

Review

Investigating the Difference in Quality of Life Between Immediate and Delayed Breast Cancer Reconstruction: A Systematic Review

VLASIOS TSANTAKIS^{1,2}, DIMITRIOS A. DIMITROULIS^{2,3},
KONSTANTINOS C. KONTZOGLU^{2,3} and NIKOLAOS I. NIKITEAS^{2,3}

¹General Oncologic Hospital Kifisia-Agioi Anargiroi, Athens, Greece;

²Faculty of Medicine, National and Kapodistrian University of Athens, Athens, Greece;

³Second Department of Propedeutic Surgery, General Hospital of Athens «Laikon», Athens, Greece

Abstract. *Background/Aim:* Immediate and delayed breast reconstruction remains a controversial topic. Apart from the clinical outcomes that have to be considered, there is a discrepancy of opinions regarding the potential differences in quality of life. It is essential to clarify this issue, in order to contribute to the reconstruction of the decision-making process. *The aim of the study was to investigate potential differences in quality of life between immediate and delayed breast reconstruction patients. Materials and Methods:* A systematic review of the literature was carried out, searching for case-control studies that have comparatively examined the effects of delayed and immediate reconstruction on quality of life. A literature search was carried out using the Medline, Scopus and Web of Science databases. The quality of the studies was evaluated using the STROBE checklist for case-control studies. *Results:* Three studies were found showing that immediate reconstruction led to benefits for the quality of life of patients, while one study showed the opposite. A relevant study revealed no statistically significant differences between the two groups,

while another study, showed that immediate reconstruction entailed short-term benefits to quality of life. Four of the studies had debatable methodological approaches. *Conclusion:* The inconsistent study findings cannot lead to any reliable conclusions regarding differences between immediate and delayed reconstruction in quality of life. It is possible that the results vary due to the time point that the comparisons made. Future research to this direction is warranted.

Undoubtedly, breast cancer constitutes a major threat for global public health. According to the American Cancer Society, 297,790 new cases of breast cancer are expected in the United States in 2023, accounting for 31% of all female cancer cases (1). On a global level, breast cancer leads to 2.26 million new cancer cases per year and is responsible for 24.5% of all female cancer cases (2). In the following decades, the incidence of breast cancer will keep increasing in developed countries, such as Canada (3) and the United States (4), as well as in parts of the developed world, such as sub-Saharan Africa (5) and Latin America (6). The increase in lack of physical activity, the fewer number of children and the postponement of childbearing are considered the major factors for these increasing trends (5).

Apart from the incidence of the disease, emphasis has also to be given at survival stage. Breast cancer has a relatively low mortality, when examining the mortality along with the high incidence of the disease. For example, in the United States breast cancer is expected, as stated above, to account for 31% of new female cancer cases for 2023, but only for 15% of female cancer mortality (1). The advances of the 90's, mainly the advances in chemotherapeutic agents that occurred during this decade (7) and the wide use of early detection (8) are responsible for this difference in terms of incidence and mortality. These are the driving factors for a

Correspondence to: Vlasios Tsantakis, Ph.D., Plastic, Aesthetic & Reconstructive Surgeon, General Oncologic Hospital Kifisia, Agioi Anargiroi, Noufaron 14 Kifisia, Attica 145 64, Greece. E-mail: vlatsa@hotmail.it

Key Words: Breast cancer, breast reconstruction, delayed reconstruction, immediate reconstruction, quality of life.

©2024 International Institute of Anticancer Research
www.iiar-anticancer.org



This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY-NC-ND) 4.0 international license (<https://creativecommons.org/licenses/by-nc-nd/4.0>).

large population of breast cancer survivors, with increased supportive care needs across the path of survivorship (9).

The supportive care needs of breast cancer patients are unique because of the association of this type of cancer with femininity and female identity. Losing the breast is regarded as disfigurement resulting in a discrepancy between self and societal image of a woman (10). Changes in identity and coping with those changes are a major strain for breast cancer survivors (10-11). According to a relevant study in breast cancer patients in South Korea, the incidence of depression is higher for patients treated with mastectomy compared to those not receiving mastectomy up to three years after treatment (12). Mastectomy also leads to lower sexual functioning for the patients (13). Therefore, breast reconstruction is considered as a way to reduce the risk of depression after mastectomy and to improve patients' quality of life (14).

