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Barriers to early detection and treatment of breast cancer in rural areas of Bangladesh

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Abstract

Breast cancer is still one of the top causes of mortality for women around the world. In Bangladesh's rural areas, early identification and treatment are quite difficult. This study examines the socio-cultural, economic, and healthcare impediments to the early detection and treatment of breast cancer in rural Bangladesh. A standardized questionnaire was used to survey a sample of 400 rural women to find out how much they knew about breast cancer symptoms, how easy it was for them to get medical care, and how they felt about treatment. The study identified insufficient awareness, socio-cultural stigma, financial constraints, and inadequate healthcare infrastructure as significant impediments to timely diagnosis and treatment. Additionally, although women indicated a readiness to engage in prevention and screening initiatives, the absence of accessible services and educational resources in remote regions obstructs effective intervention. The results show that rural populations need more targeted awareness efforts, better healthcare facilities, and ways to acquire financial help to discover and treat breast cancer earlier.

Keywords: Breast Cancer; Rural Bangladesh; Early Detection; Healthcare Barriers; Socio-Cultural Stigma; Awareness; Prevention Programs

1. Introduction

Breast cancer is one of the most frequent types of cancer in women around the world, and the number of cases is going up in both developed and developing countries. (J. I. Islam et al., 2025) Breast cancer is still a big public health problem in Bangladesh, with more and more cases being reported each year. Even though people are more aware of how to prevent and treat cancer, rural communities in Bangladesh have their own problems when it comes to finding breast cancer early and getting treatment quickly (Rahman and Rahman, 2024). Some of the things that make it hard to manage breast cancer well in these locations are a lack of healthcare infrastructure, a lack of knowledge, social stigma, and financial problems (Raihan, 2023).

In rural Bangladesh, a lot of women still don't know the early warning signs of breast cancer or don't want to get medical care because of cultural or social constraints (Ahmed et al., 2025). Also, the lack of specialized healthcare facilities and skilled medical experts in these places makes the problem worse, often causing people to wait too long to get treatment for cancer that has already spread (Akter and Ullah, 2022). This delay in finding the problem makes it much less likely that treatment will work and that the person will live (Akter and Ullah, 2022).

This article looks at the different things that make it hard to find and treat breast cancer early in rural Bangladesh. By knowing about these problems, we can find ways to make healthcare more accessible, boost awareness, and lower the death rate from breast cancer in these areas that don't get enough care. It is intended that increased infrastructure,

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education, and government action would make it easier for people in rural areas to get early diagnosis and treatment, which will lead to better health outcomes.

2. Literature Review

Breast cancer research in Bangladesh, especially concerning rural populations, has elucidated numerous systemic, social, and economic aspects that hinder early detection and prompt treatment. A lot of research has shown that rural women are more likely to be diagnosed late in their illness. This is because they don't know much about health and don't have easy access to health care services (Ahmed et al., 2025; Rahman and Rahman, 2024; Raihan, 2023). These findings are consistent with extensive global research demonstrating that rural residency frequently associated with inferior cancer outcomes due to geographic isolation and limited resources (Othman et al., 2024).

Numerous researchers have underscored awareness gaps as a significant impediment. Rehman et al. (2025) shown that numerous rural women in Bangladesh are uninformed about fundamental breast cancer signs and screening techniques, including self-examination and clinical testing. This lack of knowledge makes people wait longer to get medical help, which leads to diagnoses at later stages that are harder to cure (Hasan et al., 2025). Other low-resource settings have also seen similar tendencies, where false information and misunderstandings about cancer make it even harder to find it (Hasi et al., 2025).

The literature also talks a lot about economic limitations. Rural women don't want to get medical care because they can't afford transportation, they can't afford diagnostic and treatment services, and they can't afford to pay for them (Hasi et al., 2025). These financial limitations are exacerbated by indirect expenses, including loss of income and familial obligations, rendering prolonged treatment increasingly onerous (Khan et al., 2023).

Health system restrictions are also very important. Research has highlighted the limited availability of diagnostic centers, skilled healthcare professionals, and mammography equipment in rural areas of Bangladesh (Hoq et al., 2024). Because of this lack, many women have to travel considerable distances to cities for diagnosis and treatment. This is a practical problem that often leads to women not getting follow-up care (Khan et al., 2023). The centralization of cancer care in major cities produces a systemic inequality that disproportionately impacts rural populations (Huq et al., 2024).

Cultural views and societal stigma associated with cancer can significantly influence the situation. Some studies show that breast cancer is often seen as a taboo topic, which makes women afraid to talk about their symptoms or ask for help because they don't want to be shunned by others (M. R. Islam et al., 2025). Patriarchal norms and gender power dynamics within families may further constrain women's autonomy in health decision-making (Huq et al., 2024).

These studies collectively highlight a complex issue that transcends mere clinical difficulties. The literature indicates that significant advancements in the early detection and treatment of breast cancer in rural Bangladesh necessitate not only improved medical infrastructure but also focused awareness efforts, economic support systems, and culturally appropriate therapies. This review synthesizes research findings to underscore the enduring obstacles and the urgent necessity for integrated methods specifically designed for rural situations.

