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32 1 Factors associated with health insurance ownership among ever-married women of

2 reproductive age in Bangladesh: A Cross-Sectional Study

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26 27 We acknowledge USAID and the Government of Bangladesh for allowing us to use the data.

28

29

30 **Abstract**

31 **Background and Aims:** In a rapidly evolving landscape of the healthcare system in Bangladesh,
32 it has become a pivotal fact to understand the intricate characteristics or factors in order to have
33 the development of greater healthcare equity and widened well-being especially among the
34 underprivileged population. In Bangladesh, health insurance is an unusual idea. The number of
35 health insurance plans provided by insurance firms is extremely low and this only makes up a
36 small percentage of the population and makes up a tiny amount of the funding issues with this type
37 of financing, including minimal coverage. **The objective of the paper is to investigate the**
38 sociodemographic characteristics associated with Bangladeshi women's health insurance
39 coverage.

40 **Methods:** The ninth national survey of the 2022 Bangladesh Demographic and Health Survey
41 (BDHS) is used to report on the health and demographic status of women and their families in
42 Bangladesh. Among all interviewed women, 20,029 ever-married women aged 15–49 shared the
43 information on health insurance coverage. The outcome variable was insurance ownership, and it
44 was measured by interviewing the respondent about insurance ownership. Classifications have
45 been made into individual levels of independent variables in different groups such as
46 socioeconomic, demographic and child related factors.

47 **Results:** This study found that 99.71% of women lacked health insurance. A bivariate study
48 showed that among women of reproductive age, ownership of health insurance coverage was
49 significantly correlated with parameters such as respondents age, education, spouse age, division,
50 and mass media exposure. From adjusted logistic regression model, women aged 25–34 years had
51 3.04 times (AOR: 3.04, 95% CI: 1.34–6.89) higher health insurance ownership than the women
52 aged 35–49 years and women with mass media exposure had 2.99 times (AOR: 2.99, 95% CI:
53 1.27–7.04) higher health insurance ownership than the women not exposed to mass media.

54 **Conclusion:** According to the study's findings, extremely few Bangladeshi women of reproductive
55 age have health insurance. Additionally, women's ownership of health insurance coverage was
56 linked to socioeconomic and demographic characteristics. Consequently, policymakers must create
57 a tax-based health finance system that targets young, illiterate women from the poorest households.

58 **Keywords:** Health Insurance Ownership, Women of Reproductive age, Determinants, Healthcare

59 Equity, Bangladesh

60

61 **Background**

62 As part of the most current Sustainable Development Goals, the World Health Organization
63 has suggested that all United Nations members attain universal health coverage (UHC) status by
64 2030, given that half of the world's population still lacks access to basic health care (WHO).
65 Furthermore, the presence of low-income individuals makes this situation even more uncertain,
66 leading to disastrous financial strain and widespread poverty in Bangladeshi households
67 (Mahumud et al., 2017; Khan et al., 2017). Expanding the ownership of health insurance for ever-
68 married women of age 15 to 49 could be the key way for unlocking greater end results associated
69 with child birth and maternal health. According to the Bangladesh Demographic and Health
70 Survey (BDHS, fewer than 1% of women who have ever been married and are between the ages
71 of 15 and 49 have health insurance. Additionally, people may have to pay out-of-pocket for their
72 medical bills if they do not have insurance. Because of this, significant expenses could discourage
73 women from getting therapy or seeking medical attention. Their capacity for saving money and
74 growing in other aspects of their lives may also be hampered by this financial load and adverse
75 selection often results in the exclusion of the risk groups. Thus, the underprivileged are unable to
76 pay for private insurance.

77 In Bangladesh, health insurance remains a relatively uncommon concept. The availability
78 of health insurance plans is limited, with only a small portion of the population benefiting from
79 such coverage. These plans contribute minimally to addressing the country's healthcare funding
80 challenges, often offering limited coverage due to high premiums. Additionally, health insurance
81 is mostly accessible to urban residents employed in the formal sector. Tallon & Block (1988)
82 mentioned that healthcare costs and utilization have risen dramatically in recent years, but an
83 increasing number of people lack health insurance, making care more difficult to acquire. NGOs
84 and nearby hospitals are currently running several community-based programs at the local level.
85 The schemes are integrated in that they function as both service providers and insurers. However,
86 the program's effectiveness is questionable in a small area, but overall, they make up little to
87 nothing of the nation's spending. However, because of methodological and measurement
88 variability, the results are not comparable across the research, and they are mostly based on small-
89 scale samples. The aim was to close this gap in the current study by examining data from health
90 and demographic surveys that employ standardized data gathering tools. The produced estimations

91 will be more dependable, generalizable for the full population, and comparable across the study
92 settings because the Demographic and Health Surveys are also nationally representative.

