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Resilience and renewal: the personal impact of physical activity in breast cancer survivors

María-Jesús Lirola^{1,4}, A. Irene Hernández-Rodríguez^{1*}, Cristina Cuenca-Piqueras^{1,2,3} and María Esther Prados-Megías¹

Abstract

This study investigates the multifaceted impact of physical activity on the holistic recovery of breast cancer survivors, emphasizing psychological, social, and physical dimensions. Beyond medical treatments, reclaiming identity and autonomy post-breast cancer is a complex process involving physical and emotional well-being. The research utilized a qualitative approach, conducting in-depth interviews with five female survivors aged 41 to 57, as well as a group interview with the three physical activity instructors who led the participants' exercise sessions. Participants completed a 12-week resistance training protocol titled EFICAN (Exercise and Cancer), a structured intervention specifically designed by the research team for this study, combining individual and small-group sessions. Survivors shared personal experiences of how physical activity influenced their post-treatment recovery, while the instructors provided complementary insights into the participants' observed changes. Thematic analysis was applied to identify patterns and core themes. Three primary themes emerged: (1) physical activity as a catalyst for empowerment and recovery, (2) the significance of social bonds formed during group activities, and (3) transformative changes in body perception and self-acceptance. Participants highlighted that exercise helped regain control over their bodies, mitigate side effects, and foster resilience. Group activities provided emotional support, reducing isolation and promoting psychological well-being. Instructors echoed these findings, describing visible improvements in participants' confidence, emotional expression, and social engagement. The study findings align with existing literature, while the inclusion of instructors' perspectives adds a novel contribution to the understanding of how physical activity supports psycho-social recovery. Integrating structured physical activity into post-treatment care can support emotional healing and strengthen social bonds. Clinical programs should celebrate individual achievements and include group-based exercises to enhance adherence and overall well-being. The study's small sample size may limit generalizability. Future research should explore diverse populations and incorporate quantitative methods to complement qualitative findings. Physical activity plays a crucial role in transitioning from surviving to thriving post-cancer. It supports not only physical health but also psychological resilience and social connection, reinforcing that survivors' voices are essential in shaping recovery programs.

Keywords Body image, Social support, Group exercise, Survivor empowerment, Emotional well-being

*Correspondence:

A. Irene Hernández-Rodríguez
ihernan@ual.es

¹University of Almería, Ctra. De Sacramento, s/n, La Cañada de San Urbano, Almería P.C. 04120, Spain

²Indalo Group of Applied Sociology (GISA), Almería, Spain

³Center for the Study of Migration and Intercultural Relations (CEMyRI), University of Almería, Almería, Spain

⁴CiBIS: Research Center for Social Well-being and Inclusion, University of Almería, Almería, Spain



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Introduction

Surviving breast cancer is a journey that transcends medical treatment and delves deep into the personal and emotional realm. While clinical approaches primarily focus on the physical aspects of recovery, the process of reestablishing identity and resilience remains a complex and deeply personal endeavor for survivors. The post-treatment phase is characterized by a redefinition of self as survivors confront profound transformations that extend beyond the biological realm. Physical activity emerges as a key element in this holistic recovery, contributing not only to physiological rehabilitation but also to emotional and social well-being [1]. This research is grounded in the lived experiences of breast cancer survivors who participated in a physical activity intervention titled EFICAN (Exercise and Cancer). Developed by the research team in collaboration with clinical exercise professionals, EFICAN consisted of a 12-week resistance training program that included both individual sessions and small-group training. The protocol was designed to promote not only physiological rehabilitation but also psychosocial and emotional well-being in the post-treatment phase.

The discourse surrounding breast cancer has shifted over the decades from solely clinical outcomes to a broader recognition of the psychological, social, and cultural dimensions of survivorship. Seminal texts, such as Audre Lorde's *The Cancer Journals* [2, 3], offer a poignant, first-person narrative that captures the multifaceted impact of breast cancer on identity and body image. Lorde's reflections highlight the struggle against societal expectations of femininity and the empowerment found in embracing one's post-cancer self. These insights underscore the importance of understanding recovery not just as physical healing but as a journey toward reclaiming one's sense of self and agency [2, 3].

