

Original article

Exploring Breast Cancer Dynamics: Understanding Risk Factors, Health Behaviors, and Treatment Trends among Women in Derna, Libya

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ABSTRACT

Breast cancer poses a significant global health challenge, being the second most common cancer among women and a leading cause of cancer-related deaths. This research aims to investigate the multifaceted dimensions of breast cancer, from risk factors to diagnostic methods and treatments. A comprehensive analysis of 109 Libyan females who lived in Derna, utilizing an online questionnaire disseminated through social media platforms. In this study, 23% were diagnosed with breast cancer, while 77% were controls. Higher breast cancer incidence was observed among younger individuals (26-34 years) and those who were overweight. Most cases were from central Derna, were university graduates, employed, married, and had high incomes. Key risk factors included positive family history (20%), oral contraceptive use (4%), and hormone replacement therapy (8%). Higher rates of gynecologist visits, clinical breast examinations, and breast cancer screening were noted in the case group. The majority of cases were diagnosed at Stage III, primarily through tissue biopsy, with many opting for combined surgery and radiotherapy. In conclusion, bridging the gaps in knowledge about breast cancer risk factors, early detection methods, and treatments is crucial for advancing comprehensive cancer management and improving patient outcomes. Continued research and personalized treatment approaches are essential for the evolving landscape of breast cancer care.

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INTRODUCTION

Breast cancer poses a significant global public health challenge and continues to be a growing concern. Reports indicate that it ranks as the second most common cancer among women worldwide, constituting 25% of all new cases in 2012 [1]. Data from western countries reveal that one in nine women is likely to develop breast cancer, making it the leading cause of cancer-related deaths in women. Breast cancer stands out as one of the most frequently diagnosed cancers in women [2]. While direct causes of breast cancer remain unknown, several well-understood risk factors increase the likelihood of its development. Factors such as age, family history, menstrual history, and lifestyle choices (e.g., oral contraception, lack of breastfeeding, smoking, obesity, and a high-fat diet) play a crucial role and can be addressed

through proper health education and awareness [3]. Early detection and effective treatment are imperative to reduce breast cancer morbidity and mortality. Methods like mammography, clinical breast examinations, and breast self-examination (BSE) are considered effective for early detection, although the overall effectiveness of breast cancer screening is a topic of ongoing discussion [2].

Breast cancer is categorized into stages based on its severity, aiding doctors in treatment planning. Stages range from 0 (localized tumor) to IV (advanced, spreading to distant organs). Each stage provides insights into the tumor's size, lymph node involvement, and potential spread to other areas [4]. Surgery remains a fundamental aspect of local breast cancer treatment. Surgeons strive to ensure cancer-free margins during the removal of tissue, and additional surgeries may be necessary if clear margins are not achieved [4]. Chemotherapy is also used either alone or combined with surgery, involving the use of various cytotoxic drugs; such as alkylating agents, antimetabolites, and tubulin inhibitors [5]. High-energy radiation is also used directed at the breast or chest wall, depending on the type of surgery performed. Its efficacy varies based on the risk profile of the patient [5]. Hormonal therapy targeting hormone receptors within breast cancer cells is used as a complementary approach, offering high response rates and improved control and survival outcomes [6].

Several well-known risk factors contribute to the development of breast cancer. Age is a significant determinant, with the likelihood increasing, as women grow older. A family history of breast cancer, particularly among first-degree relatives, raises the risk, suggesting a genetic predisposition. Hormonal factors, such as early menstruation, late menopause, and late childbirth, are associated with an elevated risk. Lifestyle choices, including oral contraceptive use, hormone replacement therapy, lack of breastfeeding, and obesity, also play a role. Additionally, exposure to ionizing radiation and certain genetic mutations, such as BRCA1 and BRCA2, heighten susceptibility. Awareness of these risk factors empowers individuals to make informed decisions about their health and underscores the importance of regular screenings and preventive measures.

