Review Article

Factors impacting decision for reconstructive surgery in breast cancer in older women: a narrative review

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Background and Objective: Lower breast reconstruction rates persist in older women (aged ≥65 years) with breast cancer despite clinical guidelines recommending that chronological age alone should not preclude access. Quantitative and qualitative evidence was reviewed to identify patient, physician, and systemic factors influencing this disparity. Greater understanding of these factors is essential to improving care.

Methods: A search of English studies published between 2010 and 2025 was conducted in PubMed and Google Scholar from April to August 2025 with the terms "older women with breast cancer" and "breast reconstruction in older women". Key articles and recent systematic reviews were supplemented by reference chaining to identify relevant studies, including those published before 2010. Both quantitative and qualitative evidence addressing factors affecting reconstruction uptake in older women were included.

Key Content and Findings: A total of 78 studies are included in this review. Factors relating to uptake of breast reconstruction in older women can be categorised as patient-associated, physician-associated and systemic factors. Direct age-stratified evidence was identified for certain patient-associated factors (chronological age, comorbidity burden and functional status, disease characteristics, adjuvant therapy, and sociodemographic status), physician-related factors (physician framing and dynamics), and systemic factors (healthcare infrastructure, finance and socioeconomic status). However, most available studies were not age-specific, included few older women, and were often of low levels of evidence. Other reported influences such as patient anxiety, surgical fatigue, logistical and caregiving barriers, ageism, conflation of chronological and physiological age, were extrapolated from mixed-age data or non-age specific data. Notably, there remains a significant gap in age-specific research, particularly regarding oncoplastic breast surgery (OBS) uptake and qualitative insight into older women's experiences.

Conclusions: The underutilisation of breast reconstruction in older women reflects a complex interplay of patient-associated, physician-associated, and systemic factors. Few high quality, age-stratified studies with adequate representation of older women exist. Addressing this gap requires greater research focus on older populations, improved shared decision-making practices that prioritise physiological age over chronological, and health system reforms to mitigate structural barriers. Enhanced understanding and tailored can guide the future of reconstruction decision-making and practices, promoting equitable, patient-centred care.

Keywords: Older women; reconstruction; geriatric oncology; breast cancer; factors

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Introduction

Breast cancer is the most common cancer in women worldwide (1). Increasing chronological age is the greatest risk factor for breast cancer (2). Globally, over 40% cases occur in women aged ≥65 years (3), who account for almost 60% of total breast cancer mortality (4). The number of older women (≥65 years) with breast cancer worldwide is expected to increase substantially, quadrupling from today's 340,000 to 1.2 million by 2040 (5).

Chronological age, defined as age in years calculated from date of birth, is not used as a standalone determinant in UK or international guidelines for breast reconstruction decision-making. Instead, biological age, encompassing physiological status, comorbidity burden, functional status, and frailty, is prioritised. UK National Institute for Health and Care Excellence (NICE) Guidelines (NG101) asserts that all patients, irrespective of age, be informed of their treatment options including breast reconstruction and this should be immediate breast reconstruction unless contraindicated by comorbidities (6). *Best Practice Guidelines for Oncoplastic Breast Surgery* developed by the Association of Breast Surgery (ABS) and the British Association of Plastic, Reconstructive Surgeons (BAPRAS) likewise emphasize patient factors including comorbidities, smoking status, and body habitus for evaluating reconstruction risk-benefit in mastectomy patients alongside oncological factors but omit chronological age (7). The United States (US)'s American Society of Plastic Surgeons (ASPS) guideline (8) focuses on patients' coping ability, comorbidities and goals for restoring breast and body image when assessing surgical candidacy for reconstruction. European recommendations by European Society of Breast Cancer Specialists (EUSOMA) and the International Society of Geriatric Oncology (SIOG) advocate individualised care for older patients guided by patient factors and Comprehensive Geriatric Assessment (CGA) (9): a multidimensional, interdisciplinary process that holistically evaluates bio-psycho-social health and functional needs to develop a coordinated and integrated treatment plan (10). A Pan-Asian adaptation of 2019 European Society for Medical Oncology (ESMO) Clinical Guidelines—involving experts in Korea, China, India, Japan, Malaysia, Singapore and Taiwan—was unanimous (100% agreement) that treatment of older early breast cancer patients should be guided by "biological (not chronological) age", and similarly advocated use of geriatric assessment to inform treatment decisions (11).

Collectively, UK, European, US, and Asian guidelines reflect clear international consensus: chronological age alone should not determine breast reconstruction eligibility. Instead, best practice supports individualised, patient-centred care incorporating comprehensive assessments of physiological fitness, comorbidities, functional status, and patient preference.

Yet, clinical reality often falls short: post-mastectomy reconstruction rates for women with breast cancer—including immediate and delayed procedures—range from 25–50% in the US (12) and approximately 31% in the UK (13). However, despite accounting for nearly half of new diagnoses (14), the offer and uptake of reconstructive surgery in older women remains disproportionately low. The UK's National Mastectomy and Breast Reconstruction Audit [2011] identified age as the strongest predictor of whether reconstruction is offered for women with breast cancer, with a sharp decline after 70 (13). A prospective large multi-centre UK cohort study of 3,375 women aged ≥70 years reported a reconstruction rate of just 2.8%, far below the national average of >20% for all age groups (15). A critical examination of this care gap and the factors contributing to it is increasingly urgent.