Body image disruption is a significant and challenging consequence for many breast cancer survivors. The changes brought about by surgery, such as mastectomy and reconstruction, alongside treatment side effects like hair loss, can lead to a feeling of estrangement from one's own body [4]. This disconnection often impacts self-esteem and psychological well-being, as survivors grapple with shifting identities that do not conform to traditional standards of beauty. Research has shown that the physical appearance associated with breast cancer treatment can influence survivors' self-perception and overall mental health, contributing to challenges related to social reintegration and emotional resilience [5, 6].

The practice of physical activity provides an avenue for rebuilding this connection. Beyond the well-established physical benefits, such as improved cardiovascular health, muscle strength, and reduced fatigue [7–9], exercise offers psychological advantages that are vital for

survivors. Engaging in physical activity has been linked to reduced symptoms of anxiety and depression, fostering a sense of autonomy and empowerment [10]. Physical activity also serves as a coping strategy that reinforces survivors' resilience, allowing them to reclaim a sense of normalcy and control in their lives.

In addition to these individual benefits, the social dimension of physical activity is particularly impactful. Participating in group exercise programs enables survivors to form meaningful connections, sharing experiences that promote a sense of community and belonging [11]. The camaraderie found in group settings helps reduce isolation and offers emotional support through shared understanding and mutual encouragement. This social support can be transformative, as it reinforces the idea that survivors are not alone in their journey. Instead, they are part of a network of individuals who understand the unique challenges and triumphs associated with breast cancer recovery [12].

The narratives of women who have experienced the intersection of physical activity and breast cancer recovery provide an invaluable perspective on how exercise influences not only physical health but also emotional and social well-being. In particular, their stories shed light on the ways in which physical activity contributes to resilience and helps redefine body image. The act of engaging in regular physical activity becomes a symbol of personal strength and recovery, shifting the focus from the trauma of illness to the empowerment of reclaiming one's body.

The theoretical framework of narrative inquiry supports this perspective by emphasizing the power of stories to convey complex human experiences [13]. This approach recognizes that each individual's story is shaped by personal, cultural, and social contexts, making it a valuable tool for understanding the lived experiences of breast cancer survivors. Through narratives, researchers can explore how survivors attribute meaning to their engagement with physical activity and how this influences their recovery process [14].

Physical activity's role in improving quality of life has been corroborated by a variety of studies. Soriano-Maldonado et al. [8] demonstrated that supervised physical activity programs lead to improved physical fitness and quality of life among breast cancer survivors, even years after treatment. Spei et al. [10] highlighted that consistent physical activity not only enhances physical recovery but also promotes psychological well-being by mitigating symptoms such as fatigue and depression. Additionally, Prados and Rivas [11] emphasized that participation in structured physical programs can help reconstruct a positive self-concept, facilitating the emotional adaptation necessary for post-cancer life.

The current research aims to build upon this foundation by focusing on the personal narratives of breast cancer survivors. This study seeks to understand how these women perceive the role of physical activity in their recovery, emphasizing their emotional, social, and psychological experiences. By centering the voices of survivors, the research aims to reveal the deeper impact of physical activity beyond its physiological benefits, showcasing how it contributes to a holistic sense of renewal and resilience.

Methodology

Participants

This study involved five women who had survived breast cancer, residing in the province of Almería. The participants ranged in age from 41 to 57 years ($M=49.4$; $SD=6.32$). All women were diagnosed with breast cancer between the ages of 33 and 44, and at the time of the study, had completed surgery, chemotherapy, and/or radiotherapy at least 12 months prior to participation. Four of the participants were married, and one was separated and in a new relationship. All participants had children and were employed in various sectors, including healthcare, commerce, business consulting, and self-employment in domestic cleaning services. Two of the participants continued working during their cancer treatment, while the other three had periods of medical leave.

Participants were recruited through regional cancer-related associations, local radio and press advertisements, social network announcements, and referral from oncologists of the Torrecárdenas University Hospital. Eligibility criteria included being a breast cancer survivor and having completed surgery, chemotherapy, and/or radiotherapy (i.e., core treatments) up to 10 years before recruitment. Exclusion criteria included having metastatic breast cancer, having a breast reconstruction intervention planned within the following six months, having any absolute contraindication for exercise, or engaging in more than 300 min per week of structured exercise.

