

Early Detection and Diagnosis of Breast Cancer in Young Women: Educational Needs and Self-reported Knowledge Gaps of Healthcare Professionals in Manitoba, Canada

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Abstract

Background: Breast cancer is the most common cancer in young women (15–39 years) and the leading cause of adolescent and young adult cancer death. Incidence rates of breast cancer in young women (BCYW) in Canada have increased significantly since the mid-1980s. Late-stage diagnosis represents a key age-related disparity for young women with breast cancer. Reported barriers to a timely diagnosis include healthcare professional (HCP) awareness and knowledge gaps as well as healthcare system challenges. Barriers identified include limited awareness of the breast cancer incidence and risk in young women, insufficient familiarity with disease characteristics, and symptom presentation. **Methods:** To better understand these barriers and HCP education needs in the province of Manitoba, Canada, a team of medical and research professionals developed an online survey to assess HCP knowledge levels of BCYW topics, identify knowledge gaps, and determine preferred educational strategies. **Results:** HCPs ($n = 49$) with frontline practical experience from urban and rural settings across Manitoba completed the survey. Respondents self-reported being slightly knowledgeable or not knowledgeable at all about BCYW incidence and risk factors (30.6%), signs and symptoms (12.2%), and diagnostic pathways (22.4%). Knowledge gaps in inflammatory breast cancer and other BCYW topic areas were also reported. Respondents provided BCYW professional development suggestions and identified an online educational strategy as the preferred learning format. Respondents were receptive to further BCYW professional development. **Conclusion:** Addressing the identified HCP knowledge gaps with a virtual, tailored approach has the potential to increase early detection, ensure timely treatment, reduce distress, and help improve outcomes for young women diagnosed.

Keywords: Breast cancer, diagnostic delay, early detection, education strategy, healthcare professional, inflammatory breast cancer, knowledge levels, young women, late diagnosis

INTRODUCTION

Globally, breast cancer is the most common cancer in young women (15–39 years) and the leading cause of adolescent and young adult (AYA) cancer death.^[1] The incidence of breast cancer in young women (BCYW) continues to rise worldwide, with about 1300 young women projected to be diagnosed annually in Canada.^[2] Rates in Canada have increased significantly from the mid-1980s to 2019, especially for women in their 20s (45.5% rise) and 30s (12.5% rise).^[3] This ongoing trend along with more aggressive disease features, increased recurrence rates, and poorer outcomes makes BCYW an issue of public health importance.^[4]

Inflammatory breast cancer (IBC) is a rare and aggressive form of the disease that accounts for approximately 1%–6% of breast cancer cases and almost 10% of all breast cancer

deaths globally.^[5] Young women are at an elevated risk for aggressive breast cancer subtypes, including IBC, and are more frequently diagnosed at advanced stages of the disease.^[6] Similar to other forms of breast cancer in young women, barriers to a timely IBC diagnosis include the rarity of the disease, limited healthcare professional (HCP) awareness, and frequent misdiagnosis due to the absence of a clinically palpable tumor mass.^[5]

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Late-stage diagnosis represents a key age-related disparity affecting young women with breast cancer.^[4] In Canada, diagnostic delays have been identified as a major unmet need for AYA cancer patients.^[7] Understanding “Why so many AYAs experience delays in cancer diagnosis and how can the diagnostic process be improved?” was identified by AYA cancer patients, caregivers, and clinicians in a national study as the top AYA cancer research priority.^[8]

Given the absence of formal breast cancer early detection screening for young women, the Canadian House of Commons Standing Committee on Health has recommended the rapid development and swift implementation of “public health awareness and education strategies specifically targeting AYA women, indigenous and racialized communities, as well as the HCPs who serve them, to address knowledge barriers regarding early detection and reduce disparities in the stage at which breast cancer is diagnosed.”^[9]

In light of both patient help-seeking barriers and HCP challenges to early detection, addressing diagnostic delay requires a multifaceted approach.^[4] Reported barriers to a timely diagnosis include HCP knowledge gaps related to BCYW, such as limited awareness of the risk in young women, insufficient familiarity with disease characteristics and symptom presentation, and uncertainty regarding appropriate diagnostic and referral pathways.^[10] Health promotion strategies to address these barriers and challenges have the potential to increase early detection, ensure more timely treatment, reduce distress, and improve outcomes for young women diagnosed with breast cancer.^[4]

Purpose

To better understand HCP knowledge barriers and educational needs related to BCYW in the province of Manitoba (population 1.5M), Canada, a multidisciplinary research team of medical professionals and young adult breast cancer survivors was established. The project team, including partner members from the University of Manitoba and national charity Team Shan Breast Cancer Awareness for Young Women (Team Shan), agreed upon the following project objectives:

1. To identify knowledge barriers surrounding BCYW and corresponding educational needs of primary care practitioners in Manitoba
2. To provide valuable feedback to support the development of a tailored professional development opportunity to help meet the challenge of making a timely breast cancer diagnosis for young women.