Breast reconstruction can be either implant-based, use autologous tissue, or a combination of both to surgically restore breast shape and appearance following removal of part or all of the breast (16). This can take the form of post-mastectomy immediate breast reconstruction (PMIBR), delayed reconstruction, or oncoplastic breast surgery (OBS) which combines tumour excision with reconstructive techniques in a single procedure.

Recent systematic reviews from our group looking at older women with primary breast cancer by Lee *et al.* (17) and Chia *et al.* (18) highlight stark disparities: only 10% of women aged over 65 undergo PMIBR compared to 45% of younger women (17), while OBS uptake is similarly low, with 10.8% uptake in older compared to 89.2% uptake in younger women (18). Crucially, for both PMIBR and OBS, outcomes in older patients are comparable to younger cohorts in length of stay, medical or surgical complication rates, rates of reoperations or revisions (19). However, neither of the systematic reviews clearly elucidate the reasons underpinning these disparities. This persistent disparity in reconstruction uptake among older women warrants further investigation.

Earlier work by Hamnett & Subramanian [2016] highlighted psychosocial and practical influences including body-image, cancer-related concerns, employment, and

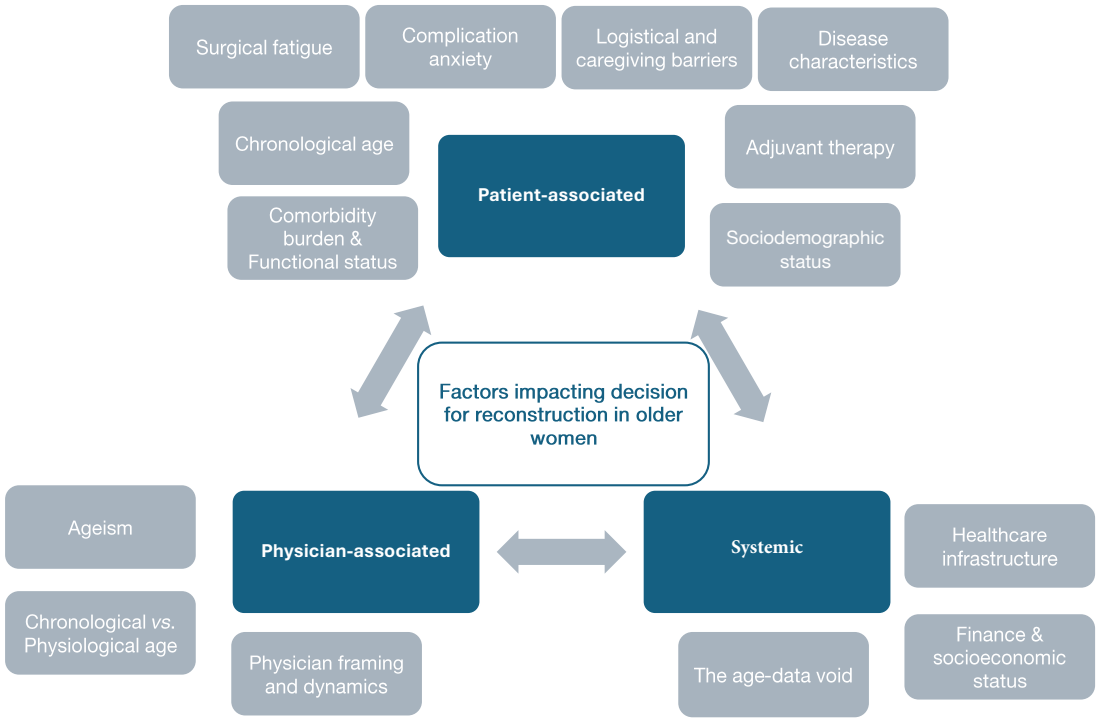

Figure 1 Diagram showing the factors impacting the decision for reconstructive surgery in older women [adapted from Lee *et al.* (17). This is an Open Access article distributed under the terms of the Creative Commons Attribution License (https://creativecommons.org/licenses/by/4.0/), which permits unrestricted reuse, distribution, and reproduction in any medium, provided the original work is properly cited].

caregiving responsibilities as important determinants of reconstruction decisions in older women (20). Our review advances this literature by integrating these insights with more recent evidence and systematically organizing factors using the framework proposed in our previous systematic literature reviews (17,18) into patient-associated factors, physician-associated factors, and systemic factors (*Figure 1*). We present this article in accordance with the Narrative Review reporting checklist (available at https://abs.amegroups.com/article/view/10.21037/abs-25-48/rc).

Methods

PubMed and Google Scholar were searched using free-text terms on breast reconstruction in older women (e.g., "older women with breast cancer", "breast reconstruction in older women", "postmastectomy immediate breast reconstruction", "oncoplastic breast surgery"). Searches were supplemented by screening the reference lists of key papers and relevant reviews to identify additional studies not captured by the initial search. Searches were conducted from April to August 2025 and included English-language, peer-reviewed studies published between 2010 and 2025. See *Table 1* for more detailed reporting on the search strategy. Our search identified relatively few studies providing high-level, age-stratified evidence regarding the factors influencing breast reconstruction uptake in older women. As this was a narrative review, a comprehensive or exhaustive search was not performed, and formal grading of evidence was not undertaken. Studies were appraised qualitatively based on design, sample size, population representativeness and susceptibility to bias. Greater weight was given to higher level evidence, including systematic reviews, large population-based studies, multicentre prospective cohorts and national audits. Lower-level evidence, such as narrative reviews, qualitative studies and single-centre observational reports, were primarily utilised to contextualize findings and explore decision-making. These classifications are presented in Table S1.

