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From Timely Diagnosis to Reintegration: Health Communication, Comprehensive Rehabilitation, and Nipple-Areola Complex Reconstruction in Women with Breast Cancer in Chile

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Abstract

Breast cancer is the leading cause of cancer-related death among Chilean women, and its mortality rate continues to rise, despite the fact that diagnosis and treatment have been covered by explicit public health guarantees since 2005. This article reviews scientific literature, official statistics, and public policy documents published between 2003 and 2026 to analyze the factors conditioning this trend, as well as the needs of women following treatment. Between 2010 and 2024, annual deaths increased by 41.6%, and only 37.4% of women aged 50 to 69 had an up-to-date mammogram (31.1% in the Metropolitan Region). Low health literacy and the communicational insistence on "prevention" contribute to delayed medical consultations and self-blame among patients—even though most cases cannot be prevented through individual behaviors. Furthermore, high rates of anxiety, depression, and failure to return to the workforce persist. Reconstruction of the nipple-areola complex (NAC) is associated with greater satisfaction and a better integration of the body image; however, it is not included among the guaranteed healthcare services in Chile or many other healthcare systems. Furthermore, skin that has undergone chemotherapy or radiotherapy requires technical adjustments and strict biosafety measures. This article describes the comprehensive rehabilitation model of the FEMPO Foundation, which integrates timely detection, psycho-oncology, NAC reconstruction, social and occupational reintegration, and education. We propose that rehabilitation should begin at the time of diagnosis and that public messaging should focus on timely detection.

Keywords: Breast cancer, early detection, health literacy, cancer rehabilitation, psycho-oncology, nipple-areola complex, oncological dermopigmentation, occupational reintegration.

Introduction

Breast cancer is the leading cause of cancer-related death among Chilean women [1,2]. The annual number of deaths has risen steadily since 2010 and, according to available projections, will continue to increase unless the conditions under which the disease is detected change [2]. This is occurring in a country that incorporated breast cancer into its Explicit Health Guarantees (GES) system in 2005 and enacted a National Cancer Law in 2020.[3].

While coverage for diagnosis and treatment exists, many women still enter the healthcare system too late. When the disease is diagnosed at a localized stage, the five-year relative survival rate exceeds 99%; in the presence of distant metastases, this figure drops to approximately 32% [4]. The stage at diagnosis remains the prognostic factor that offers the greatest potential for impactful intervention.

Furthermore, increased survival rates have highlighted a growing group of women who, upon completing their cancer treatment, are unable to return to their previous lives. The loss of a breast and the nipple-areola complex, physical changes, work-related disruptions, and emotional impact create needs that the healthcare system addresses in a fragmented—and often delayed—manner [5,6].

In this article, drawing on existing literature and available national data, we examine the communicational, psychosocial, occupational, and technical dimensions that influence breast cancer outcomes in Chile. We also describe the comprehensive rehabilitation model we have developed at Fundación FEMPO.

Methods

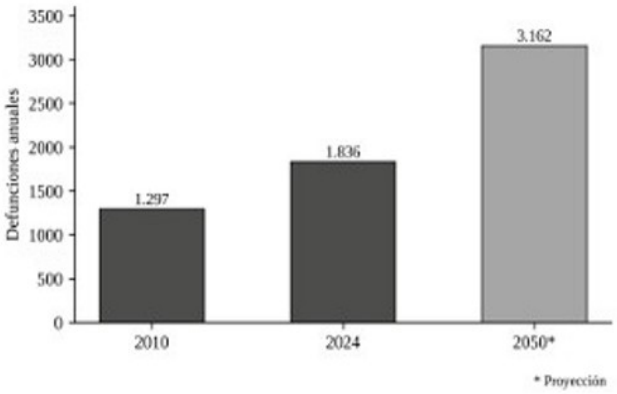
We conducted a narrative review, consulting indexed scientific articles, official statistics from the Chilean Ministry of Health and the Department of Health Statistics and Information (DEIS), reports from international organizations (IARC/GLOBOCAN, WHO, OECD), and public policy documents published between 2003 and 2026. The search covered five topics: the epidemiology of breast cancer in Chile; health literacy and communication as applied to screening; cancer rehabilitation; the psychosocial and occupational consequences of the disease; and nipple-areola complex (NAC) reconstruction on skin previously treated with chemotherapy or radiotherapy. Priority was given to systematic reviews, meta-analyses, and studies conducted within the Chilean population.