METHODS

Design and participants

As of 2025, about 3500 physicians were practicing in Manitoba.^[11] About half have been identified as general practitioners.^[12] In addition, over 300 nurse practitioners and about 140 physician assistants have been practicing in the province.^[13,14] An online survey distributed to first

point of contact HCPs was selected as the most appropriate method to reach the frontline HCPs across the province. A tracker list of potential email recipients was compiled, and additional social media contacts were added to maximize survey reach across a variety of HCP practice settings in Manitoba.

Ethics approval

The survey was approved by the University of Manitoba Health Research Ethics Board (HREB).

The survey was piloted among stakeholders with relevant expertise to refine survey content, clarity, and flow. Survey recruitment and dissemination occurred between January and September 2025.

Data collection

An electronic survey questionnaire was developed and hosted using REDCap. A total of 12 questions were included, comprising nine closed-ended questions and three open-ended questions.

Questions assessed self-reported knowledge levels regarding BCYW topics and respondents’ insights to help improve awareness and a timely breast cancer diagnosis. The questions were adapted from a previous primary HCP AYA cancer knowledge level survey conducted in New Zealand.^[15] Adjustments were made to accommodate regional healthcare terminology in Manitoba, include IBC specific questions, and incorporate pilot testing feedback.

An online survey consent disclosure described voluntary participation, privacy statements, and a brief study overview. The first section of the survey consisted of closed-ended demographic questions (professional occupation, 1st year of independent practice, and work site), and the second section assessed HCP knowledge levels of BCYW, IBC, and related BCYW topic areas using a five-point Likert scale system (from 1= “extremely knowledgeable” to 5= “not knowledgeable at all”). The final set of closed-ended questions captured respondents’ sources of BCYW information, potential professional development barriers, preferred BCYW education formats, and their interest in the survey results.

Open-ended questions asked for the respondents’ 1st year of practice, identification of additional BCYW topics they would like to know more about, and any other additional insights they would like to share regarding BCYW.

The survey was initially disseminated by email using the collected tracker list. An online survey invitation graphic was developed and shared across multiple social media platforms (e.g. Facebook, Instagram, X, and LinkedIn) to further expand survey reach.

To maximize survey dissemination across the province, support was also received from university students and community volunteers. The survey invitation was shared broadly online and in person with HCP contacts, community health clinics, and postsecondary school student health services across the

province. Due to this multi-channelled distribution approach, a response rate could not be calculated.

Analysis

Reported responses to open-ended questions were analyzed and coded to identify common themes in the responses. Through analysis of the responses, a coding scheme was developed to categorize the common types of responses. The categories describing common responses that emerged were used to code the survey responses and summarize results. Frequency analysis was used to describe demographic characteristics, closed-ended questions, and categorical data. Percentages were rounded to one decimal place.

RESULTS

Forty-nine ($n = 49$) respondents consented to participating in the survey, with 48 completing all the questions and one respondent partially completing the survey. All completed question responses were included in the analysis.

Respondent demographics

Twenty-six (53.1%) of the respondents ($n = 49$) were family physicians, 10 (20.4%) nurse practitioners, 5 (10.2%) registered nurses, 4 (8.2%) emergency physicians, and 1 (2.0%) respondent each reported pediatrician, radiologist, physician assistant, and nursing student. Respondents ($n = 48$) reported initiating their practice between 1 and 30 years prior, with an average duration of 9.5 years.

Respondents ($n = 48$) worked in the following practice settings: 19 (39.6%) in a group/shared family practice, 9 (18.8%) in community health, 8 (16.7%) in multidisciplinary team settings, 4 (8.3%) in hospital emergency departments, 2 (4.2%) in solo family practice, and 6 (12.5%) in other practice sites (three solo practices, one academic center, and two other unnamed sites).