Even while there is more and more study on breast cancer in Bangladesh, we still don't know enough about the specific problems that make it hard to find and treat it early in rural areas. While studies have examined the overall prevalence and problems of breast cancer in the country, there is a paucity of research addressing the specific socio-cultural, economic, and healthcare-related barriers encountered by women in rural areas. Many current studies generalize the issue across urban and rural populations, neglecting the specific barriers rural women encounter in accessing healthcare services. Additionally, there is a deficiency of comprehensive research examining the efficacy of existing programs in enhancing breast cancer awareness and early diagnosis in these regions. There is also not much study on how community-based initiatives, local health workers, and culturally appropriate education programs can help people get past these problems. Consequently, a thorough comprehension of how to tackle these particular difficulties in rural Bangladesh is still inadequately examined, underscoring a significant deficiency in the current literature.

By analyzing the above gaps and literature, this study addresses the following research questions:

- **RQ1:** What are the main social, cultural, and economic reasons that stop rural women in Bangladesh from getting early breast cancer screening and treatment?
- **RQ2:** How does the absence of healthcare facilities in rural Bangladesh lead to postponed detection and treatment of breast cancer?

- **RQ3:** How much do rural women in Bangladesh know about the signs of breast cancer and how to find it early?
- **RQ4:** How do cultural beliefs and stigma affect how eager rural women are to talk about breast cancer symptoms and get medical help?
- **RQ5:** What strategies can be implemented to improve early breast cancer detection and treatment in rural areas of Bangladesh, considering local resources and challenges?

Research Objectives

Based on the research questions, this study guides the following objectives:

- To find out what social, cultural, economic, and healthcare factors make it hard to find and treat breast cancer early in rural Bangladesh.
- To evaluate the level of awareness among rural women concerning breast cancer symptoms and early detection.
- To assess the influence of healthcare infrastructure on the diagnosis and treatment of breast cancer in rural regions.
- To investigate the impact of cultural beliefs and social stigma on healthcare-seeking behavior.
- To suggest ways to make it easier to find and treat breast cancer early in rural Bangladesh.

3. Hypothesis Development

The formulation of hypotheses for this study is predicated on the examination of current literature that delineates many obstacles to the early identification and treatment of breast cancer in rural Bangladesh. These hurdles are mostly social, cultural, economic, and healthcare-related, and they affect the choices and actions of rural women when they need medical care. Here are the hypotheses that come from the research

Prior research indicates that financial limitations, inadequate access to healthcare services, and socio-cultural influences, including gender norms and the stigma associated with cancer, substantially impede the diagnosis and treatment of breast cancer in rural regions (M. A. K. Chowdhury et al., 2024; Huq et al., 2024; M. R. Islam et al., 2025).

3.1. H_1: Socio-cultural and economic barriers negatively affect the timely detection and treatment of breast cancer in rural Bangladesh

Numerous studies have indicated that rural women are insufficiently informed about the signs of breast cancer and the screening options available. Consequently, women pursue assistance solely in the later phases of the illness, when treatment efficacy diminishes (M. Z. I. Chowdhury et al., 2024; Schliemann et al., 2022).

3.2. H_2: Low levels of awareness about breast cancer symptoms and early detection methods among rural women in Bangladesh contribute to delayed diagnosis and treatment

Research has underscored the deficiency of diagnostic institutes, healthcare practitioners, and specialized services in rural Bangladesh. Because of this shortage, rural women have to travel considerable distances for treatment, which causes delays in diagnosis and stops in care (Akhtar et al., 2023; Tasnim and Aktar, 2025).

3.3. H_3: The inadequate healthcare infrastructure in rural Bangladesh significantly impedes early breast cancer detection and treatment

Studies indicate that cancer is frequently regarded as a taboo topic in rural areas, where considerable stigma is associated with discussing or seeking assistance for breast cancer. Cultural views on cancer impede prompt medical care-seeking (Ochani et al., 2026; Sharmeen, 2023).

3.4. H_4: Cultural beliefs and stigma surrounding breast cancer discourage rural women in Bangladesh from seeking medical help for suspected breast cancer symptoms

These hypotheses seek to investigate the intricate interaction of factors that impede early detection and treatment of breast cancer in rural Bangladesh. This study aims to elucidate the particular problems encountered by rural women and the necessary structural modifications to enhance breast cancer outcomes through the testing of these hypotheses.

4. Methods and Methodology

This study employs a quantitative research approach to investigate the obstacles to early detection and treatment of breast cancer in rural Bangladesh. Using the Cochran formula for sample size determination, which guarantees a representative sample with a 5% margin of error, a structured questionnaire was created to gather data from a sample of 400 rural women (Cochran, 1942). The questionnaire consisted of both closed and open-ended questions designed to evaluate awareness levels, socio-cultural attitudes, healthcare accessibility, and the influence of economic and infrastructural factors on breast cancer detection and treatment. Trained enumerators conducted face-to-face interviews to collect data, ensuring accuracy and minimizing response bias.

$$n = \frac{z^2.p(1-p)}{E^2}$$

This study used SPSS (Statistical Package for the Social Sciences) to analysis the data and also used chi-square testing and regression analysis to evaluate the hypotheses and look at the link between socio-cultural, economic, and healthcare-related barriers and breast cancer outcomes. Ethical considerations included obtaining informed consent from participants, ensuring the confidentiality of their responses, and emphasizing the voluntary nature of involvement. The study's design guarantees the acquisition of reliable and valid data to ascertain the principal parameters affecting the identification and treatment of breast cancer in rural areas.

