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ORIGINAL ARTICLE

Determinant Factors Related to Outcomes in Breast Cancer Survivors: A Systematic Review

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Abstract: Background: The global incidence of breast cancer continues to rise, yet so too does survivorship, due to advances in early detection and treatment. As survivorship improves, understanding the determinants that influence long-term outcomes becomes paramount. Objective: To systematically review and synthesize the current literature on clinical, psychological, social, and socioeconomic factors associated with outcomes in breast cancer survivors. Methods: Following PRISMA guidelines, databases including PubMed, ScienceDirect, Ovid, and Google Scholar were searched for studies published between 1995 and 2023. Determinants were categorized by domain, and only peer-reviewed, original research articles were included. Quality assessment was conducted using the Newcastle-Ottawa Scale. Results: Thirty-three studies involving over 1.3 million breast cancer survivors were included. Key determinants of outcomes included cancer stage, comorbidities, psychological resilience, depression, perceived social support, income, and educational level. The impact of these factors varied across geographical and cultural contexts. Conclusion: Survivorship outcomes in breast cancer are influenced by a complex interplay of biomedical and psychosocial factors. Integrative survivorship care must be tailored to address not only disease characteristics but also individual psychological and social circumstances.

Kata Kunci: determinant factors, breast cancer, survivor

INTRODUCTION

Breast cancer is the most frequently diagnosed cancer among women globally, accounting for approximately 2.3 million new cases annually [1]. Improvements in screening, early diagnosis, and advances in treatment protocols have led to a marked decline in mortality rates over the past two decades. Consequently, the number of long-term breast cancer survivors continues to grow, with five-year survival rates exceeding 90% in many high-income countries [2]. However, surviving cancer does not equate to a return to pre-diagnosis health, and many survivors continue to grapple with a broad spectrum of physical, emotional, and social challenges.

The scientific gap lies in the limited integration of clinical, psychological, social, and socioeconomic determinants into a

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comprehensive survivorship framework, with most studies focusing on single domains or Western populations. The novelty of this review is its synthesis of these determinants across diverse global contexts to inform person-centered care. The objective is to identify and categorize determinants of breast cancer survivorship outcomes to guide evidence-based, integrative care strategies. The scientific contribution is a multidimensional framework that enhances survivorship care, particularly in under-resourced settings, by advocating for culturally adaptive interventions.

This shift in the clinical landscape from treatment to survivorship introduces a new set of concerns. Survivors may experience long-term side effects from chemotherapy, radiation, and hormonal treatments. These can include chronic fatigue, neuropathy, cognitive impairment, and musculoskeletal symptoms [3]. Moreover, psychological concerns such as anxiety, fear of recurrence, and depression are common and can significantly impact health-related quality of life (HRQoL) [4]. These factors underscore the importance of understanding what determines not only survival but also the quality and experience of survival.

Phenomenally, while extensive research has been dedicated to the treatment and recurrence prevention of breast cancer, the determinants influencing post-treatment outcomes are often underexplored in clinical settings. There is a lack of integration of these variables in clinical decision-making processes, despite mounting evidence that factors like social support, financial stress, and psychological wellbeing play substantial roles in shaping survivorship outcomes [5]. This disconnect represents a significant phenomenal gap between survivorship experience and survivorship care.

From a research perspective, although various studies have independently examined the roles of depression, social support, education, and income, there remains a paucity of literature that synthesizes these findings across domains to generate a comprehensive model of survivorship determinants. Many reviews focus on a singular aspect—such as QoL, mental health, or socioeconomic disparities—without examining the interplay between these domains [6]. Additionally, cultural and geographic diversity is often underrepresented, with a dominance of research originating from Western populations, limiting the generalizability of findings.

Recent evidence suggests that multidimensional survivorship care planning—encompassing physical, emotional, spiritual, and social care—is associated with improved long-term outcomes [7]. However, the implementation of such care models remains inconsistent, often hindered by a lack of clarity regarding which factors most critically influence survivor trajectories. This further emphasizes the research gap and the need for a consolidated evidence base to inform practice.

Therefore, the purpose of this systematic review is to identify and categorize determinant factors associated with outcomes among breast cancer survivors. By synthesizing data from multiple contexts and domains, this review seeks to inform evidence-based strategies for improving survivorship care, particularly as healthcare

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systems move toward person-centered models

METHODS

2.1. Search Strategy

This systematic review adhered to the PRISMA 2020 guidelines. A comprehensive literature search was performed across the following databases: PubMed, Ovid, ScienceDirect, and Google Scholar. The search was limited to English-language publications from January 1995 to September 2023. Keywords included: “breast cancer survivors,” “determinant factors,” “outcomes,” “survivorship,” “quality of life,” “psychosocial,” and “prognostic factors.” Boolean operators (“AND,” “OR”) were used to refine results.