93 Healthcare and social researchers have highlighted that the lack of empowerment
94 opportunities such as limited access to quality education, as well as restricted participation in
95 social, political, and labor markets are significant barriers preventing women from making
96 informed decisions about their health and other life aspects that influence long-term well-being,
97 such as fertility and nutrition (Yaya et al., 2018; Moonzwe Davis et al., 2014; Ehrhardt et al., 2009).
98 Additionally, women are disproportionately affected by catastrophic health expenditures, which
99 not only exacerbate their vulnerability but also undermine their ability to become more
100 empowered, leading to deeper poverty. To address these challenges, variety of measures have been
101 proposed and implemented to protect women from financial hardship and health risks. One key
102 initiative is the improvement of maternity care, with a focus on making it free and accessible as
103 part of the broader effort to achieve Universal Health Coverage (UHC), a crucial element of the
104 health-related Sustainable Development Goals (SDGs) (Gera et al., 2018; Acharya et al., 2018;
105 Chapman 2016; Acharya 2015; Wong et. al., 2016).

106 Moreover, several countries have already taken various measures. Giedion et al. (2013)
107 highlighted that sub-Saharan Africa has employed a variety of strategies to expand health insurance
108 coverage across its populations. According to a comprehensive review by the World Bank, which
109 examined the effects of universal health coverage initiatives in developing nations, Rwanda and
110 Nigeria stand out as examples of countries implementing multiple health insurance schemes. These
111 schemes are designed to address the needs of different population groups, with the overarching
112 goal of achieving universal health coverage. This is important to emphasize how these nations are
113 working toward inclusive healthcare by offering tailored insurance options to various segments of
114 their population. Furthermore, in countries like Namibia and South Africa, voluntary insurance
115 systems have been established. These systems include private health insurance as a key
116 component, providing individuals with more flexibility and choice in their healthcare coverage
117 (Spaan et al., 2012).

118 ⁶³ This study seeks to address a critical knowledge gap in Bangladesh by exploring the socio-
119 demographic factors associated with health insurance ownership among women of reproductive
120 age, using nationally representative data. By identifying the barriers and enablers of health

121 insurance enrollment, ⁴⁸ this research aims to contribute to a deeper understanding of the factors
122 influencing coverage. The findings can help inform more effective policies and strategies to
123 expand health insurance coverage in Bangladesh and other similar low- and middle-income
124 countries (LMICs).

125

126 **Materials and Methods**

127 ³ We followed the STROBE guideline for better observational cross-sectional study reporting in
128 epidemiology (Table S1).

129 **Data Source**

130 The ninth nationwide study to evaluate health and demographic circumstances of
131 Bangladeshi women and their families is the 2022 Bangladesh Demographic and Health study
132 (BDHS). The National Institute of Population Research and Training (NIPORT), a division of the
133 Ministry of Health and Family Welfare (MOHFW), Government of Bangladesh, provided
134 direction for the conduct of this study. Both the United States Agency for International
135 Development (USAID) and the Government of Bangladesh provided financial support. A Dhaka-
136 based research company called Mitra and Associates carried out the poll. The period of data
137 collecting in 2022 was June 27–December 12. Through USAID-funded The Demographic and
138 Health Surveys (DHS) Program, ICF provided technical assistance. The DHS Program provides
139 technical and financial assistance ²⁸ for demographic and health surveys across the world.
140 Furthermore, technical assistance was provided by the International Centre for Diarrheal Disease
141 Research, Bangladesh (icddr,b), namely in the creation and administration of verbal autopsy
142 questionnaires to ascertain the causes of mortality in children under five.

143 **Sample Design**

144 The Integrated Multi-Purpose sample Master Sample, which was compiled from an
145 exhaustive list of enumeration areas (EAs) nationwide, served as the sample frame for the 2022
146 BDHS. The Bangladesh Bureau of Statistics (BBS) first created this list during the country's 2011
147 population census. Each EA's location, the kind of habitation (city corporations, non-city
148 corporations, or rural regions), and the approximate number of households which are residential

149 are all included in the sample frame. Additionally, a sketch map of each EA's geographic limits is
150 accessible. The eight administrative divisions of Bangladesh are Rangpur, Barishal, Chattogram,
151 Dhaka, Khulna, Mymensingh, Rajshahi, and Sylhet. Zilas ¹⁵ are created from these divisions, and
152 upazilas are created from each zila. Urban areas are separated into wards within each upazila,
153 which are further subdivided into mohallas. Union parishads (UPs) and mouzas are the divisions
154 of rural regions inside upazilas. The division of regions into rural and urban zones is made possible
155 by these administrative frameworks.