Breast reconstruction is a surgical procedure that aims to recreate the shape, size and appearance of a breast after a mastectomy or significant breast tissue removal (15). It can be carried out using different approaches, such as tissue flap procedures or implants (16). Breast reconstruction is a preference of breast cancer patients and it leads to reduced psychological burden after mastectomy (17).

A debate is constantly open on the use of immediate and later reconstruction. It is an option to proceed with the reconstruction directly after surgery or at a later time and several parameters have to be examined in order to take the better decision (18-19). Immediate reconstruction might be a preference of the patient, who wants to experience and instant restoration of her body image (18). Yet, there might be significant economic and health system barriers accessing immediate reconstruction, since it is easier to access immediate reconstruction for women having private insurance and for those belonging to socially-dominant groups (20). The impact on survival also requires attention. It has been reported that immediate reconstruction can lead to higher risk for disease recurrence in case of related complications after the reconstruction surgery (21). Thus, there are several factors that have to be examined when taking a decision for immediate or later reconstruction.

In that context, the present study investigates the difference in quality of life between patients having received immediate or later reconstruction. The final aim of the study is to increase the information of clinicians regarding the effects of those two approaches, helping their patients to receive well-informed decisions about their health.

Materials and Methods

Literature search. A literature search, including English-language papers published until January 15, 2024 was carried out in MEDLINE, Scopus, and the Web of Science databases was undertaken. The combinations utilized were "breast cancer" AND

"breast reconstruction" AND (time OR immediate OR instant OR simultaneous OR simultaneously OR delayed OR later OR postponed) AND ("psychological health" OR "mental health" OR "psychopathology" OR psychiatric OR mood OR depression OR anxiety OR PTSD OR PTG OR self-esteem OR body-image self-image OR self-representation* OR self-efficacy OR optimism OR hope OR emotion* OR sleep OR "quality of life" OR sexual OR well-being OR "daily activities" OR hobbies OR "social function*" OR "physical function"). Further, a snowball technique was applied to detect any potential studies found through this process. Issues of related journals and reference lists of relevant papers were rummaged in order to locate possible records. The flow of information from record identification to study inclusion was in line with the principles of the PRISMA statement (22).

Study selection. Regarding study selection, the inclusion criteria were as follows: 1) original articles published in peer-reviewed journals; 2) studies involving breast cancer patients; 3) studies whose primary aim was to investigate differences between immediate and delayed reconstruction; 4) assessing at least one quality of life parameter of the patients; 5) using a case-control design. The exclusion criteria were the following: 1) Not being published in English; 2) analyzing another group of participants in the study (e.g. those not receiving reconstruction at all). Identified abstracts were stored using Zotero reference management software. The first and the second participated in the study selection process. Any disagreements between the two were resolved by the support of the third author.

Data extraction. The extracted data were the following: authors, year of publication, country, number of participants in each group, study design, parameters assessed, measures and results. The data extraction process was carried out by the first and the second author. Any disagreements between the two authors were resolved by the support of the third author.

Quality assessment. The quality of the included studies was analyzed using STROBE checklist for case-control studies. This instrument consists of 22 items, assessing all parameters of a case-control study paper (23). The scoring was carried out by the first and the second author. Any disagreements between the two authors were solved by the support of the fourth author.

Results

Study selection. A total of 4,912 studies were identified through database searching. Two additional records were identified through snowball searching. After removing the duplicates, 2,562 original studies remained. From those studies, 2,457 were irrelevant and were excluded by title. Of the remaining studies, 105 were full-text accessed and 98 did not meet at least one from the pre-set criteria. Finally, 6 studies were included in the qualitative synthesis (Figure 1).

