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EDICIONES COMPLUTENSE

The impact of mastectomy on body image and sexuality in women with breast cancer: a systematic review

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Abstract: Objective: The study aims to evaluate the impact of mastectomy on body image and sexuality of women with breast cancer, as well as to provide a general understanding of their quality of life. Method: This review followed the PRISMA guidelines. The expression "Mastectomy AND (sexuality OR "body image")" was searched in Lilacs, Scielo, Pubmed and Scopus databases. Articles published in English, Portuguese and Spanish between 2010 and 2020 were selected. The text analysis was carried out by peers. Results: 69.3% (43) of the studies presented mastectomy as a technique that worsens body image, sexual functioning and quality of life of women. Less radical procedures, such as breast-conserving surgery, showed lower impact on these indicators. Breast reconstruction is an alternative to mitigate breast surgery impacts. Conclusion: Mastectomy caused the major impacts on body image, sexual functioning and quality of life. These implications need to be considered during therapeutic choice.
Keywords: Breast neoplasms**,** mastectomy, body image, sexuality, quality of life.

[es] El impacto de la mastectomía en la imagen corporal y en la sexualidad de mujeres con cáncer de mama: una revisión sistemática

Resumen: Objetivo: Evaluar el impacto de la mastectomía en la imagen corporal y sexualidad de mujeres con cáncer de mama, y proporcionar una comprensión general de su calidad de vida. Método: Esta revisión siguió las directrices PRISMA. Se buscó la expresión "Mastectomy AND (sexuality OR "body image")" en las bases de datos Lilacs, Scielo, Pubmed y Scopus. Se seleccionaron artículos publicados en inglés, portugués y español entre 2010 y 2020. Los textos fueron analizados por parejas. Resultados: El 69,3% (43) de los estudios muestran que la mastectomía empeora la imagen corporal, el funcionamiento sexual y la calidad de vida de las mujeres. Procedimientos menos radicales, como

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la cirugía conservadora de la mama, mostraron menor impacto. La reconstrucción mamaria puede mitigar los impactos de las cirugías. Conclusión: La mastectomía causó mayores impactos con respecto a imagen corporal, funcionamiento sexual y calidad de vida. Estas implicaciones deben considerarse durante la elección terapéutica.
Palabras clave: Neoplasias de mama, mastectomía, imagen corporal, sexualidad, calidad de vida.

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1. Introduction

Globally, breast cancer is, excluding non-melanoma skin cancer, the most frequently diagnosed cancer in women, and the commonest cause of cancer death among this group[1]. In 2018, about 2.1 million new cases of breast cancer and 627 thousand deaths were estimated[2]. Although the incidence of breast cancer is lower in regions of medium and low income, the developing countries reveal the highest mortality rates[1].

Breast cancer is a malignancy of the breasts that causes breast symptoms and changes, such as lumps, localized pain, nipple symptoms or skin alterations[3]. In early breast cancer without metastasis, women undergo breast surgery and, commonly, need a form of systemic therapy[3]. Surgical treatment is done mainly through either mastectomy or breast-conserving surgery. Currently, studies[4-6] have demonstrated equivalence in overall survival between both surgical techniques. Thus, in the absence of medical contraindications, the decision for which surgical therapy should be used becomes a personal matter.

In a mastectomy, women experience entire breast removal, thereby resulting in a permanent change in their appearance[7]. In this regard, besides the complications arising from the illness, breast cancer and its treatment have repercussions caused by the total or partial mutilation of the breast, often resulting in problems associated with body image (BI), self-acceptance, sexuality and quality of life (QoL)[8].

BI is a psychological construct about perceptions, emotions and attitudes that individuals hold towards their own body[9]. In breast cancer, treatment can affect BI, as the loss of an organ full of symbols and identity brings to the survivors dissatisfaction with appearance, perceived loss of femininity and body integrity, reluctance to look at one's self naked, as well as feeling less sexually attractive[10]. Furthermore, the perception of BI is a key determinant of QoL[7].

Sexuality is an essential aspect of the life of cancer patients. Nonetheless, an impaired sexuality is highly prevalent among those who experience cancer, especially breast cancer, which emphasizes suffering and worry about the disease, also damaging QoL[11]. Certainly, the loss of the whole breast, a secondary sex organ, causes a variety of psychological changes and sexual complaints, including loss of attractiveness and decreased sexual interest, excitement and orgasms[12].

BI and sexuality are important factors in the QoL of women with breast cancer. Besides, it is widely accepted that mastectomy represents a considerable disruption in these aspects. Therefore, studying post-surgical sexuality and BI proves to be

relevant to health care planning, for both health professionals and public health policies. Moreover, in therapeutic planning, patients should be informed not only about the impact of surgery on cancer remission but also on health-related QoL. This includes information about possible changes in BI and sexual well-being. Although data regarding the QoL of patients with breast cancer are found in the literature, there is a lack of reviews with a specific focus on BI and sexuality after mastectomy.

Thus, this systematic review aims to comprehend how mastectomy impacts BI and sexuality of women who have undergone breast cancer treatment, as well as to provide a general understanding of these patients' QoL.

2. Materials and Methods

This review followed the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines.

Search strategies and eligibility criteria

A bibliographic search was conducted on June 2, 2020, in the following databases: Lilacs (Literatura Latinoamericana y del Caribe en Ciencias de la Salud), Scielo (Scientific Electronic Library Online), Pubmed and Scopus. The search terms used were "Mastectomy AND (sexuality OR "body image")". Filters were also applied regarding language and publication date, and only texts in Portuguese, Spanish or English, published between 2010 and 2020, were selected.

Accordingly, 1221 articles were identified through this search. Duplicates between databases were excluded and the remaining texts underwent an evaluation of their title, abstract and keywords. This analysis was performed by peers, and the divergences were solved by a third reviewer. For this purpose, the criteria described in Table 1 were used. After this process, publications that did not meet the inclusion criteria were excluded and the remaining articles were retrieved for a full-text assessment.

Then, the selected texts were fully read. It is noteworthy that this assessment was also carried out by peers, with disagreements resolved by a third reviewer. Articles that did not fit the selection criteria (depicted in Table 1) or did not have the full text available were excluded. At the end of this process, 62 articles were selected for inclusion and analysis in this review.

