# Introduction

# Methods

We followed the STROBE guideline for better observational cross-sectional study reporting in epidemiology.

## Population and study sites

## Data collection

## Outcome variables

Patient delay

Patient delay refers to the time elapsed from the initial symptom detection to the first doctor's consultation. Prognosis tends to worsen if this delay exceeds twelve (12) weeks from symptom onset (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7131859/).

Provider delay

Provider delay refers to the duration between the initial interaction with a healthcare provider and the commencement of diagnosis and treatment. It is typically deemed significant if it extends beyond four (4) weeks (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4647619/).

Total diagnosis delay

Total diagnostic delay encompasses the period from the patient's first symptom recognition to the commencement of definitive treatment, incorporating both patient and provider delays. In this study, a total diagnostic delay is typically regarded as exceeding sixteen (16) weeks (https://bmjopen.bmj.com/content/9/9/e030169).

To construct our outcome variable (delays), we categorized each patient as "1" or "Yes" if they experienced patient delay, provider delay, or total diagnostic delay exceeding 12 weeks, 4 weeks, and 16 weeks, respectively. Otherwise, they were recorded as "0" or "No".

## Possible factors

## To uncover potential factors linked to various types of delays, we examined a range of independent variables. These included the patient's age, geographic location (division), residency (urban or rural), educational attainment (illiterate, primary, and secondary) of both the patient and their spouse, household monthly income, access to portable electronic devices, and exposure to mass media.

## Statistical analysis

We conducted descriptive statistics and crosstabs, presenting counts and percentages to summarize categorical variables. Chi-square tests and Fisher's exact test were employed to investigate factors associated with different types of delays. Binary logistic regression was utilized to identify these factors. Initially, bivariable analysis assessed the relationship between delays and other factors. Univariable (unadjusted) and multivariable (adjusted) logistic regression analyses were then conducted to compare associated factors. In the univariable analyses, variables were individually added to the logistic regression model, while in the adjusted model, all possible variables were included simultaneously. Results were reported as unadjusted/crude odds ratios (COR) and adjusted odds ratios (AOR) with their respective 95% confidence intervals. All analyses were performed using R software.

**Variable selection**

Variables were chosen through a two-stage process. Initially, bivariable analysis (chi-square test) was performed individually for each independent variable. A significance threshold of p-value ≤ 0.20 was applied arbitrarily to determine the inclusion of covariates in the multivariable models (https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0242864). We employed stepwise procedures to identify the optimal model. Consequently, our final model incorporated all significant covariates. In the second stage, a comprehensive multivariable model was constructed using the selected predictor variables. Additionally, we assessed multicollinearity in the final model using a cut-off value of 4.00 for the variance inflation factor (VIF) analysis (https://link.springer.com/article/10.1186/s12889-023-15617-8). At this stage, all variables were incorporated into the model since the VIF values for each variable were below 4.00.

**Model performance**

We utilized the Area under the Receiver Operating Characteristic (AUROC) curve, sensitivity, specificity, and the Hosmer–Lemeshow goodness-of-fit test to assess the accuracy of the best model. Additionally, the calibration belt plot was employed. Higher AUROC values indicated superior model performance. In the ROC curve, a lower p-value suggests that the model effectively discriminates between two categories, with an area under the curve exceeding 0.50 (https://link.springer.com/article/10.1186/s12981-022-00495-8). The Hosmer–Lemeshow goodness-of-fit test evaluates the similarity between model-estimated probabilities and observed outcomes, typically through a goodness-of-fit test. A Hosmer–Lemeshow goodness-of-fit test with a p-value greater than 0.05 indicates the model's ability to accurately classify observations into outcome categories (https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2022.985445/full).

# Results

## Study population

Summary statistics of the analytic sample are presented in Table 1. Among the 339 study participants, 68.4% were aged <50 years, 73.2% were from rural areas, and 82.9% were currently married. A total of 43.4% of participants and 33.3% of spouses were illiterate. Also, one-third of participants had a monthly family income of <5,000 BDT, and 19.8% had a monthly family income of more than 20,000 BDT.

The medical history of the patients is shown in Table 2. The majority (91.7%) of the patients reported lump as the first clinical presentation. Only 10.9% of patients reported breast self-examination, and 9.4% had a family history of breast cancer. Approximately 41.0% of participants had a patient delay (>12 weeks), and 20.1% experienced system delay. Overall, 44.3% of patients had a diagnostic delay (>16 weeks). Physical presentations of the participants are shown in Figure 1.