Narrative description of studies. The first study included in the present systematic review was carried out by Al-Ghazal *et al.* (24) in the United Kingdom. A total of 121 patients were included in the study, of which 38 had received immediate and 83 delayed reconstruction. The average time

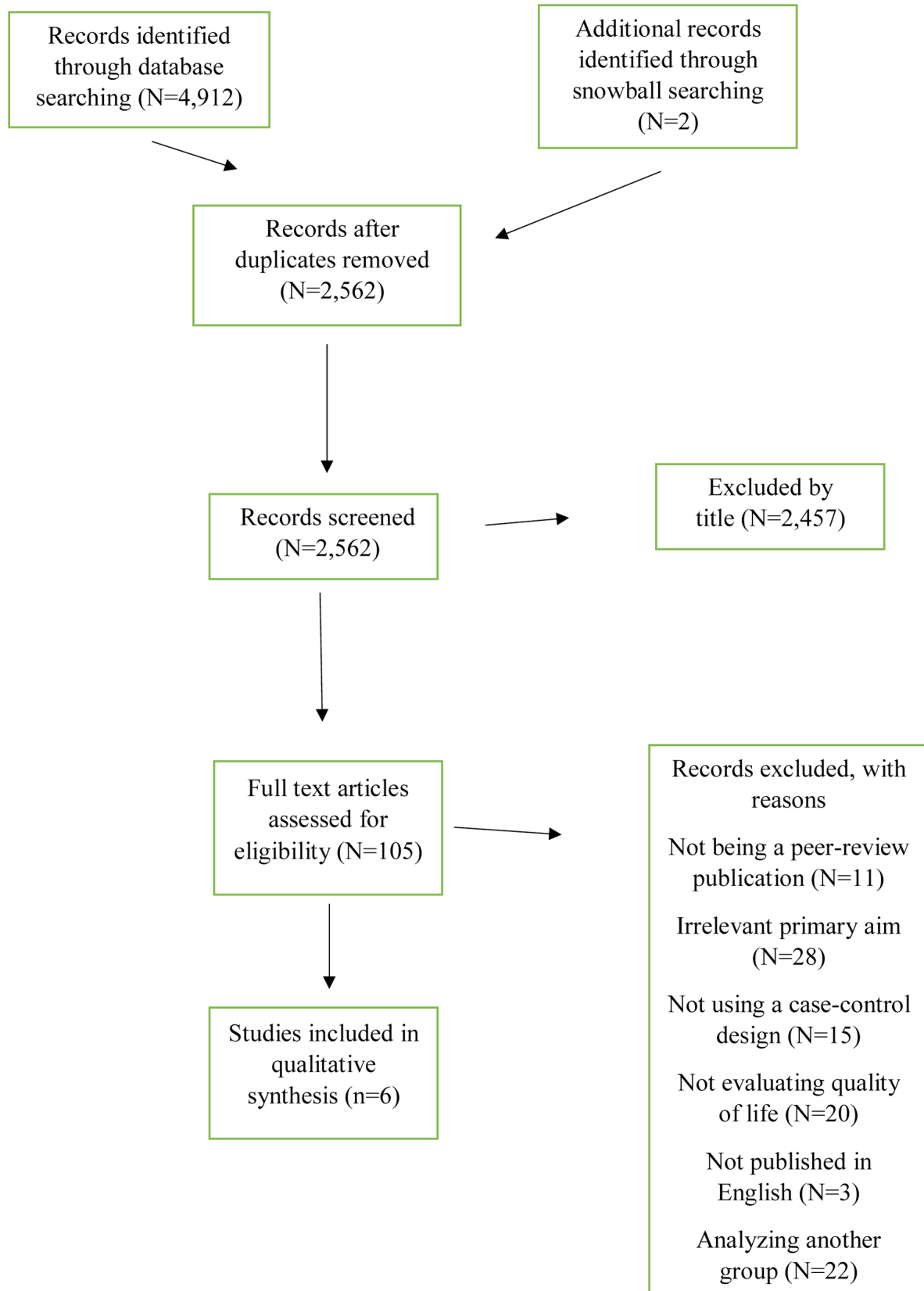


Figure 1. The flowchart of the study.

since surgery was 61.2 months. The patients were administrated the Hospital-Anxiety and Depression Scale (HADS), the Rosenberg's Self-Esteem Scale and the Hopwood's Body-Image Scale. Patients were also asked questions regarding sexuality. Anxiety and depression were decreased and body image, self-esteem and sexual feeling of attractiveness and sexual satisfaction were significantly superior in the immediate reconstruction group compared with that of the delayed patient group (Table I).