Our research question prompts an investigation into the existing knowledge the current gaps in our understanding of breast cancer risk factors, early detection methods, and available treatments, and how can addressing these gaps contribute to more effective and comprehensive cancer management strategies. Understanding breast cancer risk factors, early detection methods, and available treatments is vital for comprehensive cancer management. Ongoing research and advancements in personalized treatment approaches contribute to the evolving landscape of breast cancer care.

METHODS

This study was conducted from March to August 2023, utilizing an online questionnaire disseminated through social media platforms. The survey questions were formulated in Arabic to ensure accessibility for a diverse range of women, irrespective of their educational background. The questionnaire encompassed a comprehensive set of inquiries, covering aspects such as age, weight, educational level, income, marital status, family history of breast cancer, the presence of a gynecologist, and whether the participants had undergone regular check-ups and breast screening. For those who had experienced breast cancer, additional questions inquired into the stage of detection, the method of detection, and the approach taken for treatment. A total of 109 responses were gathered, categorizing participants into two groups: the control group with 84 responses and the case group with 25 responses.

Inclusion criteria comprised females of Libyan origin aged 16 years or older residing in Derna. Eligibility was not contingent on pregnancy, breastfeeding status, or a history of specific breast disorders or breast surgery.

Data analysis was conducted using SPSS version 12.0 for Windows and Microsoft Excel-2010. Descriptive statistics, including means and numbers with percentages, were employed to present the data. The significance level for all analyses was set at a p-value less than 0.05.

RESULTS

A total of 109 females agreed to participate in the study after exclusions, with a mean age of 35 ± 10 years (range 25–61). Within this study, 25 (23%) individuals belonged to the breast cancer group, while 84 (77%) constituted the control group. Figure 1 illustrates specific demographic data comparing the characteristics of the case and control groups.