## Diagnosis delay and associated factors

Table 3 shows the causes of diagnosis delay and associated factors that are related to patient delay. Among the 150 patients who had a diagnosis delay, 62.0% were related to the patient, 12.7% were related to the health system, and 25.3% were related to both patient and system. The major factors associated with diagnosis delay related to the patient are: thought the problem would disappear by itself (77.9%), negligence or carelessness (74.8%), financial constraints (67.9%), competing life priorities (54.2%), and embarrassment about having a breast examination (42.7%).

Table 4 shows the patients’ socioeconomic and medical history according to the principal five causes of delay. Older age (aged 60 years or more) is associated with thinking that the problem would disappear by itself (100%), negligence or carelessness (100.0%), financial constraints (80.0%), and competing life priorities (80.0%). Patients from urban areas reported a comparatively higher prevalence of thinking that the problem would disappear by itself (90.6% vs. 73.7%). Also, the prevalence of diagnosis delay related to the patient is relatively higher among those patients who were illiterate, the spouse was illiterate, had monthly family income <5,000 BDT, had breast pain, experienced skin changes, and those did the breast self-examination.

According to total diagnosis delay, Table 5 shows the prevalence by socioeconomic and medical history, result of crude and adjusted logistic regression. Overall, 44.3% of patients had a diagnosis delay. The prevalence of diagnostic delay was comparatively higher among those patients who were illiterate (50.3%), had monthly family income <5,000 BDT (53.1%), did not lump (53.6%) and had no breast pain (47.4%). In the unadjusted analysis, patients’ education, family income, and breast pain were associated with the diagnosis delay. **In the adjusted analysis after backward elimination,** factors such as patient's education, family income, lump, and breast pain have remained in the model. We observed that the odds of diagnostic delay was 81% higher among illiterate patients than those with secondary/higher education (AOR: 1.81, 95% CI: 1.00-3.28). Also, the odds of diagnostic delay was 80% higher among those patients who had monthly family income <5,000 BDT than >20,000 BDT (AOR: 0.95-3.41). On the other hand, the odds of diagnosis delay was 39% less among those patients who lumped (AOR: 0.61, 95% CI: 0.27-1.38), while it was 44% less among those patients who had breast pain (AOR: 0.56, 95% CI: 0.33-0.94).

# Discussion

# References

# Figures



Figure 1: Physical presentations of the patients

# Tables

Table 1: Background characteristics of the patients (N=339)

|  |  |  |
| --- | --- | --- |
| Characteristics | N | % |
| Age at presentation (years) |  |  |
| <40 | 114 | 33.24 |
| 40-49 | 120 | 34.98 |
| 50-59 | 79 | 23.03 |
| ≥60 | 30 | 8.75 |
| Geographic location |  |  |
| Barisal | 26 | 7.67 |
| Chittagong | 52 | 15.34 |
| Dhaka | 149 | 43.95 |
| Khulna | 39 | 11.50 |
| Mymensingh | 33 | 9.73 |
| Rajshahi | 21 | 6.19 |
| Rangpur | 14 | 4.13 |
| Sylhet | 5 | 1.47 |
| Area of residence |  |  |
| Rural | 251 | 72.75 |
| Urban | 94 | 27.25 |
| Patient education level |  |  |
| Illiterate | 147 | 42.86 |
| Primary | 115 | 33.53 |
| Secondary/higher | 81 | 23.62 |
| Current marital status |  |  |
| Single | 59 | 17.25 |
| Married | 283 | 82.75 |
| Spouse education level |  |  |
| Illiterate | 89 | 27.99 |
| Primary | 118 | 37.11 |
| Secondary/higher | 111 | 34.91 |
| Household monthly income (BDT) |  |  |
| <5000 | 113 | 34.88 |
| 5000-10000 | 100 | 30.86 |
| 10001-20000 | 44 | 13.58 |
| >20000 | 67 | 20.68 |
| Portable electronic devices access |  |  |
| Yes | 319 | 89.86 |
| No | 36 | 10.14 |
| Mass media access |  |  |
| Yes | 144 | 40.56 |
| No | 211 | 59.44 |