Table 1. Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria (EC)
Articles written in Portuguese, English or Spanish;	Articles with an approach out of the context of the investigated subject;
Articles published between 2010 and 2020;	Articles from literature review studies;
Studies with empirical results;	Articles in the form of dissertation, thesis, book chapter, book, manual, editorial, review, comment, criticism, report, letter, note, conference paper and manuscript;

Studies that addressed mastectomy as a treatment for breast cancer and analyzed its impact on women's body image and / or sexuality;	Articles that addressed the body image of women who underwent prophylactic mastectomy, whether they did not have breast cancer or underwent contralateral breast removal;
Articles that addressed breast cancer exclusively in women;	Studies that included only women who had breast reconstruction surgery or only women who had breast-conserving surgery;
Articles that addressed these issues from the perspective of mastectomized women and not according to the perception of other people towards them.	Studies performed with women who had breast cancer recurrence or metastasis;
	Articles that addressed other people's perceptions of mastectomized women;
	Studies that did not use validated scales to measure results.

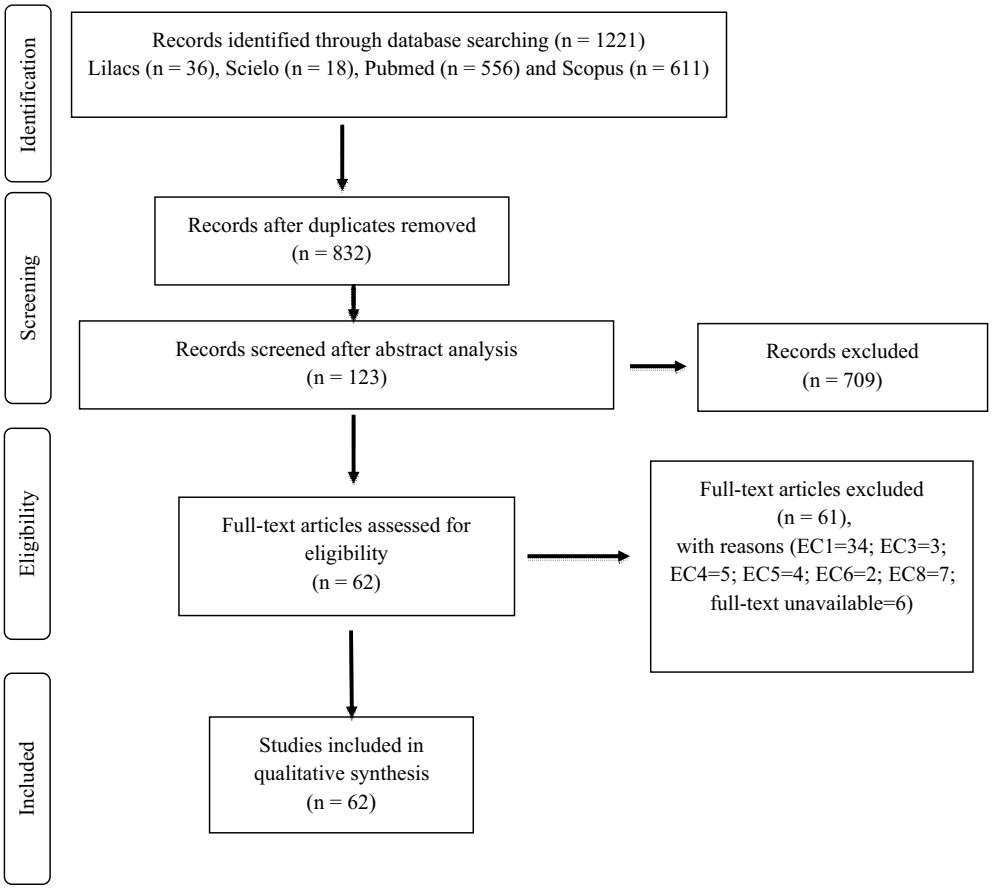
Data extraction and synthesis

Data from the included publications were extracted. Then, a table was created and the following variables were established to be collected: First author, year and country; Sample group; Age of participants (mean and range); Surgical procedure(s); Questionnaire(s) applied and Results (Table 2). A pilot test was carried out with 5 randomly chosen articles and, later on, all the included texts were tabulated. This work was conducted by two independent reviewers, with divergences being evaluated by a third reviewer. It is important to highlight that, in the "Results" column, the main findings of the studies related to the topic addressed in this review were summarized, but the results not associated with the present analysis were not described, such as data related to arm symptoms and to the development of depression after mastectomy. Finally, the extracted data were assessed according to the objective of this work.

3. Results

1221 articles were identified (36 at Lilacs, 18 at Scielo, 556 at Pubmed and 611 at Scopus), of which 389 were excluded due to duplication between databases, thus remaining 832 texts for analysis. Then, in the first evaluation stage, based on reading the title, abstract and keywords, 709 papers that did not meet the inclusion criteria were excluded. The remaining 123 publications were fully examined. Of these, 61 were excluded, 55 for not meeting the selection criteria (Table 1) and 6 for not having the full text available. At the end of this process, 62 articles were selected for data extraction and inclusion in this review (Figure 1).

Figure 1. Flow diagram of study selection according to PRISMA guidelines



Mastectomy was seen in the given studies as a factor that affects several areas of the life of women with breast cancer. In this review, an analysis was carried out focusing on its repercussions on the BI, sexual functioning (SF) and QoL of these patients.

The included articles approach the impact of mastectomy on QoL, SF and BI of women with breast cancer, also bringing a comparison with the impact of other surgical treatments, such as breast-conserving surgery, lumpectomy and breast reconstruction. The total number of participants in the analyzed studies was 10877. The minimum and maximum age of the patients were 18 and 94 years, respectively. The mean age of participants among the studies that brought that information was 51.4 years. 61 different questionnaires were used in the studies, among which the most frequently used were: (EORTC QLQ-BR23) in 19 studies (30.6%), (EORTC QLQ-C30) in 18 studies (29.0%), (FSFI) in 14 studies (22.6%) and (BIS) in 12 studies (19.3%).

Body Image

BI was addressed in 64.5% (40) of the analyzed articles. Mastectomy was a major impact factor in the BI of women with breast cancer in 46.7% (29) of the studies, both in short and long term. Furthermore, 24.2% (15) of the texts showed that the impact of mastectomy was worse than that of other surgical treatments (breast-conserving surgery, lumpectomy and breast reconstruction). In addition, the damage was greater in mastectomized patients when compared with the control group in 1.6% (1) of the articles.

Breast-conserving surgery was the second type of surgical treatment for breast cancer that had the most negative repercussions in BI. Nevertheless, in 3.2% (2) of the texts, the losses caused by mastectomy and breast-conserving surgery in BI were comparable.

