, Calderón-Meza JM, Sicras-
404 Mainar A, et al. Age and gender differences in the prevalence and patterns of multimorbidity in the older
405 population. BMC Geriatrics. 2014;14(1):75.
406 31.   Chowdhury MZI, Haque MA, Farhana Z, Anik AM, Chowdhury AH, Haque SM, et al. Prevalence of
407 cardiovascular disease among Bangladeshi adult population: a systematic review and meta-analysis of the
408 studies. Vasc Health Risk Manag. 2018;14:165-81.
409 32.   Bleich SN, Koehlmoos TL, Rashid M, Peters DH, Anderson G. Noncommunicable chronic disease in
410 Bangladesh: overview of existing programs and priorities going forward. Health Policy. 2011;100(2-3):282-
411 9.

Page | 17

412   33.   Rahman M, Zaman MM, Islam JY, Chowdhury J, Ahsan HN, Rahman R, et al. Prevalence, treatment
413   patterns, and risk factors of hypertension and pre-hypertension among Bangladeshi adults. J Hum
414   Hypertens. 2018;32(5):334-48.
415   34.   Islam AM, Mohibullah A, Paul T. Cardiovascular disease in Bangladesh: a review. Bangladesh Heart
416   Journal. 2016;31(2):80-99.
417   35.   Rahman A, Raka SC, Ahmed SM. Prevalence of cardiovascular diseases and prescription patterns
418   in a randomly selected population in Bangladesh. Biomed Pharmacol J. 2017;10(2):607-13.
419   36.   Hasan M, Sutradhar I, Gupta RD, Sarker M. Prevalence of chronic kidney disease in South Asia: a
420   systematic review. BMC nephrology. 2018;19(1):1-12.
421   37.   Kabir A, Karim MN, Islam RM, Romero L, Billah B. Health system readiness for non-communicable
422   diseases at the primary care level: a systematic review. BMJ Open. 2022;12(2):e060387.
423   38.   Ayesha I, Karin D, Guanyang Z, Reynold GBS, Haja W, Sophie W. Rural–urban health-seeking
424   behaviours for non-communicable diseases in Sierra Leone. BMJ Global Health. 2020;5(2):e002024.
425   39.   Demaio A, Jamieson J, Horn R, de Courten M, Tellier S. Non-communicable diseases in
426   emergencies: a call to action. PLoS Curr. 2013;5.
427   40.   Parr JD, Lindeboom W, Khanam MA, Pérez Koehlmoos TL. Diagnosis of chronic conditions with
428   modifiable lifestyle risk factors in selected urban and rural areas of Bangladesh and sociodemographic
429   variability therein. BMC Health Serv Res. 2011;11:309.
430   41.   Sarker AR, Mahumud RA, Sultana M, Ahmed S, Ahmed W, Khan JA. The impact of age and sex on
431   healthcare expenditure of households in Bangladesh. Springerplus. 2014;3:435.
432   42.   Deepa M, Anjana RM, Manjula D, Narayan KM, Mohan V. Convergence of prevalence rates of
433   diabetes and cardiometabolic risk factors in middle and low income groups in urban India: 10-year follow-
434   up of the Chennai Urban Population Study. J Diabetes Sci Technol. 2011;5(4):918-27.
435   43.   Adams AM, Islam R, Yusuf SS, Panasci A, Crowell N. Healthcare seeking for chronic illness among
436   adult slum dwellers in Bangladesh: A descriptive cross-sectional study in two urban settings. PLoS One.
437   2020;15(6):e0233635.

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Figure 1: Flow chart of the study participants
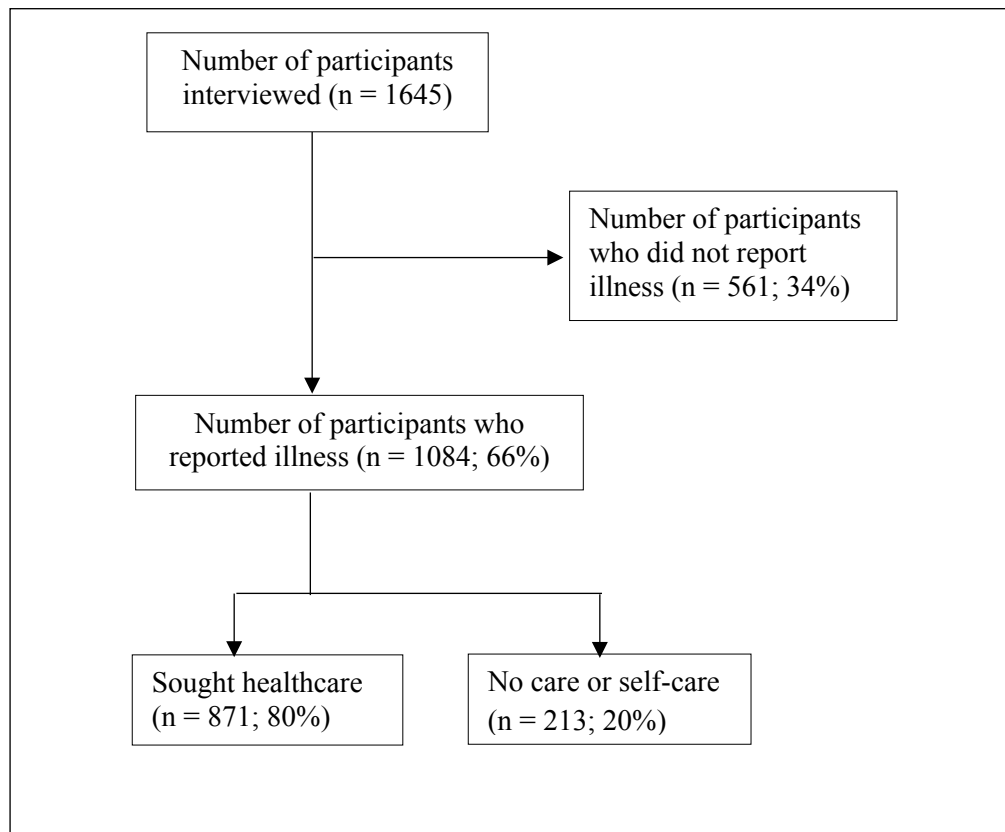
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1   **Self-reported health complaints and healthcare-seeking behaviour among adult people in rural**

2   **Bangladesh: results from a cross-sectional study**

3

4   **Short title: Self-reported health complaints and health-seeking behaviour in rural Bangladesh**

5   Ashraful Kabir[1,*], Md Nazmul Karim[1], Baki Billah[1]

6   [1] Department of Epidemiology and Preventive Medicine, School of Public Health and Preventive Medicine,

7   Monash University, Melbourne, Australia

8

9   * Corresponding author

10   Ashraful Kabir

11   Department of Epidemiology and Preventive Medicine

12   School of Public Health and Preventive Medicine

13   Monash University, Melbourne, Australia

14   Phone: +61 3 9903 0160

15   Email: md.kabir@monash.edu

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18

19 **Abstract**

20 **Objectives**: This study aims to assess self-reported health complaints and healthcare-seeking behaviors in

21 a rural population of Bangladesh. These factors are crucial for understanding health challenges and

22 designing effective healthcare services in rural areas.

23 **Design:** A cross-sectional survey was conducted from May to October 2021.

24 **Setting:** Four randomly selected administrative districts/regions of Bangladesh.

25 **Participants**: A total of 1,645 rural participants aged 18 years and older.

26 **Outcome measures**: The study assessed the prevalence of self-reported health complaints and healthcare-

27 seeking behaviours.

28 **Results**: Among the participants, 66% (1,084 out of 1,645) reported experiencing health complaints, with

29 80% seeking care and 20% either not seeking care or opting for self-care. Multivariable analysis revealed

30 that participants with formal occupations (adjusted odds ratio [aOR] = 0.609; 95% CI = 0.396–0.938; p =

31 0.025), those from the second (aOR = 1.742; 95% CI = 1.014–2.991; p = 0.044) and fifth quintiles (aOR =

32 1.210; 95% CI = 0.726–2.019; p = 0.465), with non-NCD-related complaints (aOR = 5.299; 95% CI =

33 3.673–7.643; p = <0.001), and those living more than 5 km from healthcare facilities (aOR = 1.725–95%;

34 CI = 1.040, 2.861; p = 0.034) were more likely to seek healthcare. Additionally, participants in the

35 wealthiest quintile (aOR = 1.963; 95% CI = 1.080–3.569; p = 0.027), those with non-NCD complaints (aOR

36 = 5.299; 95% CI = 3.673–7.643; p < 0.001), and those living further than 5 km (aOR = 4.615; 95% CI =

37 3.121–6.824; p < 0.001) were more likely to seek care from skilled providers or healthcare

38 facilities.**Conclusion**: A high prevalence of self-reported health complaints, particularly related to NCDs,

39 was observed. Despite this, many participants did not seek healthcare, indicating the need to address barriers

40 to healthcare access and improve health-seeking behaviors in rural Bangladesh.

41 **Keywords:** Bangladesh; Primary healthcare; Self-report health complaints; Health-seeking behaviour;

42 Health service utilisation; Multivariable analysis

Strengths and limitations of this study

- The survey was conducted in randomly selected four administrative districts, which cover the entire country to estimate the prevalence of self-reported health complaints and health-seeking behaviour among adult people in rural Bangladesh.

- A multi-stage stratified cluster sampling method was used to maximise the sample representativeness of the adult population in rural settings.