Twenty-nine (59.2%) of respondents ($n = 49$) serviced urban areas, 16 (32.7%) in rural areas, and 4 (8.2%) in both urban and rural areas. Twenty-eight (96.6%) of urban area respondents worked in settings with 500,000 plus and 1 (3.4%) in an urban setting with a population of 100,000–499,999.

Early identification of breast cancer in young women

One (2.0%) of the respondents ($n = 49$) self-reported being extremely knowledgeable about the incidence and risk factors associated with early detection of BCYW. Fourteen (28.6%) reported being very knowledgeable, 19 (38.8%) moderately knowledgeable, 10 (20.4%) slightly knowledgeable, and 5 (10.2%) reported not knowledgeable at all.

Three (6.1%) respondents ($n = 49$) self-reported being extremely knowledgeable about the signs and symptoms associated with early detection of BCYW. Sixteen (32.7%) reported being very knowledgeable, 24 (40.9%) moderately knowledgeable, 5 (10.2%) slightly knowledgeable, and 1 (2.0%) reported not knowledgeable at all.

Four (8.2%) respondents ($n = 49$) reported being extremely knowledgeable about the relevant diagnostic pathways for

suspected BCYW. Eighteen (36.7%) respondents reported they were very knowledgeable, 16 (32.7%) moderately knowledgeable, 5 (10.2%) slightly knowledgeable, and 6 (12.2%) reported not knowledgeable at all.

Total percentages of respondents ($n = 49$) reporting extremely to moderately knowledgeable levels as well as total percentages of respondents reporting slightly knowledgeable to not knowledgeable at all levels were also calculated [Figure 1].

Four (8.2%) respondents ($n = 49$) self-reported being extremely knowledgeable about seeking consultation with the relevant specialist experts. Sixteen (32.7%) reported being very knowledgeable, 21 (42.9%) moderately knowledgeable, 7 (14.3%) slightly knowledgeable, and 1 (2.0%) reported not knowledgeable at all.

Regarding knowledge of the referral pathway for young women diagnosed, 2 (4.1%) respondents ($n = 49$) self-reported being extremely knowledgeable, 14 (28.6%) very knowledgeable, 18 (36.7%) moderately knowledgeable, 9 (18.4%) slightly knowledgeable, and 6 (12.2%) reported not knowledgeable at all.

Knowledge level of inflammatory breast cancer

Regarding their understanding of incidence and risk factors of IBC in young women, 2 (4.2%) respondents ($n = 48$) self-reported being extremely knowledgeable, 8 (16.7%) very knowledgeable, 20 (41.7%) moderately knowledgeable, 14 (29.2%) slightly knowledgeable, and 4 (8.3%) reported not knowledgeable at all.

Reporting on their knowledge level of IBC signs and symptoms in young women, 2 (4.2%) respondents ($n = 48$) self-reported being extremely knowledgeable. Eleven (22.9%) reported being very knowledgeable, 23 (47.9%) moderately knowledgeable, 9 (18.8%) slightly knowledgeable, and 3 (6.3%) reported not knowledgeable at all.

Reporting on their knowledge of the diagnostic pathway for IBC, 2 (4.2%) respondents ($n = 48$) self-reported being

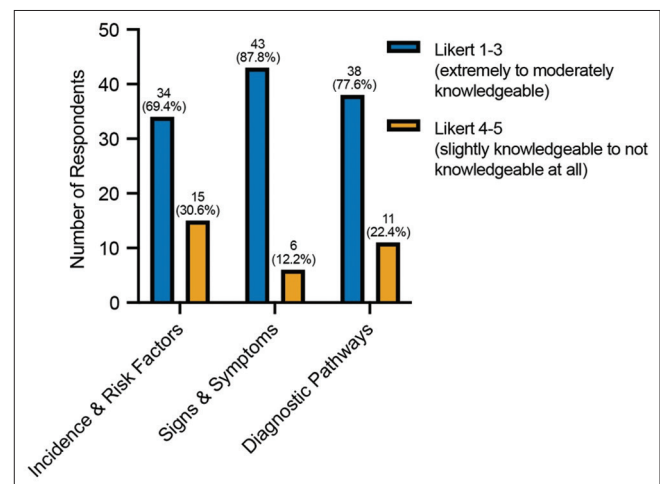


Figure 1: Self-reported knowledge level of breast cancer in young women by topic area ($n = 49$)

extremely knowledgeable, 8 (16.7%) very knowledgeable, 17 (35.4%) moderately knowledgeable, 14 (29.2%) slightly knowledgeable, and 7 (14.6%) reported not knowledgeable at all.