156 Households were chosen for the survey using a two-stage stratified sampling technique.
157 Based on ¹¹ likelihood proportionate to the EA's size, 675 EAs were chosen in the first stage, 237
158 of which were ⁸ in urban regions and 438 of which were in rural areas. Of the 45 families in each
159 EA, 30 were chosen at random to participate in the individual interviews and complete a
160 comprehensive questionnaire; the other 15 households were requested to complete a condensed
161 version. With ¹¹ 30,018 of the inhabited families successfully interviewed, the response rate was
162 nearly 100%. 30,358 ever-married women between the ages of 15 and ⁴⁹ 49 who lived in these homes
163 were found to be qualified for one-on-one interviews. In the end, 30,078 women were interviewed,
164 and 20,029 of them provided information on their health insurance coverage (Figure 1).

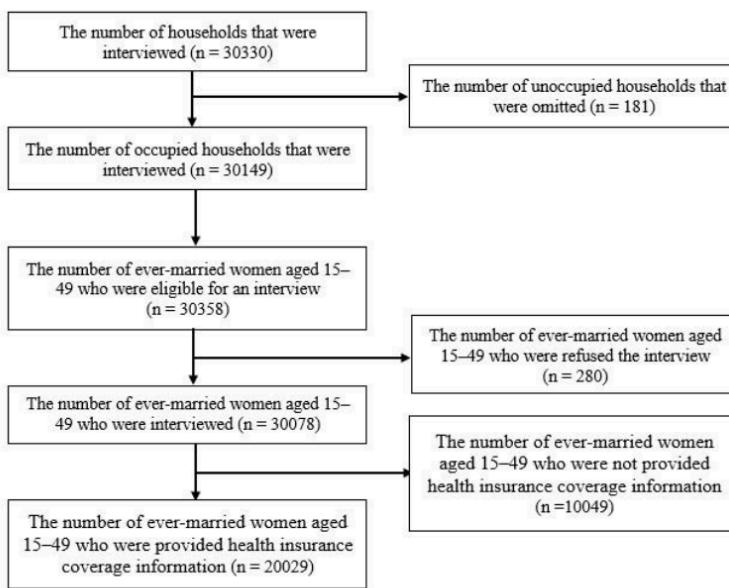


Figure 1: Diagram illustrating the analytical study sample

165

166 **Outcome variable**

167 The outcome variable was health insurance ownership, measured by asking respondents
 168 whether they were covered by any health insurance. Responses were categorized as 'Yes' for those
 169 with coverage and 'No' for those without.

170 **Possible factors**

171 By the study's goals and because of the BDHS data's hierarchical structure, two-level
 172 independent variables were considered. We classified individual levels of independent variables in
 173 different groups such as socioeconomic and demographic factors. The socioeconomic and
 174 demographic factors are the respondent's age (15-24, 25-34, 35+), husband's age (15-29, 30-44,
 175 45+), respondent's and their husbands' level of education (such as; education, primary, secondary,
 176 or higher), household heads' occupation (not working, farmer/agriculture, businessman, skilled

177 others), respondents' current work status (yes, no), wealth index (poor, middle, rich), respondents'
178 exposure to the mass media (yes, no). On the other hand, division, and area of residence (urban,
179 rural) are regional independent variables.

180 **Statistical Data Analysis**

181 We performed a comprehensive analysis using descriptive statistics to assess health
182 insurance ownership prevalence among participants from different socio-economic backgrounds.
183 Cross-tabulation and Chi-square tests evaluated the association, with significance set at $p < 0.05$
184 and 95% confidence intervals. Initially, bivariable analysis (chi-square test) was performed
185 individually for each independent variable. A significance threshold of p-value ≤ 0.20 was applied
186 arbitrarily to determine the inclusion of covariates in the multivariable models (Hasan et al., 2020).
187 Multivariable (adjusted) logistic regression analyses were then conducted to identify associated
188 risk factors for pooled data. Results were reported as adjusted odds ratios (AOR) with their
189 respective 95% confidence intervals and 5% level of significance. Additionally, we assessed
190 multicollinearity in the final model using a cut-off value of 4.00 for the variance inflation factor
191 (VIF) analysis (Hasan et al., 2023; Kim, 2019). At this stage, all variables were incorporated into
192 the model since the VIF values for each variable were below 4.00.