Instruments

Development of the interview guide

The interview guide was specifically developed for this study based on the core tenets of Self-Determination Theory (SDT) [15], with open-ended questions designed to explore participants' experiences of autonomy, competence, and relatedness in relation to physical activity and post-cancer recovery. This theoretical framework informed both the content and structure of the questions. Following a narrative inquiry approach [13], the guide encouraged participants to share their experiences in a flexible and participant-led manner. The interview was structured around five thematic areas, which served as conversational prompts rather than rigid categories:

1. Personal motivations and expectations prior to joining the EFICAN program;
2. Experiences during participation, including perceived challenges, emotions, and group dynamics;
3. Perceived impact on physical and emotional well-being, including changes in body perception and daily habits;
4. Reflections on personal transformation throughout the program;
5. Suggestions for improvement and broader applicability of the intervention.

The initial version of the guide was reviewed by two specialists in qualitative research and psycho-oncology. Minor modifications were made based on their feedback to improve clarity and alignment with the study objectives. Although the guide was not formally pilot-tested, it was iteratively refined during the early interviews to enhance the depth and clarity of responses.

Interviews

Two main instruments were used for data collection: in-depth interviews (see Supplementary Material 1) and a group interview (see Supplementary Material 2).

- **In-depth interviews:** Each of the five participants took part in a semi-structured, individual interview lasting between 60 and 90 min. These interviews aimed to explore the participants' perceptions, emotions, and experiences related to their participation in the EFICAN program- a structured 12-week resistance training intervention. Open-ended questions were used to encourage detailed, narrative responses (e.g., "Has your approach to physical activity changed after participating in EFICAN? If so, how?").
- **Group interview:** A group interview was also conducted with the three facilitators of the EFICAN program, who led the physical activity sessions in which the women participated. This 90-minute session aimed to capture instructors' perspectives on the emotional, physical, and social progress of the participants throughout the program.

All interviews were audio-recorded with the participants' informed consent and transcribed manually for subsequent analysis.

Monitoring of physical activity

To promote consistent physical activity during the intervention period, all participants were encouraged to maintain their regular lifestyle and to undertake $\geq 10,000$ steps per day, in line with existing guidelines [16, 17]. Daily step counts were tracked using an activity

bracelet, a device previously validated with high accuracy (ICC > 0.99) when compared with time-motion tracking systems [18]. The step count data were not used as outcome measures but served as a motivational tool to promote adherence. Real-time feedback from the bracelets helped participants monitor their own activity levels, and instructors used these data descriptively to encourage engagement during weekly sessions. The information was not included in the formal data analysis but supported the implementation and continuity of the physical activity program.

Procedure

The study procedure began with the identification and selection of participants through local breast cancer support associations, media advertisements, and referrals from healthcare professionals. A detailed explanation of the study's purpose and data collection process was provided. The in-depth interviews and the group interview were conducted in person, in a private room at the university's sports center to ensure privacy and participant comfort. Interviews were carried out by the last author, accompanied by another member of the research team, who rotated across sessions. Both interviewers were trained in qualitative methods and had experience working with clinical populations. All sessions were audio-recorded using a Sony ICD-PX370 digital voice recorder with the participants' consent and transcribed manually for thematic analysis.

Prior to the interviews, participants received detailed information about the study objectives and procedures. Written informed consent was obtained during the initial meeting, before any data collection took place, in accordance with ethical guidelines outlined by Lincoln and Denzin [19]. Confidentiality and the voluntary nature of participation were ensured throughout the process. The study protocol was approved by the Almería Provincial Research Ethics Committee, Spain (Ref: Ejercicio-CáncerUAL98/2019).

Participants completed a 12-week (two sessions per week) resistance training protocol, known as EFICAN (Exercise and Cancer), a structured intervention was specifically designed by the research team in collaboration with certified exercise professionals experienced in oncological rehabilitation. The program included two sessions per week and was structured to progressively support both physical recovery and emotional well-being, combining two initial weeks of individual sessions with ten weeks of small-group training. Each session lasted approximately 60 min and was delivered by two qualified facilitators with academic degrees in Physical Activity and Sport Sciences and specialized training in oncology. The sessions took place at the university's sports center

and gymnasium, offering a familiar and supportive environment. Training sessions consisted of three parts:

1. **Preparatory part:** aerobic activity, thoracic mobility exercises, core stability exercises, scapulothoracic joint stability exercises, and dynamic stability exercises.
2. **Resistance training part:** circuit-based strength exercises.
3. **Cool-down part:** dynamic/static stretching of major muscle groups.