- Data collected were self-reported and there may be under-reporting or over-reporting of health complaints and health-seeking behaviour.

- As a cross-sectional study, it cannot make causal inferences from the data.

64 **Introduction**

65 Bangladesh has made substantial progress in population health in recent decades [1]. Reduced maternal and

66 child mortality, total fertility, effective population control and family planning, increased life expectancy,

67 and wider immunisation coverage are considerable achievements in the health sector [2, 3]. However, the

68 country is undergoing a demographic and epidemiological transition posing new challenges. The rise of

69 non-communicable diseases (NCDs) is likely to place substantial pressures on the health system [4]. NCD-

70 related deaths and disabilities have gradually increased in Bangladesh and currently account for 71% of

71 deaths, an increase from 45% in 2000 [5]. In the coming years, unless appropriate strategies and actions are

72 in place, the rise of NCDs and infectious and neglected diseases is projected to pose substantial challenges

73 to the healthcare system in sustainably delivering affordable, accessible, and reliable healthcare services

74 for all segments of the population[6, 7].

75 In response to the current disease burden and future predictions, a number of strategies and programs have

76 been introduced [8]. As a common approach, healthcare services have considerably mobilized at the primary

77 healthcare (PHC) level. The increase of healthcare services at the PHC are likely to improve the quality of

78 healthcare services and make them more sustainable, affordable, accessible, and equitable [9]. It is worth

79 mentioning that Bangladesh has a pluralistic healthcare system where various practitioners provide

80 healthcare services and apply treatment methods and approaches [8]. This pluralistic healthcare system allows

81 an individual to seek healthcare services according to their needs and preferences [9]. However, have studies

82 reported that disparities exist in accessing healthcare services due to household wealth, out-of-pocket

83 expenses, and the socio-demographical characteristics of individuals [10, 11]. These disparities, combined with

84 the varying severity of health conditions, significantly affect health-seeking behavior [12].

85 Against this backdrop, a better understanding of morbidities, individuals' responses to and their choice of

86 healthcare services, and health system factors is important when reflecting on the rationale and effectiveness

87 of health-related policies, strategies and actions. In regard to this viewpoint, self-reported health status,

88 health-seeking behaviour, and the use of healthcare services can be potential determinants of the

Page | 4

89   population's health and are important factors for imrpving public health [13]. Self-reported health integrates

90   a range of individual (e.g., biological and mental) and system-level (e.g., socio-contextual) factors under

91   which individual health is determined [14]. Therefore, self-reported health may offer useful information about

92   morbidity conditions, care-seeking patterns, the disease burden, demand for healthcare services, and the

93   need for better designed healthcare services. A self-reported health status can be effective in resource-

94   limited settings because it enables stakeholders to extract health-related information with minimal effort

95   and resources. A great deal of health information can be included in a self-assessment questionnaire. There

96   is a common assumption that a self-reported assessment is less reliable and focused on contextual aspects.

97   However, self-reported health is growing in importance when it comes to public health [15].

98   Despite the growing importance of profiling self-reported morbidity and subsequent responses to seeking

99   healthcare, research related to the use of healthcare services in Bangladesh remains notably low [16]. A better

100   understanding of self-reported health complaints, health-seeking behaviour, and the use of healthcare

101   services is crucial for improved responses to healthcare demands and gaps in the existing service delivery

102   mechanism. The complete profile of self-reported health complaints, healthcare-seeking patterns, health

103   services utilisation, and associated factors in a given community are crucial to better planning and managing

104   disease burden [16, 17]. This study aims to fill this gap by providing a detailed profile of self-reported health

105   complaints, health-seeking behavior, and healthcare utilization in a rural Bangladeshi population. The

106   findings will contribute to a better understanding of the healthcare demands and gaps in service delivery,

107   and can inform public health strategies aimed at improving health outcomes in Bangladesh and similar

108   settings elsewhere.

109

110

111   **Materials and methods**

112   **Study time and settings**

Page | 5

113 This cross-sectional study was conducted in four administrative districts in Bangladesh—Cumilla,

114 Jhenaidah, Rajshahi and Sylhet—from May to October 2021. The pluralistic healthcare system was

115 observed in the studied districts, with multiple actors and healthcare providers, including the government

116 (public sector), private operators (for-profit), non-governmental organizations, charities (not-for-profit),

117 and donor agencies (developing partners and aids) playing roles in applying a mixed system of medical

118 practices [8]. Apart from these major formal providers, there is an extensive presence of informal healthcare

119 providers across the districts (i.e., traditional healers, faith healers, herbalists, quacks, and homeopaths).

120 Although the organization and delivery of the healthcare system across these districts are considerably

121 uniform, distinctive socio-demographic characteristics, geographic features, livelihood patterns, and

122 sociocultural practices were noted [8, 18-20].

123 **Sample size**

124 Sample size was calculated by using following formula.

125 $$n = \frac{Z^2 * P(1-P)}{d^2}$$

126 $$n = \frac{(1.96)^2 * 0.09(1-0.09)}{(0.02)^2}$$

127 $$n = \frac{3.84 * 0.097 * 0.903}{0.0025}$$

128 $$n = \frac{3.84 * 0.087}{0.0004}$$

129 $$n = \frac{0.336}{0.0004}$$

130 $$n = 840$$

131 Here,

132 n=the desired sample size

133 p=the proportion of the target population. We took the nationally representative data reported the

134 age-adjusted prevalence of diabetes as 9.7% [21] into account which was the highest in Bangladesh.

135 p=1-p

136 d=degree of accuracy desired, which is set at (0.02) 2%.

137     $Z^{1-\alpha/2}$=the standard normal deviate usually set at 1.96 corresponds to the 95% confidence interval)

138   The minimum required sample size was calculated to be 840. Given the nationwide scope and socio-

139   demographic diversity of the population, the sample size was adjusted by multiplying it by a design effect

140   of 1.5 [22], to account for the sampling variance introduced by the multi-stage study design [23]. This adjustment

141   resulted in a sample size of 840*1.5 = 1260. Additionally, a 10% non-response rate was anticipated [23],

142   which increased the sample size by 63, resulting in a final sample size of 1386.

143

144   **Participants and sampling strategy**

145   A multi-stage stratified cluster sampling was used in this study (Fig 1). According to the administrative

146   structure, Bangladesh is divided into eight administrative divisions [24]. Each of the divisions are divided into

147   several districts, and each district is divided into several sub-districts. The Bangladesh Bureau of Statistics

148   divided the entire country into 2,96,718 Enumeration Areas (EAs) based on the latest Population and

149   Housing Census enumeration map [25]. On average, each EA has 120 households [25]. This EA list was used as

150   a sampling frame in this study. Step-wise procedures were followed in selecting the respondents, as detailed

151   in our protocol study [24]. In the first stage, four administrative divisions were randomly chosen. Of them,

152   four districts were randomly selected—one from each selected division, including Cumilla, Jhenaidah,

153   Rajshahi, and Sylhet. The population's proportion of the latest census (64% in rural and 36% in urban) was

154   considered to determine the number of participants . In the protocol, the sample size was calculated as

155   1,386; however, we decided to increase it to 1,743, considering the availability of resources and time and

156   to increase the study power [24, 26]. The required smallest number of participants in any single EA was 63 in

157   Jhenaidah. This figure was considered the maximum sampling intensity in an available EA. A total of 26

158   EAs were randomly chosen. In the next stage, following a systematic random sampling procedure, 63

159   households were selected from each EA. Applying the inclusion criteria (aged ≥18 years, not pregnant, and

160   with no surgery history for the last three months), a single adult was interviewed in the selected household

161   following the Kish Grid method [27].

162

163   (Figure 1 to be inserted here)

164   **Data collection procedure**

165   Eight field enumerators administered a structured questionnaire to the sampled households. The

166   enumerators received one week of training that covered the research topic, data collection instruments,

167   administered electronic questionnaire, and RedCap software [28]. The purpose of the interviews was to gather

168   essential data on the participants' socio-demographic characteristics, health complaints, and healthcare-

169   seeking behaviors. Specifically, the structured interviews were designed to collect self-reported information

170   on health status, health-seeking actions taken in the past 30 days, and the types of healthcare services

171   utilized. The questionnaire used in this study was developed by the research team based on a comprehensive

172   review of the existing literature and the contextual expertise of the researchers in the field of self-reported

173   health complaints and healthcare-seeking behaviors. The development process involved identifying key

174   themes from relevant studies, which were then adapted to the local context to ensure the questions were

175   culturally appropriate and relevant to the population under study. A plain English questionnaire was

176   developed and then translated into Bengali (the local language). The Bengali version was re-translated into

177   English to check the consistency state between versions. A pilot test of the questionnaire was conducted to

178   assess its clarity, reliability, and effectiveness in capturing the intended data in the study context. The

179   necessary changes were made in the final version based on the feedback to ensure that the final version of

180   the questionnaire was well-suited to the study objectives and target population. The interview was

181   conducted in Bengali.