193 To assess the accuracy of the best model, we used the Area Under the Receiver Operating
194 Characteristic (AUROC) curve, specificity, sensitivity indicators, and the Hosmer-Lemeshow
195 goodness-of-fit test. We utilized the Area Under the Receiver Operating Characteristic (AUROC)
196 curve, sensitivity, and specificity to assess the accuracy of the best model. Higher AUROC values
197 indicated superior model performance. In the ROC curve, a lower p-value suggests that the model
198 effectively discriminates between two categories, with an area under the curve exceeding 0.50
199 (Cook & Rajbhandari, 2018; Hasan et al., 2022). The Hosmer-Lemeshow goodness-of-fit test
200 assess how well the model-estimated probabilities align with the observed outcomes. A p-value
201 greater than 0.05 in both tests indicates that the model accurately classifies observations into
202 outcome categories (Fagerland & Hosmer, 2012; Nattino et al., 2017).

203 All analysis was conducted using STATA 18 (College Station, TX: Stata Corp LP). All
204 analyses were adjusted for the cluster design by using the 'svy' command. This command uses the

205 information on sampling weight, strata, and primary sampling unit provided with the datasets
206 (Stata, 2022).

207 **Ethical Approval**

208 Our study was wholly based on an analysis of existing public domain health survey
209 datasets obtained from the BDHS 2022 which is freely available online with all personal
210 identifying information removed. The BDHS procedures were reviewed and approved by the
211 National Institute of Population Research and Training (NIPORT), Medical Education and
212 Family Welfare Division, Ministry of Health and Family Welfare (MOHFW) and USAID.
213 Informed consent was obtained from participants while interviewing them. Because this study
214 involved the analysis of secondary data thus, it did not require the ethical approval of the
215 respective institution.

216

217 **Results**

218 In Figure 2, the percentage of health insurance ownership among ever-married women in
219 the divisions is as follows: Barisal (5.98%), Chittagong (18.75%), Dhaka (25.31%), Khulna
220 (11.95%), Mymensingh (7.61%), Rajshahi (13.12%), Rangpur (11.43%), and Sylhet (5.85%). The
221 percentage of health insurance ownership among ever-married women in the top five districts is
222 Dhaka (26.18%), Tangail (13.76%), Dinajpur (10.11%), Mymensingh (6.92%), and Rajshahi
223 (4.6%). Out of the 64 districts in Bangladesh, 40 reported no health insurance ownership among
224 ever-married women.

225

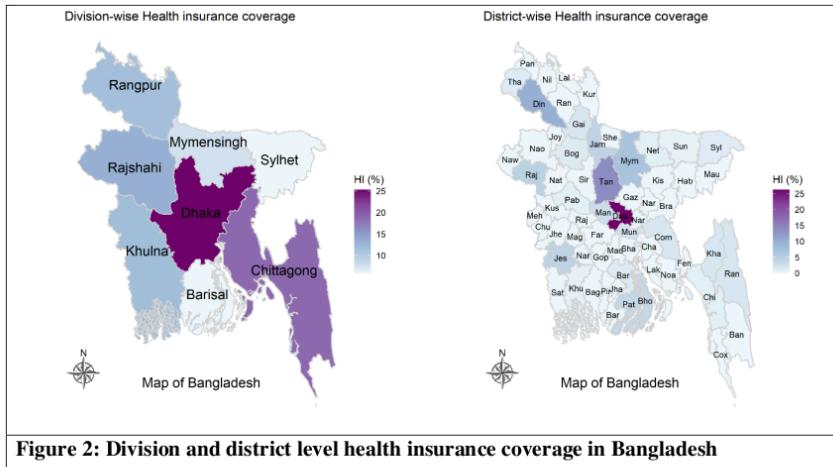


Figure 2: Division and district level health insurance coverage in Bangladesh

226

227 A total of 20029 ever-married women participated and gave their information on ownership
 228 of health insurance. Among them, 57.19% of ever-married women are from the age group 35-49
 229 years which is higher than the other age group 25-34 years (30.21%) and 15-24 years (12.59%)
 230 who have the ownership of health insurance. The highest percentage (43.81%) of ever-married
 231 women have the ownership of health insurance and secondary completed, followed by higher
 232 (27.20%), primary (22.16%), and no education (6.83%). The highest health insurance ownership
 233 (48.22%) was noticed in 30-44 years of husband/partner's age ever-married women. In the other
 234 age group, 45 or above years of husband 33.50% of ever-married women had the ownership of
 235 health insurance and the lowest 5.58% had ownership of health insurance of ever-married women
 236 whose husbands were 15-29 years old. Geographic location (division)-wise distribution of
 237 prevalence presents that alone Dhaka has the ownership of 45.29% among total health insurance
 238 ownership and 54.71% own the rest of the health insurance. The highest rate of health insurance
 239 ownership (88.63%) was observed among ever-married women who have exposure to mass media
 240 (**Table 1**).

