The Impact of Rurality on Diagnosis, Treatment, and Recovery from Breast Cancer in Women within the United States: A Literature Review

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Research Question

How does rurality impact diagnosis, treatment, and recovery from breast cancer in women within the United States?

Introduction

Every 1 in 8 women will be diagnosed with breast cancer in their lifetime, and it is the second most common type of cancer women are diagnosed with, following only skin cancer (American Cancer Society, 2025). Additionally, breast cancer is the second leading cause of death due to cancer among women in the United States. The likelihood that a woman will die from breast cancer is 2.3% (American Cancer Society, 2025). Breast cancer also proves to be a heavy financial burden on the American healthcare system, costing $29.8 billion in 2020 alone (Centers for Disease Control, 2025). Public health officials aim to lower the prevalence of breast cancer in the United States to decrease mortality rates and save billions of dollars in treatment costs (Centers for Disease Control, 2025).

Breast cancer is the unregulated growth of breast tissue (American Cancer Society, 2021b). There are various types, including but not limited to ductal carcinoma in situ (DCIS), invasive ductal carcinoma (IDC), and invasive lobular carcinoma (ILC) (American Cancer Society, 2021a). DCIS makes up almost 20% of new breast cancer cases in the United States, but it is extremely curable. This subtype of cancer is also referred to as Stage 0, but it can easily morph into invasive cancer (American Cancer Society, 2021a). IDC occurs when cells that have mutated originate from the lining of the milk ducts in the breasts and spread to other areas (American Cancer Society, 2021a). Approximately 80% of all invasive breast cancer is IDC (American Cancer Society, 2021a). ILC comprises 10% of all invasive breast cancer cases, and it originates in the lobules (American Cancer Society, 2021a). It is more difficult to detect than

other types of breast cancer, and it is more likely to spread to both breasts before women are officially diagnosed (American Cancer Society, 2021a).

Breast cancer can be detected and diagnosed in various ways. Breast exams are common at annual gynecology appointments, and providers are looking and feeling for any abnormalities in the breast (Mayo Clinic, 2025). This included changes in the texture of skin and nipples, as well as lumps inside the breast tissue (Mayo Clinic, 2025). Mammograms are used to x-ray the internal tissue of the breasts, and irregular areas may be tested further to determine the threat they pose (Mayo Clinic, 2025). Ultrasounds of the breasts can also provide further information about the composition of irregular lumps (Mayo Clinic, 2025). Breast MRIs are sometimes used to determine if cancer is present in different areas of the affected breast(s) (Mayo Clinic, 2025).

As technology and medical imaging continue to improve, better screening options are available. In addition, education on the topic has increased, and treatments have improved, lowering the overall mortality rate from breast cancer (American Cancer Society, 2025). However, previous studies have found that rural women in the United States have less access to cancer screening facilities, specialty cancer care, treatments, and medical professionals (Sprague et al., 2021). Rural women also receive breast cancer screenings less often than their urban counterparts (Bishwajit & Kpoghomou, 2017). Mammography rates are lower among rural women than urban women. Only 72.5% of women seeing medical professionals in rural areas received mammograms, whereas 77.6% of women seeing medical professionals in urban areas received mammograms. Rural women in hospital referral regions (HHRs) that had median performance rates had a 7% lower likelihood of receiving mammograms. In HHRs with lower-than-average performance rates, an even bigger disparity was demonstrated, reporting up to 19% lower likelihood of receiving mammograms. Not receiving mammograms can lead to a later

diagnosis and a worse prognosis (Orwat et al., 2017). Additionally, breast cancer tends to present itself in later stages among women residing in rural areas than among women living in urban areas (Obeng-Gyasi et al., 2022).

All of this implies that rural women may experience adverse health outcomes due to a lack of proper healthcare and signifies that a large health disparity exists between urban and rural women in the United States. This study aims to determine how rurality impacts diagnosis, treatment, and recovery from breast cancer in women within the United States.

Methods

The UGA Library multi-search tool was the primary source for retrieving articles. A total of 20 articles were included in this review, with 18 articles chosen from the UGA multi-search tool, and two articles were sourced from articles that appeared in the initial search.

Specific inclusion and exclusion criteria were applied to the search. All articles were peer-reviewed academic journal entries. The original journal articles must have been published in the last ten years (2015-2025), and their original publication must have been in English. Additionally, there must have been an online copy of the article within the database. Articles with subjects of breast cancer, breast neoplasms, and breast tumors were included in this search. Articles where the primary study was done in a different country, but had associations with the United States, were not included in the results section.