The second study was carried out by Rautalin *et al.* in Finland (25). This study involved 51 immediate and 41 delayed reconstruction patients. It was a prospective case-control study, with assessments and baseline, 3, 6, 12 and 24 months. Health-related quality of life was evaluated through two different instruments, the 15 Dimensions Health-Related Quality of Life and the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire- 30. As indicated by the study results, direct reconstruction patients had better overall HRQoL at 12 months, but at 24 months the situation had changed in favor of the other patient group (Table I).

The third study included in the present systematic review was the one carried out by Roth *et al.* (26). This study included 151 immediate and 87 delayed reconstruction patients. Patients were from Canada and the United States. Quality of life, psychological distress and somatic anxiety were assessed through Medical Outcomes Study Short Form, Brief Symptom Inventory and The Modified Somatic Perception Questionnaire. Immediate Reconstruction patients reported greater disturbance in general mental health functioning, more severe impairment in emotional well-being related to their cancer diagnosis, higher levels of anxiety, higher impairment in physical and functional well-being regarding their cancer adjustment, higher affective distress, depression, and obsessive-compulsive disorder symptoms (Table I).

The fourth study included in this systematic review was carried out by Tsantakis *et al.* (27) in Greece. This study included 69 immediate and 81 delayed reconstruction patients, on average 7.27 years after their diagnosis. Patients were administrated the Breast-Q, Rosenberg Self-Esteem Scale, and State Shame and Guilt Scale. Immediate reconstruction was associated with higher psychosocial and sexual well-being. No other quality of life parameters, neither self-esteem, nor feelings of guilt, shame, and pride, differed between the two groups (Table I).

The fifth study included in the systematic review was carried out by Wellisch *et al.* (28) in the United States. This study included 25 immediate reconstruction and 38 delayed reconstruction patients. The BSI was administrated to assess psychological functioning and second instrument, designed specifically for the study purpose, was used to assess mastectomy and reconstruction reactions. There were no

significant differences between the two groups except for difficulty with arm movement, which was statistically higher for the immediate group. Only 25% of the women who underwent immediate repair reported "high distress" in recalling their mastectomy surgery compared with 60 % of the delayed reconstruction group (Table I).

The sixth study included in the present systematic review was the one carried out by Yoon *et al.* (29). This study was carried out in the United States. It was a prospective case-control study of 1806 immediate and 151 delayed reconstruction patients. The different instruments, specifically the BREAST-Q, the Patient-Report Outcomes Measurement Information System, and the EORTC QLQ-BR23 were administrated to assess patient quality of life. Patients were assessed two years after reconstruction. No significant differences were noted in psychosocial, sexual, or physical well-being between the two groups (Table I).

Considering all the above data together, the studies of Al-Ghazal *et al.* (24), Tsantakis *et al.* (27) and Wellisch *et al.* (28) found that immediate reconstruction led to benefits for the quality of life of patients. In contrast, the study by Roth *et al.* (26) found the opposite, *i.e.*, that immediate reconstruction was detrimental to patients' quality of life. The study by Yoon *et al.* (29) found no statistically significant differences between the two groups, while the study by Rautalin *et al.* (25) found that immediate reconstruction entailed short-term benefits to quality of life, which subsequently diminished, with patients who have gone on to subsequent reconstruction having the most benefits to their quality of life in the long term.

Quality evaluation. The quality appraisal of the included studies is presented in Table II. The overall score had a potential range between 0 and 22. As indicated by the table, two studies, the ones of Al-Ghazal *et al.* (24) and Wellisch *et al.* (28) had a fairly low quality, while the other four studies had an average and similar methodological quality.

Discussion

This review article aimed to examine the differences in quality of life of women with breast cancer following immediate and subsequent reconstruction. The systematic review undertaken led to six independent studies, of which three suggest that immediate reconstruction contributes to improved quality of life for women with breast cancer, one that immediate reconstruction worsens women's quality of life, one that there are no significant differences between the two groups, and one study suggests that the benefits of immediate reconstruction on quality of life are short-termed, with subsequent reconstruction having a longer-term impact. The fact is that the above findings are largely inconsistent with each other. Indeed, with only three of six studies