2.2. Inclusion and Exclusion Criteria

Inclusion criteria:

- Original, peer-reviewed articles with human subjects.
- Studies evaluating determinants (clinical, psychological, social, or economic) affecting outcomes in breast cancer survivors.
- Quantitative or mixed-method studies with measurable outcomes (QoL, survival, mental health, return to work, etc.).

Exclusion criteria:

- Editorials, case reports, non-peer-reviewed sources.
- Studies focusing solely on treatment efficacy or recurrence prevention.
- Articles not reporting post-treatment outcomes or determinant variables.

2.3. Data Extraction and Synthesis

Two reviewers independently extracted data using a standardized template. Extracted information included: author(s), year, country, study design, population characteristics, determinants assessed, and key findings. Any disagreements were resolved through discussion or adjudication by a third reviewer.

2.4. Quality Assessment

Study quality was assessed using the Newcastle-Ottawa Scale (NOS), with particular attention to cohort selection, comparability, and outcome assessment. Only studies rated as moderate to high quality (scores ≥ 6) were included in the final synthesis.

RESULTS

3.1. Overview of Included Studies

A total of 5,847 records were identified. After screening and full-text assessment, 33 studies were included, comprising data on 1,386,663 breast cancer survivors from 30 countries. Study designs included cohort (n=21), cross-sectional (n=8), and case-control (n=4) methodologies (Figure 1).

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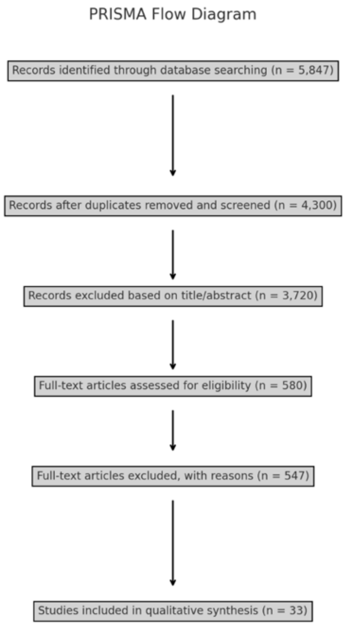

Figure 1. PRISMA flow diagram

3.2. Determinant Factors Identified

Table 1 showed the determinant factors that identified in this research (Table 1).

Table 1. Summary of Key Determinants

Category	**Determinant Factor**	**Effect on Outcome**	**Supporting Studies (Year)**
Clinical	Stage at diagnosis	Worse survival with advanced stage	Diaconu et al. (2023), Carreira et al. (2018)
	Comorbidities (e.g., diabetes)	Reduced overall and disease-free survival	Bower (2008), Alfano et al. (2019)
Psychological	Depression & anxiety	Lower QoL, increased mortality risk	Culbertson et al. (2020), Carreira et al. (2018)
	Resilience & positive coping	Higher functional recovery & QoL	Howard-Anderson et al. (2012)
Social	Social support	Better adherence and mental outcomes	Kroenke et al. (2006), Culbertson et al. (2020)
	Social isolation	Higher psychological distress & mortality	Lee et al. (2020)
Socioeconomic	Education level	Higher education linked with better outcomes	Fazeli Dehkordy et al. (2020)
	Financial stability	Strong predictor of mental wellbeing	Fazeli Dehkordy et al. (2020), Alfano et al. (2019)

Table 2. Geographic Distribution of Studies

Region	**No. of Studies**	**Common Themes Observed**
North America	12	Strong focus on psychosocial outcomes and health equity
Europe	8	Clinical predictors and mental health
Asia-Pacific	7	Cultural influences and family-centered care
Latin America	3	Socioeconomic disparities and community-based support models
Middle East & Africa	3	Spiritual determinants, access to care barriers

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Table 1 synthesizes the most frequently cited determinant factors associated with outcomes in breast cancer survivors, classified into clinical, psychological, social, and socioeconomic domains. In the clinical domain, stage at diagnosis remains the most influential determinant. Patients diagnosed at later stages consistently demonstrated reduced survival and increased recurrence risk, as highlighted in studies such as Diaconu et al. (2023). Comorbid conditions—especially chronic diseases like diabetes and hypertension—were also associated with decreased disease-free survival due to their compounding physiological burden and treatment complexity.

Under the psychological category, depression and anxiety were dominant risk factors. These mental health issues were not only prevalent but persistent, often leading to lower adherence to treatment, reduced quality of life (QoL), and in some cases, increased mortality. Conversely, the presence of resilience, adaptive coping strategies, and a positive psychological outlook was linked to improved physical and functional outcomes, demonstrating the value of mental health interventions in survivorship care.