The search terms that were used to narrow down the pool of potential articles were as follows: (breast cancer or breast neoplasm or breast carcinoma or breast tumor) AND (rural*) AND (diagnose or diagnosing or treatment or treating or recovery or recovering) AND (USA or America or United States or United States of America or US) AND (women or woman or female or females or girl or girls). When these search terms were used, 325 articles were returned.

Each of these search terms were chosen for specific reasons. Breast cancer is the primary health issue being addressed in this literature review. Breast neoplasm is an abnormal growth of breast tissue. Although not guaranteed to be malignant or cancerous, it may prove to be a useful search term to ensure certain articles are not excluded that could be beneficial to this review. Breast carcinoma is another term for breast cancer. A breast tumor is a specific and common characteristic of breast cancer, so it was included to capture articles that may discuss this specific topic. Rural* was included to encapsulate all terms that may be used to describe rurality, since women living in rural areas with breast cancer are the primary target population in this literature review.

Diagnose/diagnosing, treatment/treating, and recovery/recovering are all being examined in this literature review, so multiple versions of each word were used to hopefully include all articles that may discuss one or more of these factors regarding breast cancer. All sources/studies that were used in the results section of this literature review needed to be based in the United States, so the most common terms to describe this location were used in the search. Females are the primary sex of study in this literature review, so all common terms for that sex were included in the search.

Once the search was narrowed down to 325 articles, 20 articles were selected by reading the title and determining if the study sounded relevant to the research question. If the title of an article met these criteria, the abstract of the article was read, and once again, it was determined if the study sounded relevant to the research question. If so, the article was read in its entirety, and the information was analyzed for its relevance to this literature review. When studies had applicable and relevant data, pieces of information from the article that would be useful to the results section were pulled together.

Results

For this literature review, twenty articles were selected to determine the impact of rurality on breast cancer among women in the United States. This literature review examined impacts on diagnosis, treatment, and recovery, and the results demonstrated that breast cancer rates were associated with health disparities and differences in outcomes based on rurality.

Diagnosis

Low breast cancer screening rates are associated with rurality and an increased likelihood of late-stage diagnosis. In Nebraska, the state-wide rate of late-stage diagnosis for breast cancer was 2.3 per 1,000, whereas the rural rate for the same statistic was 3.4 per 1,000 (Chandak et al., 2019). To further demonstrate the disparity, the urban rate of late-stage diagnosis was 1.7 per 1,000. Many areas deemed “hot spots” for late-stage breast cancer diagnosis were in rural areas, whereas “cold spots” for diagnosis were in urban areas. Rural areas were also associated with less access to screening facilities, with the median distance being 13.4 miles. This is compared to the state-wide average of 2.4 miles and the urban average of 2.0 miles (Chandak et al., 2019).

Breast cancer screening rates dropped dramatically during and after the COVID-19 pandemic. Urban, metropolitan, and rural women experienced a significant decrease in the likelihood of receiving screening for breast cancer after the pandemic compared to before. However, rural women were disproportionately affected, with a 37.3% drop in screening rates, compared to urban women (26.1%) and metropolitan women (8.8%). By December of 2022, the average rate of breast cancer screenings among rural women was 33% lower than before the pandemic. Despite other populations experiencing this deficit, rural women were the most affected, and they have had a harder time raising the screening percentage back to pre-COVID levels (Bermudez et al., 2024).

There was an increase in the likelihood of patient-detected breast cancer if the patient lived in a rural area, with an odds ratio of 1.51. Rurality is positively associated with the probability of a woman detecting her own breast cancer before a clinical measure or medical professional does (Lee et al., 2024).

Treatment

The average travel time to the nearest treatment facility was twice as long for rural women, with them traveling 49.8 minutes one way on average and urban women traveling 23.9 minutes on average. Additionally, rural breast cancer patients had over double the travel distance to the nearest breast cancer treatment facility than urban breast cancer patients. The average travel distance for rural women nationwide was 40.8 miles compared to just 15.4 miles for urban women (Longacre et al., 2020). Some areas of the United States have similar results, but with an even larger disparity in travel distance. Rural women in Missouri and Illinois had a mean travel distance of 87.3 miles, while urban women had a mean travel distance of 18.0 miles (Golden et al., 2025). The likelihood of receiving delayed treatment increased by 1% for every 1-mile increase in travel to a treatment facility. Rural patients' odds ratio for receiving delayed treatment was 1.57 (Adams et al., 2025).