Total percentages of respondents reporting moderately to extremely knowledgeable levels as well as total percentages of respondents reporting slightly knowledgeable to not knowledgeable levels were also calculated [Figure 2].

Breast cancer topics

Respondents ($n = 48$) reported their knowledge levels of breast cancer symptoms versus mastitis symptoms and other benign conditions in young women. Three (6.3%) self-reported being extremely knowledgeable, 13 (27.1%) very knowledgeable, 18 (37.5%) moderately knowledgeable, 12 (25%) slightly knowledgeable, and 2 (4.2%) reported not knowledgeable at all.

Respondents ($n = 48$) reported on their knowledge level of breast imaging options during lactation. Three (6.3%) self-reported being extremely knowledgeable, 10 (20.8%) very knowledgeable, 13 (27.1%) moderately and 13 (27.1%) slightly knowledgeable, and 9 (18.8%) not knowledgeable at all.

Respondents ($n = 48$) reported on their understanding of high-risk referral priorities. Two (4.2%) respondents self-reported being extremely knowledgeable, 14 (29.2%) very knowledgeable, 23 (47.9%) moderately knowledgeable, 5 (10.4%) slightly knowledgeable, and 4 (8.3%) not knowledgeable at all.

Respondents ($n = 48$) were asked to identify any other BCYW topics they would like to know more about. Some respondents reported more than one topic. All topic areas reported were included and four thematic categories emerged from the responses: screening issues (e.g. “screening differences for people with dense breast tissue”), postdiagnosis support (e.g. “supports available postcancer diagnosis”), incidence and risk factors (e.g. “lifestyle risk factors for AYA breast cancer”), and fertility concerns (e.g. “fertility

options”) [Figure 3]. One IBC comment was also shared: “Inflammatory breast cancer is always one I worry about missing as I felt it was glossed over in family med residency.”

Adolescent and young adult women’s cancer resources

Respondents ($n = 48$) were asked to report on all the resources they used to access information on AYA women cancers. Thirty-five (72.9%) respondents reported using cancer health professionals and the Up To Date HCP website for their information. Twenty-seven (56.3%) reported using peers/colleagues, 24 (50%) health pathways, 12 (25%) medical journals, 10 (20.8%) federal or provincial guidelines, 7 (14.6%) conferences, 4 (8.3%) reported using the Internet (i.e. Mayo Clinic and Facebook Physician Group), 3 (6.3%) nongovernment organizations, and no respondents reported the AYA cancer network website or other BCYW resources.

Breast cancer in young women professional development

Respondents ($n = 48$) were asked to select barriers to participating in BCYW education. All selected barriers were included. Twenty-nine (60.4%) reported time as a barrier, 18 (37.5%) reported difficulty being relieved from duties to attend, 11 (22.9%) reported resources, e.g. financial, 6 (12.5%) reported unable to prioritize participation unless credits were provided, and 1 (2.1%) reported another barrier (rarity of the disease). Six respondents (12.5%) reported no barriers.

Respondents ($n = 48$) reported on their preferred format for further education on BCYW. Thirty-five (72.9%) respondents reported a preference for an online webpage format, 22 (45.8%) conference presentations, 15 (31.5%) face-to-face workshops, and 7 (14.6%) reported other unnamed formats.

Respondents ($n = 48$) were asked to provide individual insights to help improve BCYW awareness and facilitate earlier diagnosis for young women. Some respondents reported more than one suggestion. All suggestions were included and three BCYW thematic categories emerged from the responses: screening (e.g. “lack of quick accessibility to MRIs and US