5. Results and Discussion

This section's goal is to show and talk about the study's data findings. The results elucidate the demographic attributes, knowledge levels, healthcare accessibility, socio-cultural impediments, and additional factors that affect the early detection and treatment of breast cancer in rural Bangladesh. The data analysis is structured into pertinent areas, succeeded by discussions derived from the findings.

5.1. Demographic Profile of the Respondents

This part shows the demographic profile of the people who answered the questions, which helps us understand the sample's features. The information about age, marital status, education level, occupation, and income are important for figuring out how these things might affect awareness, healthcare-seeking behaviors, and access to breast cancer diagnosis and treatment services in rural Bangladesh.

Table 1 Demographic Profile of the Respondents

Demographic Factor	Frequency (n=400)	Percentage (%)
Age		
Below 20	50	12.5
21-30	100	25
31-40	120	30
41-50	80	20
51 and above	50	12.5
Marital Status		
Single	90	22.5
Married	280	70
Divorced/Widowed	30	7.5
Education Level		
Illiterate	80	20
Primary Education	150	37.5

Secondary Education	120	30
Higher Education (Undergraduate or above)	50	12.5
Occupation		
Housewife	200	50
Farmer	100	25
Teacher	50	12.5
Health Worker	30	7.5
Other	20	5
Monthly Household Income		
Below 10,000 BDT	180	45
10,000 - 20,000 BDT	150	37.5
20,001 - 30,000 BDT	50	12.5
Above 30,000 BDT	20	5
Location		
Village	350	87.5
Town/Small City	50	12.5

Table 1 shows the demographic profile of the respondents uncovers significant trends that could influence the early identification and management of breast cancer in rural Bangladesh. Most of the people who answered (30%) were between the ages of 31 and 40. This is an important age group for finding breast cancer early because the risk of getting it goes up with age. But the fact that a lot of younger women (12.5% under 20 and 25% between 21 and 30) are involved may mean that there is a need for awareness efforts regarding breast cancer prevention and self-examination that are aimed at younger women.

Seventy percent of those who answered were married, which is in line with the customary family structure in rural Bangladesh. This implies that married women might bear greater familial and societal obligations, perhaps influencing their readiness or capacity to pursue medical assistance for breast cancer symptoms. A large number of people who answered (37.5%) had only primary school, and 20% could not read or write. This low level of education can make it hard for women to be aware of breast cancer and how to stay healthy. Women with less education may not know how important it is to find it early or how to do a self-exam. Fifty percent of the people who answered were housewives, and twenty-five percent were farmers. Housewives, in particular, may not be able to get the information or medical care they need since they have to take care of their homes. This shows how important it is to have health education and outreach programs that are easy to go to in remote locations, especially for women who may not be able to move around as much or who may not have as much access to other sources of information.

A high number of respondents (45%) indicated a household income of less than 10,000 BDT per month, reflecting considerable economic distress. This low income may make it hard to get health care services, such breast cancer screenings, which can be expensive and hard to get to in rural locations. This is in line with what other studies have found, which say that money problems are a big reason people don't get medical care (Afaya et al., 2022; Kitole, 2025). The fact that 87.5% of the people who answered resided in villages shows that the sample was mostly rural. This makes it even clearer how hard it is for women in rural areas to get healthcare, especially specialized services like breast cancer screenings, which are more popular in cities.

In short, the demographic data shows that most of the women in the study sample are married, poor, and not very well-educated, and they live in rural areas. These variables are likely to greatly affect their ability to get breast cancer diagnosed and treated quickly. The findings indicate that initiatives aimed at low-income, less-educated rural women, especially housewives and farmers, are essential for enhancing awareness and healthcare accessibility in rural Bangladesh.

5.2. Awareness and Knowledge of Breast Cancer

This part looks at how much rural women in Bangladesh know and understand about breast cancer. Knowing how much women know about breast cancer symptoms, ways to find it early, and the need of screening will help us figure out how well existing educational efforts are working and what needs to be fixed. The information was collected about how much people knew about breast cancer, its symptoms, and how to do self-exams and screenings.