Breast reconstruction is an effective way to improve the BI of women after surgical treatment for breast cancer, which was seen in 4.8% (3) of the articles. However, 2 other studies reported that delayed reconstruction had a negative effect on BI. Moreover, 1.6% (1) of the texts concluded that breast cancer patients who did not receive any surgical treatment showed a more impaired BI than those who did.

Finally, 1.6% (1) of the articles associated better BI with an investment in self-compassion and appearance. Furthermore, another article (1.6%) related worse BI with post-treatment weight gain. Also, 1 article revealed that women who underwent nipple-sparing mastectomy with immediate reconstruction had moderately low levels of BI disorders.

Sexuality

Sexuality is directly affected by the surgical treatment of breast cancer. Thus, an association between breast surgery and impaired SF or sexual dysfunction (SD) was shown in 56.4% (35) of the assessed articles. Mastectomy harmed SF or caused greater SD in 4.8% (3) of the studies. Several texts brought a comparison between the types of treatment regarding their impact on women's sexuality: 8 articles showed that mastectomy had a worse impact on SF or caused greater SD when compared with breast-conserving surgery. Conversely, 2 other articles concluded that conservative surgery was worse for SF than mastectomy. Yet, another 3 studies demonstrated that both mastectomy and breast-conserving surgery similarly worsened SF or contributed to the development of SD. Moreover, 1.6% (1) of the articles exhibited that worse SF was associated with post-treatment weight gain.

Regarding lumpectomy, 4.8% (3) of the articles revealed better results in SF or less SD when compared with mastectomy. Furthermore, 3.2% (2) of the studies reported that SF was more affected in mastectomized women than in the control group. Additionally, 2 texts showed that SF has a strong tendency to decline over time. Also, it was evident that breast reconstruction is a viable alternative to improve SF, given that 17.7% (11) of the articles correlated it with improvements on SF or lower SD. Moreover, one study noted that SF is directly related to the age of the patients.

Remarkably, 1.6% (1) of the articles reported the existence of a positive correlation between SF and BI, and another study showed that partners' support also correlates with SF scores. Moreover, in 6.4% (4) of the texts, circumstances such as absence of

partner, high level of education, absence of breast reconstruction, advanced age and marital status were associated with greater SD. Yet, another article (1.6%) showed that lower levels of education and having an older partner were contributing factors for worse SF. Furthermore, 1 article (1.6%) associated younger age, being married and elementary education level with worse SF. However, 1.6% (1) of the studies showed that SF improved as the education and income of women with mastectomy increased.

Quality of Life

QoL is another aspect that is greatly impaired by procedures that modify the patient's body shape, such as mastectomy, and was addressed in 32.2% (20) of the selected articles. 24.2% (15) of the studies mentioned an association between QoL and mastectomy: 6.4% (4) simply showed that the procedure negatively affected QoL; 9.7% (6) reported that breast-conserving surgery would be better than mastectomy in terms of QoL, and 1.6% (1) pointed out that lumpectomy had less significant impacts on QoL than mastectomy.

Moreover, 3.2% (2) of the articles concluded that the QoL of mastectomized women improved over time. Furthermore, 2 studies showed that, concerning QoL, breast-conserving surgery was worse than mastectomy, with age influencing in these cases: younger women have a positive impact with mastectomy, but older women do not. Also, 1.6% (1) of the studies reported that younger women had their QoL more affected by surgery when compared with older women. Nevertheless, 1.6% (1) of the articles showed some similarity in the perception of QoL between patients who underwent mastectomy and those who underwent breast-conserving surgery. Also, 4.8% (3) of the texts reported breast reconstruction as an effective way to mitigate the damage of surgery in patients' QoL. Finally, in 1.6% (1) of the articles, there was a positive correlation between BI and QoL.

Table 2. Data extracted from the included studies

First Author, Year and Country	Sample group	Age (mean and range)	Surgical procedure(s)	Applied questionnaire(s)	Results
Aerts, L. (2014), Belgium[13]	230	56.0 (26 - 80)	Mastectomy, breast-conserving surgery and control group	(BDI), (WHO-5), (BIS), (EORTC QLQ-BR23), (DAS) and (*)	Mastectomized women were at high risk of SD, but showed better results in assessing the relationship with their partners. Patients who underwent breast-conserving surgery exhibited little difference in comparison with the control group regarding SF.
Akça, M. (2014), Turkey[14]	250	47.4 (28 - 55)	Mastectomy, modified radical mastectomy and breast-conserving surgery	(EORTC QLQ-C30) and (EORTC QLQ-BR23)	The QoL of mastectomized patients was more affected than that of patients who underwent breast-conserving surgery.
Archangelo, S. C. V. (2019), Brazil[15]	90	47.5 (18 - 65)	Mastectomy, mastectomy with breast reconstruction and control group	(FSFI), (BDI) and (BDDE)	Patients who had undergone breast reconstruction reported better SF and BI than the mastectomized group. Also, SD seemed to be related to the absence of a marital partner and to higher levels of education.
Arraras, J. I. (2016), Spain[16]	243	54.2 (34 - 68)	Mastectomy, mastectomy with breast reconstruction and breast-conserving surgery	(EORTC QLQ-C30) and (EORTC QLQ-BR23)	Overall, there was a slight drop in the SF and QoL scores of the patients. The risk of worse BI was greater among mastectomized women when compared with the breast-conserving surgery group.
Bhat, V. (2019), India[17]	40	50.9	Modified radical mastectomy and breast-conserving surgery	(LTQOL-BC)	Both groups presented significant changes in QoL in terms of BI. However, women who had undergone breast-conserving surgery seemed to have slightly better conditions than mastectomized ones.
Boing, L. (2017), Brazil[18]	172	56.7	Radical mastectomy, radical mastectomy with breast reconstruction and breast-conserving surgery	(IPAQ), (BIBCQ), (EORTC QLQ-C30) and (EORTC QLQ BR23)	Patients who had undergone radical mastectomy revealed worse results regarding QoL and BI. Among these, those who underwent breast reconstruction had better scores on SF and body stigma.
Casaubon, J. T. (2020), United States[19]	585	-	Mastectomy (nipple-sparing or not), nipple-sparing mastectomy with breast reconstruction, non-nipple-sparing mastectomy with breast reconstruction and lumpectomy	(FSFI) and (*)	Women who underwent lumpectomy reported better QoL (satisfaction with appearance, comfort in being seen undressed, breast's role during intimacy and pleasurable breast caress) than mastectomized women, even when compared with those who had undergone nipple-sparing surgery followed by reconstruction.