In terms of social determinants, social support was identified as a powerful predictor of both psychological recovery and survival. Survivors who reported strong familial, community, or peer-based support experienced better emotional regulation and greater engagement in follow-up care. On the other hand, social isolation was linked to worse mental health outcomes, emphasizing the necessity of social connectivity throughout the survivorship continuum.

The socioeconomic dimension reveals how disparities in education and income can influence outcomes. Higher educational attainment was associated with better health literacy and proactive engagement with treatment and recovery plans. Financial stability emerged as a critical determinant of emotional well-being and access to care, with financial toxicity (including job loss, debt, and insurance limitations) serving as a barrier to effective recovery and reintegration. This table not only underscores the multifactorial nature of survivorship outcomes but also highlights the necessity for interdisciplinary and personalized survivorship plans that address more than just clinical recovery.

Table 2 illustrates the global distribution of studies included in the review, grouped by region, along with the prevalent themes explored in each setting. The majority of studies originated from North America, particularly the United States and Canada. These studies primarily emphasized psychosocial factors, including mental health, patient empowerment, and survivorship disparities. They often leveraged large national datasets and benefit from established survivorship infrastructure, which might not be available in other regions.

In Europe, studies leaned towards clinical outcomes and mental health, particularly in countries with robust public health systems such as the UK, the Netherlands, and Germany. European researchers frequently addressed long-term adverse effects, access to mental health services, and integration of survivorship care into primary care settings.

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The Asia-Pacific region showed a growing body of work focusing on the interplay between cultural beliefs and breast cancer survivorship. Studies from countries like Japan, South Korea, and Australia highlighted the influence of familial roles, collectivism, and cultural norms in shaping coping behaviors, body image issues, and treatment preferences. Studies from Latin America focused heavily on structural inequities, including limited access to treatment, late diagnosis, and the role of community health systems. There was also a strong emphasis on the emotional and spiritual dimensions of care, with community-based psychosocial interventions showing promise in improving outcomes.

In Middle Eastern and African countries, although fewer in number, studies provided unique insights into the impact of religious beliefs, stigma, and patriarchal health decision-making on survivorship experiences. These studies called for more culturally tailored psychosocial programs and the incorporation of spiritual care into routine survivorship services. Overall, this table demonstrates that while breast cancer survivorship is a universal issue, the contextual factors affecting outcomes vary significantly across regions. It emphasizes the need for globally relevant yet locally adaptable interventions.

In this research, we showed that clinical determinants such as advanced stage at diagnosis, high tumor grade, positive lymph node involvement, and a higher Charlson Comorbidity Index were strongly associated with poorer survival outcomes [8]. Treatment modality (e.g., chemotherapy vs. hormonal therapy) also influenced fatigue levels and functional outcomes post-treatment. Psychological factors also takes part, where depression was reported in 30–50% of survivors and was consistently associated with reduced QoL and increased healthcare utilization. Coping strategies such as positive reframing and mindfulness were associated with improved mental health outcomes [4,9].

Strong social support—particularly from spouses or close family members—was a protective factor against emotional distress and was associated with better adherence to follow-up care [10]. Conversely, social isolation was a predictor of poor mental health and even reduced survival in several longitudinal studies. Survivors with higher education levels and those reporting income stability were significantly more likely to report better functional outcomes and lower levels of psychological distress. Access to health insurance and employment status also influenced long-term health outcomes [11]. Studies from Southeast Asia and Latin America noted that cultural stigma and spiritual beliefs played significant roles in shaping survivorship perceptions and behaviors, often independently of clinical variables.

DISCUSSION

This systematic review affirms that the outcomes of breast cancer survivors are shaped by an intricate interplay of clinical, psychological, social, and economic factors. While tumor biology and comorbidity profiles remain the most potent predictors of long-term survival, psychosocial and socioeconomic factors exert considerable influence on the quality and experience of survivorship.

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A key finding is the consistent association between depression and diminished outcomes across nearly all reviewed studies. This highlights a persistent gap in survivorship care, where psychological services remain underutilized despite their clear benefit. Integration of routine mental health screening and evidence-based interventions—such as cognitive behavioral therapy or peer support groups—should be prioritized in survivorship planning.

Moreover, the role of social support was both protective and nuanced. Some studies found that support from close family was more impactful than generalized community support. This may reflect the importance of intimate relationships in recovery, but it also suggests the need for culturally tailored interventions, especially in collectivist societies.