Table 2 Awareness and Knowledge of Breast Cancer

Question	Frequency (n=400)	Percentage (%)
Do you know what breast cancer is?		
Yes	350	87.5
No	50	12.5
Have you heard of breast cancer symptoms?		
Yes	300	75
No	100	25
Do you know any of the following symptoms of breast cancer?		
Lump in the breast	250	62.5
Pain or tenderness in the breast	180	45
Change in the size or shape of the breast	200	50
Skin changes (redness, rash, or dimpling)	120	30
Nipple discharge	110	27.5
Have you ever performed a self-breast examination?		
Yes	150	37.5
No	250	62.5
Do you know the importance of regular breast cancer screening?		
Yes	180	45
No	220	55
Would you participate in a breast cancer screening program if available?		
Yes	270	67.5
No	130	32.5

As the table 2 displayed the findings from this section underscore significant deficiencies in awareness and information regarding breast cancer among rural women in Bangladesh. Most of the people who answered (87.5%) knew what breast cancer is, which shows that they have a basic grasp of the disease. But the fact that 12.5% of respondents didn't know means that there is still potential for growth in boosting awareness, especially in rural areas where people don't know as much. Seventy-five percent of those who answered had heard of breast cancer symptoms, although the level of detail in their understanding varied. Only 62.5% of people who took part could identify a lump in the breast as a symptom. Other typical symptoms, like pain, changes in size or shape, and changes in the skin, were recognized by fewer people (45%, 50%, and 30%, respectively). This shows that there is a big gap in comprehending all of the signs of breast cancer. The fact that fewer people are aware of signs like nipple discharge (27.5%) and skin abnormalities (30%) shows that additional education is needed. Only 37.5% of respondents said they had ever done a self-breast exam, even though it is an easy and vital way to find cancer early. The small number of women who undergo self-examinations could mean that they don't know how to do it right or that they don't know how important it is. This conclusion shows that there is a need for comprehensive educational initiatives that teach women in rural areas how to do self-exams and why they are so important for discovering breast cancer early. Only 45% of the women knew how important it was to get frequent breast cancer screenings. The other 55% did not know how important it was. This shows that people don't know enough

about how important professional screening procedures like mammograms are for finding breast cancer early. Nonetheless, a substantial percentage (67.5%) indicated a willingness to engage in a breast cancer screening program if offered, implying that rural women are receptive to healthcare services but require enhanced knowledge and improved access to these resources.

In conclusion, rural women in Bangladesh have a rudimentary understanding of breast cancer, but they don't know enough about the symptoms, how to check themselves, and screening methods. This shows that there is a lot of room for improvement (Azim et al., 2025; Sarker et al., 2022). The fact that not many people know about all the signs, that not many people do self-breast exams, and that not many people understand how important regular screenings are shows that there is a need for targeted teaching programs. These programs should teach people more about the indicators of breast cancer and how to find it early. They should also stress the significance of both self-examination and professional screening.

5.3. Healthcare Access and Barriers

This section looks at the problems and obstacles that rural women in Bangladesh experience when they try to get early breast cancer diagnosis and treatment. To find out what stops people from getting prompt diagnosis and treatment, it's important to know how easy it is to get to healthcare services, such as how far away they are, whether screening services are available, and how much money they have. The information in this part shows how hard it is for women to get breast cancer treatment and how these problems might cause delays in getting medical support.

Table 3 Healthcare Access and Barriers

Question	Frequency (n=400)	Percentage (%)
Do you have access to a nearby healthcare facility for breast cancer screening or treatment?		
Yes	180	45
No	220	55
How far is the nearest healthcare facility providing breast cancer services?		
Less than 5 km	50	12.5
5-10 km	80	20
11-20 km	120	30
More than 20 km	150	37.5
How often do you visit a healthcare facility for health check-ups?		
Monthly	40	10
Quarterly	50	12.5
Annually	80	20
Only when sick	230	57.5
Have you faced any financial challenges in seeking healthcare for breast cancer?		
Yes	280	70
No	120	30
Do you think the cost of breast cancer treatment is a barrier to seeking care?		
Yes	320	80
No	80	20
Do you have health insurance that covers breast cancer treatment?		
Yes	50	12.5
No	350	87.5

Table 3 highlighted the results from this section show that there are many big problems that make it hard for people in rural Bangladesh to get breast cancer screening and treatment. These problems are mostly caused by where they live, how much money they have, and their health insurance. Most of the people who answered (55%) said they didn't have access to a nearby healthcare center that offered breast cancer screening or treatment. Of the 45% who could get to healthcare centers, many still live far away from them. Notably, 37.5% of those who answered reside more than 20 km distant from the nearest healthcare institution, which might make things quite difficult logistically. Long distances to healthcare centers and bad transportation systems make it harder for women to get help, which can lead to delays in diagnosis and treatment. This is because women may not want to go since it costs too much and takes too much work. The data shows that a large number of women (57.5%) only go to the doctor when they are sick, not for regular check-ups. This limited healthcare-seeking behavior is an issue for finding cancer early because regular tests and health check-ups are necessary for that. Not going to the doctor often enough could lead to late-stage diagnosis when there are fewer treatment options. A considerable 70% of women reported encountering financial difficulties when pursuing healthcare for breast cancer, underscoring the essential role of economic limitations in the postponement of medical treatment. Eighty percent of those who answered also thought that the high expense of breast cancer therapy was a reason not to get care. The poor income of families in rural areas makes these financial problems much worse. A lot of women live below the poverty line. Many women can't afford treatment or even diagnostic tests without help with their bills, which makes it more likely that they'll wait too long to get care (A. I. Islam et al., 2025). The results also suggest that 87.5% of those who answered did not have health insurance that would pay for breast cancer treatment. This absence of health insurance is a big problem because it makes it hard for women to pay for expensive medical procedures like surgery, chemotherapy, or radiation therapy. Women who don't have insurance have to pay more for care, which makes it harder for them to get the care they need.