Table I. *The characteristics and findings of the included studies.*

Publication (Ref)	Country	Number of participants in each group	Study design	Parameters assessed	Measures	Results
Al-Ghazal <i>et al.</i> , 2000 (24)	United Kingdom	38 IR and 83 DR patients	Case-control study	Psychological distress, self-esteem, and body-image	HADS, Rosenberg's Self-esteem Scale and Hopwood's Body-Image Scale. They were also asked question regarding sexuality	Anxiety and depression were decreased, and body image, self-esteem and sexual feeling of attractiveness and sexual satisfaction were significantly superior in the immediate group compared with that of the delayed group
Rautalin <i>et al.</i> , 2022 (25)	Finland	51 IR and 41 DR patients	Prospective-case control study. Measuring points were baseline, 3, 6, 12 and 24 months	Health-related quality of life	15D-HRQoL & EORTC QLQ C-30	Direct Reconstruction patients had better overall HRQoL at 12 months, but at 24 months the situation had changed in favor of the other group
Roth <i>et al.</i> , 2003 (26)	United States and Canada	151 IR and 87 DR patients	Case-control study	Quality of life, psychological distress, and somatic anxiety	Medical Outcomes Study Short Form, BSI & The Modified Somatic Perception Questionnaire	Immediate reconstruction patients reported greater disturbance in general mental health functioning, more severe impairment in emotional well-being related to their cancer diagnosis, higher levels of anxiety, higher impairment in physical and functional well-being regarding their cancer adjustment, higher affective distress, depression, and OCD symptoms
Tsantakis <i>et al.</i> , 2023 (27)	Greece	69 IR and 81 DR patients	Case-control study	Quality of life, self-esteem, shame, and guilt	Breast-Q, Rosenberg Self-Esteem Scale, and State Shame and Guilt Scale	Immediate reconstruction was associated with higher psychosocial and sexual well-being. No other quality of life parameters, neither self-esteem, nor feelings of guilt, shame, and pride, differed between the two groups
Wellisch <i>et al.</i> , 1985 (28)	United States	25 IR and 38 DR patients	Case-control study	Psychological functioning and reactions to mastectomy and reconstruction	The BSI and an instrument designed specifically for the study purpose to assess mastectomy and reconstruction reactions	There were no significant differences between the two groups, except for difficulty with arm movement, which was statistically higher for the immediate group. Only 25% of the immediate group reported "high distress" in recalling their mastectomy surgery compared with 60% of the delayed group
Yoon <i>et al.</i> , 2018 (29)	United States	1,806 IR and 151 DR patients	Prospective case-control study	Health-related Quality of life	BREAST-Q, PROMIS, and EORTC QLQ-BR23	No significant differences in psychosocial, sexual, or physical well-being at two years

Table II. The quality appraisal of the studies according to STROBE.

	Al-Ghazal <i>et al.</i> , 2000 (24)	Rautalin <i>et al.</i> , 2022 (25)	Roth <i>et al.</i> , 2003 (26)	Tsantakis <i>et al.</i> , 2023 (27)	Wellisch <i>et al.</i> , 1985 (28)	Yoon <i>et al.</i> , 2018 (29)
Title and abstract	N	N	X	X	X	N
Introduction						
Background/rationale	N	N	N	N	N	N
Objectives	N	N	N	N	N	N
Methods						
Study design	X	N	X	N	X	N
Setting	N	N	N	N	X	X
Participants	X	X	N	N	X	N
Variables	X	N	N	N	N	N
Data sources/measurement	X	N	N	N	N	N
Bias	X	X	X	X	X	X
Study size	X	X	X	X	X	X
Quantitative variables	X	N	N	N	X	N
Statistical methods	X	N	N	X	X	N
Results						
Participants	X	N	X	X	X	X
Descriptive data	X	N	X	X	N	N
Outcome data	N	N	N	N	N	N
Main results	X	N	N	X	X	N
Other analyses	X	N	N	N	X	X
Discussion						
Key results	N	N	N	N	N	N
Limitations	X	X	X	N	X	N
Interpretation	X	X	N	X	X	N
Generalizability	X	X	X	N	N	N
Other information						
Funding	X	N	N	N	X	N
Overall	6	16	14	14	8	17

N: Sufficient; X: not sufficient.

arguing in favor of immediate reconstruction, no benefit can be claimed, especially as one study showed opposite results.