First Author, Year and Country	Sample group	Age (mean and range)	Surgical procedure(s)	Applied questionnaire(s)	Results
Cobo-Cuenca, A. I. (2018), Spain[20]	514	46.3 (21 - 66)	Mastectomy, lymphadenectomy and lumpectomy**	(WSF)	Overall, patients presented abnormal SF (pain during penetration, lubrication, desire and arousal). Lumpectomized women reported less dysfunction than mastectomized women. SD was more likely among women who had not undergone reconstruction and was associated with type of hormone therapy, age and marital status.
Cordero, M. J. A. (2014), Spain[21]	114	55.0 (28 - 85)	Mastectomy and breast-conserving surgery	(BIS)	Type of surgery did not seem to influence BI, although mastectomized women showed a more incomplete perception of their bodies when naked. Changes in BI seemed to be related to the patient's sociocultural level, family support and level of information about treatment.
Cordero, M. J. A. (2015), Mexico[22]	120	51.8 (32 - 76)	Mastectomy and group with no surgical treatment	(BIS) and (BDI-II)	Both patients who underwent mastectomy and those who received a cancer diagnosis but no surgical treatment demonstrated having an affected and incomplete BI.
Cortés-Flores, A. O. (2014), Mexico[23]	139	49.7	Mastectomy, mastectomy with breast reconstruction and quadrantectomy	(EORTC QLQ-C30), (EORTC QLQ-BR23) and (*)	In all groups, loss of sexual pleasure was observed. There were no differences in BI between patients who underwent mastectomy or quadrantectomy. Breast reconstruction appeared to be a good option to improve health and QoL.
Cortés-Flores, A. O. (2017), Mexico[24]	74	46.9	Mastectomy, mastectomy with breast reconstruction and breast-conserving surgery	(FSFI)	There was a lower prevalence of SD among patients who underwent breast-conserving surgery or reconstruction after mastectomy.
Dahl, C. A. F. (2010), Norway[25]	248	55.0	Modified radical mastectomy and breast-conserving surgery	(BIS), (FQ), (SF-36), (EORTC QLQ-BR23) and (HADS)	Women's BI stayed relatively stable during the three years of the survey. Patients who had undergone radical mastectomy had greater losses regarding BI.
Denewer, A. (2012), Egypt[26]	200	45.3 (22 - 65)	Mastectomy and mastectomy with breast reconstruction	(BITS), (BSS) and (*)	Women who underwent immediate breast reconstruction had higher scores on satisfaction with BI and QoL.
Dubashi, B. (2010), India[27]	51	35	Modified radical mastectomy and breast- conserving surgery	(EORTC QLQ-C30) and (EORTC QLQ-BR23)	QoL and SF were slightly worse in the group that underwent breast-conserving surgery than in the mastectomized group.
De La Hoz, F. J. E. (2019), Spain[28]	48	46.8 (36 - 81)	Radical mastectomy and group with no surgical treatment	(FSFI)	The patients had very affected SF (desire and orgasm disorders). Women who underwent radical mastectomy had major disorders related to an incomplete BI.

First Author, Year and Country	Sample group	Age (mean and range)	Surgical procedure(s)	Applied questionnaire(s)	Results
Elmas, Ö. (2020), Turkey[12]	71	(27 - 50)	Modified radical mastectomy and breast- conserving surgery	(FSFI)	SF (arousal and orgasm) was more satisfactory and better preserved in women who underwent breast-conserving surgery than in mastectomized women.
Fernández, M. E. R. (2012), Spain[29]	72	49.6 (30 - 66)	Mastectomy and mastectomy with breast reconstruction	(RSES), (EORTC QLQ-BR23), (Test for the Measurement of Body Satisfaction) and (*)	Women who underwent breast reconstruction showed higher self-esteem, level of aesthetic satisfaction and BI.
Gargantini, A. C. (2019), Argentina[30]	30	46.6 (25 - 64)	Mastectomy, mastectomy with immediate breast reconstruction and mastectomy with delayed breast reconstruction	(BIS) and (BIQLI-SP)	Women who had undergone mastectomy had greater problems related to BI. Among women who underwent reconstruction, those who had done it right after mastectomy showed better self-esteem and BI than those who underwent the procedure later on.
Gass, J. S. (2017), United States[31]	268	58.7 (30 - 93)	Mastectomy, mastectomy with breast reconstruction and lumpectomy	(FSFI) and (*)	Breast-specific sensuality seemed to be affected in all groups, being slightly more preserved in patients who underwent lumpectomy. Overall, this procedure has been shown to provide greater SF (pleasurable breast caress and satisfaction with appearance).
Gomes, N. S. (2015), Brazil[32]	37	56.1	Mastectomy, mastectomy with breast reconstruction and breast-conserving surgery	(RSES) and (WHOQOL-bref)	Women who underwent breast-conserving surgery reported better QoL and maintained the feeling of femininity. In mastectomized women, breast reconstruction showed a very positive influence in improving QoL.
Hadi, N. (2012), Iran[33]	287	48.0	Modified radical mastectomy and breast- conserving surgery	(EORTC QLQ-C30) and (EORTC QLQ-BR23)	Women who underwent breast-conserving surgery had better BI, while mastectomized women reported lower QoL.
Han, J. (2009), Germany[34]	112	57.5 (25 - 85)	Mastectomy, mastectomy with breast reconstruction, breast-conserving surgery and breast-conserving surgery with breast reconstruction	(EORTC QLQ-C30), (EORTC QLQ-BR23) and (*).	Women who had undergone breast-conserving surgery reported better QoL and a much better perception of BI than the other groups, in addition to presenting less evident scars.
Härtl, K. (2010), Germany[35]	236	-	Modified radical mastectomy and breast- conserving surgery	(EORTC QLQ-C30), (EORTC QLQ-BR23), (HADS) and (QSC–R23)	The QoL of patients in all groups improved over time, but impairments were still observed in terms of BI and SF. There was no difference between the surgical modalities regarding QoL.