182   **Outcome measures**

183   The prevalence of self-reported health complaints and healthcare seeking were the outcomes of interest.

184   Healthcare seeking was defined as the state of action taken by the individuals who reported health

185   complaints, represented as a binary variable indicating whether they sought care (of any type) or opted for

186   self-care. The survey included four possible response options for questions assessing the outcomes of

187   interest: "yes", "no", "don't know", and "not applicable." For the purposes of analysis, we focused on the

Page | 8

188　binary "yes" and "no", responses, as these directly correspond to whether or not the participant sought

189　healthcare. The yes" and "no" responses were coded as binary variables to simplify the analysis and to

190　directly assess the key outcome of interest: healthcare-seeking behavior. Among those who sought care,

191　we further classified the source of care into skilled healthcare providers/facilities versus others (unskilled

192　providers, self-care, etc.). The survey collected self-reported healthcare-seeking data for the past 30 days

193　to minimise the chance of recall bias, as reported in previous studies in Bangladesh and similar settings

194　elsewhere [16, 29]. Previous studies reported that 30 days of self-reported information would likely provide

195　more accurate information than a longer time period would. Healthcare-seeking behaviors were categorized

196　as "sought care" and "did not seek care." When an individual reported taking no actions or that they were

197　engaged in a treatment of their own choice without following any recommendations from healthcare

198　providers to remedy their illness, this was defined as "did not seek care." In the Bangladesh context, self-

199　management has been a common practice for a long period of time, with individuals using various home

200　remedies (creed and herbal) to treat their illnesses [8, 30]. The no care and self-care responses were merged

201　into one category, considering the law response rate. Beforehand, a likelihood ration test was performed to

202　test the feasibility of combing these two variables. When a person sought care from a semi-qualified (e.g.,

203　drug shop keeper, village doctor, traditional and faith healer, or homeopath) or qualified healthcare

204　professional (e.g., general physician, nurse, or specialist). The explanatory variables were chosen based on

205　the available literature, relevant healthcare-seeking models, researchers' expertise in the relevant fields of

206　study, and the contextual factors (e.g., availability of healthcare providers and healthcare facilities in the

207　study areas). Healthcare-seeking behaviors were associated with age, sex, education, religion, and the socio-

208　economic status of the respondents [31]. Aligning with the previous studies and contextual factors, we

209　included a range of explanatory variables: age (in years and categorized into three groups: <40, 40–60, and

210　≥60), sex (male or female), education (no formal education, primary school [I–V grade], or secondary

211　school or above), religion (Muslim or other), marital status (married or unmarried), occupation (informal

212　or formal), type of illness (NCD-related complaints or non-NCD-related complaints), location (as

213　administrative districts), place of residency (rural or urban), distance from the facilities (≤5 km or >5 km),

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214 and socio-economic status (as asset quintiles). Asset quintiles were obtained by combining household

215 belongings following a principal component analysis [16].

216 The following household belongings were factored in: land (yes or no); electricity or solar panel (yes or

217 no); water source (yes or no); sanitary toilets (yes or no); television, radio, or mobile phone (yes or no);

218 refrigerator (yes or no); computer (yes or no); furniture such as chairs, tables, and a bedframe (yes or no);

219 motorbike or easy bike (yes or no); van or rickshaw (yes or no); and cooking fuel (wood, crop residue, dung

220 cake, coal, charcoal, kerosene, electricity, liquid gas, or bio gas).

221 **Statistical analysis**

222 Data analyses were conducted using SPSS (version 24). The data were checked to fix the errors and missing

223 values before commencing analysis with the SPSS software. The prevalence of self-reported health

224 complaints, healthcare-seeking behavior, and the use of health services were reported as percentages with

225 95% confidence intervals. A multivariable logistic regression was performed to assess factors associated

226 with healthcare-seeking behaviors and types of healthcare providers or facilities. The logistic regression

227 analyses reported the adjusted odds ratios (aOR) with 95% confidence intervals. The relationships between

228 the predictor variables were assessed, and the two-way term interactions, which were found significant at

229 $p < 0.05$, were included in the multivariable model. Similar to a backward elimination method, the

230 predictors that were found nonsignificant at $p < 0.05$ were dropped individually, and the resultant models

231 were compared using a goodness-of-fit test until further improvements could be established. A similar

232 process was followed to develop the final multivariable model for all outcome variables. Collinearity was

233 checked and removed from the model if the r value was 0.70. If the p-value is 0.20 or more for an

234 independent variable in a crude or unadjusted model, it will be removed from the final multivariable model.

235 The final models were reported with aORs, 95% confidence intervals, and p-values.

236 **Patient and public involvement:**

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239   Patients were not involved in this study.

240   **Results**

241   **Characteristics of the participants and self-reported health complaints**

242   Table 1 shows the characteristics of the sampled participants. Data were collected from 1,645 participants,

243   with a response rate of 94%. The non-response rate was either due to the refusal to respond or the absence

244   of household members. Among the participants with complaints, 871 (80%) sought care, and 213 (20%)

245   sought no care or performed self-care. This sample subset has been included in the analysis as they engaged

246   in healthcare-seeking. Among the participants, 41.4% were aged between 40 -60, 52.9% were female,

247   34.2% had a secondary education and above, 91.2% were married, 84.4% were in non-formal occupations

248   and 92.0% were Muslim. Nearly two thirds (36.7%) of the participants had NCD-related complaints, and

249   63.3% had non-NCD-related complaints. NCD-related complaints included diabetes mellitus, hypertension,

250   heart problems, stroke, cancer, kidney disease and chronic obstructive pulmonary disease/respiratory

251   problems, while any illness/health problems other than those mentioned above were regarded as non-NCDs.

252   Around 68.1% had access to healthcare facilities within 5 km. The bivariate analysis showed a positive

253   association between 'sought no care or self-care' with younger people (aged < 40 years) ($p = 0.005$), male

254   ($p = 0.004$), being married ($p < 0.001$), having NCD-related complaints ($p < 0.001$), availability of

255   healthcare facilities within 5 km ($p = 0.013$) and residence in Cumilla ($p < 0.001$).

256

257   *Table 1 Characteristics of the sample participants by healthcare-seeking status*

Characteristics	Overall (n =1084)	Sought care (n = 871; 80%)	Sought no care or self-care (n = 213, 20%)	*p* value
Age in years, *Median (IQR)*	43 (21)	45 (20)	40 (25)	0.118
Age group, *n (%)*				
< 40 years	424 (39.1)	323 (37.1)	101 (47.4)	0.005
40–60 years	449 (41.4)	381 (43.7)	68 (31.9)	
≥ 60 years	211 (19.5)	167 (19.2)	44 (20.7)	

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Sex, *n (%)*				
Male	511 (47.1)	393 (45.1)	118 (55.4)	0.004
Female	573 (52.9)	478 (54.9)	95 (44.6)	
Education, *n (%)*				
No formal education	366 (33.8)	305 (35.0)	61 (28.6)	0.210
Primary school (I–V grade)	347 (32.0)	274 (31.5)	73 (34.3)	
Secondary school or above	371 (34.2)	292 (33.5)	79 (37.1)	
Marital status, *n (%)*				
Married	989 (91.2)	810 (93.0)	179 (84.0)	<0.001
Unmarried	95 (8.8)	61 (7.0)	34 (16.0)	
Occupations, *n (%)*				
Non-formal	915 (84.4)	748 (85.9)	167 (78.4)	0.006
Formal	169 (15.6)	123 (14.1)	46 (21.6)	
Religious identity, *n (%)*				
Muslim	997 (92.0)	798 (91.6)	199 (93.4)	0.236
Others	87 (8.0)	73 (8.4)	14 (6.6)	
Wealth quintile (socioeconomic status), *n (%)*				
Q1 (poorest)	189 (17.4)	153 (17.6)	36 (16.9)	0.300
Q2	217 (20.0)	183 (21.0)	34 (16.0)	
Q3	222 (20.5)	169 (19.4)	53 (24.9)	
Q4	225 (20.8)	179 (20.6)	46 (21.6)	
Q5 (richest)	231 (21.3)	187 (21.5)	44 (20.6)	
Self-rated health complaints/illness, *n (%)*				
NCD-related complaints	398 (36.7)	253 (29.0)	145 (68.1)	<0.001
Non-NCD-related complaints	686 (63.3)	618 (71.0)	68 (31.9)	
District of residence, *n (%)*				
Cumilla	512 (47.2)	431 (49.5)	81 (38.0)	<0.001
Jhenaidah	128 (11.8)	88 (10.1)	40 (18.8)	
Rajshahi	242 (22.3)	182 (20.9)	60 (28.2)	
Sylhet	202 (18.6)	170 (19.5)	32 (15.0)	
Distance from the facilities, *n (%)*				
≤ 5km	738 (68.1)	579 (66.5)	159 (74.6)	0.013
> 5 km	346 (31.9)	292 (33.5)	54 (25.4)	

258

259   IQR: Interquartile range, km: kilometer

260   Test statistics and p values based on ANOVA for continuous variables; Chi-square tests (or Fisher's exact tests)

261   for categorical variables

262

263   Table 2 shows the result of the regression analysis and the model specification. This analysis examines

264   whether a respondent sought any form of healthcare, regardless of the type of healthcare provider (i.e.,

265   skilled or unskilled), or chose self-care. Respondents with formal occupations (aOR = 0.609; 95% CI =

266   0.396, 0.938; *p = 0.025*), from the second (aOR = 1.742; 95% CI = 1.014, 2.991; *p = 0.044*) and richest

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267 quintiles (aOR = 1.210; 95% CI = 0.726–2.019; *p = 0.465*), with non-NCD-related complaints (aOR =

268 5.299; 95% CI = 3.673–7.643; *p = <0.001*), and who lived a distance of >5 km away from healthcare

269 facilities (aOR = 1.725; 95% CI = 1.040, 2.861; *p = 0.034*) were more likely to seek healthcare.