The combined examination of the results of this systematic review led to some additional considerations. Indeed, in designing the study, the key research question was whether immediate or long-term reconstruction implies more benefits. However, it appears that the answer to this question is considerably more complex. The research by Rautalin *et al.* (25) highlights a particularly interesting concern, shifting the focus of attention. They, therefore, argue that it is the time point of examining quality of life levels after reconstruction that differentiates whether or not more positive effects are found for the immediate or late reconstruction patients. Based on their study, when these two groups of patients are examined in the short term, women who have gone on to immediate reconstruction have more benefits, whereas when examined in

the long term more benefits are found for women who have gone on to later reconstruction. It is, therefore, likely that the findings of this study go beyond a simplistic comparison of immediate and subsequent reconstruction, highlighting the very important issue of the time over which any differences between these two groups of patients are assessed.

In fact, this systematic review does not come to any clear conclusion, creating more new questions than it attempted to answer. Future research should therefore further examine not only immediate and delayed reconstruction, but also the differences observed along time. Simple case-control studies therefore appear to be insufficient to fully understand this phenomenon and case-control studies including repeated measures are needed.

A second suggestion for future studies involves the need to carry out studies in other parts of the world. Indeed, all

studies were conducted either in Europe or North America. The cultural factor is undoubtedly linked to representations of femininity (30), and the mental health of women with breast cancer is a direct function of the factors and dynamics of the social and cultural environment (31). Indeed, in some regions of the world, such as the Middle East and North Africa, the patriarchal dynamics of local societies impose an additional psychological burden on women with breast cancer (32), leading to significant barriers to accessing reconstruction (33). Therefore, given that the cultural determinants of breast cancer adaptation and access to reconstruction vary between individual regions of the world, this systematic review cannot lead to a broader conclusion on the difference between immediate and subsequent reconstruction, as all studies were conducted either in North America or Europe. Hence, it is essential to carry out comparative studies in non-western countries.

A third limitation of the present study has to do with the timing of some of the relevant studies. The oldest study included in this systematic review was conducted almost 40 years ago (28), while the study by Al-Ghazal *et al.* (24) is also quite old. The main problem with the time of these studies is that significant advances in reconstruction have taken place in the meantime (34), and as a result the systematic review reaches a relative conclusion having incorporated studies in which practices were used that may not be used to the same extent today. Thus, there is a need for more recent studies, involving patients that have received reconstruction based on the latest related advancements.

In general, this systematic review comes to more research questions than it attempts to answer. The recommendations of the systematic review could be used to intensify research in the above directions, so that the question of potential differences in quality of life levels between women who have received immediate and delayed reconstruction can be answered more satisfactorily. Until such research is conducted and the research question under consideration is fully answered, it is uncertain how to arrive at recommendations for clinical practice and proposals for taking quality of life into account in reconstruction decision-making.

Conclusion

The inconsistent study findings can't lead to reliable conclusions for the difference between immediate and delayed reconstruction in quality of life. It is possible that the results vary regarding the time point that the comparison is made. Future research to this direction is warranted.

Conflicts of Interest

The Authors hereby state that they have no potential conflicts of interest to declare.

Authors' Contributions

The first and second Authors (V.T. and D.D.) conducted the literature search process and data extraction. Any disagreements between them were resolved with the support of the third author (K.K.). Quality assessment was performed by the first and second authors (V.T. and D.D.). Any disagreements between these two authors were resolved with the support of the fourth author (N.N.). All Authors contributed to writing parts of the manuscript and drafted it until its final version. All Authors read and approved the final version of the manuscript.