First Author, Year and Country	Sample group	Age (mean and range)	Surgical procedure(s)	Applied questionnaire(s)	Results
Howes, B. M. (2016), Australia[36]	407	(20 - 94)	Mastectomy, mastectomy with breast reconstruction, breast-conserving surgery and control group	(BREASx'T-Q) and (*)	Women who had undergone mastectomy with no reconstruction scored less on SF. Women who had undergone reconstruction had better results on SF. Women who had undergone breast-conserving surgery scored the lowest in the physical well-being chest domain and reported more significant breast asymmetry.
Irarrázaval, M. E. (2016), Chile[37]	91	60.0 (38 - 83)	Mastectomy, mastectomy with breast reconstruction and breast-conserving surgery	(EORTC QLQ-C30) and (EORTC QLQ-BR23)	Both mastectomy with and without reconstruction had a long-term impact on BI. Symptoms of surgery affected at least 1/4 of patients (mainly fatigue, pain and insomnia).
Jablonski, M. J. (2018), Poland[38]	50	51.8 (32 - 65)	Mastectomy, breast-conserving surgery and control group	(J-C questionnaire)	Women who underwent surgery showed poor results in body acceptance and in experiencing intimacy, and also a greater manifestation of femininity than women in the control group. Mastectomized women and those who underwent conservative surgery had similar difficulties in self-acceptance and in developing intimate relationships with their partners.
Jablonski, M. J. (2019), Poland[39]	78	(34 - 68)	Mastectomy, breast-conserving surgery and control group	(BS-Q) and (SOC-29)	Women, after both mastectomy and breast-conserving surgery, were more likely to present less body acceptance and problems in developing intimate relationships with their partners. A greater manifestation of femininity was also observed in the surgically treated groups.
Jay, M. (2019), Canada[40]	257	-	Mastectomy, mastectomy with breast reconstruction and breast-conserving surgery	(BREAST-Q)	Women who underwent breast-conserving surgery presented higher breast satisfaction and SF than those who underwent mastectomy with reconstruction
Kennedy, F. (2010), England[41]	43	60.2 (34 - 87)	Mastectomy, mastectomy with breast reconstruction and wide local excision	(HADS), (BIS) and (EORTC QLQ-C30)	Women who underwent mastectomy with immediate reconstruction presented greater general suffering regarding BI than the other groups.
Lagendijk, M. (2018), Netherlands[42]	612	(43 - 60)	Mastectomy, mastectomy with implant reconstruction, mastectomy with autologous reconstruction and breast-conserving surgery	(EQ-5D-5L), (EORTC-QLQ-C30), (EORTC-QLQ-BR23) and (BREAST-Q)	Women who had undergone mastectomy and implant reconstruction had a lower level of breast satisfaction. Women who had undergone isolated mastectomy had worse physical functioning and BI. Women who had undergone conservative surgery and isolated mastectomy had worse SF than groups that had undergone reconstruction.

First Author, Year and Country	Sample group	Age (mean and range)	Surgical procedure(s)	Applied questionnaire(s)	Results
Li, S. (2018), China[43]	310	48.1 (25 -68)	Mastectomy	(BIBCQ-C), (PANAS), (MSPSS), (HAMA) and (HAMD)	Mastectomized women had worse BI and greater vulnerability (fear of death and recurrence). Mastectomy had greater negative effects on women more concerned with physical appearance for reasons including scars and asymmetry between the breasts.
Luutonen, S. (2013), Finland[44]	273	57.7 (24 - 83)	Mastectomy and breast-conserving surgery	(HRQoL 15D) and (BDI)	Mastectomy was associated with better health-related QoL when compared with breast-conserving surgery. Among younger women, having a mastectomy instead of conservative surgery led to a positive impact on QoL, which did not happen with older women. The older group had more habitual activities and sexual relations.
Maharjan, M. (2018), Nepal[45]	107	47.9	Mastectomy	(EORTC QLQ-C30) and (EORTC QLQ-BR23)	Mastectomy interfered in different areas of women's lives, many of them being related. BI was associated with age, occupation, educational level, use of prostheses and presence of comorbidities. SF was related to age.
Manganiello, A (2011), Brazil[46]	100	-	Mastectomy and mastectomy with breast reconstruction	(SQ-F) and (SF-36)	Mastectomized women with low educational level, older partners and without reconstruction had DS.
Martins, JOA (2020), Brazil[47]	70	56.0 (32 - 72)	Mastectomy, mastectomy with breast reconstruction and breast-conserving surgery	(QS-F) and (*)	Surgical treatment negatively affected the SF of women with breast cancer. The youngest, married and with basic education had greater difficulties in their sexual life.
Metcalfe, K. A. (2012), Canada[48]	158	-	Mastectomy, mastectomy with immediate breast reconstruction and mastectomy with delayed breast reconstruction	(QLI), (BIBC), (IES), (BSI) and (SAQ)	Women with delayed reconstruction had greater stigma and concern with their body and worse perception of BI than the others.
Moreira, H. (2010), Portugal[49]	56	52.4 (37 - 68)	Mastectomy and breast-conserving surgery	(DAS24), (ESS), (ASI-R), (WHOQOL-Bref) and (HADS)	Mastectomy was shown to be harmful to BI (greater body shame and less satisfaction with appearance) when compared with breast-conserving surgery. Body shame increased significantly over time.
Moreira, J. (2010), Brazil[50]	36	48.7 (31 - 60)	Mastectomy and mastectomy with breast reconstruction	(FSFI)	Breast reconstruction after mastectomy improved the patients' SF.
Munshi, A. (2010), India[51]	255	-	Mastectomy and breast-conserving surgery	(EORTC QLQ-C30) and (EORTC QLQ-BR23)	Mastectomized women had worse sexual pleasure and performance and worse BI when compared with patients who had undergone breast-conserving surgery. There was no significant difference in QoL between the types of surgery.