Transcripts of the interviews were subsequently shared with the participants for their review and validation, allowing them to make corrections or clarifications to their testimonies.

Data analysis

The study was conducted within the framework of Self-Determination Theory [15], which provided a foundation for understanding how physical activity can fulfill the psychological needs of autonomy, competence, and relatedness among breast cancer survivors. This theoretical approach offered a basis for exploring how physical activity promotes resilience and well-being, particularly relevant for individuals recovering from significant health challenges.

A thematic analysis was carried out following the phases outlined by Corbin and Strauss [20]. The data analysis was carried out using a hermeneutic-interpretative approach, focusing on the participants' narratives and their reconstruction through conversations and feedback. The methodology employed is based on a systematic process of data analysis, divided into two main stages: open coding and axial coding. In the first stage, Open Coding, the most relevant evidence extracted from the participants' narratives was identified and grouped. This initial process allowed for the creation of a category scheme, which was gradually agreed upon by both the participants and the researchers. The second stage, known as Axial Coding, involved a more detailed organization of the evidence within the previously agreed categories. During this phase, the categories were refined, allowing for a deeper and more nuanced interpretation of the information. The analysis was informed by a constructivist interpretative framework, particularly in relation to how participants constructed meaning around their bodily experiences and recovery processes.

Thematic saturation was considered achieved when no new codes or categories emerged from the data. Following the criteria proposed by Guest et al. [21], who argue that data saturation in homogenous samples with focused objectives may occur within the first six interviews, we observed a repetition of themes by the fourth individual

interview. The group interview with the three physical activity instructors further validated and enriched the thematic structure, providing triangulation of perspectives. These processes supported the credibility and depth of the findings within the defined scope of the study.

Adherence to COREQ guidelines

To ensure transparency and methodological rigor, the study followed the guidelines of the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist [22]. The roles of the research team, participant recruitment procedures, and data collection methods, including in-depth and group interviews, were thoroughly documented. Reflexivity was maintained throughout the research process to acknowledge and manage potential biases and positionalities. In line with participatory and narrative research principles, co-construction of meaning with participants was emphasized, particularly in the final stages of narrative development. Cancer survivors were engaged in member-checking and narrative return processes to collaboratively shape the final versions of their testimonies, fostering auto-reflexivity and dialogical construction [23].

In addition, the last author kept a reflective journal, where personal impressions, assumptions, and emotional responses were recorded after each interview and during the data analysis phase. This process facilitated critical self-awareness and promoted transparency in the interpretative process. Furthermore, an audit trail was maintained throughout the study, documenting analytical decisions, codebook iterations, and theme refinements. These strategies contributed to the credibility and dependability of the findings by providing a transparent rationale for methodological choices and interpretive outcomes.

Results

The analysis of the narratives collected from the participants revealed profound insights into their experiences with physical activity post-breast cancer treatment. Three main themes emerged from the data: (1) physical activity as a catalyst for empowerment and recovery, (2) the social bonds formed through group activities, and (3) transformative changes in body perception and self-acceptance. Each theme underscores how the integration of physical activity contributed not only to the participants' physical health but also to their psychological and emotional well-being.

Physical activity as a catalyst for empowerment and recovery

A recurring theme in the narratives was how physical activity served as a powerful tool for reclaiming

autonomy and fostering resilience. The participants frequently expressed that engaging in exercise allowed them to feel in control of their bodies once more, contrasting sharply with the sense of helplessness often associated with their cancer treatment.

One participant shared, *"When I started participating in the program, I felt like I was taking back control over my life. The exercises reminded me that I am capable, that my body is still strong despite everything it's been through."* This sentiment resonated across most of the interviews, suggesting that physical activity played a significant role in bridging the gap between surviving cancer and feeling alive again.