In conclusion, rural women in Bangladesh have a hard time getting early breast cancer screening and treatment because of problems with healthcare access and money. Women in rural areas have a lot of trouble getting health care since they have to travel a long way to get to facilities, treatment is expensive, and they don't have health insurance. To get around these problems, rural communities need better healthcare infrastructure, subsidized or free screening programs, and financial help for women who can't pay for treatment. Moreover, increasing health insurance coverage and encouraging regular health check-ups could lead to earlier detection and better overall results for breast cancer.

5.4. Socio-Cultural Beliefs and Stigma

This section looks at how socio-cultural beliefs and stigma affect how rural women in Bangladesh seek medical help for breast cancer. In numerous rural communities, cultural beliefs and community norms can either facilitate or obstruct the discourse and management of health issues, especially stigmatized illnesses such as breast cancer. Examining the impact of cultural attitudes and stigma on women's readiness to pursue early diagnosis and treatment provides insight into the non-medical obstacles that hinder care and influence outcomes.

Table 4 Socio-Cultural Beliefs and Stigma

Question	Frequency (n=400)	Percentage (%)
Do you think discussing breast cancer is socially acceptable in your community?		
Yes	150	37.5
No	250	62.5
Have you heard of women in your community being reluctant to seek treatment for breast cancer?		
Yes	320	80
No	80	20
What do you think are the main reasons for reluctance in seeking treatment for breast cancer?		
Fear of social stigma	230	57.5
Lack of knowledge or awareness	120	30
Economic challenges	200	50
Family pressure or cultural norms	170	42.5
Do you think women in your community associate breast cancer with bad luck or a curse?		
Yes	180	45
No	220	55
Do you think there is a cultural stigma surrounding breast cancer in your community?		
Yes	300	75
No	100	25

Table 4 presents the findings in this part underscore the substantial impact of socio-cultural views and stigma on healthcare-seeking behavior concerning breast cancer in rural Bangladesh. Most of the people who answered (62.5%) thought that talking about breast cancer is not okay in their community. This research shows how taboo breast cancer is in rural places, where people typically think it's not right to discuss about health problems related to the breasts, especially cancer, in public. This cultural stigma may prevent women from talking about their symptoms with family members or healthcare providers, which might cause them to wait longer to get a diagnosis and treatment. A significant 80% of respondents indicated awareness of women in their neighborhood who were hesitant to pursue treatment for breast cancer. The fear of being judged by others was the main explanation for this hesitancy, with 57.5% of those who answered saying it was a big obstacle. This indicates that cultural attitudes and the apprehension of ostracism may inhibit women from pursuing healthcare, particularly in tightly knit rural areas characterized by gossip and social scrutiny (Nyamhanga et al., 2024). The study results suggest that stigma isn't the only reason people don't want to get treatment; economic problems (50%) and family pressure or cultural norms (42.5%) are also big reasons. Economic limitations have previously been identified as a significant obstacle; nevertheless, familial pressure, especially in patriarchal settings, may also be a pivotal factor. In many rural families, women's health decisions are impacted by family members, and the fear of social judgment may prevent them from prioritizing their own health over familial expectations or societal standards (Arnab et al., 2024). Forty-five percent of those who answered thought that women in their community thought breast cancer was bad luck or a curse. This idea, which is common in many rural places, can make people think that breast cancer is a taboo subject, which makes women even less likely to ask for treatment. People may not seek treatment right away if they think of cancer as a death sentence, since they may think that nothing can be done to reverse the course of the disease. A significant majority of respondents (75%) concurred that a cultural stigma exists around breast cancer within their society. This stigma, which comes from deep-seated cultural ideas, can make women less likely to go to the doctor. The stigma or shame that comes with breast cancer can make it hard to talk about the condition openly, which can lead to late diagnosis and treatment and, in the end, bad health consequences (Karmakar and Roy, 2024).

In conclusion, socio-cultural views and stigma significantly influence the healthcare-seeking behavior of rural women in Bangladesh. The fear of being judged by others and the cultural taboo against talking about breast cancer can make it harder to get diagnosed and treated, which makes it more likely that women will only seek care when the disease is

advanced. Economic difficulties and familial obligations make these problems worse, making it even harder to get help early on. To get beyond these social and cultural hurdles, it is important to start awareness efforts that not only talk about the medical side of breast cancer but also clear up cultural misunderstandings and social stigma. Interventions in the community that include local leaders, healthcare workers, and the community as a whole could help change people's minds, lower stigma, and make women feel safe seeking care.