First Author, Year and Country	Sample group	Age (mean and range)	Surgical procedure(s)	Applied questionnaire(s)	Results
Mushtaq, M. (2017), Pakistan[52]	100	(40 - 65)	Mastectomy and lumpectomy	(BISS), (DASS) and (DRS-15v-v)	Mastectomized women had worse BI and resilience than those who had undergone lumpectomy. There were significant differences in satisfaction with BI, anguish and resilience in the pre- and post-evaluation of women who had undergone breast cancer surgery.
Neto, M. S. (2013), Brazil[53]	36	48.7 (31 - 60)	Mastectomy and mastectomy with breast reconstruction	(FSFI) and (Alderman Scale)	Mastectomized women had worse results regarding SF when compared with those who underwent reconstruction. Women who had undergone reconstruction showed improvement in SF, better self-esteem and BI and a 100% satisfaction with the surgery.
Ng, S. K. (2016), Australia[54]	143	-	Mastectomy and mastectomy with breast reconstruction	(BREAST-Q)	Women who had undergone reconstruction showed higher satisfaction with breast and sexual well-being than those who underwent mastectomy alone. Type (autologous or implant) and moment (immediate or delayed) of reconstruction did not seem to influence results.
Nowicki, A. (2015), Poland[55]	100	57.0 (30 - 79)	Mastectomy and breast-conserving surgery	(EORTC QLQ C-30) and (EORTC QLQ BR-23)	Mastectomized women had worse BI in comparison to the group who had undergone breast-conserving surgery. The QoL in the early postoperative period was similar in both groups, however it changed over time. Breast-conserving surgery had a better effect on self-esteem and QoL.
Nunez, C. (2018), Colombia[56]	37	55.7 (30 - 87)	Mastectomy, breast-conserving surgery and group with no surgical treatment	(CAEPO) and (BIS)	Women who underwent surgery had less damage to BI than those with no surgical treatment. The meaning of the surgery in terms of body representation, normality, femininity and sensuality seemed to be more relevant than the surgical change itself.
Öztürk, D. (2016), Turkey[57]	100	47.0 (28 - 65)	Mastectomy, mastectomy with breast reconstruction and breast-conserving surgery	(FSFI) and (*)	Women who had undergone breast reconstruction or breast-conserving surgery reported better SF. Reconstruction had positive effects on sex life, but conservative surgery showed even more satisfactory results. Mastectomy and older age negatively affected SF.
Pegorare, A. B. G. S. (2017), Brazil[58]	36	52.0 (37 - 60)	Mastectomy and quadrantectomy	(FSFI) and (EORTC QLQ-C30)	Most women had SD. There were no differences in SD between the types of surgery. Younger women had their QoL more impaired when compared with older women.
Prates, A. C. (2017), Brazil[59]	167	49.0 (31 - 88)	Mastectomy, mastectomy with breast reconstruction, breast-conserving surgery, group with no surgical treatment and control group	(BSS) and (RSES)	Women with breast cancer, especially after mastectomy and chemotherapy, had greater dissatisfaction with BI. Women who had undergone breast reconstruction did not show impairments in the perception of their BI.

First Author, Year and Country	Sample group	Age (mean and range)	Surgical procedure(s)	Applied questionnaire(s)	Results
Raggio, G. A. (2014), United States[60]	83	56.2	Unilateral mastectomy, bilateral mastectomy and lumpectomy	(FSFI), (FSDS-R), (BITS), (BASS), (SF-12), (CES-D) and (*)	Mastectomized women had worse BI and SF when compared with the group that had undergone lumpectomy. Worse BI and SF were associated with post-treatment weight gain.
Rahman, M. M. (2016), Bangladesh[61]	250	44.7 (21 - 67)	Mastectomy	(EORTC QLQ-C30) and (EORTC QLQ-BR23)	QoL in mastectomized women was affected after surgery, but there was an improvement over time. BI, SF and sexual pleasure deteriorated during follow-up.
Retrouvey, H. (2019), Canada[62]	303	55.6	Mastectomy, mastectomy with breast reconstruction and breast-conserving surgery	(BREAST-Q), (HADS) and (IES)	Mastectomized women had worse satisfaction with breasts and SF in the long term in comparison to the groups of conservative surgery and mastectomy with reconstruction.
Seara, L. S. (2012), Portugal[63]	135	53.8 (39 - 81)	Mastectomy and control group	(FSFI), (BIS) and (BDI-II)	Mastectomized women had worse SF and BI compared with the control group. There was a positive correlation between partner support and SF and BI.
Sherman, K. A. (2016), Australia[64]	75	47.8 (27 - 66)	Nipple-sparing mastectomy with breast reconstruction	(BIS), (DASS-21), (IES), (SCS) and (ASI-R)	Women who had undergone nipple-sparing mastectomy with immediate reconstruction had moderately low levels of BI disorders. BI disorders were associated with psychological distress. Better BI was associated with investment in self-compassion and appearance.
Spatuzzi, R. (2016), Italy[65]	157	56.4	Mastectomy, mastectomy with breast reconstruction and breast-conserving surgery	(EORTC QLQ-C30), (EORTC QLQ-BR23), (BIS) and (MSPSS)	Mastectomized women had worse BI compared with the conservative surgery group. In the reconstruction group, better BI was associated with perceived social support.
Streb, J. (2018), Poland[66]	67	(25 - 68)	Mastectomy, breast-conserving surgery and control group	(FSFI), (EORTC QLQ-BR23), (EORTC QLQ-C30) and (Zubrod Scale)	Mastectomized women had a higher risk of SD (sexual desire, arousal, lubrication and orgasm) in comparison to the conservative surgery group and the control group. Higher risk of SD was associated with surgery on the dominant-hand side.
Sun, Y. (2013), South Korea[67]	407	51.6 (28 - 70)	Mastectomy, mastectomy with breast reconstruction and breast-conserving surgery	(EORTC QLQ-C30), (EORTC QLQ-BR23), (RSES), (BDI), (BIS) and (CARES)	Mastectomized women had worse QoL and BI in comparison to the conservative surgery group. Women who had undergone reconstruction after mastectomy had better SF when compared with mastectomy group, but QoL was similar.
Slowik, A. J. (2017), Poland[68]	42	56.0 (36 - 68)	Mastectomy, mastectomy with breast reconstruction and breast-conserving surgery	(EORTC QLQ-C30), (EORTC QLQ-BR23), (FSFI) and (SOC-29)	There were no differences in QoL and SF between surgical modalities. Higher risk of SD was associated with mastectomy on the dominant-hand side. Higher risk of disturbances in BI was associated with the presence of emotional disorders.

First Author, Year and Country	Sample group	Age (mean and range)	Surgical procedure(s)	Applied questionnaire(s)	Results
Telli, S. (2020), Turkey[69]	176	46.3 (33 - 55)	Mastectomy and control group	(SQOL-F) and (DAS)	Mastectomized women had worse SF compared with the control group. There was a positive correlation between SF and dyadic adjustment. SF improved as the education and income of women with mastectomy increased.
Tsai, H. (2017), Taiwan[70]	544	-	Mastectomy and breast-conserving surgery	(EORTC QLQ-C30) and (EORTC QLQ-BR23)	Mastectomized women had worse BI compared with the conservative surgery group. The type of surgery did not show a notable impact on other areas of QoL.
Turk, K. E. (2018), Taiwan[7]	57	49.3 (28 - 78)	Modified radical mastectomy	(FACT-B) and (BCS)	Mastectomy had a negative impact on BI and QoL. There was a strong positive correlation between BI and QoL.
Wani, S. (2018), India[71]	147	42.9	Mastectomy	(EORTC QLQ-BR23)	In mastectomized women, BI and SF tended to deteriorate over time. There was an improvement in other aspects of QoL (specific breast symptoms and future perspectives).
Wu, T. (2020), Taiwan[72]	581	53.2	Mastectomy and breast-conserving surgery	(WHOQOL-BREF), (BIS) and (BI)	There were no differences in BI and QoL between the surgical modalities. BI scores were predictive in all QoL domains. Women who had undergone mastectomy had a greater tendency to stability in their QoL and BI scores when compared with conservative surgery group.