References

- 1 Siegel RL, Miller KD, Wagle NS, Jemal A: Cancer statistics, 2023. *CA Cancer J Clin* 73(1): 17-48, 2023. DOI: 10.3322/caac.21763
- 2 Chhikara BS, Parang K: Global Cancer Statistics 2022: the trends projection analysis. *Chem Biol Lett* 10(1): 451-451, 2023.
- 3 Poirier AE, Ruan Y, Walter SD, Franco EL, Villeneuve PJ, King WD, Volesky K, O'Sullivan D, Friedenreich C, Brennar D, ComPARE Study Team: The future burden of cancer in Canada: Long-term cancer incidence projections 2013-2042. *Cancer Epidemiol* 59: 199-207, 2019. DOI: 10.1016/j.canep.2019.02.011
- 4 Rahib L, Wehner MR, Matrisian LM, Nead KT: Estimated projection of US cancer incidence and death to 2040. *JAMA Netw Open* 4(4): e214708, 2021. DOI: 10.1001/jamanetworkopen.2021.4708
- 5 Arnold M, Morgan E, Rumgay H, Mafra A, Singh D, Laversanne M, Vignat J, Gralow JR, Cardoso F, Siesling S, Soerjomataram I: Current and future burden of breast cancer: Global statistics for 2020 and 2040. *Breast* 66: 15-23, 2022. DOI: 10.1016/j.breast.2022.08.010
- 6 Bray F, Piñeros M: Cancer patterns, trends and projections in Latin America and the Caribbean: a global context. *Salud Publica Mex* 58(2): 104-117, 2016. DOI: 10.21149/spm.v58i2.7779
- 7 DeVita VT, Chu E: A history of cancer chemotherapy. *Cancer Res* 68(21): 8643-8653, 2008. DOI: 10.1158/0008-5472.CAN-07-6611
- 8 Wang L: Early diagnosis of breast cancer. *Sensors (Basel)* 17(7): 1572, 2017. DOI: 10.3390/s17071572
- 9 Stan D, Loprinzi CL, Ruddy KJ: Breast cancer survivorship issues. *Hematol Oncol Clin North Am* 27(4): 805-27, ix, 2013. DOI: 10.1016/j.hoc.2013.05.005
- 10 Sun L, Ang E, Ang WHD, Lopez V: Losing the breast: A meta-synthesis of the impact in women breast cancer survivors. *Psychooncology* 27(2): 376-385, 2018. DOI: 10.1002/pon.4460
- 11 Ataollahi MR, Sharifi J, Paknahad MR, Paknahad A: Breast cancer and associated factors: a review. *J Med Life* 8(Spec Iss 4): 6, 2015.
- 12 Kim MS, Kim SY, Kim JH, Park B, Choi HG: Depression in breast cancer patients who have undergone mastectomy: A national cohort study. *PLoS One* 12(4): e0175395, 2017. DOI: 10.1371/journal.pone.0175395
- 13 Aerts L, Christiaens MR, Enzlin P, Neven P, Amant F: Sexual functioning in women after mastectomy *versus* breast conserving therapy for early-stage breast cancer: A prospective controlled study. *Breast* 23(5): 629-636, 2014. DOI: 10.1016/j.breast.2014.06.012
- 14 Padmalatha S, Tsai YT, Ku HC, Wu YL, Yu T, Fang SY, Ko NY: Higher risk of depression after total mastectomy *versus* breast reconstruction among adult women with breast cancer: a