The women spoke of how the routine of physical activity helped mitigate persistent side effects of treatment, such as fatigue and joint pain. One participant, who experienced prolonged fatigue due to her medication, noted, *"The fatigue I had from the tamoxifen was almost nonexistent when I stayed active. Exercise gave me back energy I thought I had lost forever."*

Additionally, the participants reported an increased sense of resilience as they observed physical improvements over time. Progress in strength, flexibility, and stamina translated into a boost in self-efficacy and a renewed sense of purpose. This was expressed by another participant who stated, *"When I saw that I could lift more weight or stretch further than I did weeks before, it was like winning a battle. It made me realize that I am not just surviving, but thriving."* The incremental successes in physical activity provided tangible evidence of progress, reinforcing positive psychological outcomes and encouraging continued engagement in physical activity.

The social bonds formed through group activities

Beyond the individual benefits, the social aspect of participating in group physical activities emerged as a powerful motivator and source of emotional support. The shared experiences within these groups created a sense of camaraderie that went beyond the gym or fitness center. The participants emphasized the importance of connecting with others who had experienced similar challenges, highlighting the deep sense of understanding and solidarity that developed through these interactions.

"Meeting other women who knew exactly how I felt was liberating. We didn't need to explain the pain or the fear; it was understood. We could just focus on being in the moment, moving, laughing, and supporting each other," shared one participant. This bond provided a safe space for emotional expression and fostered a supportive community where shared laughter and mutual encouragement flourished.

Participants emphasized the importance of the group format of the sessions, which fostered mutual encouragement, emotional connection, and a sense of shared

progress. The anticipation of seeing familiar faces and sharing stories added a social incentive to attending the sessions regularly. *“The exercise group was more than just a place to work out—it became a part of my support system,”* stated one participant. This aligns with previous studies emphasizing the psychosocial benefits of group exercise in promoting adherence and emotional well-being.

Moreover, the collective environment fostered a sense of normalcy and reduced the isolation often felt during and after cancer treatment. Participants expressed that the group’s shared understanding alleviated the burden of needing to explain themselves or their condition. *“Being surrounded by people who understood without words was comforting. It felt like a space where we were all equals, not defined by our diagnosis,”* shared another participant. This shared experience helped reinforce resilience and fostered a sense of belonging, which was critical for emotional recovery.

Transformative changes in body perception and self-acceptance

The third theme that emerged from the analysis centered around the participants’ evolving relationships with their bodies. Many women recounted initially experiencing feelings of disconnection, discomfort, or even rejection toward their post-treatment bodies. The physical scars and changes were daily reminders of their journey, often invoking mixed emotions of gratitude for survival intertwined with grief for what had been lost.

One participant reflected on this transformation, saying, *“At first, I couldn’t look at myself without feeling sad. The scars, the changes—they were reminders of what I went through. But as I continued with exercise, I started to see my body differently, not as damaged but as resilient.”* This gradual shift in body perception was a common thread across the narratives. Physical activity played a significant role in helping participants reconnect with and appreciate their bodies for their strength and capacity, rather than focusing solely on their appearance.

For many, the act of participating in exercise redefined their concept of health and wellness. Instead of seeing their bodies through the lens of societal beauty standards, the participants learned to value their bodies for their functionality and resilience. *“My body is not perfect, but it’s mine, and it’s strong. Every time I push through a workout, I remind myself that it carried me through the hardest fight of my life,”* shared one woman. This theme of self-acceptance underscores the psychological benefits of physical activity, which extend beyond mere fitness to encompass a broader, more inclusive sense of well-being.

Additionally, the participants spoke about the newfound confidence they gained through physical activity. One woman described how this confidence affected

other aspects of her life, stating, *“Once I started feeling stronger and more capable in my workouts, I noticed that I approached other challenges with the same mindset. It was empowering.”* This reflects the idea that physical resilience can translate into psychological resilience, helping individuals navigate post-cancer life with greater confidence.

The redefined relationship with their bodies also influenced their social interactions and self-perception as women. One participant summed it up, saying, *“I learned to accept myself, scars and all. It made me realize that my value isn’t diminished by what I’ve gone through—it’s enhanced by it.”* This narrative highlights the profound impact that physical activity had on fostering self-acceptance and a positive body image.

Instructors’ perspectives: observing change and resilience

The group interview with the three physical activity instructors offered valuable insights into the implementation and impact of the EFICAN program from a facilitation perspective. All three instructors had completed specialized training in physical activity and cancer through the Professional Institute for Exercise and Cancer (IPEFC) prior to their involvement in the project. This preparatory experience helped them dismantle societal stigmas surrounding cancer and approach the participants with empathy, knowledge, and professionalism.