270 *Table 2 Predictors of healthcare-seeking status (n = 1084)*

Characteristics	Sought care adjusted odds ratio (95% CI)	*p* value
Education (ref: No formal education)		
Primary school (I–V grade)	0.892 (0.595, 1.338)	0.582
Secondary school or above (VI–X grade)	1.069 (0.696, 1.641)	0.761
Occupations (ref: non-formal)		
Formal	0.609 (0.396, 0.938)	0.025
Asset quintile/socio-economic status (ref: Q1)		
Q2	1.742 (1.014, 2.991)	0.044
Q3	1.076 (0.643, 1.803)	0.780
Q4	1.170 (0.699, 1.957)	0.551
Q5 (richest)	`	0.465
Self-rated illness/NCD status (ref: single NCD)		
Non-NCD-related complaints	5.299 (3.673, 7.643)	<0.001
Distance from the facilities (ref: ≤ 5 km)		
> 5 km	1.725 (1.040, 2.861)	0.034

271

272 Test statistics and p values based on ANOVA for continuous variables, Chi-square tests (or Fisher's exact tests)
273 for categorical variables

274

275 Table 3 shows the predictors for using skilled care providers/healthcare facilities. Respondents with fifth

276 asset quintiles (aOR = 1.963, 95% CI 1.080, 3.569, *p* = 0.027), non-NCDs related complaints (aOR = 5.299

277 95% CI 3.673, 7.643, *p* = < 0.001) and a distance > 5 km of from the healthcare facility (aOR = 4.615, 95%

278 CI 3.121, 6.824, *p* = < 0.001) were more likely to seek healthcare from skilled care providers/healthcare

279 facilities.

280

281

282 *Table 3 Predictors of the type of facilities/providers (n = 871)*

Characteristics	Sought care from skilled	*p* value

	providers/healthcare facilities adjusted odds ratio (95% CI)	
Education (ref: No formal education)		
Primary school (I–V grade)	0.970 (0.613, 1.533)	0.895
Secondary school and above (VI–X grade)	1.119 (0.704, 1.779)	0.634
Occupation (ref: non-formal)		
Formal	1.037 (0.603, 1.784)	0.894
Asset quintile/socio-economic status (ref: Q1)		
Q2	1.159 (0.669, 2.008)	0.598
Q3	1.209 (0.677, 2.160)	0.521
Q4	1.809 (0.994, 3.293)	0.053
Q5 (richest)	1.963 (1.080, 3.569)	0.027
Self-rated illness/NCD status (ref: single NCD)		
Non-NCD related complaints	4.615 (3.121, 6.824)	< 0.001
Distance from the facilities (ref: ≤ 5km)		
> 5 km	6.583 (3.123, 13.875)	< 0.001

283

284   Test statistics and p values based on ANOVA for continuous variables, Chi-square tests (or Fisher's exact tests)
285   for categorical variables

286

287   **Discussion**

288   This study investigated self-reported health complaints, healthcare-seeking behaviour, and use of health

289   services in rural Bangladesh. We found that a large proportion of participants (1,084 out of 1,645, 66%)

290   reported having some degree of illness. A previous study in Bangladesh resulted in around 75% self-

291   reported illnesses among the older population (aged 65 years or above), which is higher than our study [32].

292   However, studies in neighbouring countries of Bangladesh have reported lower prevalence rates of

293   morbidities. For instance, Poudel et al. found that 48.3% of the elderly in Nepal were affected by pre-

294   existing chronic conditions [33]. In contrast, studies in India indicated that the prevalence of at least one

295   morbidity among individuals aged 60 years and older ranges from 84% to 88% [34, 35]. This is likely due to

296   people of advanced age having an increased risk of morbidities (33). As such, studies showed that the

297   multimorbidity increased with age [36, 37]. Among the reported complaints, over one-third of the participants

298   had NCD-related complaints. Previous studies showed an increasing trend of NCDs and associated risk

299   factors in recent years in Bangladesh, with varying prevalence based on age, income, sex, ethnicity and

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300 geographical location [38, 39]. As such, studies have reported that hypertension varied between 15.9% and

301 30%, diabetes between 5% and 34.9%, cardiovascular diseases between 1% and 21%, and chronic kidney

302 diseases between 12.8% and 26.0% [38, 40-44]. Our study showed that more than one-third of illness complaints

303 were NCD-related, which is consistent with findings from similar studies in comparable contexts [45-47].

304 Although we did not report each of the major NCDs separately due to the scope and aims, we assume that

305 the combined prevalence of NCDs is likely to be consistent with these studies.

306 Our study showed that a participant with a non-NCD-related complaint sought care compared to the NCD-

307 related complaints. Due to the nature of the study, we cannot adequately explain the reasons for this varying

308 pattern of healthcare seeking. However, a few studies have reported that healthcare seeking is influenced

309 by a range of factors, including supply-side factors (e.g., health facility, care providers, and cost), disease

310 severity, psychosocial, and individual characteristics [45-50]. NCD-related illnesses often require continued

311 medication support, well-equipped healthcare facilities, and trained healthcare providers. These factors may

312 not be readily available in rural settings and can involve high treatment costs, leading to avoidance of

313 healthcare [17, 45, 46]. Illness severity also influences healthcare-seeking behavior, as people may not be prompt

314 to seek care unless the illness disrupts their daily lifestyle [12]. NCD-related illnesses may cause little or no

315 impact on the daily activities of the person, which may lead to delayed or avoidance of healthcare seeking

316 [51].

317 Unlike the previous studies mentioned, our study found that educational entainment did not have a

318 significant influence on healthcare seeking in Bangladesh and in similar contexts [52, 53]. We suggest that a

319 further qualitative study investigate the extent that educational entainment influences health decision-

320 making. Socio-economic position (wealth quintile) was not found to be significantly associated with illness

321 complaints or seeking of healthcare. It is generally assumed that people from affluent segments of society

322 are more likely to develop illnesses and seek healthcare. Our findings showed that more than one third of

323 illnesses were reported to be NCD-related. Possibly due to the epidemiological and demographic

324 transitions, a higher proportion of people from relatively lower socio-economic positions are developing

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325 illnesses. In particular, epidemiological and demographic transitions NCD progress the change of

326 developing NCDs among low-income groups rapidly increased [54]. However, the findings show that the

327 wealthiest group with NCD-related illness complaints who lived a greater distance from the healthcare

328 facilities had higher odds of seeking skilled providers or facilities. This may be due to the fact that people

329 belonging to the richest quintile had more reliance on private healthcare facilities, which are located in the

330 urban centre or local township. People from the low-income group often rely on unskilled care providers,

331 including the highly prevalent drug outlets (locally known as pharmacies), informal care providers, and the

332 practice of self-medication [55]. NCD-related services and trained providers are less likely to be available in

333 rural settings, so, people with NCD-related health complaints have a greater likelihood of seeking care from

334 privately operated facilities, usually located in townships or district headquarters or far away, to ensure

335 quality care.

Limitations of the study

337 This study has certain limitations. This was a cross-sectional study, so it wasunable to establish a temporal

338 relationships between the prevalence of self-reported health complaints and the healthcare-seeking

339 behaviour of the participants. A possible limitation is that self-reported data may be subjected to recall bias.

340 The findings of this study were based on data from rural settings; therefore, they may not be easily

341 representative of other populations. Notwithstanding these limitations, the findings offer important insights

342 on the state of self-reported health complaints, healthcare-seeking behavior, and the use of healthcare

343 services, which have certain implications for designing better health planning.

344 .

345

Conclusion

347 This study sheds light on the self-reported health complaints, health-seeking behaviors, and healthcare

348 utilization patterns among people in rural Bangladesh. A large proportion of participants reported health

349 complaints, with over one-third of these complaints being related to non-communicable diseases (NCDs),

350 highlighting the growing burden of NCDs in rural settings. Despite this, 20% of participants did not seek

351 care, even though healthcare services were available within a reasonable distance for most individuals. The

352 factors associated with seeking healthcare included the presence of non-NCD-related complaints, formal

353 employment, higher socioeconomic status, and access to healthcare facilities. These findings suggest that

354 barriers to healthcare-seeking, such as affordability, awareness, and quality of care, continue to persist,

355 despite efforts to improve primary healthcare services. It is clear that tailored interventions are needed to

356 improve healthcare access, particularly for NCD management, and to encourage more proactive health-

357 seeking behaviors. Moreover, addressing the accessibility of skilled care providers and improving public

358 awareness about NCDs are crucial for optimizing healthcare utilization and achieving better health

359 outcomes in rural areas.

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364 **Acknowledgments**

367 **Authors' contributions**

368 Ashraful Kabir (AK) is the review guarantor. Ashraful Kabir (AK), Md Nazmul Karim (NK), and Baki

369 Billah (BB) conceived and designed the study. AK developed the data collection tools. AK, and the data

370 collection activities and coordinated the field operations. AK prepared the first draft of the manuscript. NK

371 and BB revised the manuscript. BB provided overall stewardship. The final manuscript has been read and

372 approved by all the authors.

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375 **Competing interests**

376 The authors declare that they have no competing interests.

377 **Ethics approval and consent to participate**

378 The project has been approved by Monash University Human Research Ethics Committee (Project ID:

379 27112) and the Bangladesh Medical Research Council (BMRC) (Ref: BMRC/NREC/2019-2022/270). This

380 study was performed in line with the principles of the Declaration of Helsink. All participant provided

381 informed written consent.