Much of the existing literature either includes a limited number of older patients or does not stratify results by age. Therefore, the factors described below represent a combination of age-specific findings from studies with lower levels of evidence, as well as extrapolated evidence

Table 1 The search strategy

Items	Specification
Date of search	11 April 2025 (with an update search in August 2025)
Databases and other sources searched	PubMed and Google Scholar
Search terms used	Free-text search terms including: "older women with breast cancer", "breast reconstruction in older women", "postmastectomy immediate breast reconstruction", "oncoplastic breast surgery", supplemented by reference chaining from key papers and systematic reviews by Lee *et al.* and Chia *et al.*
Timeframe	No specific date limits applied; focus on recent literature from approximately 2010–2025, with key older references included for context
Inclusion and exclusion criteria	Included: peer-reviewed English-language quantitative and qualitative studies focusing on factors affecting breast reconstruction decision making in older women
	Excluded: non-English papers and studies without age-stratified data. Systematic reviews and cohort studies were prioritised
Selection process	Selection conducted by first author through title and abstract screening followed by full text review. No formal independent or blinded selection process
Any additional considerations, if applicable	This is a narrative review rather than a systematic review; search was pragmatic and iterative to capture a broad scope of relevant literature

from non-age-specific studies.

Patient-associated factors

A range of patient-associated factors are thought to contribute to lower reconstruction uptake in older women with breast cancer. These include chronological age, patient anxiety, surgical fatigue, logistical and caregiving burdens, comorbidity burden and functional status, disease characteristics, adjuvant therapy, and sociodemographic status (*Figure 1*). However, empirical evidence directly linking these factors to reconstruction rates in older women remains limited (17,18) (Higher-level evidence). Factors like chronological age, disease characteristics, adjuvant therapy, and sociodemographic status have been reported with age-specific data or stratified analyses (21-24) (Higher-level evidence) (25) (Lower-level evidence). Others including patient anxiety, surgical fatigue, logistical and caregiving burdens are often extrapolated from studies with mixed-age populations or based on qualitative reports (26-29) (Lower-level evidence).

Chronological age

Older age is consistently associated with lower PMIBR rates, as shown in large US (21) (Higher-level evidence) and New Zealand (22) (Higher-level evidence) retrospective studies. Furthermore, younger women are significantly more likely to undergo PMIBR in (30) (Lower-level evidence) and US cohorts (23,24) (Higher-level evidence). In Quemener *et al.*'s survey, 67.6% of women who did not undergo reconstruction, compared to 3.8% of those who did, cited feeling "too old" suggesting age perceptions significantly influence decision-making (25) (Lower-level evidence).

A perceived indifference toward body image in older women has been proposed as a reason for lower uptake of reconstruction (31) (Higher-level evidence). Husain *et al.* (26) (Lower-level evidence) found that some older women felt age and marital status influenced the value placed on reconstruction, while others expressed apprehension about disfigurement and the impact of surgery on appearance and self-image. Other studies challenge the notion that body image matters less with age, reporting that older women are similarly concerned (32) (Higher-level evidence), and that feelings toward breasts do not change significantly with age (33,34) (Lower-level evidence). In another qualitative study by Fenlon *et al.* (27) (Lower-level evidence), many participants emphasised a continued desire to preserve their ideal body image irrespective of age: "I'm 80 but… this is me and my life and the way we live it. I didn't want it to change" (27) (Lower-level evidence). One

literature review reports that older women who underwent reconstruction reported better quality-of-life and mental health outcomes compared to mastectomy-only patients, reinforcing that body image remains highly relevant in later life, but cautioned that these women may have been less frail (20) (Lower-level evidence). This distinction between frailty and age links closely to our later discussion on the conflation of chronological and biological age (see physician-related factors). These findings reflect both patients' attitudes and perceived assumptions—by clinicians and patients—about ageing and the value of reconstruction in older age.

Despite shared decision-making being best practice, few studies explicitly explore or report older women's preferences and values regarding breast reconstruction (35) (Lower-level evidence). A retrospective study found that 91.8% of patients believed age should not affect whether breast reconstruction is offered (31) (Higher-level evidence). The 8.2% who disagreed cited reasons such as "pain", "trauma", "difficult recovery", "fit(ness)" and "health reasons" (31) (Higher-level evidence); concerns relating more to treatment burden and associated comorbidities rather than age itself.

Patient anxiety

Fear of complication is a proposed major deterrent to reconstruction in older women. One study found 42% of older women who declined reconstruction cited fears about surgical complications, versus 20% who proceeded (28) (Lower-level evidence). James *et al.* (19) (Lower-level evidence) similarly noted "presumed higher complication rates" as a reason for older women's avoidance of reconstruction and OBS.

Beach *et al.* [2019] (29) (Lower-level evidence) postulates that older people "harbour misinformed views about cancer and their ability to tolerate treatment". In reality, complications and outcomes are comparable between younger and older women for both implant (36,37) (Higher-level evidence) and autologous reconstruction (38,39) (Higher-level evidence), despite increasing rates of comorbidity such as hypertension (38% *vs.* 18%), average body mass index (BMI) (30 *vs.* 28 kg/m^2), and average ASA score (2.9 *vs.* 1.9) (39). Moreover, 88.5% of older patients responded "yes" when asked whether they would choose reconstruction again (31) (Higher-level evidence).