Young women in rural areas experience less delay in treatment for breast cancer (OR=1.18%) than their counterparts in urban (OR=2.36%) and metro (OR=2.97%) areas (Jain et al., 2022). However, women of all geographic regions experienced treatment delay, indicating a need for more timely treatment across all geographic locations (Jain et al., 2022).

Rural women in Kentucky were 64% less likely to receive breast reconstruction after tumor removal than urban women. Breast reconstruction rates rose among rural women over the period of the study (2006-2015) by 11.5%. However, there was still a significant disparity

between urban and rural women, as urban women saw a 35.2% increase in breast reconstruction in the same time frame (DeCoster et al., 2020).

Women living in rural and urban areas saw approximately the same decrease in mastectomies and increase in breast conserving surgeries (BCS) between 2011 and 2016. There was no significant change in either population of women between receiving a mastectomy and BCS between 2003 and 2010. Starting in 2011, there was an average annual decrease of 5.8% in mastectomies among rural women. Starting in 2010, there was an annual increase of 3.4% in BCS among rural women. This is similar to their urban and metropolitan counterparts (Roberson et al., 2022). However, mastectomies with no reconstruction or additional combined treatments were still most common among rural and low-income women compared to urban or metropolitan women (Shirvani et al., 2016). Higher percentages of rural women do not receive different forms of treatment or additional reconstruction compared to other groups of women, signifying a lack of diffusion of innovative treatments in rural and low-income areas (Shirvani et al., 2016).

BCS paired with post-operative radiation therapy (PORT) is the medical standard of care for women diagnosed with ductal carcinoma in situ (DCIS) breast cancer. However, 56% of rural women who underwent BCS did not receive PORT, compared to only 29% of urban women who underwent BCS. The significantly different proportion between the two groups of women indicates a lack of standard breast cancer treatment and care among women living in rural areas compared to urban women (Riley, Chrischilles, et al., 2022).

Gene Expression Profiling (GEP) can help medical professionals determine women at higher risk for recurring breast cancer, and it can prevent over-treatment and its possible side effects. Despite GEP's known benefits, utilization rates among women who are eligible are significantly lower among women who seek care in small rural areas (56.6%) compared to

women who seek their care in urban areas (52.8%). This may lead to less preventative care and medical history awareness among providers and their rural patients (Riley, Charlton, et al., 2022).

An increase in contralateral prophylactic mastectomies (CPM) is independently associated with rurality (OR=1.10) and increased travel distance (OR=1.37) among women with unilateral breast cancer. Metro-women were more likely to receive CPM if they traveled 30 miles or greater to receive treatment, whereas rural women were more likely to receive CPM regardless of the distance traveled. The highest proportion of CPM in every age group was among rural women. Rural women who underwent CPM were less likely to receive breast reconstruction than their urban counterparts. CPM is invasive, and it has a much greater risk of complications and long recovery times. This leads to a greater number of rural women experiencing more potential health complications than urban women. If women received treatment for their unilateral breast cancer within 30 miles of their residence, rural (OR=0.74) and suburban women (OR=0.67) were less likely to receive reconstruction than their urban counterparts (Wahlen et al., 2023).

Approximately 52% of rural women under the age of forty underwent CPM compared to 40% of urban women and 39% of non-metro women. Rural women had the furthest travel distance of the three groups of patients, with a median travel distance of 36 miles to a treatment facility or hospital. Breast reconstruction after CPM led to even greater median distance traveled among rural women, with the median being 51 miles. Rural women were recommended to undergo CPM more frequently than metropolitan women. This creates a health outcome disparity between the two groups of women due to the complications associated with CPM. Additionally,

only 29% of rural women with breast cancer received treatment at a rural hospital, implying further travel distance for care (Lizarraga et al., 2021).

Other treatments, such as adjuvant endocrine therapy, a type of preventative medication that is taken post-surgery to reduce the risk of redeveloping breast cancer, are common prescriptions. However, women living in states that had more rural areas were less likely to receive adjuvant endocrine therapy as recommended by medical professionals than women living in states with more metropolitan and urban areas (Camacho et al., 2017).

Recovery

Postoperative pain was experienced by women receiving care in rural areas at a 2.081% higher rate than women receiving care in urban areas. Typically, the location of receiving care correlates with residence, meaning that rural women experience postoperative pain at higher levels than urban women (Suo et al., 2024).