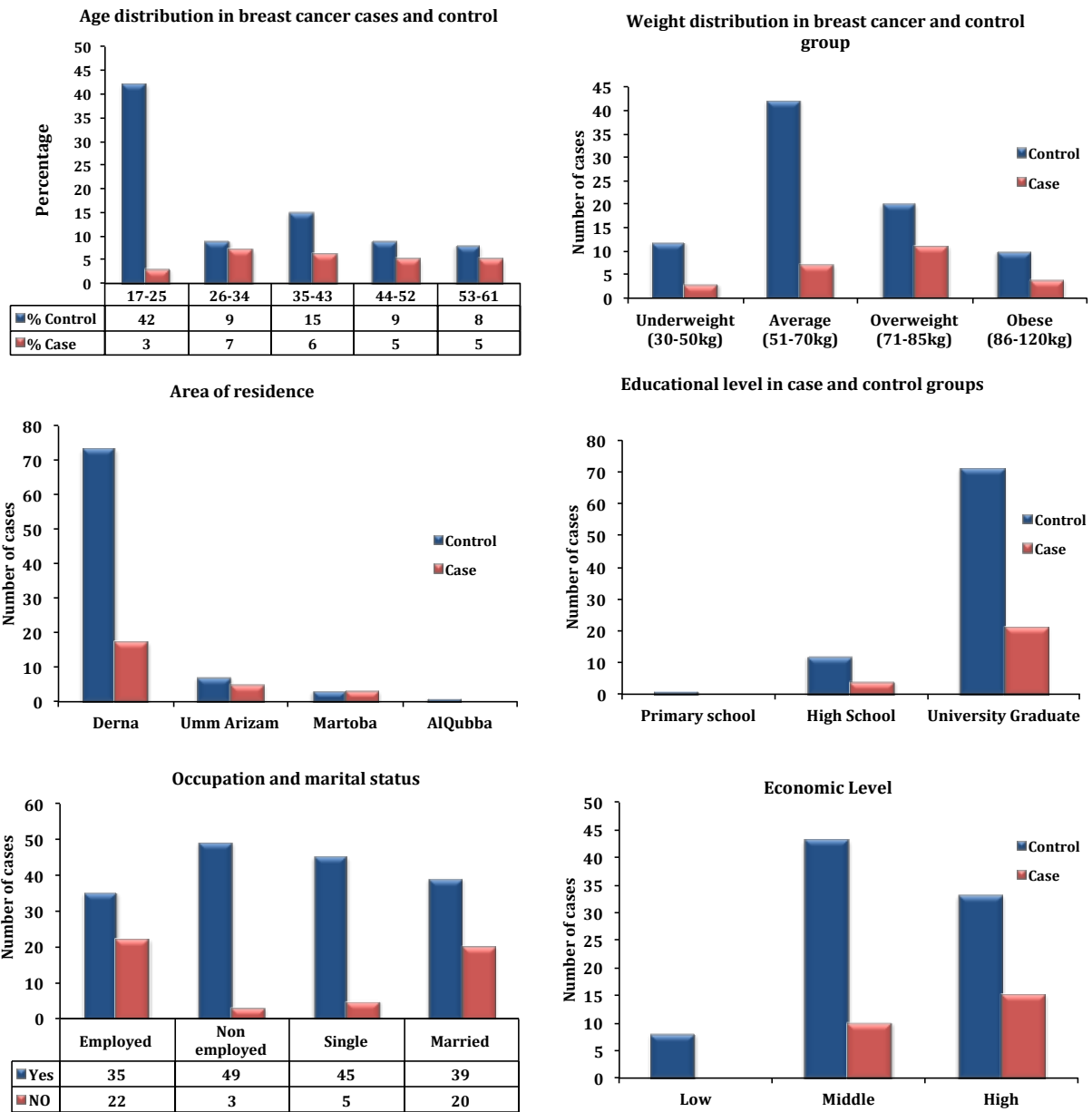


Figure 1. Comparative Analysis of Demographic Factors.

*This figure provides a visual overview of the distribution of participants across these demographic factors, offering insights into the diversity of the study population. Each bar represents the distribution of individuals within distinct categories for the following variables. **A:** Age: Breast cancer incidence is more prevalent among individuals of younger ages (26-34 year). **B:** Weight: The occurrence of cancer is notably higher among those categorized as overweight. **C:** Area of Residence: The majority resides in the central part of Derna. **D:** Education: A predominant majority of both cases and controls have attained a university degree. **E:** Occupation & marital status: In contrast to the control group, a significant proportion of cancer cases are employed; furthermore, a considerable number of cancer cases are married. **F:** Economic level: The majority of individuals diagnosed with cancer have a high-income level.*

Comparative Analysis of Breast Cancer Risk Factors between Control and Case Groups is illustrated in figure 2. Exploring Positive Family History, Oral Contraceptive Use, Hormone Replacement Therapy, and exposure to radiation.

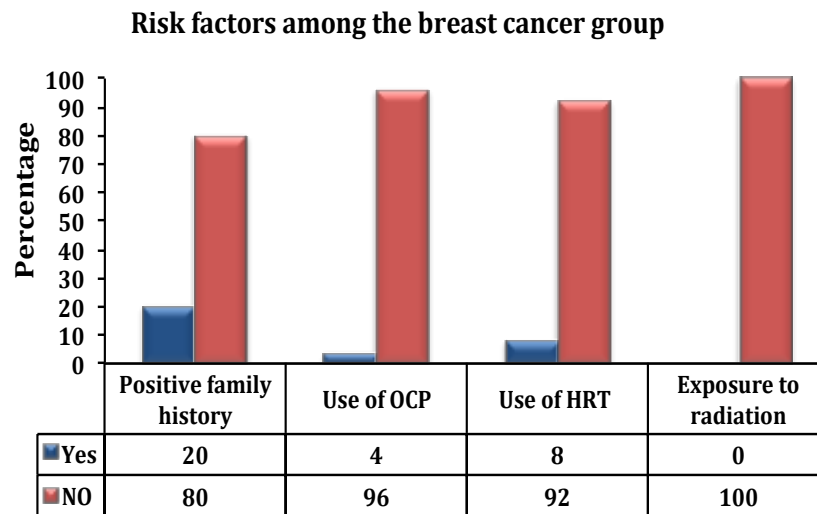


Figure 2. Distribution of Risk Factors in the Study Population.