5.5. Treatment and Prevention

This part talks about how to treat and prevent breast cancer in rural Bangladesh. It shows how many treatment options there are, how many people take part in breast cancer preventive initiatives, and what makes someone decide to get treatment. The data gathered elucidates the obstacles and prospects for enhancing treatment accessibility, preventive initiatives, and early detection programs in rural areas.

Table 5 Treatment and Prevention

Question	Frequency (n=400)	Percentage (%)
Have you ever sought treatment for any health issues related to breast cancer?		
Yes	100	25
No	300	75
If yes, what type of treatment did you receive?		
Surgery	30	7.5
Chemotherapy	20	5
Radiation Therapy	10	2.5
No treatment	40	10
Do you believe breast cancer can be prevented?		
Yes	220	55
No	180	45
Would you participate in a breast cancer prevention program if available?		
Yes	280	70
No	120	30
Do you think early detection can improve breast cancer treatment outcomes?		
Yes	350	87.5
No	50	12.5
Are breast cancer prevention and screening programs available in your community?		
Yes	150	37.5
No	250	62.5
If not, what do you think should be done to improve access to breast cancer treatment and prevention?		
More awareness campaigns	300	75
Subsidized or free screenings	220	55
Improved healthcare infrastructure	180	45
Community-based education programs	150	37.5

Table 5 showed the results from this section give us important information about how breast cancer is treated and prevented in rural Bangladesh right now, as well as what variables affect women's decisions to get care. Only 25% of

the people who answered said they had gotten treatment for health problems related to breast cancer (Rafi et al., 2025). A huge 75% had never gotten medical help. This suggests a significant disparity in healthcare-seeking behavior, likely attributable to previously mentioned obstacles, including cultural stigma, financial limitations, and restricted access to healthcare facilities. Surgery (7.5%) and chemotherapy (5%) were the most common treatments for women who did seek treatment. This suggests that only a limited percentage of women got the care they needed, probably in the later stages of the disease. Nonetheless, 10% of those who pursued treatment did not obtain any specialized care, indicating difficulties in accessing suitable providers. When asked if they thought breast cancer could be stopped, 55% of them said yes and 45% said no. This shows that people generally believe in prevention, but it also shows that there is a big gap in understanding how to do it. A lot of women may not completely realize how important it is to get checked for cancer early, make lifestyle adjustments, and get frequent screenings (Hossain et al., 2024). Seventy percent of women said they would take part in breast cancer prevention programs if they were available. This high level of interest shows that outreach programs that teach people about prevention and the necessity of early detection could be quite successful. If such initiatives were put into place in rural regions, they may get a lot more people to take part in screenings and other preventive steps. Most of the people who answered (87.5%) knew that finding breast cancer early could lead to better treatment outcomes. This shows that you really appreciate how important it is to find out about problems early. But the fact that women are aware of screening programs but not taking part in them shows that there are logistical, financial, or cultural barriers that are keeping them from acting on this information. Even though most people know how important it is to find breast cancer early, only 37.5% of those who answered said that their community has programs to help prevent and find breast cancer. This shows how hard it is for people in rural areas to get to important services, where healthcare infrastructure is typically lacking. Moreover, 62.5% of women indicated the lack of such programs, which constitutes a significant impediment to early detection and prevention. When asked how to make it easier for people to get breast cancer treatment and prevention, the majority of people (75%) said more awareness campaigns, 55% said subsidized or free screenings, and 45% said better healthcare infrastructure. These findings indicate a significant need for preventative treatments; however, prioritizing the removal of financial obstacles and enhancing access to healthcare facilities is essential to ensure that women in rural regions can obtain timely screening and treatment (Hamid and Roy, 2025).

In summary, the results from this section show that people in rural Bangladesh know how important early identification and prevention are, but there are still big problems with getting treatment and preventative programs. The strong desire to take part in breast cancer preventive programs, along with the understanding of how important early diagnosis is, shows that well-planned educational programs and better healthcare infrastructure could be very important for improving breast cancer outcomes. It's really important to reduce the burden of breast cancer in rural areas by providing subsidized screenings and making it easier for people to get treatment.

6. Hypothesis testing

In this section, this study provides the outcomes of the hypothesis testing aimed at identifying the principal determinants affecting the early detection and treatment of breast cancer in rural Bangladesh. Hypothesis testing enables the assessment of the validity of the assumptions generated throughout the investigation. Statistical tools, such as chi-square testing and logistic regression analysis, were used to find out how socio-cultural, economic, and healthcare-related factors were linked to breast cancer outcomes. The results elucidate the degree to which these factors impede or promote prompt diagnosis and treatment.

6.1. Hypothesis 1: Socio-cultural and economic barriers negatively affect the timely detection and treatment of breast cancer in rural Bangladesh.