Instructors described the initial two-week period of individual sessions with each participant as critical for building trust and tailoring exercises to the specific physical and emotional needs of each woman. They emphasized the importance of listening, emotional containment, and adapting sessions to each woman’s surgical history, physical limitations, and psychological state. One instructor shared: *“Many times the hour went by and we hadn’t done any exercise—we had just talked, and that was what they needed.”*

Over time, the instructors observed notable changes in the women’s physical capacity, confidence, and social engagement. The sense of community that emerged among participants was a recurring theme: *“At first, they were nervous and reserved, but soon they were chatting like lifelong friends,”* one instructor explained. The group dynamic became a key source of motivation, often described as more meaningful than the exercise itself: *“They came for the training, but stayed for the group.”*

Despite the structured nature of the protocol, the instructors implemented minor modifications and added motivational elements (e.g., games, partner exercises) to enhance enjoyment and adherence. They recognized the limitations imposed by the research design but also highlighted how participants expressed a desire for greater variety and more personalized challenges.

Finally, the instructors reflected on the long-term impact of the program, noting that many women maintained active lifestyles after the intervention, often seeking new activities independently. One facilitator remarked: *“Some of them are still training with me, others joined swimming or hiking groups—the important thing is that they didn’t want to stop.”* These accounts reinforce the value of integrating emotional, relational, and contextual elements into exercise programs for cancer survivors.

Discussion

This study aimed to explore the multifaceted impacts of physical activity on the recovery process of breast cancer survivors, examining how engagement in exercise influenced their physical, psychological, and social well-being. These findings highlight the potential of structured physical activity programs like EFICAN to promote not only physical recovery, but also emotional resilience and social connectedness among breast cancer survivors. This section discusses these findings in the context of existing literature, highlights the implications for practice and policy, and suggests future research directions.

Physical activity as a source of empowerment and recovery

One of the key findings of this study was that physical activity emerged as a tool for empowerment among the participants. The narratives highlighted how exercise provided a sense of agency that was crucial for regaining control over their lives after the loss of autonomy experienced during cancer treatment. These findings align with previous research showing that structured physical activity programs like EFICAN can alleviate common post-treatment symptoms such as fatigue, pain, and decreased energy levels [10]. The women’s narratives suggest how consistent engagement in the EFICAN program contributed to reducing such effects, supporting the role of exercise as an effective non-pharmacological strategy for long-term symptom management.

The participants’ descriptions of reclaiming their bodies through exercise resonate with the concept of post-traumatic growth (PTG), where individuals experience positive psychological change as a result of struggling with highly challenging life circumstances [24]. The women in this study expressed that the improvements they saw in their physical abilities translated into a mental resilience that extended beyond the gym. The sense of accomplishment gained from mastering new physical challenges contributed to enhanced self-efficacy, an essential component for developing PTG [25, 26].

Moreover, the importance of self-efficacy in breast cancer recovery is well-documented [27–29]. According to Bandura’s theory of self-efficacy [25], belief in one’s ability to perform specific actions is crucial for motivation

and perseverance. The participants’ ability to progress in their physical routines reinforced their belief in their capacity to overcome difficulties, which is vital for long-term recovery. This finding suggests that structured physical activity programs should emphasize achievable milestones to foster self-efficacy and, consequently, empower survivors.

The role of social support in group activities

The narratives underscored the significant role that social support played in encouraging adherence to physical activity and fostering emotional well-being. Group exercise programs offered a platform for social connection, providing a sense of camaraderie that mitigated feelings of isolation and strengthened the participants’ commitment to maintaining an active lifestyle. This is consistent with findings by Soriano-Maldonado et al. [8], who demonstrated that group-based physical activity contributed to sustained exercise participation and enhanced quality of life among breast cancer survivors.

Social support has been widely acknowledged as a critical factor in coping with chronic illnesses [30]. The shared understanding and non-verbalized empathy found within these group settings offered participants an emotional reprieve. They could share stories, laugh, and engage in mutual encouragement without needing to explain their struggles, which reinforced a sense of belonging. These shared experiences aligned with the concept of “communal coping” [31], where individuals collectively manage stressors by pooling their emotional and social resources.

