**Title: Factors associated with health insurance ownership among ever-married women of reproductive age: according to BDHS 2022**

In Figure 1, the percentage of health insurance ownership among ever-married women in the divisions is as follows: Barisal (5.98%), Chittagong (18.75%), Dhaka (25.31%), Khulna (11.95%), Mymensingh (7.61%), Rajshahi (13.12%), Rangpur (11.43%), and Sylhet (5.85%).

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| **Figure: Division-wise Health insurance coverage in percentage** |

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

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|  | **Status of health insurance** | | |  |
|  | **Yes**  **n (%)** | **No**  **n (%)** | **Total**  **n (%)** | **P-value** |
| **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 Occupation** |  |  |  |  |
| Farmer/Agriculture | 11 (19.68) | 4425 (24.16) | 4436 (23.32) | 0.649 |
| Businessman | 11 (18.62) | 3749 (20.47) | 3760 (19.77) |  |
| Skilled | 28 (48.84) | 8081 (44.12) | 8109 (42.64) |  |
| Others | 7 (12.86) | 2061 (11.25) | 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) |  |
| **Total** | **58 (0.29)** | **19970 (99.71)** | **20029 (100.00)** |  |

A total of 20029 ever-married women participated and gave their information on ownership of health insurance. Among them, 57.19% of ever-married women are from age group 35-49 years which is higher than the other age group 25-34 years (30.21%) and 15-24 years (12.59%) who has the ownership of health insurance. A highest percentage (43.81%) of ever-married women has the ownership of health insurance and secondary completed, followed by higher (27.20%), primary (22.16%), and no education (6.83%). Highest health insurance ownership (48.22%) noticed in 30-44 years husband/partner’s age ever-married women. The other age group 45 or above years of husband 33.50% of ever-married women had the ownership of health-insurance and a lowest 5.58% had ownership of health insurance of ever-married women whose husband is 15-29 years old. Geographic location (division)–wise distribution of prevalence presents that alone Dhaka has the ownership of 45.29% among total health insurance ownership and 54.71% own rest of the health insurance **(Table 1)**.

**Table 2: Factors Influencing Health Insurance Ownership Among Ever-Married Women of 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 | 0.82 (0.41-1.64) | 0.582 |
| 25-34 | 1.64 (0.90-2.98) | 0.105 | 3.14 (1.32-7.46) | 0.010 |
| 35-49 | Reference |  | Reference |  |
| **Education** |  |  |  |  |
| Higher | 4.08 (1.14-14.54) | 0.030 | 2.07 (0.45-9.46) | 0.346 |
| Secondary | 1.89 (0.53-6.69) | 0.323 | 2.95 (0.73-11.91) | 0.127 |
| Primary | 1.72 (0.45-6.59) | 0.431 | 7.23 (1.52-34.45) | 0.013 |
| No education | Reference |  | Reference |  |
| **Women currently working** |  |  |  |  |
| Yes | 1.33 (0.73-2.43) | 0.350 | 1.20 (0.66-2.18) | 0.556 |
| No | Reference |  | Reference |  |
| **Body Mass Index** |  |  |  |  |
| Underweight | 1.09 (0.32-3.75) | 0.892 | 1.55 (0.47-5.03) | 0.470 |
| Normal weight | 0.58 (0.29-1.18) | 0.135 | 0.62 (0.31-1.23) | 0.174 |
| Overweight | 1.03 (0.51-2.09) | 0.934 | 0.90 (0.43-1.88) | 0.788 |
| Obese | Reference |  | Reference |  |
| **Husband age** |  |  |  |  |
| 45 or above | 4.05 (1.39-11.82) | 0.011 | 1.40 (0.68-9.22) | 0.666 |
| 30-44 | 3.44 (1.13-10.44) | 0.029 | 2.51 (0.68-9.22) | 0.166 |
| 15-29 | Reference |  | Reference |  |
| **Husband education** |  |  |  |  |
| Higher | 1.55 (0.61-3.92) | 0.355 | 0.76 (0.24-2.36) | 0.632 |
| Secondary | 1.34 (0.58-3.12) | 0.493 | 1.06 (0.52-2.20) | 0.865 |
| Primary | 0.69 (0.24-1.96) | 0.487 | 0.63 (0.21-1.92) | 0.415 |
| No education | Reference |  | Reference |  |
| **Husband Occupation** |  |  |  |  |
| Others | 1.40 (0.54-3.62) | 0.484 | 1.51 (0.57-4.01) | 0.404 |
| Skilled | 1.36 (0.64-2.86) | 0.420 | 1.09 (0.50-2.40) | 0.829 |
| Businessman | 1.12 (0.48-2.61) | 0.799 | 0.82 (0.36-1.83) | 0.620 |
| Farmer/Agriculture | Reference |  | Reference |  |
| **Residence** |  |  |  |  |
| Urban | 1.15 (0.58-2.27) | 0.689 | 0.66 (0.28-1.56) | 0.689 |
| Rural | Reference |  | Reference |  |
| **Division** |  |  |  |  |
| Dhaka | 2.44 (1.15-5.18) | 0.016 | 2.75 (1.12-6.80) | 0.028 |
| Others | Reference |  | Reference |  |
| **Religion** |  |  |  |  |
| Islam | 1.60 (0.65-3.96) | 0.302 | 1.59 (0.61-4.17) | 0.343 |
| Others | Reference |  | Reference |  |
| **Wealth index** |  |  |  |  |
| Rich | 1.55 (0.76-3.18) | 0.231 | 0.94 (0.47-1.86) | 0.854 |
| Middle | 1.26 (0.56-2.83) | 0.573 | 1.01 (0.48-2.11) | 0.987 |
| Poor | Reference |  | Reference |  |
| **Household family members** |  |  |  |  |
| <4 | 1.15 (0.50-2.66) | 0.744 | 1.01 (0.39-2.59) | 0.998 |
| 4-5 | 1.40 (0.74-2.65) | 0.303 | 1.19 (0.63-2.24) | 0.596 |
| >5 | Reference |  | Reference |  |
| **Number of living children** |  |  |  |  |
| 0 | 0.54 (0.17-1.71) | 0.295 | 0.88 (0.25-3.17) | 0.848 |
| 1-2 | 1.06 (0.56-1.98) | 0.865 | 1.01 (0.46-2.21) | 0.982 |
| 3+ | Reference |  | Reference |  |