Persistent patient anxiety despite equivocal outcomes between older and younger women suggests possible gaps in patient education and pre-operative counselling. Inadequate patient education and information is cited as one of two main reasons for lower reconstruction rates among women above 60, alongside physician bias (31) (Higher-level evidence). Older patients have comparatively limited access to supplementary sources of health information and rely more heavily on physician's input (30) (Lower-level evidence); in one study 59% of over 65s reported their surgeon as their sole source of information about breast reconstruction (25) (Lower-level evidence). Hamnett & Subramanian [2016] emphasised that older patients are less likely to independently research reconstruction options and therefore rely heavily on physician input (20).

Another retrospective study found surgeons to be the "most important" figures influencing a woman to opt for reconstruction (25) (Lower-level evidence). Contrastingly, women who did not undergo reconstruction reported significantly less influence from others—physicians, husband/partner, family or friends—potentially reflecting a greater personal autonomy in their decision to decline reconstruction (25) (Lower-level evidence). Quality of patient information also varied: Women who underwent reconstruction felt better informed, engaged more frequently in discussions with surgeons about concerns and fears, and were more satisfied with the information received, compared to those who did not undergo reconstruction (25) (Lower-level evidence). These findings suggest that older women may base decisions regarding breast reconstruction on misplaced fears rather than clinical evidence, underscoring the need for better pre-operative counselling and patient-specific information.

Surgical fatigue

For some older women, the prospect of undergoing multiple surgeries is a further deterrent: "I decided not to have breast reconstruction mainly because I have had too many surgeries already. I don't want to have any more surgery unless it is to save my life." (28) (Lower-level evidence). OBS, which integrates reconstruction in the initial surgery, may offer a less burdensome alternative. OBS has demonstrated safety and efficacy in older women, with no significant difference in complication rates between older and younger women (40) (Higher-level evidence) and high patient satisfaction toward breast appearance and overall quality of life (19) (Lower-level evidence).

However, Chia *et al.* (18) (Higher-level evidence) found an absence of studies comparing OBS uptake between age

groups. Although OBS rates are clearly lower among older women, none of the reviewed studies proposed underlying factors to account for this disparity. This omission reflects asymmetry in research attention between PMIBR and OBS and foregrounds a critical research gap.

Logistical and caregiving barriers

Older patients may face practical challenges including limited mobility and transportation access. Some rely on family or caregivers for transport to hospital, which can contribute to logistical strain (41) (Lower-level evidence). Age UK reported that 18% of patients aged ≥65 years felt worse after hospital appointments due to travel stress, with 10% missing appointments altogether due to transport difficulties (42) (Lower-level evidence). Furthermore 16% of over-65s in the UK are caregivers themselves (42) (Lower-level evidence), and 61% of these report "feeling overwhelmed" (43) (Lower-level evidence). The time commitment for multiple surgeries coupled with extended recovery may therefore deter older patients. Interestingly, Mavioso *et al.*'s review reveals that complication rates, length of stay, and recovery time are not significantly different between older and younger groups (30) (Lower-level evidence), again suggesting disconnect between perceived and actual risk. Hamnett & Subramanian [2016] (Lower-level evidence) similarly propose that older women's caregiving responsibilities are a factor to be considered in reconstruction decision-making: while some older patients may delay or decline procedures due to these duties, such responsibilities need not preclude reconstruction if the issue is identified and addressed through referral to local authorities or carer support services (20).

These logistical and caregiving challenges highlight the importance of addressing physical barriers when discussing treatment options with older women. Ensuring that healthcare delivery is tailored to their needs, whether through improved transportation access, support systems, or more flexible surgical schedules could mitigate some of these obstacles.

Comorbidity burden and functional status

Lower comorbidity burden is consistently associated with higher PMIBR uptake (21,22,24) (Higher-level evidence). Older women are more likely to present with higher burden of comorbidities including cardiovascular disease, diabetes, and reduced functional reserve (39,44,45) (Higher-level evidence). These factors can influence the decision to offer or pursue breast reconstruction. However, comorbidity burden varies widely among older adults (46) (Higher-level evidence), and lower surgery rates in older women persist even when controlling for comorbidity (25) (Lower-level evidence) (47,48) (Higher-level evidence). In line with international guidelines, comorbidities should be assessed within their own right as in any other age group (6,7) (Higher-level evidence) (8) (Lower-level evidence), rather than being conflated with chronological age.

Disease characteristics

Favourable disease characteristics such as non-invasive tumours (23) (Higher-level evidence), clinically negative lymph node status (23,24) (Higher-level evidence), earlier cancer stage (22) (Higher-level evidence), smaller clinical tumour size and well-differentiated tumours (24) (Higher-level evidence), are linked with higher PMIBR rates in older women. A systematic review including women of all ages also identified favourable disease characteristics as predictors of post-mastectomy reconstruction (49) (Higher-level evidence). Yet, low uptake of PMIBR in older women persists even when with favourable disease, suggesting non-clinical factors may play a more dominant role in decision-making. In a retrospective case-control study comparing BCS outcomes in older (≥70 years) compared to younger women, older women experienced lower rates of locoregional recurrence (5.4% *vs.* 1.7%) , with no significant age-related differences in tumour subtype or lymph node invasion, contrary to some literature suggesting that tumours in elderly patients are generally associated with more favourable biology (50) (Lower-level evidence).