The description of the comprehensive rehabilitation model is based on the protocols, aggregated records, and institutional archives of Fundación FEMPO (2017–2026), as well as the clinical experience previously published by the lead author—which includes a case series of ten NAC reconstructions on skin treated with chemotherapy and a technical analysis of irradiated skin (see section 3.7). This work does not incorporate individual patient data, nor does it constitute a formal evaluation of effectiveness.

Results and Synthesis

Mortality and Screening Coverage

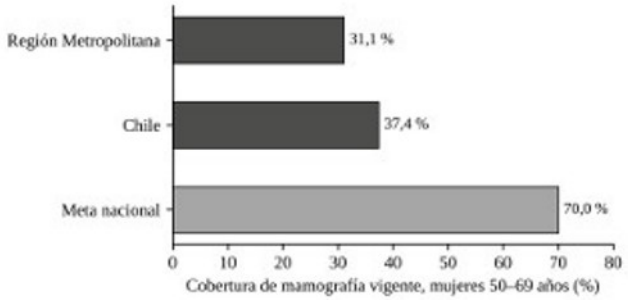
According to an analysis of deaths recorded by the DEIS (Department of Health Statistics and Information), the number of female deaths due to breast cancer rose from 1,297 in 2010 to 1,836 in 2024—an increase of 41.6%—while the crude mortality rate grew by 20.5% over the same period. If current conditions persist, projections based on GLOBOCAN estimate 3,162 annual deaths by 2050 (Figure 1) [2].



Defunciones anuales = Annual mortality

Figure 1. Annual deaths among women due to breast cancer in Chile: 2010, 2024, and projections for 2050. Prepared by the authors based on Pairo-Cuba et al. [2], using data from DEIS-Minsal and GLOBOCAN projections.

The most significant shortfall lies in detection. Only 37.4% of Chilean women aged 50 to 69 have an up-to-date mammogram; in the Metropolitan Region, this figure drops to 31.1%—one of the lowest rates in the country—against a national target of 70% (Figure 2) [7]. Since mammography screening is managed through primary healthcare, this gap can be addressed most effectively at the municipal (communal) level.



Metropolitan Region

Chile

National Goal

Current mammography coverage, women aged 50-69 (%)

Figure 2. Current mammography coverage among women aged 50 to 69. Prepared by the authors using data from the Cancer Observatory, based on information from the Ministry of Health [7].

Health literacy

Fifty-three percent of Chilean adults fall into the lowest levels of reading comprehension, compared to an average of 26% in OECD countries [8]. Patients forget between 40% and 80% of the medical information provided during a consultation, and some of what they do recall is remembered incorrectly[9]. Low health literacy is consistently associated with lower utilization of preventive services—including mammography—and with poorer health outcomes [10,11]. Given these figures, simply providing information is not enough; how it is delivered matters.

Prevention and timely detection: Implications for the patient

In public communication regarding breast cancer—both in Chile and internationally—the term "prevention" predominates. While there are modifiable risk factors, most cases cannot be avoided through individual behaviors; therefore, the primary tool available for reducing mortality is early detection [1,12]. The WHO Global Breast Cancer Initiative identifies health promotion—focused on early detection and timely diagnosis—as a foundational pillar for reducing mortality [12].