This figure illustrates the prevalence of key risk factors within the surveyed breast cancer population. The data includes responses regarding positive family history 20% of the surveyed population reported a positive family history of breast cancer. A small percentage (4%) reported using oral contraceptive pills. A relatively low percentage (8%) reported the use of hormone replacement therapy. None of the participants reported exposure to radiation. The percentages represent the proportion of individuals with each response category.

Awareness and practices in women's health within the surveyed population was explored looking to the regular gynecologist visits, breast self-examination and breast cancer screening. Results are depicted in comparing both breast cancer cases and control groups **Figure 3.**

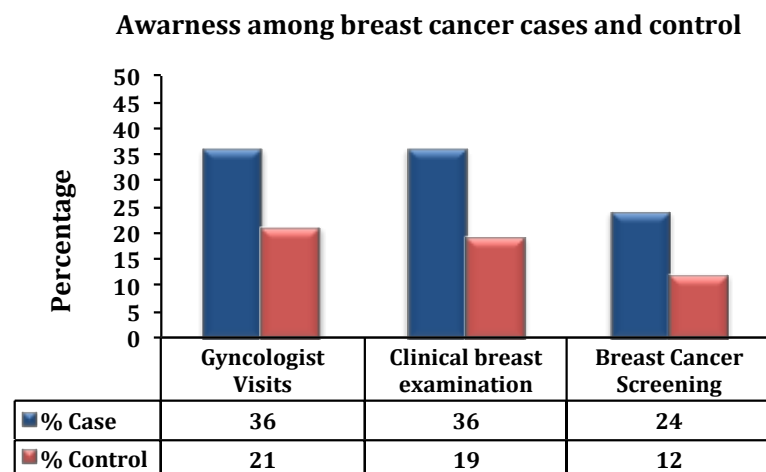


Figure 3. Awareness and Practices in Women's Health: A Comparative Analysis.

This figure provides insights into the variations in health awareness and practices related between the case and control groups. A higher percentage of cases (36%) reported visiting a gynecologist compared to the control group (21%). Both cases and controls engage in clinical breast examinations, with a notably higher percentage among cases (36%) compared to controls (19%). The figure indicates the percentage distribution of women who undergo breast cancer screening, with a higher percentage among cases (24%) compared to controls (12%). The data represents the percentage distribution.

An insight into the affected cases exploring the diagnostic methods, staging, and treatment approach used in breast cancer. A comprehensive analysis of age at diagnosis and reproductive factor represented by the age at first childbirth in breast cancer-positive cases was explored. Information is demonstrated in figure 4.