Adjuvant therapy

Lee *et al.* (17)'s systematic review (Higher-level evidence) reports that adjunct cancer therapies including postmastectomy radiation (22,24) (Higher-level evidence) and adjuvant- or neoadjuvant-chemotherapy (24) (Higher-level evidence), are inversely associated with reconstruction rates in older women. Radiation influences the consistency and predictability of PMIBR outcomes, with reported complication rates up to 40% following postmastectomy irradiation after skin-sparing mastectomy and expander or implant placement (51) (Higher-level evidence). The technical challenges of combining reconstruction with adjunct therapies are well-documented (52) (Higher-

level evidence) (53-55) (Lower-level evidence), with lower patient satisfaction and higher complication rates in these patients (53) (Lower-level evidence), potentially dissuading both patients and clinicians from pursuing PMIBR. These findings highlight the importance of individualised assessment in older patients with breast cancer.

Sociodemographic status

Sociodemographic variables influence PMIBR uptake in older women (17) (Higher-level evidence). Ethnicity is a consistent determinant; Māori and Pacific (22) (Higher-level evidence), Black (21) (Higher-level evidence), Asian and minority ethnic women (BAME) (56) (Higher-level evidence) have markedly lower reconstruction rates compared to other groups, while white race is associated with higher PMIBR rates (24) (Higher-level evidence).

Community norms and patient-held values can function either as barriers or facilitators to PMIBR (56) (Higher-level evidence). Among African American women, notions of "body ethics" informed reconstruction decisions: some expressed preference for autologous procedures—using "what God has given"—opposing implant-based procedures, while others rejected reconstruction entirely (57) (Lower-level evidence). Cultural perspectives among Asian women often frame reconstruction as "cosmetic", carrying unnecessary avoidable risk and burden (58) (Lower-level evidence).

Women's views surrounding reconstruction were not uniform within cultural groups (59) (Lower-level evidence): some considered breasts central to "traditional feminine appearance" while others reported conflicting views within their communities (59) (Lower-level evidence). Age emerged as a deciding factor; one participant remarked, "older women have said that at a certain age I would not want to go through reconstruction again" (59) (Lower-level evidence). These nuances highlight how age intersects with decision-making, but such perspectives remain underexplored, reflecting scarcity of literature studying ethnic and cultural influences across age groups.

Marital status also influences reconstruction uptake in older women, with single women less likely to receive PMIBR (21,23) (Higher-level evidence). One study noted that some women who declined post-mastectomy reconstruction were "widows" with "limited social lives" who often opted for external prosthesis instead, suggesting that social and emotional factors may contribute to decision-making (60) (Higher-level evidence). Existing studies have been criticised for failing to adequately capture psychosocial factors from the general health questionnaires utilised, highlighting the need for more robust tools to capture important emotional and social dimensions which influence patient choice for reconstruction (35) (Lower-level evidence).

Physician-related factors

Physician-related factors contribute to disparities in breast reconstruction rates between older and younger women. Key influences include ageism, conflation of chronological and physiological age, and physician framing and dynamics (*Figure 1*). Direct evidence exists mainly for patient-reported pre-operative information, involvement in decision-making and provider recommendation, which are discussed in the physician framing and dynamics section. Other physician-related influences are primarily extrapolated from studies not stratified by age or based on limited samples of older patients.

Ageism

Physician bias and lack of patient education are central to the persistent disparity in reconstruction rates between older and younger women (31) (Higher-level evidence). While patient preference and complication anxiety may account for some of the disparity in *uptake* of reconstruction, there remains a stark disparity in the *offer* for reconstruction between older and younger women. Fenlon *et al.* (27) (Lower-level evidence) found reconstruction was infrequently suggested to older women, despite many expressing an interest. Some women later reported they "felt regret" surrounding missed opportunities to discuss or pursue reconstruction (27) (Lower-level evidence). Jeevan *et al.* (61) (Higher-level evidence) similarly observed a sharp decline in offers for PMIBR in women over 70 years.

Surgeons remain hesitant to recommend reconstruction to older women (28) (Lower-level evidence). Age under 50 is the strongest predictor for receiving an offer (62) (Higher-level evidence), reflecting potential systemic bias in surgical counselling. Yet, little empirical research exists on how physicians make these decisions (35) (Lower-level evidence). Frequently cited reasons for reluctance include assumptions that reconstruction is less important (31) (Higher-level evidence) (63) (Lower-level evidence) or "unnecessary" in older age, often based on unsubstantiated beliefs about reduced surgical tolerance (31) (Higher-level

evidence).

More broadly, age discrimination exists in the management of early breast cancer as a whole, with discrepancy in utilisation of surgical and adjuvant treatments and survival in older compared to younger women (64) (Lower-level evidence). Lavelle *et al.* (47) (Higher-level evidence) assert that treatment disparities are unlikely to reflect patient preference alone. This wider ageism likely extends to the offer of reconstruction to older women, though the extent to which remains unclear (61) (Higher-level evidence).

Chronological versus physiological age

While comorbidities and functional status are valid clinical considerations in offering breast reconstruction, equating older chronological age with poor fitness is grossly myopic; such overgeneralizations are clinically reductive and reflect structural ageism (65) (Lower-level evidence). Such assumptions may subtly shape treatment offers even when clinical profiles are comparable across age groups. Evidence across multiple specialties, including breast cancer, demonstrates that disparities in treatment offers arise solely based on chronological age (66) (Lower-level evidence). Bowman *et al.* (31) propose that fitness should be evaluated independently of age, arguing that "surgeons run the risk of undertreating their patients when considering chronologic age over physiologic age" (31) (Higher-level evidence). Shifting focus from age-based assumptions to more nuanced, individualised assessment—guided by physiological rather than chronological age, using measures of comorbidity, frailty and functional status, such as the CGA (10) (Higher-level evidence)—would enable a more personalised approach to breast reconstruction.