382 **Patient consent for publication**

383 Not required

384 **Availability of data and materials**

385 The data used and analyzed during this research are not publicly available due to ethical restrictions, and

386 data confidentiality. Data are available upon reasonable request from researchers who meet the criteria for

387 access to confidential data. Interested parties may contact the first author (md.kabir@monash.edu) for

388 further inquiries in this regard.

389 **References**:

390 1.   Chowdhury AM, Bhuiya A, Chowdhury ME, Rasheed S, Hussain Z, Chen LC. The Bangladesh
391 paradox: exceptional health achievement despite economic poverty. Lancet. 2013;382(9906):1734-45.
392 2.   Kabir A, Maitrot MR. Factors influencing feeding practices of extreme poor infants and young
393 children in families of working mothers in Dhaka slums: A qualitative study. PLoS One.
394 2017;12(2):e0172119.
395 3.   El Arifeen S, Christou A, Reichenbach L, Osman FA, Azad K, Islam KS, et al. Community-based
396 approaches and partnerships: innovations in health-service delivery in Bangladesh. Lancet.
397 2013;382(9909):2012-26.
398 4.   Kabir A, Karim MN, Billah B. The capacity of primary healthcare facilities in Bangladesh to prevent
399 and control non-communicable diseases. BMC Primary Care. 2023;24(1):60.

400   5.   World Health Organization. Noncommunicable Diseases Data Portal 2023 [Available from:
401   https://ncdportal.org/CountryProfile/GHE110/BGD.

402   6.   Sayeed MA. Is Bangladesh Ready to Cope with her Future Disease Burden? Ibrahim Med Coll J.
403   2008;2(1):1-2.

404   7.   USAID Bangladesh. USAID Bangladesh Health Strategy 2022-2027: USAID Bangladesh; 2022
405   [Available from: https://www.usaid.gov/sites/default/files/2023-02/Bangladesh-Health-Strategy-
406   Doc_2022-2027.pdf.

407   8.   Kabir A, Karim MN, Billah B. Health system challenges and opportunities in organizing non-
408   communicable diseases services delivery at primary healthcare level in Bangladesh: A qualitative study.
409   Front Public Health. 2022;10:1015245.

410   9.   Kabir A, Karim N, Billah B. Preference and willingness to receive non-communicable disease
411   services from primary healthcare facilities in Bangladesh: A qualitative study. BMC Health Serv Res.
412   2022;22(1):1473.

413   10.   Iqbal MH. Disparities of health service for the poor in the coastal area: does Universal health
414   coverage reduce disparities? J Mark Access Health Policy. 2019;7(1):1575683.

415   11.   khanam M, Hasan E. Inequalities in health care utilization for common illnesses among under five
416   children in Bangladesh. BMC Pediatrics. 2020;20(1):192.

417   12.   Peppa M, John Edmunds W, Funk S. Disease severity determines health-seeking behaviour
418   amongst individuals with influenza-like illness in an internet-based cohort. BMC Infectious Diseases.
419   2017;17(1):238.

420   13.   George PP, Heng BH, De Castro Molina JA, Wong LY, Wei Lin NC, Cheah JT. Self-reported chronic
421   diseases and health status and health service utilization--results from a community health survey in
422   Singapore. Int J Equity Health. 2012;11:44.

423   14.   Wuorela M, Lavonius S, Salminen M, Vahlberg T, Viitanen M, Viikari L. Self-rated health and
424   objective health status as predictors of all-cause mortality among older people: a prospective study with
425   a 5-, 10-, and 27-year follow-up. BMC Geriatrics. 2020;20(1):120.

426   15.   Bhandari A, Wagner T. Self-reported utilization of health care services: improving measurement
427   and accuracy. Med Care Res Rev. 2006;63(2):217-35.

428   16.   Rasul FB, Kalmus O, Sarker M, Adib HI, Hossain MS, Hasan MZ, et al. Determinants of health
429   seeking behavior for chronic non-communicable diseases and related out-of-pocket expenditure: results
430   from a cross-sectional survey in northern Bangladesh. Journal of Health, Population and Nutrition.
431   2019;38(1):48.

432   17.   Bhojani U, Beerenahalli TS, Devadasan R, Munegowda CM, Devadasan N, Criel B, et al. No longer
433   diseases of the wealthy: prevalence and health-seeking for self-reported chronic conditions among urban
434   poor in Southern India. BMC Health Serv Res. 2013;13:306.

435   18.   Fottrell E, Ahmed N, Shaha SK, Jennings H, Kuddus A, Morrison J, et al. Distribution of diabetes,
436   hypertension and non-communicable disease risk factors among adults in rural Bangladesh: a cross-
437   sectional survey. BMJ Glob Health. 2018;3(6):e000787.

438   19.   Khalequzzaman M, Chiang C, Choudhury SR, Yatsuya H, Al-Mamun MA, Al-Shoaibi AAA, et al.
439   Prevalence of non-communicable disease risk factors among poor shantytown residents in Dhaka,
440   Bangladesh: a community-based cross-sectional survey. BMJ Open. 2017;7(11):e014710.

441   20.   Khanam F, Hossain MB, Mistry SK, Afsana K, Rahman M. Prevalence and Risk Factors of
442   Cardiovascular Diseases among Bangladeshi Adults: Findings from a Cross-sectional Study. J Epidemiol
443   Glob Health. 2019;9(3):176-84.

444   21.   Akter S, Rahman MM, Abe SK, Sultana P. Prevalence of diabetes and prediabetes and their risk
445   factors among Bangladeshi adults: a nationwide survey. Bulletin of the World Health Organization.
446   2014;92:204-13A.

447   22.   Henry GT. Practical sampling: Sage; 1990.

Page | 19

448 23.   Islam R, Bell R, Billah B, Hossain M, Davis S. The prevalence of symptomatic pelvic floor disorders
449 in women in Bangladesh. Climacteric. 2016;19(6):558-64.
450 24.   Kabir A, Karim MN, Billah B. Primary healthcare system readiness to prevent and manage non-
451 communicable diseases in Bangladesh: a mixed-method study protocol. BMJ Open. 2021;11(9):e051961.
452 25.   Bangladesh Bureau of Statistics. Bangladesh Population and Housing Census 2011: Urban Area
453 Report Dhaka, Bangladesh: Ministry of Planning, Government of the People's Republic of Bangladesh;
454 2014   [Available   from:
455 http://203.112.218.65:8008/WebTestApplication/userfiles/Image/National%20Reports/Population%20
456 %20Housing%20Census%202011.pdf.
457 26.   Kabir A, Karim MN, Karim J, Billah B. Challenges and Strategies in Conducting Population Health
458 Research during the COVID-19 Pandemic: Experience from a Nationwide Mixed-Methods Study in
459 Bangladesh. Int J Environ Res Public Health. 2023;20(9).
460 27.   Kish L. A Procedure for Objective Respondent Selection within the Household. Journal of the
461 American Statistical Association. 1949;44(247):380-7.
462 28.   Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture
463 (REDCap)—a metadata-driven methodology and workflow process for providing translational research
464 informatics support. Journal of biomedical informatics. 2009;42(2):377-81.
465 29.   Wang Q, Brenner S, Leppert G, Banda TH, Kalmus O, De Allegri M. Health seeking behaviour and
466 the related household out-of-pocket expenditure for chronic non-communicable diseases in rural Malawi.
467 Health Policy and Planning. 2015;30(2):242-52.
468 30.   Ahmed SM, Hossain MA, Chowdhury MR. Informal sector providers in Bangladesh: how equipped
469 are they to provide rational health care? Health Policy Plan. 2009;24(6):467-78.
470 31.   Ahmed SM, Tomson G, Petzold M, Kabir ZN. Socioeconomic status overrides age and gender in
471 determining health-seeking behaviour in rural Bangladesh. Bull World Health Organ. 2005;83(2):109-17.
472 32.   Hossain SJ, Ferdousi MJ, Siddique MAB, Tipu S, Qayyum MA, Laskar MS. Self-reported health
473 problems, health care seeking behaviour and cost coping mechanism of older people: Implication for
474 primary health care delivery in rural Bangladesh. J Family Med Prim Care. 2019;8(3):1209-15.
475 33.   Poudel M, Ojha A, Thapa J, Yadav DK, Sah RB, Chakravartty A, et al. Morbidities, health problems,
476 health care seeking and utilization behaviour among elderly residing on urban areas of eastern Nepal: A
477 cross-sectional study. PLoS One. 2022;17(9):e0273101.
478 34.   Joshi K, Kumar R, Avasthi A. Morbidity profile and its relationship with disability and psychological
479 distress among elderly people in Northern India. Int J Epidemiol. 2003;32(6):978-87.
480 35.   Sharma D, Mazta SR, Parashar A. Morbidity Pattern and Health-seeking Behavior of Aged
481 Population residing in Shimla Hills of North India: A Cross-Sectional Study. J Family Med Prim Care.
482 2013;2(2):188-93.
483 36.   Salive ME. Multimorbidity in Older Adults. Epidemiologic Reviews. 2013;35(1):75-83.
484 37.   Shankar R, Tondon J, Gambhir IS, Tripathi CB. Health status of elderly population in rural area of
485 Varanasi district. Indian J Public Health. 2007;51(1):56-8.
486 38.   Chowdhury MZI, Haque MA, Farhana Z, Anik AM, Chowdhury AH, Haque SM, et al. Prevalence of
487 cardiovascular disease among Bangladeshi adult population: a systematic review and meta-analysis of the
488 studies. Vasc Health Risk Manag. 2018;14:165-81.
489 39.   Bleich SN, Koehlmoos TL, Rashid M, Peters DH, Anderson G. Noncommunicable chronic disease in
490 Bangladesh: overview of existing programs and priorities going forward. Health Policy. 2011;100(2-3):282-
491 9.
492 40.   Rahman M, Zaman MM, Islam JY, Chowdhury J, Ahsan HN, Rahman R, et al. Prevalence, treatment
493 patterns, and risk factors of hypertension and pre-hypertension among Bangladeshi adults. J Hum
494 Hypertens. 2018;32(5):334-48.