Table 2: Medical history of the patients (N=339)

|  |  |  |  |
| --- | --- | --- | --- |
| Characteristics | | N | % |
| First clinical presentations 1 | |  |  |
|  | Lump | 314 | 88.45 |
|  | Breast pain | 93 | 26.20 |
|  | Nipple discharge | 20 | 5.63 |
|  | Skin changes | 15 | 4.23 |
|  | Bone pain | 12 | 3.38 |
| Breast self-examination | | 37 | 11.11 |
| Family history of breast cancer | | 32 | 9.52 |
| Patient delay | | 139 | 41.0 |
| Provider delay | | 82 | 24.33 |
| Diagnostic delay | | 190 | 55.72 |
| Stage of cancer 2 | |  |  |
|  | Stage I | 10 | 3.94 |
|  | Stage II | 124 | 48.82 |
|  | Stage III | 112 | 44.09 |
|  | Stage IV | 8 | 3.15 |

1 multiple answer

Table 3: Reason for patient delay

|  |  |  |
| --- | --- | --- |
| Characteristics | N | % |
| Reason for patient delay 1 (n = 139) |  |  |
| Thought the problem would disappear by itself | 110 | 79.14 |
| Negligence or carelessness | 105 | 75.54 |
| Financial constraints | 91 | 65.47 |
| Competing life priorities (taking care of family) | 76 | 54.68 |
| Embarrassment about having a breast examination | 62 | 44.60 |
| Too busy (other reason) | 57 | 41.01 |
| Fear of cancer diagnosis and/or treatment | 53 | 38.13 |
| Difficult to arrange transport | 38 | 27.34 |
| Lack of information | 34 | 24.46 |
| Appointment delay | 30 | 21.58 |
| Other reason | 28 | 20.14 |