Physician framing and dynamics

An older women's decision to forgo breast reconstruction—alongside complication anxiety— may themselves be influenced by physician framing and absence of clear, evidence-based preoperative information. Lee *et al.* (17)'s systematic review (Higher-level evidence), identifies patient-reported preoperative information (23) (Higher-level evidence) and provider recommendation (24) (Higher-level evidence) as significant influences on reconstruction decision-making.

Even when options are presented, older patients often defer to physician judgement (25,67) (Higher-level evidence), suggesting that deviations from standard treatment may reflect clinician preference rather than patient autonomy. A qualitative study exploring breast cancer treatment choices found that many older women were "passive information seekers" who relied heavily on "expert advice" (26) (Lower-level evidence). One interviewee explained, "I just left it in their hands, whatever they did was right" (26) (Lower-level evidence); none actively considered how their age might influence treatment, instead reaffirming their reliance on clinicians. As another said, "I'd advise them now the young or old, if they [healthcare professionals] think removal of the breast and the glands is the best option, to have it". Patient-reported involvement in decision-making is a key predictor of reconstruction uptake in older women (23) (Higher-level evidence). Although NICE endorses shared decision-making (SDM) as best practice (68), older patients seemingly encounter a more paternalistic model. This may not necessarily reflect coercion by physicians, but rather a willingness among older patients—who are more likely to exhibit an external Health Locus of Control (69) (Lower-level evidence)—to place trust in medical authority.

Importantly, when properly informed and supported, older women are just as likely to opt for reconstruction as their younger counterparts (17) (Higher-level evidence). Given their trust in physicians, older women may be particularly vulnerable to implicit bias. It is therefore paramount that clinicians provide balanced, comprehensive, and evidence-based counselling on breast reconstruction options. As Walton *et al.* (35) (Lower-level evidence) emphasise, there is a critical need for objective data examining how physicians' personal attitudes, assumptions, and experiences influence breast reconstruction counselling in older women. Without such data, it is difficult to disentangle the extent to which low reconstruction rates in older women are attributed to patient preference or physician-driven decision making.

Systemic factors

The systematic review by Chia *et al.* (18) (Higher-level evidence) identified geographical inequalities arising from the centralization of OBS services to specialist centres as a potential systemic factor, although none of the appraised studies directly investigated contributors to lower OBS uptake in older women. In contrast, Lee *et al.* (17) (Higher-level evidence) highlighted several systemic factors with direct age-specific evidence influencing PMIBR

accessibility and uptake among older women (*Figure 1*) as discussed in the Healthcare infrastructure and finance and socioeconomic status sections. However, limited evidence exists on age-specific differences, highlighting the persistent age-data void.

Healthcare infrastructure

Institutional setting significantly influences PMIBR rates in older compared to younger women. Women treated in public hospitals are less likely to undergo reconstruction than those in private settings (22) (Higher-level evidence). This disparity may reflect differences in physician practices, availability of specialist reconstructive services, and higher levels of social deprivation among public hospital patients (22) (Higher-level evidence). Higher rates are observed in academic/research or comprehensive community cancer programmes (24) (Higher-level evidence) and non-teaching hospitals (21) (Higher-level evidence). Furthermore, large hospital size, high hospital volume and high surgeon volume are associated with greater PMIBR rates (21) (Higher-level evidence). Conversely, rural hospital treatment is associated with a 50% decrease in PMIBR rates (21) (Higher-level evidence). Despite NICE's 2009 guidance that "all appropriate breast reconstruction options should be offered and discussed with patients, irrespective of whether they are all available locally" (70) (Higher-level evidence), variation in implementation persists. As discussed in "Patient-associated factors", logistical and transport barriers may disproportionately affect older adults, though the age-geography interaction remains underexplored. The National Mastectomy and Breast Reconstruction Audit [2009] reported that "Despite huge geographical variation in reconstruction rates, a woman's age remains the single most important factor in determining whether or not she will be offered breast reconstruction" (71) (Higher-level evidence). There is limited empirical research directly evaluating how geographical location, referral pattern, and hospital infrastructure differentially affect older versus younger women. It remains unclear whether observed disparities are primarily driven by patient preference, provider bias, infrastructural inequities, or a combination of the three.

Finance and socioeconomic status

In the US, insurance status strongly influences PMIBR access: older women with insurance of any form are more likely to receive PMIBR, with a threefold increase among those with commercial plans (21) (Higher-level evidence). Although the Women's Health and Cancer Rights Act (US) mandates that plans covering mastectomy also cover breast reconstruction (21,72) (Higher-level evidence), rising costs of reconstruction post-mastectomy may exacerbate this gap, since access to PMIBR is increasingly contingent on robust insurance coverage (21) (Higher-level evidence).

Cancer patients face heavier out-of-pocket expenditures than healthy individuals or those managing chronic conditions (73) (Higher-level evidence). These financial pressures can influence decision-making, potentially leading patients to decline or delay treatments they cannot afford (74) (Higher-level evidence). This is particularly pertinent for older adults who may have more limited incomes post-retirement and therefore reduced ability to absorb such expenses.