Page | 20

495 41.   Islam AM, Mohibullah A, Paul T. Cardiovascular disease in Bangladesh: a review. Bangladesh Heart
496 Journal. 2016;31(2):80-99.
497 42.   Rahman A, Raka SC, Ahmed SM. Prevalence of cardiovascular diseases and prescription patterns
498 in a randomly selected population in Bangladesh. Biomed Pharmacol J. 2017;10(2):607-13.
499 43.   Hasan M, Sutradhar I, Gupta RD, Sarker M. Prevalence of chronic kidney disease in South Asia: a
500 systematic review. BMC nephrology. 2018;19(1):1-12.
501 44.   Kabir A, Datta R, Raza SH, Maitrot MRL. Health shocks, care-seeking behaviour and coping
502 strategies of extreme poor households in Bangladesh's Chittagong Hill tracts. BMC Public Health.
503 2019;19(1):1008.
504 45.   Mahumud RA, Gow J, Mosharaf MP, Kundu S, Rahman MA, Dukhi N, et al. The burden of chronic
505 diseases, disease-stratified exploration and gender-differentiated healthcare utilisation among patients
506 in Bangladesh. PLoS One. 2023;18(5):e0284117.
507 46.   Sarker AR, Zabeen I, Khanam M, Akter R, Ali N. Healthcare-seeking experiences of older citizens
508 in Bangladesh: A qualitative study. PLOS Glob Public Health. 2023;3(2):e0001185.
509 47.   Chowdhury HA, Joham AE, Kabir A, Rahman A, Ali L, Harrison CL, et al. Exploring type 2 diabetes
510 self-management practices in rural Bangladesh: facilitators, barriers and expectations-a qualitative study
511 protocol. BMJ Open. 2024;14(5):e081385.
512 48.   Sikder SS, Labrique AB, Ullah B, Mehra S, Rashid M, Ali H, et al. Care-seeking patterns for fatal
513 non-communicable diseases among women of reproductive age in rural northwest Bangladesh. BMC
514 Womens Health. 2012;12:23.
515 49.   Miah MS, Mamun MR, Hasan SMM, Sarker MGF, Miah MS, Khan MGU, et al. COVID-19
516 transmission flow through the stigmatization process in Bangladesh: A qualitative study. Lifestyle Med
517 (Hoboken). 2022;3(1):e52.
518 50.   Kabir A, Karim MN, Islam RM, Romero L, Billah B. Health system readiness for non-communicable
519 diseases at the primary care level: a systematic review. BMJ Open. 2022;12(2):e060387.
520 51.   Demaio A, Jamieson J, Horn R, de Courten M, Tellier S. Non-communicable diseases in
521 emergencies: a call to action. PLoS Curr. 2013;5.
522 52.   Parr JD, Lindeboom W, Khanam MA, Pérez Koehlmoos TL. Diagnosis of chronic conditions with
523 modifiable lifestyle risk factors in selected urban and rural areas of Bangladesh and sociodemographic
524 variability therein. BMC Health Serv Res. 2011;11:309.
525 53.   Sarker AR, Mahumud RA, Sultana M, Ahmed S, Ahmed W, Khan JA. The impact of age and sex on
526 healthcare expenditure of households in Bangladesh. Springerplus. 2014;3:435.
527 54.   Deepa M, Anjana RM, Manjula D, Narayan KM, Mohan V. Convergence of prevalence rates of
528 diabetes and cardiometabolic risk factors in middle and low income groups in urban India: 10-year follow-
529 up of the Chennai Urban Population Study. J Diabetes Sci Technol. 2011;5(4):918-27.
530 55.   Adams AM, Islam R, Yusuf SS, Panasci A, Crowell N. Healthcare seeking for chronic illness among
531 adult slum dwellers in Bangladesh: A descriptive cross-sectional study in two urban settings. PLoS One.
532 2020;15(6):e0233635.

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534 **Figure Legends:**

535 Figure 1: Flow chart of the study participants

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Figure 1: Flow chart of the study participants

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        ┌─────────────────────────┐
        │ Number of participants  │
        │ interviewed (n = 1645)  │
        └─────────────────────────┘
                    │
                    │          ┌─────────────────────────┐
                    ├─────────▶│ Number of participants  │
                    │          │ who did not report      │
                    │          │ illness (n = 561; 34%)  │
                    ▼          └─────────────────────────┘
        ┌─────────────────────────┐
        │ Number of participants who │
        │ reported illness (n = 1084; 66%) │
        └─────────────────────────┘
            │               │
            ▼               ▼
  ┌──────────────────┐  ┌──────────────────┐
  │ Sought healthcare│  │ No care or self-care │
  │ (n = 871; 80%)   │  │ (n = 213; 20%)   │
  └──────────────────┘  └──────────────────┘
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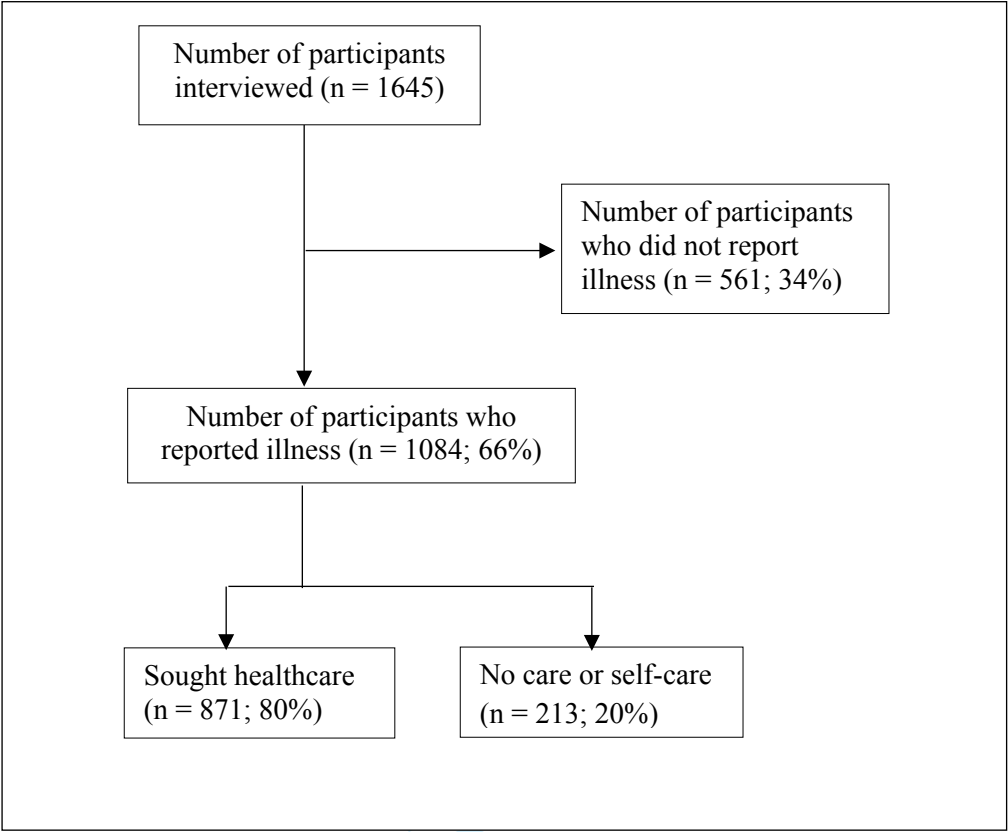
Household Survey Form

A. Household Identification

	Questions	Code	Responses
A.1	Household ID (this study will include 1323 households. Please write 4 digits number in the boxes)		☐☐☐☐
A.2	District	Cumilla... 1 Jhenaidah.. 2 Rajshahi.. 3 Sylhet.. 4	☐
A.4	Enumeration Area (EAs) type	Rural... 1 Urban.. 2	☐
A.5	Enumeration Area (EAs) number *Upazila*	EA .... 1 EA.. 2 EA.. 3 EA.. 4 EA.. 5 EA.. 6	☐
A.6	Address (specify the name)	Sub-district .... Union/Ward .... Village/Mohollah .... Household head .... Bari/para .... Location...	☐
A.7	Interviewer's name & code	Name...	☐☐
A.8	Data collection data	_____/_____/_____ DD / MM / Year	
A.9	(a). The respondent should be a person in the household aged 18 years and above. This survey should not be completed if the appropriate person is absent at data collection time. ☐ 1 Yes ⟶ if the condition is Yes, Continue ☐ 2 No ⟶ if the condition is No, Stop here		