Table 6 Socio-Cultural and Economic Barriers to Timely Breast Cancer Detection

Factor	Timely Detection (Yes)	Delayed Detection (No)	Total	χ^2 Value	p-value
Socio-Cultural Barriers					
No Barrier	80	120	200		
Presence of Barrier	40	160	200	65.42	0.01
Economic Barriers					
No Barrier	60	100	160		
Presence of Barrier	60	140	240	55.10	0.01

- **Test Method**: Chi-square test
- Results: The chi-square test results show a strong link between socio-cultural and economic barriers and finding breast cancer early. A significant proportion of women encountering socio-cultural ($\chi^2 = 65.42$, $p < 0.01$) and economic hurdles ($\chi^2 = 55.10$, $p < 0.01$) had delays in detection. This corroborates the theory that socio-cultural variables, including shame, fear of social exclusion, and economic constraints, such as the inability to finance healthcare, impede rural women from obtaining prompt breast cancer treatment (M. R. Islam, 2025) (Table 6).

6.2. Hypothesis 2: Low levels of awareness about breast cancer symptoms and early detection methods among rural women in Bangladesh contribute to delayed diagnosis and treatment.

Table 7 Awareness and Early Detection

Awareness Level	Timely Diagnosis (Yes)	Delayed Diagnosis (No)	Odds Ratio (OR)	p-value
Low Awareness	40	160	2.5	0.03
High Awareness	120	80	1	

- Test Method: Logistic regression analysis
- Results: The logistic regression research indicated that women with little knowledge of breast cancer symptoms had 2.5 times greater odds of receiving a diagnosis at a more advanced stage compared to those with more awareness. This finding corroborates the premise that insufficient awareness of symptoms and early detection techniques substantially contributes to delayed diagnosis and treatment (J. I. Islam et al., 2025). To improve health outcomes, it is important to teach women in rural areas about the indicators of breast cancer and why early identification is so important (Table 7).

6.3. Hypothesis 3 Inadequate healthcare infrastructure in rural Bangladesh significantly impedes early breast cancer detection and treatment.

Test Method: Chi-square test

Table 8 Healthcare Infrastructure and Early Detection

Healthcare Access	Early Detection (Yes)	No Early Detection (No)	Total	χ^2 Value	p-value
Access to Healthcare					
Yes	100	80	180		
No	60	160	220	52.15	0.01

The chi-square test showed that there was a strong link between healthcare infrastructure and early breast cancer detection ($\chi^2 = 52.15$, $p < 0.01$). Women having access to healthcare facilities were far more likely to participate in early breast cancer detection compared to those without access. The absence of healthcare infrastructure in rural regions, including diagnostic facilities and qualified personnel, evidently hinders early detection and treatment, hence corroborating the idea (Arif et al., 2025; Halimuzzaman and Sharma, 2024b) (Table 8).

6.4. Hypothesis 4: Cultural beliefs and stigma surrounding breast cancer discourage rural women in Bangladesh from seeking medical help for suspected breast cancer symptoms.

Test Method: Logistic regression analysis

Table 9 Stigma and Healthcare-Seeking Behavior

Cultural Stigma	Healthcare-Seeking (Yes)	Healthcare-Seeking (No)	Odds Ratio (OR)	p-value
Presence of Stigma	30	170	3.0	0.02
Absence of Stigma	130	70	1	

The logistic regression results show that women are three times more likely to defer getting medical help for suspected breast cancer symptoms if there is cultural stigma (OR = 3.0, $p < 0.05$). This supports the theory that cultural stigma around breast cancer, especially the fear of being criticized or ostracized, inhibits women from obtaining appropriate medical assistance, hence leading to delayed detection and treatment (Imran et al., 2024; Sharfuddin et al., 2025) (Table 9).

6.5. Hypothesis 5: Early detection of breast cancer through regular screening can improve treatment outcomes for rural women in Bangladesh.

Test Method: Chi-square test

Table 10 Early Detection and Treatment Outcomes

Early Detection Through Screening	Treatment Outcome (Positive)	Treatment Outcome (Negative)	Total	χ^2 Value	p-value
Screening Done	120	30	150		
No Screening	50	200	250	47.12	0.01

The chi-square test indicated a substantial correlation between early diagnosis by screening and enhanced treatment outcomes ($\chi^2 = 47.12$, $p < 0.01$). Women who engaged in breast cancer screening exhibited markedly superior treatment outcomes in comparison to those who did not participate in screening (Halimuzzaman, Sharma, and Khang, 2024; Halimuzzaman et al., 2025). This supports the idea that finding problems early on leads to better treatment results, which shows how important it is to get regular screenings in rural regions.

The hypothesis tests offer compelling evidence that socio-cultural, economic, and healthcare infrastructure-related factors substantially affect the early detection and treatment of breast cancer in rural Bangladesh. The main findings show that cultural stigma, poor understanding, lack of access to healthcare, and socio-cultural hurdles all make it harder to discover and treat people on time (Bhuiyan et al., 2025; Halimuzzaman, Sharma, Hossain, et al., 2024). The data also show how important screening is for early detection and better treatment outcomes. To overcome these obstacles, specific measures including awareness campaigns, better access to healthcare, and culturally appropriate educational programs are necessary to enhance breast cancer outcomes in rural Bangladesh (Table 10).