Higher socioeconomic status correlates with increased receipt of guideline-concordant care and improved survival outcomes (75) (Lower-level evidence) (76) (Higher-level evidence), and several studies confirm this pattern extends to breast reconstruction: higher socioeconomic status correlates with increased rates of PMIBR (17,22,23) (Higher-level evidence). Strikingly, financial-related disparities in PMIBR rates persist even in universal healthcare systems. A Swedish population-based study reported that unemployed or retired older women are less likely to receive PMIBR (23) (Higher-level evidence), despite universal healthcare coverage which should theoretically eliminate financial bias related to insurance status or ability to pay. This could suggest that even when decoupled from direct healthcare costs, socioeconomic status may influence access through indirect mechanisms such as health literacy, patients' ability to navigate healthcare systems, or physicians' assumptions about patient preferences or priorities. Tailoring information to patients' desired level of involvement in decision-making, individual education and literacy levels, as Frisell *et al.* (23) (Higher-level evidence) recommend, may help mitigate gaps across age and income groups.

The age-data void

The extent to which age influences an immediate reconstruction offer is unclear due to limited evidence (61) (Higher-level evidence). There remains a striking paucity of studies directly comparing reconstructive surgery outcomes between older (≥65 years) and younger women; few large

cohort studies include older patients or stratify results by age (17,77) (Higher-level evidence). Older patients are underenrolled and underrepresented in trials (78) (Higher-level evidence), therefore there is no robust evidence base to guide reconstructive decisions for older women.

This lack of quantitative data is paralleled with a scarcity in qualitative research exploring older women's experiences, values, and preferences around reconstruction. While some studies acknowledge factors which may influence reconstruction rates across age groups, few have sought to explore underlying reasons, let alone engage directly with older women to understand how they interpret medical advice, perceive reconstruction, or navigate decision-making within the broader context of ageing. In the absence of such qualitative insight, clinicians and healthcare systems are left to infer patients' attitudes and priorities, inadvertently risking assumption and bias, as previously discussed. Addressing this dual evidence gap is crucial to developing a more inclusive, evidence-based care that can better supports individualised and equitable reconstructive care across the lifespan.

Limitations

The literature included was heterogenous, with few high-quality, age-stratified studies and limited representation of women aged ≥65 years. Qualitative insights into older women's perspective were particularly scarce. As this was a narrative review, the search was not systematic and formal grading of evidence was not undertaken, which may limit reproducibility and precision. This review is further limited by its narrative design, targeted search strategy, and the heterogeneity of included studies. While some meta-analyses were incorporated, many studies, including smaller or qualitative reports, were not amenable to quantitative synthesis, and formal quality metrics were not consistently applied. This may affect the precision and generalisability of findings.

This synthesis complements prior systematic (17,18) and algorithmic reviews (20) by offering a broader conceptual framework across patient, physician, and systemic domains.

Nonetheless, the review's strengths lie in its broad scope, inclusion of both quantitative and qualitative studies, and qualitative appraisal that weighted larger, population-based and systematic evidence while contextualizing smaller or qualitative reports. By synthesizing patient, physician and systemic factors, this review provides a conceptual framework that extends prior reviews while addressing the literature gap (17,18) in examining reasons for lower reconstruction uptake among older women.

Conclusions

The complex interplay of patient, physician and systemic factors shape the decision for breast reconstruction in older women with breast cancer. Persistent underutilisation in this population, despite international consensus advocating against the use of chronological age alone as a gatekeeper to reconstruction access, reveals a substantial gap between best practice and reality.

Patient-associated factors—including complication anxiety, logistical barriers, and cultural perceptions—intersect with physician-associated biases and structural ageism that influence the offer and uptake of reconstructive surgery. Yet, the degree to which these factors contribute remains insufficiently studied, particularly with respect to the dynamics of how and what information is framed, conveyed, and received. Systemic factors—including inequalities in healthcare infrastructure, insurance coverage, and socioeconomic status—further compound these challenges and disproportionately affect older women. Perhaps most concerning is the lack of meaningful representation of older women in clinical research, and a near-total absence of qualitative work capturing their experiences, values, and priorities in the decision-making process.

Closing this gap has clear implications for the future of breast reconstruction in older women. Improved, inclusive research design is needed alongside a shift in clinical practice beyond age-based proxies, embracing nuanced, patient-centred approaches that account for individual preferences and holistic health status. Physicians are called upon to adopt shared decision-making frameworks that acknowledge physiological—rather than chronological—age and actively counteract implicit biases. Health systems may also need to implement targeted interventions such as enhanced support for caregiving responsibilities, transportation, and tailored pre-operative counselling to reduce structural barriers and facilitate access.