The odds ratio for developing depressive symptoms after a cancer diagnosis in non-metropolitan areas, also referred to as rural areas, is 4.02 (Krok-Schoen et al., 2024). However, women living in large, urban areas have an odds ratio of developing depressive symptoms after a cancer diagnosis of 2.62. Additionally, urban women have similar pre- and post-cancer diagnosis depressive symptoms, whereas rural women have a significant increase in depressive symptoms post-cancer diagnosis, illustrating a disparity in mental health outcomes between the women from differing geographic regions (Krok-Schoen et al., 2024).

The odds ratio for receiving survivorship care and instructions among urban women in Missouri was 5.90 times greater than their rural counterparts. Individuals diagnosed with breast cancer in rural areas were the least likely of any geographic location to receive a full care plan,

treatment summary, or instructions on how to cope with this diagnosis and treatment (Anbari et al., 2024).

Stage IV breast cancer mortality rates did not significantly differ between women in rural areas (84%) and urban areas (83%). White women living in rural areas had an increased risk of mortality due to stage IV breast cancer, with a subdistribution hazard ratio (SHR) of 1.09. However, rurality did not have a significant association with breast cancer mortality among other races. Rurality was significantly associated with an increased risk of mortality among Black women diagnosed with hormone receptor-negative (HR-negative) breast cancer (SHR = 1.27). Rurality did not have a significant association with mortality among other HR-negative races (Huang et al., 2022). Women living in rural areas who were under the age of 40 when they received their diagnosis had a higher mortality risk (HR = 1.37) than women under 40 living in urban areas, demonstrating another geographic disparity (Moubadder et al., 2022).

Discussion

The purpose of this literature review was to determine the impact of rurality on diagnosis, treatment, and recovery among women in the United States. Since the risk for breast cancer is high, 1 in 8 women, as previously mentioned, research aimed at determining disparities in diagnosis, treatment, and recovery is essential for creating a healthier population. Observing healthcare availability, accessibility, and disease outcomes is one of the most important things that researchers can do before creating interventions to combat these differences. Rural areas have fewer healthcare facilities than urban areas, and therefore, fewer breast cancer screening resources are widely available to rural residents (Maven Team, 2022). When people need to travel further distances for preventative care, they often do not receive that care as frequently as recommended (Maven Team, 2022). Individuals in rural areas tend to be diagnosed with breast

cancer in its later stages since breast cancer screenings are less frequent and less available in these areas compared to urban/metropolitan areas (Sprague et al., 2021).

There is a serious lack of healthcare specialists and providers in rural areas, which leads to delayed treatment, specifically surgery for cancer. This is linked to larger travel distances and costs associated with receiving care from the sparse facilities that offer it (Centers for Disease Control, 2024). The lack of preventative care and the lag in diagnosis lead to a need for more specialty care in rural areas (Centers for Disease Control, 2024) and survivorship instructions for rural women, but they are the least likely to receive this information, leading to a large gap in knowledge and coverage among these individuals.

Older adults in rural areas have less access to mental health services, leading to worse mental health outcomes after a cancer diagnosis. This makes a full recovery from breast cancer a longer and more difficult process for survivors in rural areas (Burris & Andrykowski, 2010). Many women experience mental health challenges because of the lack of a complete survivorship care plan, and there are limited mental health services available to these survivors in rural areas (Burris & Andrykowski, 2010).

Young women living in rural areas who have been diagnosed with breast cancer also have a higher mortality rate from breast cancer than young urban women diagnosed with breast cancer. Geographic location impacts rural women's treatment outcomes and preferred choice for treatment (Obeng-Gyasi et al., 2022). This alludes to the fact that women who live in rural areas may want to receive the most intense treatment they can in order to decrease future visits and distance travelled due to lack of access. This creates an ethical issue as well because even though rural women have the same options for treatment that urban women have, they cannot access them as readily. Therefore, rural women who may be interested in less invasive or less drastic

treatments or recovery options may feel forced to receive the most intense treatment. This is because of their difficulty accessing treatment again, should they opt for a less invasive treatment option, but then need further intervention.

Limitations

The most notable limitation in this literature review is that only 20 articles were selected to be reported in the results section. By only using 20 pieces of literature in this paper, some important information on breast cancer may have been omitted and not included in this review. The disease is well researched, and additional information in articles that were not selected may have been useful in this study. The search terms used were designed to capture articles that were relevant to the research question being asked, but some useful articles may have been filtered out. Additionally, articles that were not housed in the UGA library database were not included in this search, so several informational articles that could have been useful for the results of this literature review were excluded.