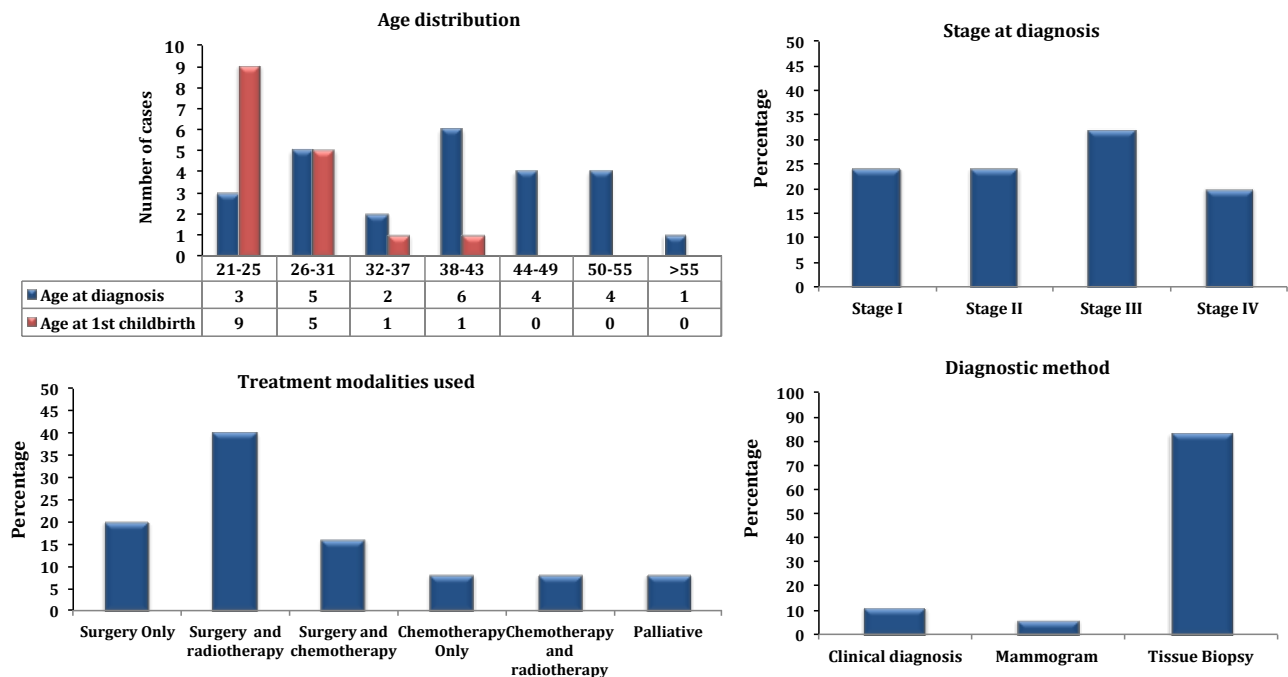


Figure 4. Comprehensive Analysis of Diagnostic and Reproductive Factors in Breast Cancer-Positive Cases.

This figure provides a detailed exploration of diagnostic and treatment factors among breast cancer-positive cases. The distribution of age across both diagnosis and first childbirth is depicted. A percentage for various treatment modalities and diagnostic methods is presented, alongside the breakdown of cancer stages at the time of diagnosis. The age distribution suggests a higher proportion of breast cancer cases in younger individuals. Individuals who had their first child between the ages of 21 and 25 is the most populated age range, suggesting a relatively higher incidence of cancer at younger age. Tissue biopsy is the predominant diagnostic method, indicating the importance of obtaining definitive pathology results. The majority of cases were diagnosed at later cancer stages (Stage III), emphasizing the need for early detection strategies. The data reveals diverse treatment choices among breast cancer-positive cases, with a substantial percentage opting for combined surgery and radiotherapy.

DISCUSSION

Breast cancer is a complex and multifaceted health concern, necessitating a thorough understanding of risk factors, early detection methods, and treatment modalities for effective cancer management. Our study aimed to contribute to this understanding by exploring these aspects within the context of a population of Libyan women residing in Derna.

The demographic analysis revealed distinctive characteristics between breast cancer cases and the control group. Notably, the age distribution emphasizes a higher prevalence of breast cancer among younger individuals (26-34 years). This aligns with existing literature suggesting an increased risk of breast cancer in younger age groups [7]. The weight category also emerged as a potential factor, with a notable association between overweight individuals and a higher occurrence of breast cancer. Additionally, marital status, educational attainment, employment status, and economic level demonstrated variations between the case and control groups, are providing insights into potential socioeconomic factors influencing breast cancer prevalence.