B. Respondent information

	Questions	Code	Responses
B.1	Respondent name	(specify).....................................	
B.2	Relation with the household head	(specify).....................................	
B.3	Respondent contact number	(specify).....................................	
B.4	Do you have any health insurance?	Yes .... 1 No 2	☐
B.5	Age of the respondent (write age in the round off figure)		☐☐
B.6	Gender of the respondent	Male .... 1 Female 2	☐

B.7	Occupation of the respondent [(**Unskilled manual**= day labor, Rickshaw/van puller, agri-labor, non-agri labor, boatman, blacksmith, goldsmith, cultivator, fisherman, carpenter, potter, shoe maker, vendor, domestic maid/servant) **(Skilled manual**=motor driver, mechanic, operator, electrician, police, defence force) **(Non-manual**=shop keeper, landlord, small and medium enterprise, businessman, imam/priest) **Professional**= doctor, engineer, teacher, NGO worker, Govt employee, private employee, lawyer, retired service holder)	Unskilled manual.......................... 1 Skilled manual.............................. 2 Non-manual................................... 3 Professional.................................. 4 Housewife..................................... 5 Unemployed .... 6 Student .... 7 Other (specify) 8	☐
B.8	Education of the respondent	No formal schooling .... 1 Primary level (I-IV grade) .... 2 Secondary level (VI-IX grade) .... 3 Above secondary level (>X grade).. 4 Not applicable 5	☐
B.9	Religion of the respondent	Muslim .... 1 Hindu .... 2 Christian .... 3 Buddhist .... 4 Others 5	☐
B.10	Marital status of the respondent	Married .... 1 Unmarried .... 2 Divorced .... 3 Widowed .... 4 Not applicable 5	☐
B.11	Do you or did you smoke any tobacco products such as cigarettes or bidi or Shisha (water pipe)?	No, never smoked .... 1 Yes, in the past (more than 1 month) .... 2 Yes, currently smoking 3	☐
B.12	If yes, what type (if multiple responses, take the most frequent one)?	Cigarettes .... 1 Bidi .... 2 Shisha (water pipe) .... 3 Others (specify) 4	☐
B.13	If currently smoking, number of sticks in a typical day?	(specify in numbers)	☐☐
B.14	Duration of smoking?	(specify in years)	☐☐
B.15	Do you or did you ever consume smokeless tobacco?	No, never smoked .... 1 Yes, in the past (more than 1 month) .... 2 Yes, currently smoking 3	☐

B.16	If yes, what type (if multiple responses, take the most frequent one)?	Chew, moist or dry snuff, dip or snus.. 1 Cigar/Cigarillo.............................. 2 Gul .... 3 Gutka.. 4 Khaini .... 5 Naswar.. 6 Nasal snuff.................................... 7 Paan/Betel Quid with tobacco........ 8 Sada pata .... 9 Tobacco gum.............................. 10 Zorda.. 11 Others (specify) 12	☐
B.17	If currently consume, number of frequencies in a typical day?	(specify in numbers)	☐☐
B.18	Duration of consumption?	(specify in years)	☐☐
B.19	Do you or did you ever consume alcohol?	No, never smoked .... 1 Yes, in the past (more than 1 month) .... 2 Yes, currently smoking 3	☐
B.20	If currently consume, number of frequencies in a typical week?	(specify in numbers)	☐☐
B.21	Duration of consumption?	(specify in years)	☐☐
B.22	Do you take extra table salt in your meal?	Yes.. 1 No 2	☐
B.23	If yes, how frequently?	Regular .... 1 Occasionally................................. 2	☐
B.24	Typically, how often do you eat a portion of fresh/frozen/tinned/dried fruits? (don't count fruit juices) [please count the frequency]	Once a day or less.......................... 1 2 or more times a day..................... 2 Once a week or less........................ 3 2-3 times a week............................ 4 4 or more times a week .... 5 Never or very rare.......................... 6	☐
B.25	Typically, how often do you eat red meat (including camel, lamb, beef, and veal.) [please count the frequency]	Once a day or less.......................... 1 2 or more times a day..................... 2 Once a week or less........................ 3 2-3 times a week............................ 4 4 or more times a week .... 5 Never or very rare.......................... 6	☐
B.26	Typically, how often do you eat rice [please count the frequency]	Once a day or less.......................... 1 2 or more times a day..................... 2 Once a week or less........................ 3 2-3 times a week............................ 4 4 or more times a week .... 5 Never or very rare.......................... 6	☐
B.27	Typically, how often do you eat cake, sweet pastry, biscuits, chocolate, halva or other types of	Once a day or less.......................... 1 2 or more times a day..................... 2 Once a week or less........................ 3 2-3 times a week............................ 4	☐

		sweet pastries or desserts? [please count the frequency]	4 or more times a week .... 5 Never or very rare........................... 6	
B.28	Typically, how often do use butter or animal fat in your cooking? (for example, for cooking rice, vegetables and pastries) [please count the frequency]		Once a day or less........................... 1 2 or more times a day..................... 2 Once a week or less........................ 3 2-3 times a week............................. 4 4 or more times a week .... 5 Never or very rare........................... 6	☐
B.29	Typically, how often do you take fresh/canned vegetable? [please count the frequency]		Once a day or less........................... 1 2 or more times a day..................... 2 Once a week or less........................ 3 2-3 times a week............................. 4 4 or more times a week .... 5 Never or very rare........................... 6	☐
B.30	Typically, how often do you eat fast-food such as pizza, burger, sandwich, etc? [please count the frequency]		Once a day or less........................... 1 2 or more times a day..................... 2 Once a week or less........................ 3 2-3 times a week............................. 4 4 or more times a week .... 5 Never or very rare........................... 6	☐
B.31	Typically, how often do you eat fatty-rich food such as biryani, pulao-rice, tahari, etc.? [please count the frequency]		Once a day or less........................... 1 2 or more times a day..................... 2 Once a week or less........................ 3 2-3 times a week............................. 4 4 or more times a week .... 5 Never or very rare........................... 6	☐
B.32	Typically, how often do take beverage (Coke, Pepsi, Fanta, 7up, Energy drink etc) [please count the frequency]		Once a day or less........................... 1 2 or more times a day..................... 2 Once a week or less........................ 3 2-3 times a week............................. 4 4 or more times a week .... 5 Never or very rare........................... 6	☐
B.33	Typically, how much time do you expend in physical activity/exercise (walking, jogging, playing/sports etc) [please count the number of hours]		One hour a day or less..................... 1 2 or more hours a day..................... 2 One hour a week or less.................. 3 2-3 hours a week............................. 4 4 or more hours a week .... 5 Never or very rare........................... 6	☐
B.34	Typically, how much time do you expend in watching TV [please count the number of hours]		One hour a day or less..................... 1 2 or more hours a day..................... 2 One hour a week or less.................. 3 2-3 hours a week............................. 4 4 or more hours a week .... 5 Never or very rare........................... 6	☐
B.35	Typically, how much time do you expend in virtual world (social media. video game)? [please count the number of hours]		One hour a day or less..................... 1 2 or more hours a day..................... 2 One hour a week or less.................. 3 2-3 hours a week............................. 4 4 or more hours a week .... 5 Never or very rare........................... 6	☐

B.36	Do you have any risk factor/NCDs?	NCDs	Yes	No
		Cardiovascular diseases	☐	☐

		Chronic respiratory diseases	☐	☐
		Diabetes mellitus	☐	☐
		Cancer	☐	☐
		Hypertension	☐	☐
		Other (specify)		
B.37	Distant of the household from the nearest primary health center (PHC)?	< 5 km .... 1 6-10 km .... 2 11-15 km .... 3 >16 km 4	☐	

C. Illness and health service access

	Questions	Code	Responses
C.1	Within the last 3 months, did you have an illness/conditions that prompted you to visit someone to treat?	Yes .... 1 No .... 2 Don't know 9	☐ C:27
C.2	Within the last 3 months, how many episodes of illness/conditions that prompted you to visit someone to treat?	(specify).............................	
C.3	How long ago the last episode of illness happened that prompted you to visit someone to treat?	Write days in round off	☐☐
C.4	Do you know what the name of the disease/illness/condition was?	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.5	What was the primary symptom that prompted you to visit a healthcare practitioner?	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.6	High blood pressure	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.7	Fever	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.8	Breathing difficulty/shortness of breath	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.9	Chest tightness	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.10	Respiratory infection/flu/colds	Yes .... 1 No 2	☐

		Don't know .... 8 Not applicable 9	
C.11	Chronic cough (mucus)	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.12	Swelling ankles/feet/legs	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.13	Increased hunger/thirst	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.14	Weight loss/gain	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.15	Fatigue/tiredness/weakness/lack of energy	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.16	Frequent urination	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.17	Blurry vision/vision loss	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.18	Tingling/pain/numbness	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.19	Discomfort in chest/shoulders/elbow/jaw/back	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.20	Slow heartbeat	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.21	Fainting/near fainting	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.22	A lump (lymph nodes, dimple, pucker, ich)	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐
C.23	Skin change (yelling, darkening, redness, freckles)	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9	☐

C.24	Pain (urination, bowel/stool)	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9		
C.25	Indigestion/Loss/change of appetites	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9		
C.26	Amenia	Yes .... 1 No .... 2 Don't know .... 8 Not applicable 9		

C.27 During the last episode of illness, which health care practitioner/facilities did you visited or consulted with as a first contact? How much time did it take to reach the health facilities?