The group dynamic also promoted adherence to exercise programs, as noted by participants who expressed looking forward to meeting friends at exercise sessions. This aspect supports the findings of Thoits [32], who argued that social relationships play a vital role in promoting health behavior adherence. The anticipation of positive social interactions and shared physical activity experiences created a feedback loop that reinforced continued participation, enhancing both physical and emotional resilience.

Transformative changes in body perception and self-acceptance

Perhaps one of the most significant findings of this study was the transformative shift in body perception reported by participants. Initially, the women described feelings of disconnection and discomfort with their bodies, often viewing their post-treatment physical selves through a lens of trauma and loss. However, as they engaged in physical activity, this perception began to change. Exercise became a tool not just for physical rehabilitation but for redefining their relationship with their bodies, allowing them to view themselves as resilient and capable.

This finding aligns with the body of work examining the impact of breast cancer on body image and self-esteem. Studies have shown that changes in physical appearance due to cancer treatment, such as scarring, hair loss, and mastectomy, can profoundly affect a woman's self-concept and body image [4, 5]. However, engaging in physical activity has been linked to improvements in body image and self-esteem [33]. The narratives of the participants in this study echoed these findings, illustrating how physical activity helped them shift their focus from external appearance to internal strength and functionality.

One participant's statement, "*My body is not perfect, but it's mine, and it's strong,*" encapsulates the profound shift in body perception that exercise facilitated. This shift from viewing the body as a vessel of illness to a symbol of survival and strength aligns with research on embodied resilience [34]. By participating in physical activities that challenged and celebrated their bodies' capabilities, the women in this study experienced a newfound appreciation for their physical selves. This highlights the importance of designing exercise programs that not only focus on physical outcomes but also encourage participants to recognize and celebrate their body's resilience and progress.

Psychological and social implications

The study's findings have several implications for the psychological and social dimensions of recovery for breast cancer survivors. The role of physical activity as a facilitator of psychological resilience was evident in the participants' stories. They described feeling more confident, suggesting that physical activity helped buffer against anxiety and contributed to a more positive outlook on life. This observation supports the findings of Ramirez et al. [9], who reported that exercise helps regulate mood and reduce anxiety among cancer patients.

The narratives suggest that engaging in structured physical activity may offer more than physical benefits; it can also introduce a sense of stability and predictability into the lives of breast cancer survivors. This routine appeared particularly meaningful during the transition from active treatment to post-treatment life—a phase often described as disorienting or uncertain due to the sudden reduction in medical oversight. Participation in the EFICAN program seemed to act as a bridge, offering continuity through scheduled sessions and a sense of purposeful structure during a vulnerable period of adjustment.

The social benefits derived from group activities were equally significant. Participants frequently emphasized how these sessions served as a reminder that they were not alone in their journey. The shared experience fostered by group activities reinforced social bonds that contributed to emotional well-being and mitigated feelings of

isolation. This social interaction aligns with findings from research on collective coping mechanisms [31], which highlight the benefits of shared experiences in promoting psychological health and well-being.

Beyond the survivors' self-reported experiences, the perspectives of the physical activity instructors provided an additional layer of insight that enriched the interpretation of the findings. Their observations reinforced the emergence of empowerment, resilience, and emotional connection, while offering external validation of participants' reported transformations. Instructors noted improvements not only in physical function but also in the women's confidence, expressiveness, and motivation to maintain an active lifestyle. These accounts highlight the value of incorporating multi-perspective data when evaluating psycho-social interventions. Moreover, the instructors' reflections on group cohesion, mutual support, and sustained engagement underscore the relevance of relational and emotional dynamics within exercise programs—a dimension already emphasized in recent literature on group-based rehabilitation in oncology [8, 35]. Integrating both participant and facilitator voices deepens our understanding of the mechanisms through which structured physical activity fosters recovery and well-being.

Limitations and future research

While the findings of this study offer valuable insights, several limitations must be acknowledged. The sample size was relatively small, consisting of only five participants, which may limit the generalizability of the results. Additionally, the study focused on a specific geographical region, which could affect the cultural context of the findings. Breast cancer survivors from this region—Almería, in southern Spain—may be influenced by strong family-oriented values, close-knit community networks, and access to public healthcare and sport facilities. These factors may have facilitated their participation in the EFICAN program and shaped their perceptions of recovery, social support, and physical activity. Future research should aim to include a larger and more diverse sample to enhance the transferability of the results and explore whether these findings hold true across different cultural and social settings.