The higher prevalence of employment and marriage among cancer cases may suggest a potential association with socioeconomic factors. It is possible that individuals with certain employment and marital statuses may have different lifestyle patterns, access to healthcare, or exposure to risk factors that could influence cancer incidence. Geographically, the fact that a considerable number of cancer cases reside in a specific place highlights the potential impact of geographic factors on cancer occurrence. Environmental, lifestyle, or even genetic factors associated with that particular location might contribute to the observed pattern. In addition, understanding the cultural context is crucial for interpreting these findings accurately. While the observation is interesting, it also highlights the need for further investigation. Additional research, including qualitative studies or more detailed demographic analyses, may help unravel the specific factors contributing to the observed associations.

A positive family history was reported by 20% of the surveyed population, emphasizing the hereditary aspect of breast cancer. The relatively low percentages of oral contraceptive use and hormone replacement therapy suggest the need for further investigation into these factors within the Libyan population. These findings align with established literature regarding risk factors associated with breast cancer such as age, family history, and hormonal factors, such as early menstruation and late childbirth, which emerged as significant contributors to breast cancer incidence [7,8,9,10,11,12]. Lifestyle choices, including oral contraceptive use, hormone replacement therapy, lack of breastfeeding, and obesity, were also identified as influential factors.

The observation that a higher percentage of breast cancer cases reported visiting a gynecologist, engaging in clinical breast examinations, and undergoing breast cancer screening, but still presented at a late stage with a low rate of breast cancer screening, suggests a dualistic or paradoxical behaviour within the studied population. This finding could signal a discrepancy between awareness and actual preventive actions. Moreover, individuals may face perceived barriers to participating in formal breast cancer screening programs. These barriers could include factors such as access to healthcare facilities, socio-economic constraints, cultural beliefs, or fear of the screening process itself. On top of that, the observed low rate of breast cancer screening could also be attributed to the perceived effectiveness or limitations of the existing screening programs. If individuals do not perceive screening methods as reliable or beneficial, they may be less likely to participate. The delay in seeking formal breast cancer screening might be influenced by fear or stigma associated with a potential cancer diagnosis. Individuals may be more comfortable with routine check-ups but hesitant to undergo formal screening due to anxiety about the results. Notwithstanding, lack of comprehensive education about the importance of early detection through formal screening. Nonetheless, the observed behaviour may also be influenced by factors within the healthcare system, such as the availability and accessibility of screening services, effectiveness of public health campaigns, or the quality of healthcare infrastructure. The dualistic behaviour suggests a complex interplay of individual, societal, and healthcare system factors. The age distribution in this study revealed a higher incidence of breast cancer among individuals aged 26-34. These findings emphasize the trend of breast cancer cases occurring at a relatively young age in the female Libyan population, which is consistent with a previously reported trend stated that nearly 70.9% of cases occurring in Libyan individuals who are 50 years or younger with a mean age of 46 years [7]. However, the observation that breast cancer cases are noted in individuals who had their first child between the ages of 21 and 25, contrasts with the general trend that has been observed in some studies. Typically, there has been a commonly cited association between delayed childbearing (having a first child after the age of 35) and an increased risk of breast cancer. However, it's important to note that breast cancer is a complex disease influenced by various factors, and there can be variations in risk factors and patterns across different populations. In this specific study population among Libyan women, the observed trend of breast cancer cases may suggest unique characteristics or risk factors in this particular group [13-19].