241

³⁸
⁶⁵ **Table 1: Percentage of ever-married women aged 15–49 with health insurance ownership by sociodemographic characteristics**

	Status of Health Insurance Ownership			P-value
	Yes n (%)	No n (%)	Total n (%)	
Age (in years)				
15-24	7 (12.59)	5011 (25.09)	5018 (25.06)	0.016
25-34	18 (30.21)	6943 (34.76)	6960 (34.75)	
35-49	33 (57.19)	8017 (40.14)	8050 (40.19)	
Education				
No education	4 (6.83)	2748 (13.76)	2752 (13.74)	0.046
Primary	13 (22.16)	5201 (26.04)	5214 (26.03)	
Secondary	26 (43.81)	9333 (46.74)	9359 (46.73)	
Higher	16 (27.20)	2687 (13.46)	2703 (13.50)	
Women currently working				
Yes	22 (38.50)	6389 (31.99)	6412 (32.01)	0.350
No	36 (61.50)	13581 (68.01)	13617 (67.99)	
Body Mass Index				
Underweight	3 (5.94)	979 (4.90)	982 (4.90)	0.494
Normal weight	10 (17.28)	5311 (26.60)	5321 (26.57)	
Overweight	10 (16.28)	2832 (14.18)	2842 (14.19)	
Obese	35 (60.50)	10848 (54.32)	10884 (54.34)	
Husband age				
15-29	3 (5.58)	3481 (18.32)	3484 (18.28)	0.033
30-44	34 (48.22)	9156 (48.18)	9190 (48.22)	
45 or above	20 (33.50)	6365 (33.50)	6385 (33.50)	
Husband education				
No education	11 (19.16)	4072 (21.47)	4083 (21.47)	0.299
Primary	10 (17.48)	5376 (28.35)	5386 (28.32)	
Secondary	23 (38.99)	6173 (32.55)	6196 (32.57)	
Higher	14 (24.37)	3342 (17.62)	3356 (17.64)	
Husband currently working				
Not working	0 (0.00)	646 (3.41)	646 (3.39)	0.293
Working	58 (100.00)	18317 (96.59)	18375 (96.61)	
Husband occupation				
Not working	0 (0.00)	646 (3.41)	646 (3.39)	0.649
Farmer/Agriculture	11 (19.68)	4425 (23.34)	4436 (23.32)	
Businessman	11 (18.62)	3749 (19.77)	3760 (19.77)	
Skilled	28 (48.84)	8081 (42.62)	8109 (42.64)	
Others	7 (12.86)	2061 (10.87)	2069 (10.88)	
Residence				
Urban	18 (31.36)	5682 (28.45)	5700 (28.46)	0.689
Rural	40 (68.64)	14288 (71.55)	14328 (71.54)	

Division				
Dhaka	26 (45.29)	5054 (25.31)	5080 (25.37)	0.016
Others	32 (54.71)	14916 (74.69)	14948 (74.63)	
Religion				
Islam	50 (85.52)	18057 (90.44)	18107 (90.43)	0.302
Others	8 (14.48)	1908 (9.56)	1916 (9.57)	
Wealth index				
Poor	17 (29.67)	7593 (38.02)	7610 (38.00)	0.438
Middle	12 (20.32)	4124 (20.65)	4135 (20.65)	
Rich	29 (50.01)	8254 (41.33)	8283 (41.36)	
Household family members				
<4	13 (22.31)	4705 (23.56)	4718 (23.56)	0.581
4-5	30 (51.87)	9001 (45.07)	9031 (45.09)	
>5	15 (25.82)	6264 (31.37)	6279 (31.35)	
Number of living children				
0	3 (5.96)	2165 (10.84)	2169 (10.83)	0.516
1-2	37 (62.94)	11702 (58.60)	11739 (58.61)	
3+	18 (31.09)	6103 (30.56)	6121 (30.56)	
Exposure to mass media				
Yes	52 (88.63)	13283 (66.52)	13335 (66.58)	<0.001
No	6 (11.37)	6687 (33.48)	6693 (33.42)	
Total	58 (0.29)	19970 (99.71)	20029 (100.00)	