1 multiple answer

Table 5: Comparison of patients according to **patient delay**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Patient delay | | | | | |
| Characteristics | Chi-square test | | Unadjusted model | | Adjusted model | |
| n (%)  **(n= 139)** | *P-value* | COR (95% CI) | *P-value* | AOR (95% CI) | *P-value* |
| **Socioeconomic characteristics** |  |  |  |  |  |  |
| *Age at presentation (years)* |  |  |  |  |  |  |
| <40 | 44 (39.29) | 0.839 | 1.12 (0.49 – 2.64) | 0.794 |  |  |
| 40-49 | 52 (44.07) |  | 1.36 (0.60 – 3.19) | 0.465 |  |  |
| 50-59 | 31 (40.26) |  | 1.16 (0.49 – 2.85) | 0.733 |  |  |
| ≥60 | 11 (36.67) |  | Reference |  |  |  |
| *Geographic location* |  |  |  |  |  |  |
| Chittagong | 22 (43.14) | 0.669 | 1.21 (0.47 – 3.25) | 0.694 |  |  |
| Dhaka | 61 (40.94) |  | 1.11 (0.48 – 2.68) | 0.812 |  |  |
| Khulna | 19 (50.00) |  | 1.60 (0.59 – 4.51) | 0.364 |  |  |
| Mymensingh | 9 (27.27) |  | 0.60 (0.20 – 1.80) | 0.363 |  |  |
| Rajshahi | 8 (40.00) |  | 1.07 (0.32 – 3.54) | 0.916 |  |  |
| Rangpur | 5 (35.71) |  | 0.89 (0.22 – 3.39) | 0.864 |  |  |
| Sylhet | 3 (60.00) |  | 2.40 (0.34 – 20.77) | 0.380 |  |  |
| Barisal | 10 (38.46) |  | Reference |  |  |  |
| Area of residence |  |  |  |  |  |  |
| Rural | 106 (42.91) | 0.270 | 1.32 (0.81 – 2.19) | 0.271 |  |  |
| Urban | 33 (36.26) |  | Reference |  |  |  |
| Current marital status |  |  |  |  |  |  |
| Single | 111 (48.21) | 0.226 | 1.42 (0.80 – 2.54) | 0.226 |  |  |
| Married | 27 (39.50) |  | Reference |  |  |  |
| Patient education level |  |  |  |  |  |  |
| Illiterate | 69 (47.59) | 0.082 | 1.82 (1.03 – 3.25) | 0.041 | 1.96 (1.04 – 3.74) | 0.039 |
| Primary | 43 (37.72) |  | 1.21 (0.66 – 2.23) | 0.534 | 1.45 (0.75 – 2.85) | 0.270 |
| Secondary/Higher | 26 (33.33) |  | Reference |  |  |  |
| *Spouse education level* |  |  |  |  |  |  |
| Illiterate | 39 (44.32) | 0.637 | 1.29 (0.73 – 2.28) | 0.383 |  |  |
| Primary | 45 (38.79) |  | 1.03 (0.60 – 1.76) | 0.925 |  |  |
| Secondary/Higher | 42 (38.18) |  | Reference |  |  |  |
| *Household monthly income (BDT)* |  |  |  |  |  |  |
| <5000 | 57 (50.44) | 0.011 | 1.42 (0.77 – 2.62) | 0.262 | 1.15 (0.58 – 2.29) | 0.693 |
| 5000-10000 | 27 (27.84) |  | 0.54 (0.28 – 1.04) | 0.064 | 0.45 (0.22 – 0.90) | 0.025 |
| 10001-20000 | 19 (43.18) |  | 1.06 (0.49 – 2.29) | 0.885 | 1.05 (0.47 – 2.33) | 0.901 |
| >20000 | 28 (41.79) |  | Reference |  |  |  |
| Portable electronic devices |  |  |  |  |  |  |
| Yes | 124 (39.49) | 0.045 | 0.44 (0.18 – 0.99) | 0.049 | 0.46 (0.17 – 1.18) | 0.108 |
| No | 15 (60.00) |  | Reference |  | Reference |  |
| Mass media access |  |  |  |  |  |  |
| Yes | 52 (36.88) | 0.193 | 0.75 (0.48 – 1.16) | 0.193 | 0.79 (0.47 – 1.33) | 0.375 |
| No | 87 (43.94) |  | Reference |  | Reference |  |
| **Medical history of the patients** |  |  |  |  |  |  |
| Lump |  |  |  |  |  |  |
| Yes | 128 (41.16) | 0.847 | 1.08 (0.50 – 2.45) | 0.847 |  |  |
| No | 11 (39.39) |  | Reference |  |  |  |
| Breast pain |  |  |  |  |  |  |
| Yes | 30 (32.61) | 0.055 | 0.61 (0.37 – 1.01) | 0.066 | 0.55 (0.32 – 0.94) | 0.032 |
| No | 109 (44.13) |  | Reference |  |  |  |
| Nipple discharge |  |  |  |  |  |  |
| Yes | 8 (42.11) | 0.920 | 1.05 (0.40 – 2.66) |  |  |  |
| No | 131 (40.94) |  | Reference |  |  |  |
| Skin changes |  |  |  |  |  |  |
| Yes | 7 (46.67) | 0.648 | 1.27 (0.44 – 3.63) | 0.649 |  |  |
| No | 132 (40.74) |  | Reference |  |  |  |
| Bone pain |  |  |  |  |  |  |
| Yes | 4 (33.33) | 0.582 | 0.71 (0.19 – 2.31) | 0.584 |  |  |
| No | 135 (41.28) |  | Reference |  |  |  |
| Breast self-examination |  |  |  |  |  |  |
| Yes | 15 (40.54) | 0.975 | 1.01 (0.50 – 2.02) | 0.975 |  |  |
| No | 118 (40.27) |  | Reference |  |  |  |
| Family history of breast cancer |  |  |  |  |  |  |
| Yes | 11 (34.38) | 0.450 | 0.75 (0.34 – 1.57) | 0.451 |  |  |
| No | 123 (41.28) |  | Reference |  |  |  |

AOR: adjusted odds ratio, CI: confidence interval, COR: crude odds ratio, Ref: reference category.