SF = sexual functioning
SD = sexual dysfunction
BI = body image
QoL = quality of life
(*) = the study also used non-standardized questionnaires created by the authors to evaluate BI, SF or QoL
** = some women participating in the study underwent breast reconstruction after surgery, but the article does not specify which among them underwent this procedure

(ASI-R) - Appearance Schemas Inventory - Revised, (BASS) - Body Areas Satisfaction Scale*; (BCS) - Breast cancer screening; (BDI) - Beck Depression Inventory; (BDI-II) – Beck Depression Inventory II; (BDDE) - Body Dysmorphic Disorder Examination; (BI)* - Barthel Index*; (BIBCQ) - Body Image after Breast Cancer Questionnaire; (BIBC) - Body Image after Breast Cancer; (BIBCQ-C) - Body Image after Breast Cancer Questionnaire C; (BIS) – Body Image Scale; (BISS) - Body Image States Scale; (BIQLI-SP) - Body Image Quality of Life Inventory SP; (BITS) - Breast-Impact of Treatment Scale; (BSI) - Brief Symptom Inventory; (BSS) - Breast Severity Symptom; (BS-Q) - Body Shape Questionnaire; (CAEPO)* - Cuestionario de Afrontamiento al Estrés para Pacientes Oncológicos, translated as Coping with Stress Questionnaire for Cancer Patients*; (CARES) - Cancer Rehabilitation Evaluation System; (CES-D) – Center of Epidemiologic Studies – Depression; (DAS) - Dyadic Adjustment Scale; (DAS24) - Dyadic Adjustment Scale; (DASS) - Depression, Anxiety and Stress Scale; (DASS-21) - Depression, Anxiety and Stress Scale 21; (DRS-15v-v)* - Dispositional Resiliency Scale 15*; (EORTC QLQ-BR23) - The European Organization for Research and Treatment for Cancer Quality of Life Questionnaire-Core 30 and Breast Cancer-Specific; (EORTC QLQ-C30) - The European Organization for Research and Treatment for Cancer Quality of Life Questionnaire - Core 30; (EQ-5D-5L) - EuroQol-5 Dimensions;(ESS) - European Social Survey; (FACT-B) - The Functional Assessment of Cancer Therapy – Breast; (FSDS-R) - The Female Sexual Distress Scale-Revised; (FSFI) - Female Sexual Function Index; (FQ) - The Family Questionnaire; (HADS) - Hospital Anxiety and Depression Scale; (HAMA) - Hamilton Anxiety Rating Scale; (HAMD) - Hamilton Depression Rating Scale; (HRQoL 15D) - Health-Related Quality of Life 15 Dimensional; (IPAQ) - International Physical Activity Questionnaires; (IES) - Impact of Event Scale; (LTQOL–BC) - Long-term Quality of Life – Breast Cancer; (MSPSS) - The Multidimensional Scale of Perceived Social Support; (PANAS) - Positive and Negative Affect Schedule; (QSC–R23) - Questionnaire on Stress in Cancer Patients – Revised; (QLI) - Quality of Life Index; (QS-F) - Quociente Sexual – Feminino; (RSES) - The Rosenberg Self-Esteem Scale; (SAQ) - Self-Assessment Questionnaire; (SF-36) - Sexual Functioning Scale – 36; (SF-12) - Sexual Functioning Scale – 12; (SQ-F) - Sexuality Quotient–Female Version; (SOC-29) - Sense of Coherence Scale 29; (SCS) - Self-Compassion Scales; (SQOL-F) - The Sexual Quality of Life - Female; (WHO-5) - World Health Organization - Five Well-Being; (WSF) - Women's Sexual Function; (WHOQOL-bref) - World Health Organization Quality of Life-bref.*

4. Discussion

Body Image

BI is not restricted to the perception of the physical appearance of the body itself, once it also involves psychological, social and cultural facets. Thus, removal of the breast, an organ full of meanings and social representations, can cause serious changes in women's body perception[73].

Overall, the results of this review showed that mastectomy is a major impact factor on the BI of women with breast cancer, both in short and long term. Indeed, when compared with other forms of surgical treatment (such as breast-conserving surgery), radical breast removal revealed worse levels of satisfaction with BI. These results reinforce the findings of other reviews, which also argue that mastectomy has a greater impact on BI than other surgical modalities[74,75]. According to Aureliano[76], the breast has a strong symbolic meaning, for being part of the social conception of womanhood. Hence, mastectomy represents a fragmentation of the female body, in which the symbol of women's femininity and sexuality becomes disposable. In this regard, even after cure, the breast removal leaves a permanent mark on the perception of their own body[76].

Furthermore, breast reconstruction proved to be an important way of restoring a complete BI in some articles. This can be justified by the fact that this surgery seeks to rebuild the breasts' symbolic representation, offering women a BI closer to what is socially established as "normal" and feminine[76]. This result is consistent with the findings of the review performed by Santos and Vieira[74], that understood reconstruction as a valuable tool for improving BI.

Given the symbolic importance of breast, as well as the potential positive effects of reconstruction, yet another result of this review can be explained: the low levels of BI disorders among patients who underwent nipple-sparing mastectomy with immediate breast reconstruction. After all, the nipple is extremely important for the full function and recognition of the breast and its preservation can reduce the feeling of mutilation, thus allowing a result closer to the original breast after reconstruction[77].

Importantly, a minority of studies have shown evidence that delayed reconstruction can impair BI. As reported by Aureliano[76], reconstruction, despite its opposite goal, can generate the feeling of a transformed, reconstructed body for many women. Therefore, it could be understood as another mutilation, a useless modification[76]. This would explain why, when performed late in the process of readaptation and reformulation of one's body perception, reconstruction negatively affected the BI of certain women included in this review. Such results add to what is stated in the research conducted by Almeida et al.[75], which concluded that there is no consensus about the impact of reconstruction, whether immediate or delayed, on the BI of women with cancer.

The studies also depicted other factors that influence levels of satisfaction with BI, besides the type of surgical procedure. Investment in self-compassion and appearance was associated with better BI, whereas weight gain after treatment with worse BI. According to Oliveira et al.[73], women undergo, after mastectomy, a complex process of accepting their "new body", which suffers great external influence and depends largely on social approval. Hence, the importance of investing in self-compassion, once it allows women to value BI without depending on external validation. Furthermore, the weight stigma and the modern "beauty standards" can

make the fat body seem inadequate, not acceptable[78]. This factor can make people feel undesirable and seriously affect BI, but this is even further enhanced by the loss of the breast. Therefore, it is natural to understand that the body acceptance of mastectomized women who gain weight after treatment is more severely affected.