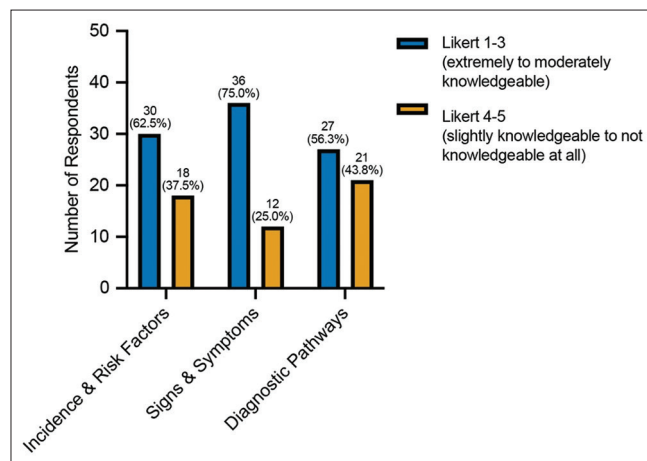


Figure 2: Self-reported knowledge level of inflammatory breast cancer by topic area ($n = 48$)

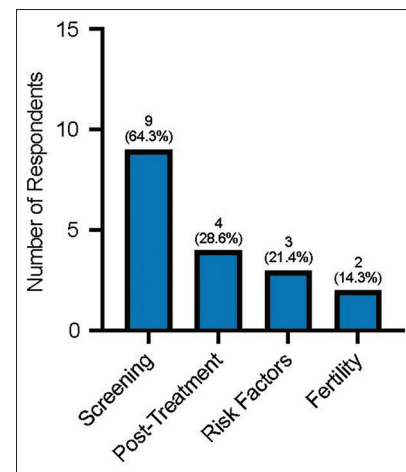


Figure 3: Breast cancer in young women topic areas respondents suggested for additional learning ($n = 14$)

for AYA”), public awareness (e.g. “I think commercials and radio ads reach much further than we can as family doctors in making young women aware of risks and symptoms”), and professional development (e.g. “...talks whether zoom or in person”) [Figure 4]. Respondents also commented on the seriousness of the disease: “had two friends die in their mid-30s of breast cancer...Devastating!!” and “This is an essential topic.”

DISCUSSION

The vast majority of survey respondents identified as frontline HCPs with varied years of professional experience. This was significant as family physicians, nurse practitioners, and emergency physicians are usually the first point of contact for young women with breast cancer symptoms, and they were the identified target population for the survey. The respondents also practiced in a variety of settings in both urban and rural areas across the province. Survey results indicated that the majority of respondents were moderately to extremely knowledgeable about BCYW incidence and risk factors, the vast majority were moderately to extremely knowledgeable regarding signs and symptoms, and the majority were moderately to extremely knowledgeable about diagnostic pathways for suspected breast cancer cases, seeking consultation with relevant specialists and referral pathways. However, a notable percentage of respondents reported that they were only slightly knowledgeable or not knowledgeable at all regarding the early identification of BCYW topics surveyed. Close to a third were least knowledgeable about incidence and risk factors. These findings highlighted the need for professional development in the BCYW topic areas surveyed.

Regarding knowledge of IBC incidence and risk factors, signs and symptoms in young women, and diagnostic pathways for IBC, the majority of respondents also reported being moderately to extremely knowledgeable, but these totals were less than the totals reported for the BCYW question. Respectively, a higher percentage of respondents reported

being only slightly knowledgeable or not knowledgeable at all. Respondents reported being least knowledgeable about IBC diagnostic pathways. These IBC knowledge levels highlighted the need for professional development in this BCYW subtype as well.

The majority of respondents were knowledgeable about signs and symptoms of breast cancer versus mastitis, breast imaging options in the setting of lactation, and the understanding of high-risk priorities, but only a few were extremely knowledgeable. A small percentage also reported being not knowledgeable at all. Addressing these knowledge gaps should also be included in BCYW professional development.

Results identified some BCYW topics that respondents would like to know more about. Close to a third of the respondents reported that they would like more information on BCYW screening, posttreatment supports, incidence and risk factors, and fertility concerns. This provides valuable information to include in the development of an education strategy and addresses the BCYW knowledge gaps reported by HCPs. The responses also suggest an interest in BCYW and receptiveness to professional development.

Respondents used a variety of resources to obtain BCYW information, but few accessed an online AYA cancer website or the Internet. Knowledge of reputable BCYW online sites may assist in further knowledge transfer and HCP support.

Respondents interested in BCYW professional development preferred an online format. Respondents reported a variety of online education possibilities (i.e. virtual presentations, webinars, and Zoom) as their preferred format for BCYW professional development. Other in-person suggestions included “lunch and learns” or education dinner events.