Table 6: Comparison of patients according to **provider delay**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Patient delay | | | | | |
| Characteristics | Chi-square test | | Unadjusted model | | Adjusted model | |
| n (%)  **(n= 82)** | *P-value* | COR (95% CI) | *P-value* | AOR (95% CI) | *P-value* |
| **Socioeconomic characteristics** |  |  |  |  |  |  |
| *Age at presentation (years)* |  |  |  |  |  |  |
| <40 | 23 (20.54) | 0.613 | 0.57 (0.23 – 1.48) | 0.233 |  |  |
| 40-49 | 29 (24.37) |  | 0.72 (0.30 – 1.81) | 0.463 |  |  |
| 50-59 | 20 (26.67) |  | 0.81 (0.32 – 2.13) | 0.656 |  |  |
| ≥60 | 9 (1.03) |  | Reference |  |  |  |
| *Geographic location* |  |  |  |  |  |  |
| Chittagong | 14 (26.08) | 0.030 | 1.23 (0.42 – 3.91) | 0.714 | 1.17 (0.38 – 3.85) | 0.789 |
| Dhaka | 27 (18.49) |  | 0.76 (0.29 – 2.23) | 0.585 | 0.82 (0.30 – 2.49) | 0.704 |
| Khulna | 10 (26.32) |  | 1.19 (0.38 – 4.00) | 0.769 | 1.13 (0.35 – 3.94) | 0.838 |
| Mymensingh | 8 (25.00) |  | 1.11 (0.33 – 3.88) | 0.865 | 1.14 (0.33 – 4.14) | 0.837 |
| Rajshahi | 6 (30.00) |  | 1.43 (0.37 – 5.49) | 0.597 | 1.48 (0.37 – 5.92) | 0.575 |
| Rangpur | 9 (64.29) |  | 6.00 (1.51 – 7.06) | 0.014 | 4.60 (1.11 – 7.52) | 0.041 |
| Sylhet | 1 (20.00) |  | 0.83 (0.04 – 7.14) | 0.880 | 0.85 (0.04 – 7.58) | 0.894 |
| Barisal | 6 (23.08) |  | Reference |  | Reference |  |
| Area of residence |  |  |  |  |  |  |
| Rural | 72 (29.51) | <0.001 | 3.86 (1.93 – 8.62) | <0.001 | 3.07 (1.49 – 6.98) | 0.004 |
| Urban | 9 (9.78) |  | Reference |  | Reference |  |
| Current marital status |  |  |  |  |  |  |
| Single | 17 (30.36) | 0.213 | 1.49 (0.78 – 2.79) | 0.215 |  |  |
| Married | 63 (22.58) |  | Reference |  |  |  |
| Patient education level |  |  |  |  |  |  |
| Illiterate | 36 (24.66) | 0.916 | 1.14 (0.59 – 2.23) | 0.704 |  |  |
| Primary | 28 (24.78) |  | 1.14 (0.58 – 2.31) | 0.703 |  |  |
| Secondary/Higher | 17 (22.37) |  | Reference |  |  |  |
| *Spouse education level* |  |  |  |  |  |  |
| Illiterate | 18 (20.22) | 0.283 | 0.94 (0.46 – 1.87) | 0.854 |  |  |
| Primary | 33 (28.70) |  | 1.49 (0.81 – 2.77) | 0.204 |  |  |
| Secondary/Higher | 23 (21.30) |  | Reference |  |  |  |
| *Household monthly income (BDT)* |  |  |  |  |  |  |
| <5000 | 28 (24.78) | 0.791 | 1.05 (0.52 – 2.16) | 0.892 |  |  |
| 5000-10000 | 27 (27.55) |  | 1.21 (0.60 – 2.52) | 0.598 |  |  |
| 10001-20000 | 8 (19.51) |  | 0.77 (0.28 – 1.97) | 0.597 |  |  |
| >20000 | 16 (23.88) |  | Reference |  |  |  |
| Portable electronic devices |  |  |  |  |  |  |
| Yes | 78 (24.76) | 0.487 | 1.48 (0.53 – 5.24) | 0.489 |  |  |
| No | 4 (18.18) |  | Reference |  |  |  |
| Mass media access |  |  |  |  |  |  |
| Yes | 38 (26.76) | 0.375 | 1.25 (0.76 – 2.07) | 0.376 |  |  |
| No | 44 (22.56) |  | Reference |  |  |  |
| **Medical history of the patients** |  |  |  |  |  |  |
| Lump |  |  |  |  |  |  |
| Yes | 75 (24.04) | 0.657 | 0.81 (0.34 – 2.16) | 0.657 |  |  |
| No | 7 (28.00) |  | Reference |  |  |  |
| Breast pain |  |  |  |  |  |  |
| Yes | 28 (30.43) | 0.110 | 1.55 (0.90 – 2.64) | 0.111 | 1.36 (0.76 – 2.41) | 0.296 |
| No | 54 (22.04) |  | Reference |  | Reference |  |
| Nipple discharge |  |  |  |  |  |  |
| Yes | 9 (45.00) | 0.026 | 2.73 (1.06 – 6.86) | 0.032 | 2.92 (1.04 – 8.06) | 0.037 |
| No | 73 (23.03) |  | Reference |  | Reference |  |
| Skin changes |  |  |  |  |  |  |
| Yes | 2 (13.33) | 0.310 | 0.46 (0.07 – 1.73) | 0.321 |  |  |
| No | 80 (24.84) |  | Reference |  |  |  |
| Bone pain |  |  |  |  |  |  |
| Yes | 1 (8.33) | 0.188 | 0.27 (0.01 – 1.44) | 0.218 |  |  |
| No | 81 (24.92) |  | Reference |  |  |  |
| Breast self-examination |  |  |  |  |  |  |
| Yes | 8 (21.62) | 0.638 | 0.82 (0.38 – 1.80) | 0.638 |  |  |
| No | 74 (25.17) |  | Reference |  |  |  |
| Family history of breast cancer |  |  |  |  |  |  |
| Yes | 7 (21.88) | 0.750 | 0.87 (0.33 – 2.00) | 0.750 |  |  |
| No | 73 (24.41) |  | Reference |  |  |  |