244

245 According to the crude logistic regression model in Table 2, women aged 15-24 years had
 246 42% (COR: 0.58, 95% CI: 0.25–1.31) lower health insurance ownership than the women aged 35-
 247 49 years. In addition, women aged 25-34 years had 1.64 times (COR: 1.64, 95% CI: 0.90–2.98)
 248 higher health insurance ownership than women aged 35-49 years. Women with higher educational
 249 status had 4.08 times (COR: 4.08, 95% CI: 1.14–14.54) higher health insurance ownership than
 250 the women with no educational status. In regards to BMI, women who were normal weight had
 251 42% (COR: 0.58, 95% CI: 0.29–1.18) lower health insurance ownership than the women who were
 252 obese. Respondents husband aged 45 or above years and 30-44 years had 3.44 times (COR: 3.44,
 253 95% CI: 1.13–10.44) and 4.05 times (COR: 4.05, 95% CI: 1.39–11.82) higher health insurance
 254 ownership than the respondents' husband age 15-29 years, respectively. Women from the Dhaka
 255 division had 2.44 times (COR: 2.44, 95% CI: 1.15–5.18) higher health insurance ownership than
 256 the women from other divisions. In addition, women with mass media exposure had 3.93 times
 257 (COR: 3.93, 95% CI: 1.68–9.16) higher health insurance ownership than the women not exposed
 258 to mass media.

22

259 **Table 2: Factors Influencing Health Insurance Ownership Among Ever-Married Women of
260 Reproductive Age Using Bivariable and Multivariable Logistic Regression**

	COR (95% CI)	P-value	AOR (95% CI)	P-value
Age (in years)				
15-24	0.58 (0.25-1.31)	0.188	0.81 (0.35-1.87)	0.622
25-34	1.64 (0.90-2.98)	0.105	3.04 (1.34-6.89)	0.008
35-49	Reference		Reference	
Education				
Higher	4.08 (1.14-14.54)	0.030	3.53 (0.84-14.80)	0.084
Secondary	1.89 (0.53-6.69)	0.323	1.93 (0.48-7.71)	0.350
Primary	1.72 (0.45-6.59)	0.431	1.64 (0.40-6.76)	0.493
No education	Reference		Reference	
Women currently working				
Yes	1.33 (0.73-2.43)	0.350		
No	Reference			
Body Mass Index				
Underweight	1.09 (0.32-3.75)	0.892	1.88 (0.59-6.01)	0.289
Normal weight	0.58 (0.29-1.18)	0.135	0.68 (0.34-1.37)	0.282
Overweight	1.03 (0.51-2.09)	0.934	0.90 (0.43-1.85)	0.766
Obese	Reference		Reference	
Husband age				
45 or above	3.44 (1.13-10.44)	0.029	1.40 (0.34-5.79)	0.638
30-44	4.05 (1.39-11.82)	0.011	2.71 (0.83-8.85)	0.098
15-29	Reference		Reference	
Husband education				
Higher	1.55 (0.61-3.92)	0.355		
Secondary	1.34 (0.58-3.12)	0.493		
Primary	0.69 (0.24-1.96)	0.487		
No education	Reference			
Residence				
Urban	1.15 (0.58-2.27)	0.689		
Rural	Reference			
Division				
Dhaka	2.44 (1.15-5.18)	0.016	2.08 (0.96-4.50)	0.062
Others	Reference		Reference	
Religion				
Islam	1.60 (0.65-3.96)	0.302		
Others	Reference			
Wealth index				
Rich	1.55 (0.76-3.18)	0.231		
Middle	1.26 (0.56-2.83)	0.573		
Poor	Reference			
Household family members				

<4	1.15 (0.50-2.66)	0.744		
4-5	1.40 (0.74-2.65)	0.303		
>5	Reference			
Number of living children				
0	0.54 (0.17-1.71)	0.295		
1-2	1.06 (0.56-1.98)	0.865		
3+	Reference			
Exposure to mass media				
Yes	3.93 (1.68-9.16)	<0.001	2.99 (1.27-7.04)	0.012
No	Reference		Reference	