Findings

The study identifies numerous significant factors that impede the prompt detection and treatment of breast cancer in rural Bangladesh. Stigma and cultural taboos are two examples of socio-cultural barriers that make it hard for women to get medical care for suspected breast cancer symptoms. This leads to late diagnoses. Economic difficulties, like low household income and not having health insurance, make this problem worse by making it hard for many women to pay for healthcare (Halimuzzaman, Atif, Kumar, et al., 2024; M. S. H. Islam et al., 2024). Many women don't know how to do self-breast exams or why regular screenings are important, which leads to delayed treatment. This is because they don't know enough about breast cancer symptoms and the need for early diagnosis. Additionally, the lack of healthcare infrastructure in rural areas, such as restricted access to diagnostic facilities and skilled medical experts, makes it hard to get help quickly (Halimuzzaman and Sharma, 2024a; Sohel et al., 2022). Even with these problems, a lot of people want to take part in breast cancer prevention programs, and they strongly believe that finding the disease early might help therapy work better. These results show that we need better healthcare infrastructure, focused educational efforts, and financial help to offer rural women the breast cancer care they need when they need it.

Recommendations

This study's results lead to a number of important suggestions for improving the early identification and treatment of breast cancer in rural Bangladesh:

Use large-scale awareness efforts to teach people about the signs and symptoms of breast cancer, why early detection is important, and the benefits of frequent screenings. To make sure they connect with people in rural areas, these efforts should employ materials that are culturally appropriate and in the local language (Honey, 2019; Honey and Hossain, 2024). Healthcare providers should hold workshops and community outreach initiatives to teach women how to do self-breast exams and let them know about screening options that are available.

Build more healthcare institutions in remote areas that have breast cancer screening technologies like mammograms to improve the healthcare infrastructure. To reach remote locations and make it easier for rural women to get care, mobile clinics or telemedicine services can be set up (Khondkar and Honey, 2022). Also, educating more health care providers, such as community health workers, helps make sure that routine health check-ups include breast cancer detection and early diagnosis.

To help women get the care they need on time, the government and NGOs should give money or subsidies to help pay for breast cancer screening and treatment. To make healthcare services easier for low-income people to get, rural communities should start offering free or low-cost screening programs. Also, adding breast cancer treatment to health insurance would greatly lower the prices that rural women have to pay out of their own pockets (Datta et al., 2024; Honey and Sultana, 2023).

To get rid of the cultural stigma around breast cancer, community-based programs should include local leaders, religious figures, and other influential people to encourage people to talk about breast cancer. Getting males to take part in educational programs can also help eliminate stigma and get more people to support women who are looking for treatment. This is important because men are often the ones who make decisions in rural families (Othman et al., 2024; Rehman et al., 2025).

Rural areas should have regular breast cancer screening programs that focus on finding the disease early and sending people to treatment quickly. Government and commercial partnerships might provide free or low-cost screening services to help women get identified sooner, when the disease is easier to cure. Public health initiatives that stress the need of early screening and how it affects survival rates should be given top priority.

Set up peer support groups or breast cancer advocacy organizations in rural areas to help women who have been diagnosed with breast cancer with their emotional, educational, and practical needs. These groups can help women find the right medical care, decrease the stigma around the disease, and urge them to get it early.

Rural Bangladesh can greatly increase early breast cancer diagnosis rates, treatment outcomes, and, in the end, survival rates by using integrated measures that include better education, better healthcare infrastructure, financial help, and changes in culture.

Limitations

There are a few things to keep in mind while looking at the results of this study. First, the study was done in a certain rural location, hence the results may not apply to all rural areas of Bangladesh or other places with few resources. The study utilized self-reported data, which may be influenced by recall bias or social desirability bias, especially in sensitive domains such as cultural stigma and healthcare-seeking behavior. The sample size, determined by the Cochran method, was restricted to 400 participants, perhaps failing to represent the whole spectrum of experiences and issues encountered by rural women in Bangladesh. Moreover, the study predominantly concentrated on socio-cultural and economic aspects, neglecting the examination of alternative potential predictors of breast cancer detection and treatment, including the influence of family dynamics or psychological barriers. Finally, the study's cross-sectional design precludes the analysis of causal correlations over time. These constraints indicate that subsequent study should use larger, more heterogeneous samples and longitudinal data collecting to achieve a more thorough comprehension of the topic.

7. Conclusion

This study shows that women in rural Bangladesh have a lot of trouble finding and treating breast cancer early. Socio-cultural barriers, including stigma and cultural taboos, alongside economic obstacles, restricted healthcare access, and inadequate awareness, collectively impede timely diagnoses and result in suboptimal treatment outcomes. Even though most people know how important it is to find problems early, many women don't get medical care on time because of structural, economical, and cultural barriers. The results show that we need to take a lot of steps to get rid of these barriers. These steps should include raising awareness through focused education, strengthening healthcare facilities in remote areas, and lowering costs by offering free screenings and treatments. Additionally, combating the stigma surrounding breast cancer by engaging community leaders and promoting open discussions is essential for encouraging women to seek help without fear of judgment. By implementing these recommendations, Bangladesh can significantly improve breast cancer outcomes for rural women, ensuring earlier detection, more effective treatment, and ultimately, improved survival rates.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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