AOR: adjusted odds ratio, CI: confidence interval, COR: crude odds ratio, Ref: reference category.

Table 6: Comparison of patients according to **total delay**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Patient delay | | | | | |
| Characteristics | Chi-square test | | Unadjusted model | | Adjusted model | |
| n (%)  **(n= 190)** | *P-value* | COR (95% CI) | *P-value* | AOR (95% CI) | *P-value* |
| **Socioeconomic characteristics** |  |  |  |  |  |  |
| *Age at presentation (years)* |  |  |  |  |  |  |
| <40 | 62 (55.36) | 0.960 | 0.82 (0.36 – 1.86) | 0.649 |  |  |
| 40-49 | 65 (54.62) |  | 0.80 (0.35 – 1.80) | 0.597 |  |  |
| 50-59 | 44 (56.41) |  | 0.86 (0.35 – 2.02) | 0.736 |  |  |
| ≥60 | 18 (60.00) |  | Reference |  |  |  |
| *Geographic location* |  |  |  |  |  |  |
| Chittagong | 33 (63.46) | 0.024 | 2.03 (0.78 – 5.35) | 0.148 | 2.18 (0.81 – 6.04) | 0.126 |
| Dhaka | 78 (52.35) |  | 1.28 (0.56 – 3.00) | 0.560 | 1.46 (0.61 – 3.57) | 0.393 |
| Khulna | 25 (65.79) |  | 2.24 (0.81 – 6.36) | 0.121 | 2.11 (0.74 – 6.18) | 0.167 |
| Mymensingh | 13 (39.39) |  | 0.76 (0.27 – 2.15) | 0.602 | 0.73 (0.25 – 2.16) | 0.571 |
| Rajshahi | 10 (50.00) |  | 1.67 (0.36 – 3.79) | 0.796 | 1.19 (0.36 – 4.03) | 0.774 |
| Rangpur | 13 (92.86) |  | 5.17 (2.46 – 6.41) | 0.014 | 6.38 (1.90 – 7.34) | 0.026 |
| Sylhet | 3 (60.00) |  | 1.75 (0.25 – 5.03) | 0.573 | 2.07 (0.27 – 9.12) | 0.482 |
| Barisal | 12 (46.15) |  | Reference |  | Reference |  |
| Area of residence |  |  |  |  |  |  |
| Rural | 150 (60.48) | <0.001 | 2.08 (1.28 – 3.40) | 0.003 | 1.96 (1.17 – 3.33) | 0.011 |
| Urban | 39 (42.39) |  | Reference |  | Reference |  |
| Current marital status |  |  |  |  |  |  |
| Single | 37 (64.91) | 0.115 | 1.60 (0.90 – 2.95) | 0.117 | 1.61 (0.89 – 2.91) | 0.144 |
| Married | 151 (53.55) |  | Reference |  | Reference |  |
| Patient education level |  |  |  |  |  |  |
| Illiterate | 89 (60.96) | 0.121 | 1.77 (1.02 – 3.09) | 0.043 | 1.61 (0.86 – 3.10) | 0.114 |
| Primary | 62 (54.39) |  | 1.35 (0.76 – 2.41) | 0.303 | 1.36 (0.74 – 2.52) | 0.329 |
| Secondary/Higher | 37 (46.84) |  | Reference |  | Reference |  |
| *Spouse education level* |  |  |  |  |  |  |
| Illiterate | 52 (58.43) | 0.683 | 1.28 (0.73 – 2.26) | 0.383 |  |  |
| Primary | 64 (55.17) |  | 1.12 (0.67 – 1.90) | 0.659 |  |  |