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Footnote

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Supplementary

Table S1 List of citations, year of publication, study type and classification of evidence level

Ref No.	Citation (first author *et al.*)	Year	Study type	Evidence level
(1)	World Cancer Research Fund	2022	Epidemiological statistics/report	Higher-level
(2)	Macmillan Cancer Support	2023	Patient information/epidemiological summary	Higher-level
(3)	DeSantis *et al.*	2011	Epidemiological review	Higher-level
(4)	Siegel *et al.*	2014	Epidemiological review	Higher-level
(5)	Maddams *et al.*	2012	Population projections study	Higher-level
(6)	National Institute for Health and Care Excellence (NICE)	2023	Clinical practice guideline	Higher-level
(7)	Gilmour *et al.*	2021	Consensus guideline	Higher-level
(8)	American Society of Plastic Surgeons (ASPS)	2025	Professional patient resource	Lower-level
(9)	Biganzoli *et al.*	2021	Joint recommendations/Consensus statement	Higher-level
(10)	Stuck & Iliffe	2011	Review article	Higher-level
(11)	Park *et al.*	2020	Clinical practice guideline	Higher-level
(12)	Steffe *et al.*	2017	Observational study/Survey	Lower-level
(13)	NHS Information Centre	2011	National audit	Higher-level
(14)	Cancer Research UK	2024	National epidemiological statistics	Higher-level
(15)	Morgan *et al.*	2020	Prospective cohort study	Higher-level
(16)	Cancer Research UK	2022	Patient information	Lower-level
(17)	Lee *et al.*	2022	Systematic review	Higher-level
(18)	Chia *et al.*	2023	Systematic review	Higher-level
(19)	James *et al.*	2015	Narrative review	Lower-level
(20)	Hamnett & Subramanian	2016	Literature review	Lower-level
(21)	Hershman *et al.*	2012	Retrospective cohort study	Higher-level
(22)	Campbell *et al.*	2018	Regional cohort study	Higher-level
(23)	Frisell *et al.*	2020	Population based cohort study	Higher-level
(24)	Gibreel *et al.*	2017	National cancer database study	Higher-level
(25)	Quemener *et al.*	2019	Survey study	Lower-level
(26)	Husain *et al.*	2008	Qualitative study	Lower-level
(27)	Fenlon *et al.*	2013	Qualitative study	Lower-level
(28)	Handel *et al.*	1990	Observational survey	Lower-level
(29)	Beach *et al.*	2019	Policy/advocacy report	Lower-level
(30)	Mavioso *et al.*	2022	Narrative review	Lower-level
(31)	Bowman *et al.*	2006	Retrospective cohort study	Higher-level
(32)	Figueiredo *et al.*	2004	Observational cohort study	Higher-level
(33)	Goin & Goin	1981	Observational psychosocial study	Lower-level
(34)	Risius *et al.*	2014	Observational study	Lower-level
(35)	Walton *et al.*	2011	Review article	Lower-level
(36)	Wong *et al.*	2014	Multicenter cohort study	Higher-level
(37)	Howard-McNatt *et al.*	2011	Retrospective cohort study	Higher-level
(38)	Chang *et al.*	2011	Retrospective cohort study	Higher-level
(39)	Selber *et al.*	2009	Retrospective cohort study	Higher-level
(40)	Gaffney *et al.*	2024	Matched-cohort comparison study	Higher-level
(41)	Age UK	2017	Report/Grey literature	Lower-level
(42)	Age UK	2017	Report/Grey literature	Lower-level
(43)	Age UK	2023	Report/Grey literature	Lower-level
(44)	Field *et al.*	2011	Cohort study	Higher-level
(45)	Arneja & Brooks	2021	Cohort study	Higher-level
(46)	Bertozzi *et al.*	2025	Review article	Higher-level
(47)	Lavelle *et al.*	2012	Population-based cohort study	Higher-level
(48)	Oh *et al.*	2019	Retrospective cohort study	Higher-level
(49)	Brennan & Spillane	2013	Systematic review	Higher-level
(50)	Vanni *et al.*	2020	Retrospective cohort study	Lower-level
(51)	Sbitany *et al.*	2014	Cohort study	Higher-level
(52)	Doherty *et al.*	2023	Population-based study	Higher-level
(53)	Karami *et al.*	2020	Narrative review	Lower-level
(54)	Yun *et al.*	2018	Narrative review	Lower-level
(55)	Ho *et al.*	2017	Narrative review	Lower-level
(56)	Lee *et al.*	2021	Systematic review	Higher-level
(57)	Rubin *et al.*	2013	Qualitative study	Lower-level
(58)	Fu *et al.*	2017	Qualitative study	Lower-level
(59)	Li *et al.*	2023	Qualitative study	Lower-level
(60)	De Lorenzi *et al.*	2010	Retrospective cohort study	Higher-level
(61)	Jeevan *et al.*	2017	Registry cohort study	Higher-level
(62)	Morrow *et al.*	2001	National database study	Higher-level
(63)	Angarita *et al.*	2021	Qualitative study	Lower-level
(64)	Dimitrakopoulos *et al.*	2015	Narrative review	Lower-level
(65)	Kite & Wagner	2022	Academic textbook	Lower-level
(66)	Wyman *et al.*	2018	Book chapter	Lower-level
(67)	Degner *et al.*	1997	Large survey study	Higher-level
(68)	NICE (NG197)	2021	Clinical Guideline	Higher-level
(69)	Lachman	1986	Psychology research article	Lower-level
(70)	National Collaborating Centre for Cancer/NICE	2009	Clinical Guideline	Higher-level
(71)	NHS Information Centre for Health and Social Care	2009	National audit	Higher-level
(72)	U.S. Department of Labor (WHCRA)	1998	Policy/Fact sheet	Higher-level
(73)	Park & Look	2019	Health services research article	Higher-level
(74)	Bernard *et al.*	2011	Health services research	Higher-level
(75)	Scott & Hoskin	2024	Literature review	Lower-level
(76)	van Maaren *et al.*	2022	Registry/epidemiology study	Higher-level
(77)	Santosa *et al.*	2016	Multicenter prospective study	Higher-level
(78)	Lewis *et al.*	2003	Observational cohort study	Higher-level

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