261 COR = Crude Odds Ratio, AOR = Adjusted Odds Ratio, CI= Confidence Interval

262 According to the adjusted logistic regression model, women aged 25-34 years had 3.04
 263 times (AOR: 3.04, 95% CI: 1.34–6.89) higher health insurance ownership than the women aged
 264 35-49 years. Women with higher, secondary and primary educational status had 3.53 times (AOR:
 265 3.53, 95% CI: 0.84–14.80), 1.93 times (AOR: 1.93, 95% CI: 0.48–7.71) and 1.64 times (AOR:
 266 1.64, 95% CI: 0.40–6.76) higher health insurance ownership than the women with no educational
 267 status, respectively. Respondents' husbands aged 45+ years had 1.40 times (AOR: 1.40, 95% CI:
 268 0.34–5.79) higher health insurance ownership than the respondents' husbands aged 15-29 years.
 269 Women from the Dhaka division had 2.08 times (AOR: 2.08, 95% CI: 0.96–4.50) higher health
 270 insurance ownership than the women from other divisions. In addition, women with mass media
 271 exposure had 2.99 times (AOR: 2.99, 95% CI: 1.27–7.04) higher health insurance ownership than
 272 the women not exposed to mass media (Table 2).

273 All the variables were included in the multivariable logistic regression model because the
 274 VIF values of each variable were less than 4.00, which means no multicollinearity in this model
 275 (Table3).

276 **Table 3: Variance Inflation Factor (VIF) of Multivariable Logistic Regression**

Variables	VIF Value
Age (in years)	2.55
Education	1.23
Body Mass Index	1.01
Husband age	2.50
Division	1.01
Exposure to mass media	1.11
Mean VIF	1.57

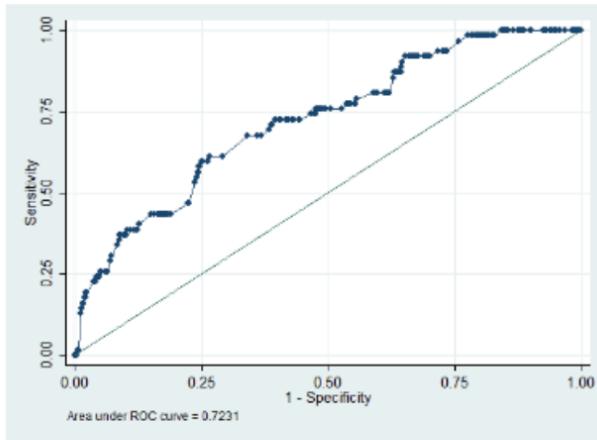
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278 The Hosmer-Lemeshow chi-square test and associated p-value indicate that the model fits
279 the data well (Table 4). The multivariable model achieved a classification accuracy of 99.67%.
280 The area under the ROC curve for the model was 72.31% (95% CI: 66.00%-78.61%, Asymptotic
281 p-value: <0.001), demonstrating its robustness (Table 4 and Figure 3).

282
283 **Table 4: Hosmer-Lemeshow Test, Area under ROC Curve and classification accuracy for**
284 **final logistic regression model**

Hosmer-Lemeshow Test		Area Under ROC Curve		Correctly classified
Chi-square	P-value	AUC	P-value	
357.04	0.976	72.31 (66.00-78.61)	<0.001	99.67%

285
286



287 **Figure 3: Area Under ROC curve**

288 **Discussion**

289 This research aims at the factors that influence women's ownership of health insurance in
290 Bangladesh and shows that health insurance ownership among women who are aged between 15–
291 49 years and its sociodemographic factors have some significant correlations. The results
292 demonstrate the existence of greater disparities in the percentage of insurance ownership among

293 women in Bangladesh and descriptive statistics show women belonging to Dhaka division, the city
294 of the capital, own a greater percentage of health insurance ownership among all which is in line
295 with findings of (Kimani et al., 2014). In addition to that, the relationship of sociodemographic
296 factors with health ownership is supported by Shao et al. (2022). Furthermore, it can be noted that
297 findings revealed insignificant urban-rural disparity, however, which is inconsistent with Shao et
298 al. (2022) where disparity in urban-rural in terms of insurance ownership found significant.

299 According to multivariate regression analysis, insurance ownership by women of age 15-
300 49 age is influenced by the sociodemographic differences. More specifically, women's age,
301 education, their husband's age and division were found significantly associated with the ownership
302 of insurance. These results are consistent with earlier research that demonstrated positive
303 relationship between insurance ownership and socioeconomic factors (Amu et al., 2018; Kirigia et
304 al., 2005)

305 Table 1 revealed that Individuals with higher age tend to have more investments in health
306 insurance to get financial security and consistency found in the findings of (Grossman et al., 1972).
307 He mentioned in the study that it was expected that there will be higher tendency of aged people
308 in making larger investments in health than the class of young, because the health stock
309 depreciation rate increases with age, Moreover, Insurance ownership is significantly affected by
310 the education level, such as women with no education possess the least percentage of insurance
311 ownership and this is significantly associated with the insurance ownership of women due to lack
312 of awareness about their expected or potential expenditure related to their health and inability for
313 taking health insurance policies. However, women who have obtained secondary education hold
314 the highest percentage ownership of insurance among all, which is in line with the existing
315 evidence that uneducated women are severely at a disadvantage phase in terms of insurance
316 ownership and this finding is supported by (Liu & Chen, 2002; Kimani et al., 2014). As one's
317 household wealth index rises, the likelihood of having insurance also goes up. This result is in line
318 with earlier research that indicated wealthier households were more likely to have insurance
319 (Kumi-Kyereme et al., 2013; Sarpong et al., 2010).