All the studies that were included in the results section were observational, meaning that causation could not be determined. Across several studies, there was a clear correlation between rurality and disruption in diagnosis, treatment, and recovery. However, without an experimental study, definite causation cannot be determined. The operational definition of rurality and urban areas differed between studies, as researchers used varying methods to determine where participants resided or received care. This creates potential biases, as some locations may have been classified as rural in some studies and urban in others.

Many of the studies collected data through the Surveillance, Epidemiology, and End Results (SEER) national database. This registry includes thousands of women diagnosed with breast cancer every year, but it encompasses less than half of all cases. This means that women

who qualified for studies and could have provided useful data may have been excluded. The lack of completion of the database also makes it difficult to get a full, national picture of breast cancer and how it varies between geographic locations.

Due to the mortality rate of this disease, it can be difficult to track diagnosis, treatment, and recovery over time. Additionally, much of this research examines specific locations and therefore does not capture every rural and urban area in the United States. Although there are obvious trends associating rurality with lower levels of care, this does not mean that every single rural community experiences worsened outcomes from breast cancer.

Implications

This literature review highlights the importance of understanding existing healthcare disparities regarding breast cancer among women residing in different geographic locations. Despite the vast amount of literature and knowledge medical professionals and researchers have on this topic, there is still room for further research, practice, and policy.

Future Research

Discovering more effective prevention and intervention methods for breast cancer, specifically for rural women, could help improve health outcomes for this population. Additionally, running experiments to determine the effectiveness of existing programs or interventions when applying them to rural women, especially in specific areas, would be beneficial research in this area (Nayyar et al., 2023). Determining other underlying risk factors for the disparities that may appear between these two populations would pave further research and interventions to improve breast cancer-related health outcomes in rural women.

There was not much research available that thoroughly outlined cultural factors that affect diagnosis, treatment, and recovery. Cultural factors among both urban and rural women

could have large impacts on a woman's medical decisions regarding breast cancer screenings, treatment options, and recovery outlook. Additionally, cultural factors experienced by different races and ethnicities may play a role in breast cancer prognosis. Specific races and ethnic groups could be unevenly located in urban or rural areas, therefore leading to disparities and differences between women living in the two geographic regions. There is a need for more research that observes these factors and determines their role in diagnosis, treatment, and recovery.

Future Practice

Both public health professionals and policymakers need to prioritize distributing resources to rural medical facilities that will improve health outcomes for rural patients. Shifting the emphasis of interventions and policies to focus on rural delivery and bridging the gap between rural and urban health outcomes among women is essential to limiting health disparities long-term. Increasing the utilization of services that have been shown to have positive impacts on rural health, such as telemedicine, is another way to further promote healthy outcomes and less health inequity between geographic locations (Sprague et al., 2021).

Service delivery programs for breast cancer have also shown promise in decreasing inequities between urban and rural women. The Marshfield Clinic Breast Care Program (BCP) is an initiative that coordinates patient appointments with multiple specialty breast cancer providers, such as radiologists, oncologists, breast surgeons, and other specialists. This team of professionals works together to create a treatment and care plan specific to the patient. This decreases the transportation and financial burden on rural women seeking care because they can consult all their providers at once instead of needing several appointments. Ultimately, this increases rural health outcomes and limits geographic disparities (Depke et al., 2015).

Future Policy

Some countries around the world have taken measures to try and address the disparities in breast cancer diagnosis and care. Initiatives like mobile screening clinics, educational sessions, and working with community stakeholders to address the gap in breast cancer diagnosis, treatment, and recovery plans for underserved and rural women have been implemented (Nayyar et al., 2023). These programs have shown promise in decreasing the gap in coverage and accessibility to necessary healthcare (Nayyar et al., 2023). Similar policies could be made in the United States to improve health outcomes and patient experience in rural communities.

Additionally, having culturally appropriate solutions, such as translation services, has increased the number of people who receive testing and treatment in areas with large ethnic and racial minority groups (Nayyar et al., 2023). People who feel that healthcare providers and the medical system are willing to meet them where they are, and be respectful of their culture and fears, are more likely to seek out available health services (Nayyar et al., 2023).

Conclusion

Breast cancer is a crucial topic in public health, as millions of people are diagnosed globally. This literature review summarized the findings from 20 articles about crucial differences between diagnosis, treatment, and recovery for women in rural areas versus urban areas. Rural women experience many hardships regarding breast cancer that urban women do not, such as a lack of access to care, limited availability of care, and potentially worse health outcomes. The data from this review can be used to provide information to further create more effective prevention, intervention, and treatment strategies for rural women with breast cancer. Additional data and research on the health disparities surrounding breast cancer are necessary for health equity and a healthy future for everyone.

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