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

According to crude logistic regression model in Table 2, women aged 15-24 years had 42% (COR: 0.58, 95% CI: 0.25–1.31) lower health insurance ownership than the women aged 35-49 years. In addition, women aged 25-34 years had 1.64 times (COR: 1.64, 95% CI: 0.90–2.98) higher health insurance ownership than the women aged 35-49 years. Women with higher educational status had 4.08 times (COR: 4.08, 95% CI: 1.14–14.54) higher health insurance ownership than the women with no educational status. In regards of BMI, women who were normal weight had 42% (COR: 0.58, 95% CI: 0.29–1.18) lower health insurance ownership than the women who were obese. Respondents husband aged 45 or above years and 30-44 years had 4.05 times (COR: 4.05, 95% CI: 1.39–11.82) and 3.44 times (COR: 3.44, 95% CI: 1.13–10.44) higher health insurance ownership than the respondents husband age 15-29 years, respectively. In addition, women from Dhaka division had 2.44 times (COR: 2.44, 95% CI: 1.15–5.18) higher health insurance ownership than the women from other division.

According to adjusted logistic regression model, women aged 25-34 years had 3.14 times (AOR: 3.14, 95% CI: 1.32–7.46) higher health insurance ownership than the women aged 35-49 years. Women with secondary and primary educational status had 2.95 times (AOR: 2.95, 95% CI: 0.73–11.91) and 7.23 times (AOR: 7.23, 95% CI: 1.52–34.45) higher health insurance ownership than the women with no educational status, respectively. In regards of BMI, women who were normal weight had 38% (AOR: 0.62, 95% CI: 0.31–1.23) lower health insurance ownership than the women who were obese. Respondents husband aged 30-44 years had 2.51 times (AOR: 2.51, 95% CI: 0.68–9.22) higher health insurance ownership than the respondents husband age 15-29 years. In addition, women from Dhaka division had 2.75 times (AOR: 2.75, 95% CI: 1.12–6.80) higher health insurance ownership than the women from other division (Table 2).

All variables were included in the multivariable logistic regression model because the VIF values of each variable were less than 4.00, means no multicollinearity in the model (Table 3).

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

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| --- | --- |
| **Variables** | **VIF Value** |
| Age (in years) | 2.74 |
| Education | 2.56 |
| Women currently working | 1.83 |
| Body Mass Index | 1.79 |
| Husband age | 1.59 |
| Husband education | 1.47 |
| Husband Occupation | 1.20 |
| Residence | 1.09 |
| Division | 1.08 |
| Religion | 1.05 |
| Wealth index | 1.05 |
| Household family members | 1.02 |
| Number of living children | 1.01 |
| **Mean VIF** | 1.50 |

The Table 4 shows goodness of fit of multivariable logistic regression model. The lower AIC, and BIC values indicate a better fitting the model. In multivariable model, the AIC estimates showed a lower value (838.96) and BIC (1049.88) (Table 4). The areas under the AUROC curve were 71.05% (95% CI: 64.24–77.87) (Table 4 and Figure 1). These values indicate that the model was well fitted and could differentiate between the two groups of health insurance ownership. So, without any doubt, the multivariable model is better suited in BDHS 2022 surveys.

**Table 4: Goodness of fit of multivariable logistic regression model**

|  |  |  |  |
| --- | --- | --- | --- |
| **AIC** | **BIC** | **AUROC (95% CI)** | **P-value** |
| 838.96 | 1049.88 | 71.05% (64.24-77.87) | <0.001 |

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| **Figure: Area Under ROC curve of adjusted model** |