	<15 min	15-60 min	>60 min
Government hospital (UHC, District/general hospital)	1 ☐	2 ☐	3 ☐
Government health centre/clinic	1 ☐	2 ☐	3 ☐
Medical college/specialised hospital/clinics	1 ☐	2 ☐	3 ☐
Abroad/overseas	1 ☐	2 ☐	3 ☐
NGO hospital/missionary hospital	1 ☐	2 ☐	3 ☐
Private hospital, clinic, physician (MBBS)	1 ☐	2 ☐	3 ☐
Nurse/Paramedics	1 ☐	2 ☐	3 ☐
Drug vendor/pharmacy	1 ☐	2 ☐	3 ☐
Unqualified/village doctor	1 ☐	2 ☐	3 ☐
Traditional care provider (*Kabiraj/ojha*)	1 ☐	2 ☐	3 ☐
Homeopath	1 ☐	2 ☐	3 ☐
Self-remedy/home management	1 ☐	2 ☐	3 ☐
Other (specify)			

C.28 What illness/diseases did the care provider diagnosed?

a. Diabetes	Yes ☐	No ☐
b. Hypertension	Yes ☐	No ☐
c. Heart problem	Yes ☐	No ☐
d. Stroke	Yes ☐	No ☐
e. Cancer	Yes ☐	No ☐
f. COPD/respiratory problem	Yes ☐	No ☐
g. Other (specify)		

C.29	How many times did you (patient) visit this provider/ facility for this recent episode of illness?	<2 times............................. 1 3-5 times............................ 2 >5 times............................. 3 Don't know 8	
C.30	Did you (patient) require hospital/clinic admission?	Yes .... 1 No .... 2 Don't know 8	☐ ⊢→ C:43
C.31	If yes, did you try to admitted at govt. hospital/clinic?	Yes .... 1 No .... 2 Don't know 8	
C.32	If yes, was you able to admitted at govt. hospital/clinic?	Yes .... 1 No .... 2 Don't know 8	

C.33	How many days were required before you got recovered?	Write days in round off	
C.34	How much did you pay in total to the provider for all these visits? (Provider fee/ Registration fee/ Ticket fee) (Taka)]	Write the amount in taka	Tk............
C.35	How much did you pay for transport for provider visits (round trip including any accompanied person)? (Tk.)]	Write the amount in taka	Tk............
C.36	How much did you pay for medicines advised by this provider? (Tk.)	Write the amount in taka	Tk............
C.37	Did you have any diagnostic tests done during this visit(s)?]	Yes .... 1 No .... 2 Don't know 8	
C.38	If yes, how much did you pay in total for all diagnostic tests done, including the accompanied person, consider both were going for the test(s) and report collection? (Taka] (please calculate and put the sum)	Write the amount in taka	Tk............
C.39	Has any care providers told you should continue the medicine for this illness?	Yes .... 1 No .... 2 Don't know 8	
C.40	Do you take any medicine at this time (interview date) for this illness?	Yes .... 1 No .... 2 Don't know 8	
C.41	If yes, does the patient has any medicine available at home?	Yes .... 1 No .... 2 Don't know 8	

| C.42 | Which medicine have you been prescribed to the person with NCDs by the care provider? Can I see that?
 (Please check these medicine and fill up a row for each item at the interview date) | | | | | |

List	A **Medicine** (write the marketing name, if not possible, write category i.e., BP, diabetic medicine)	B **Condition for which taking medicine** (write a, b, c, d, e, f, g, from the previous question)	C **Obtained from** (Govt hos=1 NGO/Mission=2 Govt health clinic/centre=3, Private hos/clinic=4 Private pharmacy/drug shop=5 Traditional provider=6 Others=(specify)	D **Does the patient take medicine regularly if prescribed so?** (Yes=1 No=2)	E **Cost of last month medicine** (Rounded to the nearest taka; write 0 if received from govt. supports)	F **Did the cost shared by any insurance?** (Yes=1 No=2)
Med-1						
Med-2						
Med-3						
Med-4						
Med-5						
Med-6						
Med-7						

Med-8						
Med-9						
	Ask these questions to collect more information about access to medicine and associated factors.					
C.43	Do the healthcare providers at govt facility take/will take the patient's ability to pay to decide the medicines to be prescribed?	Yes ☐		No ☐		Don't know ☐
C.44	Does the healthcare providers at a private facility (hospital/clinic) take/will take the patient's ability to pay for deciding the medicines to be prescribed?	Yes ☐		No ☐		Don't know ☐
C.45	Do the healthcare providers consult with the patient regarding the cost of medicine during the prescription?	Yes ☐		No ☐		Don't know ☐
C.46	Do you think two identical drugs (same generic) prices different?	Yes ☐		No ☐		Don't know ☐
C.47	Do you know which medicine is supplied free of cost at govt facilities?	Yes ☐		No ☐		Don't know ☐
C.48	When you buy medicine, did you ask for least price product at a pharmacy?	Yes ☐		No ☐		Don't know ☐
C.49	Did you discontinue medication due to your unaffordability to buy that was prescribed regularly taken?	Yes ☐		No ☐		Don't know ☐
C.50	Have you changed the drug that doctor prescribed due to the price following the pharmacist's opinion?	Yes ☐		No ☐		Don't know ☐
C.51	Do you pharmacist/drug shopper recommend quality drugs if you ask for a such?	Yes ☐		No ☐		Don't know ☐
C.52	Did you make the poor quality of drugs upon the pharmacist's recommendation due to the minimum cost?	Yes ☐		No ☐		Don't know ☐
C.53	Do you consider a company/brand in purchasing medicine?	Yes ☐		No ☐		Don't know ☐
C.54	Do you think the healthcare services nearby govt is good?	Yes ☐		No ☐		Don't know ☐
C.55	Do you think the healthcare service provided is adequate at a nearby govt facility?	Yes ☐		No ☐		Don't know ☐
C.56	Do you think a person with NCD has easy and equitable access (with no influence, irrespective socioeconomic condition) to nearby govt facilities?	Yes ☐		No ☐		Don't know ☐
C.57	Do you think the healthcare services nearby private facility is good?	Yes ☐		No ☐		Don't know ☐
C.58	Do you think the healthcare service provided is adequate at nearby private facilities?	Yes ☐		No ☐		Don't know ☐

| C.59 | Do you think a person with NCD has easy and equitable access (with no influence, irrespective socioeconomic condition) to nearby private facilities? | Yes ☐ | No ☐ | Don't know ☐ |
| C.60 | Do you think the healthcare services cost is reasonable at nearby private facilities and affordable for the majority? | Yes ☐ | No ☐ | Don't know ☐ |

D. Household assets and socioeconomic condition

	Questions	Code	Responses
D.1	Location of the house	Rural area..1 Pourasova ....2 City corporation 3	☐
D.2	Status of your living house	Self-owned ....1 Rented ....2 Govt. land ....3 Owned by landlord (without rent) .... 4 Other (specify)....................................8	☐
D.3	How many rooms (unit)?	>3 rooms...1 3 to 4 room ....2 4-5 rooms ....3 >5 room 4	☐
D.4	Type of house	Unpaved hut (tin roof) ....1 Semi-stone/brick build house ....2 Stone/brick build house ....3 Other (specify) 8	☐
D.5	Do you have any cattle in your house? (write the number)?	Ox ....1 Cattle/buffalo.......................................2 Sheep/goat ....3 Chicken/duck ....4 Other (specify) 8	☐
D.6	Does this house have homestead land?	Yes ....1 No ....2 Don't know ....8 Refused to tell 9	☐
D.7	If yes, how much homestead land (decimal) does your household own?	Specify quantity in decimal	
D.8	Does your household own any land, other than homestead land?	Yes ....1 No ....2 Don't know ....8 Refused to tell 9	☐
D.9	If yes, how much homestead land (decimal) does your household own?	Specify quantity in decimal	
D.10	Please choose the level that is closest to what your household spent total over the past month (taka)?	>40000 ....1 4001 to 8000 ....2 8000 to 12000......................................3 >12000..4 Don't know 8	☐

			Refused to tell 9	
D.11	How would you describe your economic status?		Rich 1	
			Higher middle class 2	
			Middle class.......................................3	
			Poor..4	
			Hardcore poor....................................5	
			Don't know 8	
			Refused to tell 9	
D.12	Does this household have electricity/solar panel?		Yes 1	
			No 2	
D.13	Does this household have a water tap inside the house?		Yes 1	
			No 2	
D.14	Does this household have a toilet inside (attached) to the house?		Yes 1	
			No 2	
D.15	Does this household have a TV?		Yes 1	
			No 2	
D.16	Does this household have a refrigerator?		Yes 1	
			No 2	
D.17	Does this household have a computer?		Yes 1	
			No 2	
D.18	Does this household have a mobile phone?		Yes 1	
			No 2	
D.19	Does this household have a radio?		Yes 1	
			No 2	
D.20	Does this household have furniture (chair/table)?		Yes 1	
			No 2	
D.21	Does this household have furniture (khat/chowki)?		Yes 1	
			No 2	
D.22	Does this household have motorbike/easy bike/		Yes 1	
			No 2	
D.23	Does this household have van/rickshaw/boat?		Yes 1	
			No 2	
D.24	What type of fuel does your household mainly use for cooking?		Wood 1	
			Crop residue 2	
			Dung cake...3	
			Cole/coke/lignite...............................4	
			Charcoal..5	
			Kerosene..6	
			Electricity 7	
			Liquide gas 8	
			Bio-gas..9	
			Others 10	
			Don't know 11	