The greatest barriers to professional development reported were time constraints and being relieved from duties to attend. This information along with the preferred online delivery format provides valuable information to assist in the development of a BCYW educational strategy.

Providing a virtual presentation that could be viewed at HCPs’ convenience has the potential to mitigate the main barriers reported. Despite a low pretest probability of breast cancer in young women and professional challenges, “the seriousness of the disease and early treatment options support further investigation” and “referral to obtain an accurate diagnosis” are warranted.^[4] Presentations could also provide the opportunity to share online BCYW resources and diagnostic tools that support HCP practices.

Respondents shared additional BCYW insights on screening, public awareness, as well as presentations and networking opportunities. The suggestions compliment BCYW professional development topic areas shared by respondents and also identify the need for public awareness and education targeting the well AYA female population, their families, and the general public.

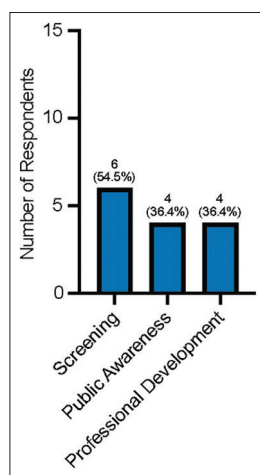


Figure 4: Respondent insights to help improve breast cancer in young women awareness and timely diagnosis ($n = 11$)

These broader health promotion initiatives can help improve BCYW awareness and increase early detection.

Results were similar to the findings from the 2019 New Zealand survey that assessed HCP self-reported knowledge gaps related to the identification of all types of AYA (12–24 years) cancer, particularly cancer symptoms and knowledge of diagnostic pathways.^[15] Respondents also reported a preference for online learning.^[15]

The 2022 mixed methods study from the United States, designed to assess HCP knowledge and barriers that contribute to disparities in IBC diagnosis and treatment, also reported knowledge gaps in IBC symptoms, standardized IBC screening, and treatment plans. Respondents also indicated a desire for HCP-targeted IBC educational tools and reported a preference for online educational opportunities.^[5]

Strengths and limitations

The study captured responses from a variety of frontline providers from multiple healthcare settings across Manitoba. The multi-channelled distribution approach helped increase survey participation but did not provide the ability to calculate a survey response rate.

The study relied on self-reported Likert scales with no objective case-based or diagnostic-accuracy items. Subjective reporting can be overinflated due to unconscious incompetence with no assurance of the actual state of knowledge.

Participation was also voluntary with no extrinsic incentive provided. It is possible that the HCPs who engaged in the survey had more interest in BCYW than their colleagues who chose not to participate. It is also possible that our findings overestimate the level of knowledge and comfort of the average HCP in Manitoba.

Survey data collected provide an opportunity for further association analysis, such as the number of years of professional experience with the knowledge variables.

Implications

BCYW awareness and knowledge gaps have been identified as a HCP barrier to a timely diagnosis in the literature for a couple of decades.^[4] There has been limited documentation of HCP knowledge levels and BCYW educational needs in Canada. Although the survey population was limited ($n = 49$), the results show the lack of thorough knowledge on early signs of BCYW that may be contributing to late-stage diagnosis. The survey findings also provide professional development preferences to help design a tailored HCP educational strategy.

The findings provide valuable information for both national and provincial healthcare systems in Canada as well as for HCPs and stakeholders worldwide. Once confirmed in larger survey population numbers, findings could lead to developing new guidelines for detecting early signs of BCYW and dissemination to HCPs via professional development opportunities.

CONCLUSIONS

HCP knowledge of BCYW incidence, risk factors, signs and symptoms, and referral pathways is critical for promoting early detection and improving outcomes for young women with breast cancer. Survey results identified important HCP knowledge gaps and highlighted priority BCYW topics, including IBC, for future professional development endeavors. Survey findings suggest that a tailored, virtual education approach, designed to reach frontline HCPs, may be the most effective strategy to address these gaps.

Knowledgeable HCPs who recognize BCYW, consider breast cancer in differential diagnoses, and investigate unexplained and persistent symptoms can increase early detection, ensure more timely treatment, and reduce distress. Ultimately, targeted education may reduce disparities in care, support timely interventions, and improve long-term outcomes for young women diagnosed with breast cancer.

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Nil.

Conflicts of interest

There are no conflicts of interest.

Data availability statement

Further details of data referred to and discussed in the manuscript are available from the corresponding author upon request.

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