| Secondary/Higher | 58 (52.25) |  | Reference |  |  |  |
| *Household monthly income (BDT)* |  |  |  |  |  |  |
| <5000 | 73 (64.60) | 0.101 | 1.48 (0.80 – 2.75) | 0.213 |  |  |
| 5000-10000 | 47 (47.96) |  | 0.74 (0.40 – 1.39) | 0.360 |  |  |
| 10001-20000 | 23 (52.27) |  | 0.89 (0.41 – 1.91) | 0.760 |  |  |
| >20000 | 37 (55.22) |  | Reference |  |  |  |
| Portable electronic devices |  |  |  |  |  |  |
| Yes | 173 (54.75) | 0.199 | 0.56 (0.23 – 1.32) | 0.204 |  |  |
| No | 17 (68.00) |  | Reference |  |  |  |
| Mass media access |  |  |  |  |  |  |
| Yes | 79 55.63) | 0.979 | 0.99 (0.64 – 1.54) | 0.979 |  |  |
| No | 111 (55.78) |  | Reference |  |  |  |
| **Medical history of the patients** |  |  |  |  |  |  |
| Lump |  |  |  |  |  |  |
| Yes | 174 (55.59) | 0.874 | 0.94 (0.42 – 2.04) | 0.874 |  |  |
| No | 16 (57.14) |  | Reference |  |  |  |
| Breast pain |  |  |  |  |  |  |
| Yes | 46 (50.00) | 0.196 | 0.73 (0.45 – 1.18) | 0.197 | 0.62 (0.37 – 1.04) | 0.069 |
| No | 144 (57.83) |  | Reference |  | Reference |  |
| Nipple discharge |  |  |  |  |  |  |
| Yes | 14 (70.00) | 0.185 | 1.92 (0.75 – 5.54) | 0.192 | 2.05 (0.72 – 6.73) | 0.199 |
| No | 176 (54.83) |  | Reference |  | Reference |  |
| Skin changes |  |  |  |  |  |  |
| Yes | 9 (60.00) | 0.733 | 1.20 (0.42 – 3.66) | 0.733 |  |  |
| No | 181 (55.52) |  | Reference |  |  |  |
| Bone pain |  |  |  |  |  |  |
| Yes | 5 (41.67) | 0.318 | 0.56 (0.16 – 1.77) | 0.325 |  |  |
| No | 185 (56.23) |  | Reference |  |  |  |
| Breast self-examination |  |  |  |  |  |  |
| Yes | 20 (54.05) | 0.859 | 0.94 (0.47 – 1.88) | 0.859 |  |  |
| No | 164 (55.59) |  | Reference |  |  |  |
| Family history of breast cancer |  |  |  |  |  |  |
| Yes | 15 (46.88) | 0.306 | 0.68 (0.33 – 1.42) | 0.308 |  |  |
| No | 169 (56.33) |  | Reference |  |  |  |

AOR: adjusted odds ratio, CI: confidence interval, COR: crude odds ratio, Ref: reference category.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Hosmer and Lemeshow's goodness of fit test | | | Area Under Receiver Operating Characteristic Curve | | |
|  | X-squared | DF | P-value | AUC scores | 95% CI | P-value |
| Model 1 | 6.01 | 8 | 0.646 | 62.43% | 59.80%-72.05% | <0.001 |
| Model 2 | 5.35 | 6 | 0.500 | 58.92% | 61.48%-75.14% | <0.001 |
| Model 3 | 2.34 | 8 | 0.969 | 66.16% | 61.15%-72.71% | <0.001 |