In our view, the focus on "prevention" carries consequences that are rarely discussed. Prior to a diagnosis, it may lead a woman to believe that a healthy lifestyle offers protection, potentially causing her to downplay the importance of regular check-ups. Once diagnosed, it may suggest that the disease could have been avoided, which fuels feel-

ings of guilt. Self-blame among women with breast cancer is associated with greater psychological distress and poorer emotional adjustment [13]. In our clinical practice, many patients arrive asking what they did wrong. This guilt over "failing to prevent" the disease often emerges before other forms of grief—even those related to the treatment process itself.

For this reason, we propose a simple message centered on a single action: in most cases, breast cancer cannot be prevented, but detecting it in time can make the difference between life and death. Community education and patient navigation interventions have been shown to increase participation in mammographic screening [14,15]; however, their effectiveness depends on the implementing teams being trained in effective health communication.

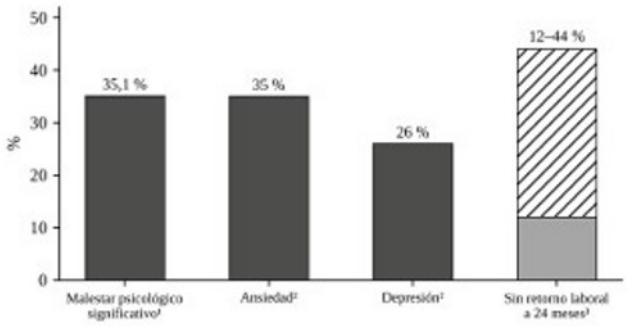
Rehabilitation from the Time of Diagnosis

Rehabilitation is commonly viewed as something that follows treatment. However, the literature on cancer rehabilitation advocates for interventions starting at the moment of diagnosis ("prehabilitation"), together with a prospective surveillance model designed to identify and address physical and functional sequelae at an early stage [16,17].

In the case of breast cancer, a patient faces a cumulative series of losses: the guilt associated with prevention-related messaging, the impact of the diagnosis, the effects of chemotherapy and radiotherapy, the loss of the breast, the loss of the nipple-areola complex (NAC), and, frequently, the loss of employment. If rehabilitation begins only after treatment has concluded, the woman traverses almost this entire journey without structured support. Conversely, initiating rehabilitation at the time of diagnosis allows for the anticipation of potential sequelae, the preparation of skin and tissue for reconstructive phases, the timely processing of grief, and the planning of a return to work before the employment termination is finalized.

Psychosocial burden and return to work

Up to 35.1% of individuals with cancer experience significant psychological distress [18], and a recent meta-analysis estimates prevalence rates of 35% for anxiety and 26% for depression among patients with breast cancer (Figure 3) [19].



Psychological distress Anxiety Depression No return to work within 24 months.

Figure 3. Psychosocial and occupational burden associated with breast cancer. [1]Zabora et al. [18]; [2]Qing and Ye [19]; [3]range reported by Tamminga et al. [20]. Prepared by the authors.

The occupational impact is also significant. Cancer survivors face a 1.37 times higher risk of unemployment compared to the population without cancer [21], and between 12% and 44% of breast cancer survivors have not returned to work 24 months after diagnosis [20]. In Chile, returning to work is influenced by physical aftereffects, fatigue, changes in body image, and a lack of structured support systems [6]. In many cases, these women are heads of households; therefore, the loss of employment directly affects their entire family unit.

Nipple-Areolar Complex (NAC) Reconstruction and Coverage

Breast reconstruction is included under the GES (Explicit Health Guarantees) framework in Chile. However, the final reconstruction of the nipple-areola complex (NAC) via oncological dermopigmentation is not covered as a specific medical procedure, nor is there a technical standard defining its clinical indications, safety requirements, or the training required for those who perform it.

This is also the case in many other healthcare systems. The United States is an exception: since 1998, the Women's Health and Cancer Rights Act has mandated that health plans covering mastectomies must also cover all stages of breast reconstruction [22]. In other words, recognizing the NAC reconstruction as an integral part of the treatment is a feasible health policy decision.