Sexuality

Sexuality involves the integration of different dimensions, including the individual, the cultural, the physical, the affective and the social. As breast removal interferes in many of them, it also manifests itself as an amputation of sexuality, desire, feeling of femininity and attractiveness[79].

Overall, mastectomy has proved to be a major impact factor in the SF of women with breast cancer, when compared not only to the control group, but also to the surgical modalities of breast-conserving surgery and lumpectomy. According to Vaziri and Lotfi-Kashani[80], the ability to achieve a healthy SF involves psychological and physical factors that affect the sexual response cycle, for example, desire, arousal and orgasm. Furthermore, breasts carry a strong symbolic content as an attribute of female beauty, attractiveness and sexual identity of women[73]. Thereby, total breast removal affects specific aspects of SF and intimacy and manifests as a mutilation of the female body, causing changes in the understanding of one's sexual self.

Moreover, breast reconstruction was correlated with improvements in SF or associated with a lower risk of SD, thus representing a promising alternative to restore and improve SF. As reported by Hart et al.[81], this is explained by the fact that the reconstruction gives women back the feeling of normality and the symbolism that the organ carries, acting in the maintenance of femininity, the feeling of sexual attractiveness and confidence during intimate relationships. These findings are consistent with the review conducted by Gilbert et al.[82], wherein mastectomy compared with breast-conserving surgery or reconstruction was shown to result in greater feelings of body shame, reluctance to look at one's body, a negative BI, and a lower perceived sexual attractiveness. In turn, Santos et al.[83] stated that there was no consensus in the literature regarding which surgical modality has the least adverse consequences for SF of women with breast cancer.

Factors including post-treatment weight gain, time elapsed after surgery, age, education level, marital status, presence or absence of a partner, partner support, age of the partner, BI and income were either positively or negatively correlated with SF. Conforming to Male et al.[84], post-treatment weight gain is associated with feelings of distress and worse BI, which explains a more impaired SF in these women. The SF deterioration over time observed in two articles was also noticed in the review conducted by Boswell and Dizon[85], which argued that, although some problems improved over time, SF was not one of them.

Despite divergences in the included studies on the impact of age on SF, Chang et al.[86] described that older women give less importance to the breasts and the deterioration of intimate relationships, and also worry less about their reproductive functions. Moreover, partner support was shown to be associated with better SF, however, marital status and the presence or absence of a partner were controversial. About this subject, Chang et al.[86] also stated that partners are valuable sources of support for women with breast cancer, but having a partner that does not provide support is harmful.

Quality of Life

The development of a woman's QoL is related to a variety of factors, including her body perception. Considering the role of the breasts in sensuality and in feminine aesthetics, their major influence in this process becomes evident. Hence, since mastectomy promotes breast removal, the procedure can cause great impacts on patients' QoL[73].

In general, the results of the present study referred that mastectomy negatively influenced the QoL of patients with breast cancer. After all, partial or total breast removal can cause complications to sexual health, to practice of physical and domestic activities and to family life, once this organ is full of symbolism and female identity, directly affecting women's self-esteem[87]. There was also evidence that, over time, women tend to have progressive improvements in QoL. Given that there is a disruption of the female body's integrity with mastectomy, time is necessary so that they can accept this change and rebuild their BI[76].

When compared to the modalities of conservative surgery, mastectomy showed greater impact on women's QoL in most studies. The advantage of breast-conserving surgery can be explained by its association with a more positive BI[88], since it promotes less body modification. This reinforces the data presented in the systematic review conducted by Simeão et al.[87], which concluded that mastectomized women without reconstruction had worse QoL scores.

Moreover, in some studies, breast reconstruction has proved to be an important way of mitigating the damage caused by mastectomy on QoL. Previous research associated BI to QoL, indicating that these factors have a strong positive correlation. The systematic review by Cordova et al.[89] also showed positive results for patients who underwent breast reconstruction, justified by the aesthetic concern with their bodies. After all, in a context of overvaluation of aesthetic standards and body stereotypes, women who undergo total breast removal often feel frustrated and may develop subsequent psychosocial problems.

Another factor associated with QoL levels was the age of the participants, however, there were controversies regarding the influence exerted by it. Younger age was sometimes related to a more positive impact of mastectomy when compared with conservative surgery, which can be explained by the fear of cancer recurrence and the concern of younger women to heal themselves to care for their children and family[76]. Nonetheless, in other studies, younger age was associated with a greater impact on QoL after surgery, which can be justified by the greater tendency of younger women to be concerned with physical appearance, femininity and sexuality[90].

Limitations

Some limitations observed in the present study were the non-inclusion of books and the so-called "gray literature" in the search for articles and the non-use of a mechanism to assess the risk of bias in the analyzed studies.

A strength of this review was the analysis of articles that used exclusively standardized questionnaires. Notwithstanding that, many different and sometimes generic questionnaires were applied, which complicated the assessment and standardization of results.

Finally, most of the articles included in this literature review evaluated aspects related to BI, SF and QoL in only one moment of patients' lives. Therefore, their evolution over time and in long term was only considered in a few studies

5. Conclusion

Published data regarding BI, sexuality and QoL of mastectomized women were analyzed in this review. The majority of studies pointed out evidence that mastectomy is the surgical modality that causes the greatest impact on BI and sexuality, including impairment on QoL. In addition, breast reconstruction proved to be a procedure capable of improving patients' BI, SF and QoL, especially if performed immediately.

There are also factors (investment in self-compassion, weight gain after surgery, age, marital status, among others) that can either positively or negatively influence the BI, SF and QoL of women after mastectomy. Another relevant variable was time after surgery: there was evidence of progressive improvement in QoL and acceptance of BI over the years. Adversely, there may be deterioration in SF.

Concerning the practical implications of this review, physicians should, whenever possible, take into account throughout the therapeutic choice the disorders that mastectomy may cause and provide options to the patients. Furthermore, women must be informed about the impacts of mastectomy on BI, SF and QoL in order to have greater autonomy in the process of choosing a therapeutic method.

Finally, only a small number of studies explored the evolution of BI, SF and QoL over time. Likewise, there was a lack of specific data on the interference of factors, such as age and marital status, in BI, SF and QoL, as they still remain controversial in the present literature. Therefore, it is pivotal that new studies develop these questions. After all, they are relevant to the professional who seeks to better guide patients on how the types of surgery impact the QoL of women with breast cancer.

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