320 Wang et al. (2021) found that the percentage of women who reported that they had health
321 insurance ownership was strikingly lower across all countries (Five Countries) studied.
322 Furthermore, the findings from the multivariate analyses suggest that the true extent of the issue

323 is likely more severe, as considerable socioeconomic disparities influence the distribution of health
324 insurance coverage among women, with those in lower-income and marginalized groups being
325 particularly underrepresented and this finding supports our study. There are several noteworthy
326 advantages, e.g., the datasets are nationwide representative and have large sample size.
327 Consequently, the study's results can be applied to the whole population (women).

328 In addition to that, the findings of Laksono et al. (2021) reveal that pregnant women with
329 the category of higher education were 3.349 times more likely than individuals without education
330 to be issued health insurance. In contrast, pregnant women with a middle wealth status were 0.679
331 times as likely to have health insurance as the poorest women. On the other hand, the wealthiest
332 pregnant women had a 1.358 times greater likelihood of having health insurance than the poorest.
333 Therefore, their research findings are largely consistent with our study results.

334

335 **Limitations and Future Direction**

336 One of the study's limitations is that, lacked information on respondents' health condition
337 (such as the frequency and existence of diseases), and inability in order to examine the association
338 between health status and health insurance coverage. Moreover, the status of health is a significant
339 predictor of health insurance ownership, according to prior research (Dong et al., 2009).
340 Additionally, no information on health care usage or out-of-pocket expenses was gathered, making
341 it impossible to investigate how having health insurance affected these two outcomes.

342 Future studies should examine the reasons why some populations have lower insurance
343 coverage and evaluate how well health insurance programs work to promote MHS across various
344 socioeconomic categories.

345

346 **Implication of the study**

347 This research can provide insights into the socio-economic, demographic factors or
348 characteristics influencing health insurance ownership. Moreover, decision makers and researchers
349 can develop proper policies which will improve health insurance ownership.

350 In addition to that, this study will be beneficial for Governments and service providers
351 related to healthcare as they attempt to design, redesign, modify the insurance schemes which aim
352 to address various needs of women of reproductive age. Better health outcomes could be reached
353 for women through the findings of the study.

354

355 **Conclusion**

356 Socioeconomic disparity in health insurance ownership persists despite the growing
357 number of people who hold health insurance and use necessary maternity healthcare services. The
358 purpose of this cross-sectional study of health and demographic surveys was to determine the
359 percentage of adult women aged 15–49 who had health insurance as well as the sociodemographic
360 correlates of such ownership. It is recommended that by considering the elements which are unique
361 to each nation, health authorities should adopt proactive measures to reduce the sociodemographic
362 disparities in women's health insurance ownership. Since it is essential to expedite the
363 accomplishment of the Millennium Development Goals (MDGs), addressing inequalities in access
364 to healthcare facilities among the impoverished and disadvantaged groups of demographics is a
365 top priority in the world health discussion.

366

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369 **Author Contribution**

370 ⁹ **Sabrin Sultana:** data curation, formal analysis, investigation, methodology, project
371 administration, validation, writing—original draft.

372 **Taslima Akther:** data curation, formal analysis, investigation, methodology, writing—original
373 draft.

374 **Mohammad Nayeem Hasan:** data curation, methodology, project administration, validation,
375 writing—review, and editing.

376 **Data Availability**

377 The datasets were accessible to the public free of charge ([https://dhsprogram.com/data/available-⁹
378 datasets.cfm](https://dhsprogram.com/data/available-datasets.cfm)).

379 **Conflicts of interest**

380 No potential conflict of interest was reported by the authors.

381 ⁵ **Transparency Statement**

382 The lead author Mohammad Nayeem Hasan affirms that this manuscript is an honest, accurate,
383 and transparent account of the study being reported; that no important aspects of the study have
384 been omitted; and that any discrepancies from the study as planned (and, if relevant, registered)
385 have been explained.

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