The substantial proportion of patients diagnosed at advanced stages implies a delay in seeking medical attention and a late identification of the disease, as highlighted in the study conducted by Ikpatt et al., [12] focusing on breast cancer in Nigeria. In Nigeria, mammography is not routinely performed, whereas in Libya, it is conducted but not as part of screening programs. Nevertheless, the utilization of mammography has not proven effective in enhancing early diagnosis. Challenges in achieving an early mammographic diagnosis in premenopausal women, along with the inherent biological aggressiveness of this subtype, contribute to the limited efficacy of early screening [19]. These findings align with similar trends observed in other North African regions. In Egypt, breast cancer accounts for a significant portion of female cancer-related deaths (8.2%), with a prevalent occurrence of advanced-stage tumors at presentation [20,21]. Similarly, in Tunisia, breast cancer is associated with poor survival due to delayed diagnosis [20,22]. This observation highlights the urgency of implementing effective early detection strategies. Furthermore, the dominance of tissue biopsy as a diagnostic approach underscores the critical significance of obtaining precise pathology results. This observation emphasizes that clinicians are adhering to the triple assessment rule, which involves a comprehensive evaluation comprising clinical examination, imaging studies, and pathological analysis. Furthermore, it suggests the reliability of diagnosis, comprehensive evaluation, precision in treatment planning, patient-centered care and recognition of diagnostic challenges. The diverse treatment choices among breast cancer-positive cases, as illustrated in **Figure 4**, demonstrate the complexity of managing the condition. The prevalence of combined surgery and radiotherapy suggests the multifaceted nature of treatment decisions, emphasizing the need for personalized and comprehensive approaches.

CONCLUSION

The results of the study offer valuable insights into the demographic characteristics, risk factors, health awareness, and diagnostic and treatment approaches among females in the surveyed population. These findings contribute to a comprehensive understanding of breast cancer incidence and associated factors. The findings emphasize the importance

of tailored interventions addressing specific risk factors, promoting health awareness, and implementing early detection strategies. Continued research and targeted public health initiatives are essential for advancing breast cancer management in this population and beyond.

Conflicts of Interest

Authors declared that there is no conflict of interest associated with this manuscript.

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استكشاف ديناميكيات سرطان الثدي: فهم عوامل الخطر وسلوكيات الصحة واتجاهات العلاج بين النساء في درنة، ليبيا

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المستخلص

سرطان الثدي، الذي ينتشر عالمياً ويعتبر الثاني الأكثر شيوعاً بين النساء، يشكل مشكلة صحية عامة مهمة. فهم دينامياته المتعددة، بما في ذلك عوامل الخطر وطرق الكشف وخيارات العلاج، أمر بالغ الأهمية للإدارة الفعالة. قامت هذه الدراسة، التي أجريت بين النساء الليبيات، بالتحقيق في هذه الجوانب، مع التركيز على 109 مشاركة في درنة. أظهرت النتائج أن 23% من المجموعة كانت تعاني من سرطان الثدي، وكانت النساء الأصغر سناً (26-34 عاماً) وأولئك الذين يصنفون على أنهم زائدو الوزن يظهرهم نسبة أعلى من الإصابة. معظم الحالات كانت تقيم في وسط درنة، وكانت خريجات الجامعات، وموظفات، ومتزوجات، وكانت لديهن دخلاً عالياً. وكانت العوامل الرئيسية للخطر تشمل التاريخ العائلي الإيجابي، واستخدام وسائل منع الحمل الفموية، وعلاج الهرمونات البديلة. وكانت الممارسات الصحية مثل زيارات طبيب النساء وفحص سرطان الثدي أكثر انتشاراً بين الحالات مقارنة بالضوابط. كانت الطرق التشخيصية تتضمن بشكل أساسي بيوبسيا الأنسجة، مع تشخيص العديد من الحالات في مراحل متأخرة. وتباينت الخيارات العلاجية، مع نسبة كبيرة تختار الجراحة المشتركة والعلاج الإشعاعي. تؤكد الدراسة أهمية استراتيجيات الكشف المبكر والتدخلات المصممة خصيصاً لإدارة سرطان الثدي. وهناك حاجة لإجراء مزيد من الأبحاث لتعزيز الوعي وتحسين استراتيجيات الإدارة لهذا التحدي الصحي العالمي.

الكلمات المفتاحية: سرطان الثدي، عوامل الخطر، الكشف المبكر، استراتيجيات العلاج، التحليل الديموغرافي.