NAC reconstruction is associated with high levels of patient satisfaction and improved integration of body image (23). For patients, however, its value extends beyond the visual aspect. They describe it as a process that allows them to recognize themselves, feel at home in their bodies, and engage with their family, social and professional environments without the constant, visible reminder of their illness (24,25). For this reason, we consider it an intervention for physical rehabilitation - comparable to the care provided following other conditions that compromise bodily integrity.

Technical and biosafety requirements for treated skin

Treated skin does not behave like healthy skin. Chemotherapy and radiotherapy alter microcirculation, barrier function, skin thickness and elasticity, the structure of dermal collagen, and basal pigmentation (26,27). Following radiotherapy, persistent hyperpigmentation is observed in nearly 80% of survivors, and difficulties with pigment retention are reported in up to 70% of patients who have previously undergone radiation (27). In the case of the left breast, dosimetric planning -aimed at protecting the heart and the left anterior descending artery-results in specific patterns of skin irradiation (27).

In practice, this translates to a less predictable tissue response. We have observed, for example, that irradiated skin with marked xerosis tends to exhibit increased scaling during the healing process and irregular pigment loss; consequently, the appearance immediately following the procedure does not reliably predict the final outcome [27]. Applying the conventional technique under these conditions risks poor results and avoidable complications. The experience gained by the lead author—formalized through the Global Pattern® method and documented in her publications, including a case series of ten patients with skin previously treated with chemotherapy [26] and a technical analysis of irradiated skin [27]—has led us to adopt a progressive approach, the criteria for which are summarized in Table 1.

Biosafety is an integral part of the method, not an optional add-on. It encompasses the sanitary authorization of the facilities; the use of sterile, single-use skin-penetrating devices; the use of authorized supplies that are traceable by batch number and expiration date; the safe handling of sharps; the documentation of any incidents; and the suspension of the procedure in the event of any breach of sterility. The procedure is performed only after clearance from the treating team and once treatment-related skin complications have resolved. It

is advisable to inform the patient from the outset that, in the case of irradiated skin, a second session is often required and is part of the treatment plan—it does not constitute a technical failure [27].

Table 1. Alterations in treated skin and technical adaptations for oncological dermopigmentation of the nipple-areola complex (NAC). Developed by the authors based on Gateño Caraccioli [26,27].

Skin Alteration	Impact on Technique	Clinical Measure
Xerosis and hyperkeratosis	Increased epidermal resistance and decreased elasticity	Prior skin conditioning with deep hydration; avoid large-gauge needles
Barrier damage and hypersensitivity	Increased susceptibility to infection and contact dermatitis	Mandatory patch test; medical-grade, sterile, and hypoallergenic pigments
Collagen atrophy and loss of elasticity	Risk of pathological scarring and pigment expulsion	Precise deposition at the upper dermoepidermal junction; low voltage and minimum passes
Basal hyperpigmentation	Different chromatic background compared to the contralateral breast	Color selection adapted to the tissue, not a direct copy of the healthy breast
Unpredictable retention	Pigment loss during re-epithelialization	Retention assessment after complete healing; planned second session, not

Teaching and Professional Training

In the absence of a guaranteed service, there are also no established training standards. Currently, oncological breast dermopigmentation can be performed by professionals with diverse training backgrounds, lacking common criteria for evaluating treated skin, selecting pigments, or ensuring biosafety—a situation that also raises questions regarding professional ethics [28]. This heterogeneity compromises patient safety and the reproducibility of outcomes.

We believe that training should be addressed at three levels: (i) training for primary healthcare staff and municipal teams in effective health communication, ensuring that the message regarding timely detection reaches the population in an understandable way; (ii) specialized training in psycho-oncology, focused on addressing the grieving process associated with the illness and preparing for reintegration; and (iii) specialized training in oncological breast dermopigmentation, with clearly defined entry and exit profiles, covering the physiology of treated skin, technical and biosafety protocols, supervised practice, and competency assessment. In our experience, collaborating with universities is the best approach for certifying these competencies and building lasting capacity within local municipalities.