The study also relied on self-reported narratives, which, while rich in detail, may be subject to recall bias or social desirability bias. Future research could incorporate a mixed-methods approach, combining qualitative narratives with quantitative measures of physical and psychological outcomes to provide a more comprehensive understanding of the effects of physical activity on breast cancer survivors.

Another area for future research involves exploring the long-term impacts of physical activity on psychological

resilience and body perception. While this study highlighted the immediate benefits experienced by participants, understanding how these benefits evolve over time would be valuable for developing long-term support strategies for breast cancer survivors. Previous research has examined the effects of exercise on mental health, body image, and quality of life among breast cancer survivors, often using standardized instruments such as the Body Image Scale [36], the Functional Assessment of Cancer Therapy – Breast (FACT-B) [37], or resilience scales like the Connor-Davidson Resilience Scale (CD-RISC) [38]. Future studies could build upon our findings by incorporating such measures to validate and extend the qualitative insights, allowing for triangulation of data and broader generalizability.

Practical implications for practice and policy

The insights gained from this study have significant implications for the development of post-treatment care programs for breast cancer survivors. The findings suggest that exercise programs should be designed not only to improve physical health but also to foster psychological and social well-being. Healthcare providers and policymakers should consider integrating structured, supportive group exercise programs into standard post-treatment care plans. These programs could include activities that emphasize gradual progression, celebrate individual achievements, and foster a sense of community among participants.

Furthermore, training for exercise instructors should include elements of psychosocial support to ensure that they can create an inclusive and empathetic environment. This approach could help facilitate the type of social bonds that were found to be beneficial in this study, making exercise sessions more than just physical routines but spaces for holistic healing.

Conclusions and broader significance

This study reinforces the importance of viewing physical activity as a comprehensive tool for recovery in breast cancer survivors. Beyond its physical benefits, exercise provides a pathway for emotional healing, social support, and redefined body perception. The participants' narratives illustrate that physical activity fosters resilience, not just in terms of physical strength but as an essential component of psychological and emotional recovery. By celebrating their capabilities and forming supportive connections, these women were able to move from a mindset of merely surviving to one of thriving.

The broader significance of this study lies in its potential to inform the development of survivor-focused interventions that prioritize holistic well-being. By incorporating physical, emotional, and social dimensions into recovery programs, healthcare providers can

support breast cancer survivors in building a renewed sense of identity and resilience. The findings underscore the importance of shifting the conversation from surviving cancer to embracing life beyond it, where physical activity acts as a catalyst for empowerment, connection, and self-acceptance. Incorporating women's voices and experiences not only enriches our understanding of post-cancer recovery but also asserts their central role in the process, emphasizing that their strength and resilience are the driving force behind true empowerment and transformation.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12905-025-03791-3>.

Supplementary Material 1

Supplementary Material 2

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Author contributions

Conceptualization M.J.L.; Data curation M.J.L., A.I.H.R., C.C.P., M.E.P.M.; Formal analysis M.J.L., A.I.H.R., C.C.P., M.E.P.M.; Funding acquisition M.J.L., M.E.P.M.; Investigation M.J.L., A.I.H.R., C.C.P., M.E.P.M.; Methodology M.J.L., M.E.P.M.; Project administration M.J.L., A.I.H.R., M.E.P.M.; Software M.J.L., A.I.H.R., C.C.P., M.E.P.M.; Resources M.J.L., A.I.H.R., C.C.P., M.E.P.M.; Supervision M.E.P.M.; Writing – original draft M.J.L.; Writing – review & editing M.J.L., A.I.H.R., C.C.P., M.E.P.M.

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Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request. However, due to ethical and privacy considerations, and in accordance with the explicit wishes of the participating women, the data are not publicly available.

Declarations

Ethics approval and consent to participate

All participants provided informed consent, and the study was approved by the Ethics Committee of Almería Provincial Research Ethics Committee, Spain (approval code: Ejercicio-CáncerUAL98/2019). The research was conducted in accordance with the ethical standards of the Declaration of Helsinki and relevant guidelines and regulations.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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