- systematic review and metaregression. *Clinical Breast Cancer* 21(5): e526-e538, 2021. DOI: 10.1016/j.clbc.2021.01.003
- 15 Sbitany H: Breast reconstruction. *Surg Clin North Am* 98(4): 845-857, 2018. DOI: 10.1016/j.suc.2018.03.011
- 16 Kronowitz SJ: State of the art and science in postmastectomy breast reconstruction. *Plast Reconstr Surg* 135(4): 755e-771e, 2015. DOI: 10.1097/PRS.0000000000001118
- 17 Fernández-Delgado J, López-Pedraza MJ, Blasco JA, Andradás-Aragones E, Sánchez-Méndez JJ, Sordo-Miralles G, Reza MM: Satisfaction with and psychological impact of immediate and deferred breast reconstruction. *Ann Oncol* 19(8): 1430-1434, 2008. DOI: 10.1093/annonc/mdn153
- 18 Flitcroft K, Brennan M, Costa D, Wong A, Snook K, Spillane A: An evaluation of factors affecting preference for immediate, delayed or no breast reconstruction in women with high-risk breast cancer. *Psychooncology* 25(12): 1463-1469, 2016. DOI: 10.1002/pon.4087
- 19 Ter Stege JA, Oldenburg HSA, Woerdeman LAE, Witkamp AJ, Kieffer JM, van Huizum MA, van Duijnhoven FH, Hahn DEE, Gerritsma MA, Kuenen MA, Kimmings NAN, Ruhé QPQ, Krabbe-Timmerman IS, Riet MV, Corten EML, Sherman KA, Bleiker EMA: Decisional conflict in breast cancer patients considering immediate breast reconstruction. *Breast* 55: 91-97, 2021. DOI: 10.1016/j.breast.2020.12.001
- 20 Reuben BC, Manwaring J, Neumayer LA: Recent trends and predictors in immediate breast reconstruction after mastectomy in the United States. *Am J Surg* 198(2): 237-243, 2009. DOI: 10.1016/j.amjsurg.2008.11.034
- 21 Lee KT, Jung JH, Mun GH, Pyon JK, Bang SI, Lee JE, Nam SJ: Influence of complications following total mastectomy and immediate reconstruction on breast cancer recurrence. *Br J Surg* 107(9): 1154-1162, 2020. DOI: 10.1002/bjs.11572
- 22 Moher D, Liberati A, Tetzlaff J, Altman DG, PRISMA Group: Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med* 8(5): 336-341, 2010. DOI: 10.1016/j.ijsu.2010.02.007
- 23 Vandembroucke JP: When are observational studies as credible as randomised trials? *Lancet* 363(9422): 1728-1731, 2004. DOI: 10.1016/S0140-6736(04)16261-2
- 24 Al-Ghazal SK, Sully L, Fallowfield L, Blamey RW: The psychological impact of immediate rather than delayed breast reconstruction. *Eur J Surg Oncol* 26(1): 17-19, 2000. DOI: 10.1053/ejso.1999.0733
- 25 Rautalin M, Jahkola T, Roine RP: Breast reconstruction-prospective follow up on breast cancer patients' health-related quality of life. *World J Surg* 46(4): 836-844, 2022. DOI: 10.1007/s00268-021-06426-4
- 26 Roth RS, Lowery JC, Davis J, Wilkins EG: Quality of life and affective distress in women seeking immediate *versus* delayed breast reconstruction after mastectomy for breast cancer. *Plast Reconstr Surg* 116(4): 993-1002, 2005. DOI: 10.1097/01.prs.00000178395.19992.ca
- 27 Tsantakis V, Dimitroulis D, Kontzoglou K, Nikiteas N: The effect of time since reconstruction on breast cancer patients' quality of life, self-esteem, shame, guilt, and pride. *Palliat Support Care*: 1-7, 2023. DOI: 10.1017/S1478951523000445
- 28 Wellisch DK, Schain WS, Noone RB, Little JW: Psychosocial correlates of immediate *versus* delayed reconstruction of the breast. *Plast Reconstr Surg* 76(5): 713-718, 1985. DOI: 10.1097/00006534-198511000-00010
- 29 Yoon AP, Qi J, Brown DL, Kim HM, Hamill JB, Erdmann-Sager J, Pusic AL, Wilkins EG: Outcomes of immediate *versus* delayed breast reconstruction: Results of a multicenter prospective study. *Breast* 37: 72-79, 2018. DOI: 10.1016/j.breast.2017.10.009
- 30 Evans A: Femininity in the 21st century. *Curr Opin Psychol* 49: 101502, 2023. DOI: 10.1016/j.copsyc.2022.101502
- 31 Pelekasis P, Kampoli K, Ntavatzikos A, Charoni A, Tsiou C, Koumariou A: Depressive symptoms during adverse economic and political circumstances: A comparative study on Greek female breast cancer patients receiving chemotherapy treatment. *Eur J Cancer Care (Engl)* 26(6): e12687, 2017. DOI: 10.1111/ecc.12687
- 32 Salem H, Daher-Nashif S: Psychosocial aspects of female breast cancer in the Middle East and north Africa. *Int J Environ Res Public Health* 17(18): 6802, 2020. DOI: 10.3390/ijerph17186802
- 33 Khan N, Saleem HY, Huayllani MT, Boczar D, Forte AJ: Breast reconstruction in the Middle East: a controversial topic. *Plast Reconstr Surg* 145(5): 1011e-1012e, 2020. DOI: 10.1097/PRS.00000000000006758
- 34 Homsy A, Rüegg E, Montandon D, Vlastos G, Modarressi A, Pittet B: Breast reconstruction. *Ann Plast Surg* 80(4): 457-463, 2018. DOI: 10.1097/SAP.00000000000001312

Received February 6, 2024

Revised March 8, 2024

Accepted March 20, 2024