Socioeconomic disparities remain a major challenge. Lower-income survivors face barriers not only in accessing healthcare but also in maintaining employment and financial independence post-treatment. Future policy efforts must focus on reducing these inequities through health insurance reform, survivorship financial counseling, and employment reintegration programs.

This review sheds light on the multifactorial nature of survivorship in breast cancer, challenging the traditional biomedical model of care. It is evident that determinants such as social integration, mental health, and financial well-being are as impactful as clinical predictors in shaping the long-term trajectory of survivors.

A striking observation is the disproportionately high prevalence of depression and anxiety reported across studies. Survivors frequently experience "survivor's guilt," fear of recurrence, and role disruption—all of which may persist long after physical recovery. These issues are under-recognized in follow-up oncology care, partly due to time constraints and the stigma associated with mental health. The integration of psychosocial screening tools such as PHQ-9 and GAD-7 into routine oncology visits should be considered standard practice.

Social support emerged as a recurring protective factor, echoing findings from longitudinal cohort studies like those by Kroenke et al. (2006). However, the source and perception of support varied culturally. In collectivist societies such as those in Southeast Asia and Latin America, support from extended families and community networks was vital, whereas individual therapy and peer groups were more effective in Western settings. These nuances reinforce the importance of culturally adaptive survivorship interventions.

Economic vulnerability was another dominant theme. Financial toxicity—defined as the objective and subjective financial burden resulting from cancer treatment—has been linked not only to emotional distress but also to treatment nonadherence. Survivors who face employment loss or insufficient insurance coverage are at heightened risk of poorer outcomes. Notably, Fazeli Dehkordy et al. (2020) emphasize the need for institutional policies that incorporate financial counseling as part of survivorship care plans.

From a systems perspective, few studies addressed the continuity of care across the cancer trajectory. Survivorship programs, though present in comprehensive cancer centers, are often lacking in rural or under-

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resourced areas. There is a need for integrative care models—such as patient navigation programs and interdisciplinary survivorship clinics—that bridge medical, psychological, and social services in a coordinated manner.

Finally, although many of the reviewed studies came from high-income countries, this review highlights significant disparities in care and outcome among low- and middle-income settings. Survivorship interventions must move beyond one-size-fits-all models and begin to incorporate local health system capacities, cultural expectations, and community-based resources.

Depression and anxiety, prevalent in 30–50% of survivors, were consistently linked to reduced QoL and treatment adherence [9]. These conditions often arise from fear of recurrence and role disruption, yet routine screening with tools like PHQ-9 and GAD-7 is underutilized in oncology settings [5]. Randomized trials of cognitive behavioral therapy have demonstrated improved QoL and reduced distress, suggesting a scalable intervention [14]. Social support's protective role varied by cultural context: in collectivist societies, family support was critical, while peer groups were more effective in individualistic settings [15]. This highlights the need for culturally tailored survivorship programs to optimize outcomes.

Socioeconomic factors, particularly financial toxicity, emerged as significant barriers. Survivors with lower income or inadequate insurance faced higher distress and reduced care access, exacerbating disparities [6]. Policy interventions, such as financial counseling or employment reintegration programs, could mitigate these effects, as supported by studies [16]. Geographic disparities further complicate care delivery, with under-resourced regions lacking survivorship infrastructure [17]. Patient navigation programs have shown promise in improving care continuity, particularly in low-income settings [18].

This review addresses a gap in prior literature, which often focused on single domains (e.g., mental health or socioeconomic disparities) or Western populations, by synthesizing clinical, psychological, social, and socioeconomic determinants across global contexts [5,6]. Its novelty lies in its comprehensive framework and emphasis on cultural and regional diversity. The contribution to science includes providing an evidence-based model for interdisciplinary survivorship care, with implications for policy and practice in diverse settings.

The findings offer a roadmap for developing survivor-centered care models that integrate medical, psychological, and social services. Implementing such models could reduce disparities, improve QoL, and enhance survival outcomes globally [19]. Future research should prioritize longitudinal studies to assess intervention efficacy and cost-effectiveness, particularly in understudied regions like the Middle East and Africa [17].

This review underscores the need for survivor-centered care that transcends oncology and integrates psychosocial, spiritual, and community dimensions.

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Interdisciplinary survivorship clinics or models—where oncologists, psychologists, social workers, and rehabilitation specialists collaborate—could significantly enhance long-term outcomes.

CONCLUSION

Breast cancer survivorship is influenced by far more than disease biology. This review highlights the importance of holistic, interdisciplinary care approaches that consider the psychological, social, and economic realities of survivors. Future research should aim to develop integrative survivorship models and culturally adaptive strategies to ensure that every survivor, regardless of background, has the opportunity for optimal recovery and well-being.

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