The comprehensive rehabilitation model of Fundación FEMPO

The model we apply at Fundación FEMPO is aimed at women who are living with, or have experienced, breast cancer, and it begins at the point of diagnosis. Its components are described in Table 2.

Between 2017 and 2026, the foundation recorded more than 8,000 breast reconstructions performed free of charge. This initiative was included in the First Book of Best Practices in Cancer Care in Chile [29].

Table 2. Components of the comprehensive rehabilitation model of Fundación FEMPO.

Component	Objective	Main Actions
Early detection	Reduce late consultation	Community educational programs with short messages and a single action
Psychological orientation	Entrance gate to the program	Initial evaluation and timely referral
Psycho-oncology	Address the grief of the disease	Addressing guilt, body image, and preparation for reintegration
Reconstruction of the NAC *(Complex Areola-Teat)*	Physical rehabilitation	Oncological breast dermopigmentation with technical and biosecurity protocol, with discharge from the treating team
Social and labor reintegration	Return to previous life	Individual return plan and coordination with the local employment network

Discussion

In Chile, treatment for breast cancer is guaranteed, yet mortality rates continue to rise. The data reviewed point to late presentation as a primary explanation, while the understanding of health-related information emerges as a barrier—less visible than those related to access, but equally significant.

For this reason, we believe that health communication should be planned and evaluated just like any other healthcare intervention. Shifting the focus from prevention toward timely detection could encourage regular check-ups while simultaneously reducing the guilt many women experience upon diagnosis—a burden that compounds subsequent grief and hinders adjustment to the illness.

Furthermore, being discharged from cancer treatment does not necessarily mean full recovery. The persistence of psychological distress, challenges in returning to the workforce, and changes to body image justify a rehabilitation process that begins at the time of diagnosis and continues beyond the completion of treatment. Within this continuum, the reconstruction of the breast-aerola-nipple (BAN) complex represents the physical conclusion of the disease. The fact that this procedure is not covered leaves the rehabilitation process incomplete at its very final stage.

Regarding the technical aspects, skin that has been treated with chemotherapy or radiotherapy requires specific protocols and biosafety criteria that fall outside the scope of conventional practice. The standardization of these protocols and the certified training of professionals are essential prerequisites for reconstruction of the CAP [Primary Care Center] can be integrated into the public network with reliable, predictable, and reproducible results.

Finally, the coordination between primary care, municipalities, civil society organizations, and academia offers a pathway to transform local experiences into public policy.

Limitations

This is a narrative review, lacking a systematic search or a formal assessment of the quality of the evidence. The description of the institutional model is based on aggregated records rather than an effectiveness study, and the technical criteria described require prospective validation. Further research is needed to evaluate the impact of effective communication interventions on mammography coverage and the stage at diagnosis, as well as the effect of comprehensive rehabilitation and nipple-areolar complex (NAC) reconstruction on quality

of life and return to work among the Chilean population.

Conclusions

Reducing breast cancer mortality in Chile requires addressing the stage at diagnosis through clear, concise messaging focused on timely detection, delivered by teams trained in effective communication. Rehabilitation should begin at the time of diagnosis and integrate psycho-oncology, nipple-areolar complex (NAC) reconstruction—following standardized technical and biosafety protocols—and social and occupational reintegration. Including NAC reconstruction in guaranteed healthcare services and developing certified educational programs represent concrete steps toward a public policy for the comprehensive rehabilitation of women with breast cancer.

Declarations

Conflict of interest: Paola Gateño Caraccioli is the founder and president of Fundación FEMPO, and Josefina Lattus is the director of the Psycho-oncology Department at the same institution, whose model is described in this article.

Funding: This work did not receive external funding.

Ethical considerations: This article does not include individual patient data. Institutional figures are presented in an aggregated format.

Authors' contributions: PGC conceived the work, conducted the review, and drafted the manuscript. JL contributed to the psycho-oncology sections and critically reviewed the text. Both authors approved the final version.

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