Original Article

Systematic review and meta-analysis of the efficacy and safety of psychological intervention nursing on the quality of life of breast cancer patients

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Background: With the increasing incidence of breast cancer, breast cancer patients suffered from psychological problems in different degrees. There was no unified conclusion on whether psychological intervention nursing can improve the quality of life (QOL) of breast cancer patients. This meta-analysis aimed to explore the impact of psychological nursing interventions on the quality of life of breast cancer patients.

Methods: We retrieved related articles from both English databases (including PubMed, Medline, and Embase) and Chinese databases [including China Biology Medicine DISC (CBMdisc), China National Knowledge Network (CNKI), Wanfang, and China Science and Technology Journal Database (VIP]. All of the databases were searched using a combination of the following search terms: psychological intervention nursing, psychological nursing, psychotherapy, breast loss, radical mastectomy, modified radical mastectomy, and quality of life. The quality of the included literature was assessed using RevMan 5.3 provided by the Cochrane system.

Results: A total of 12 articles were included, and the meta-analysis results showed that the quality of life questionnaire core 30 (QLQ-C 30) was evaluated, and there was heterogeneity among the studies ($P<0.00001$, $I^2=92\%$). There was no statistical difference between the intervention group and the control group [standardized mean difference (SMD) =0.58, 95% confidence interval (CI): –0.11–1.27, P=0.10]. Short Form 36 Questionnaire (SF-36) was evaluated, and there was no heterogeneity among the studies (P=0.40, $I^2=0\%$). The fixed effect model was used for Meta-analysis. There were statistical differences between the intervention group and the control group [mean difference (MD) =6.12, 95% CI: 5.17–7.06, P<0.00001]. According to the evaluation of functional assessment of cancer therapy (FACT), there is heterogeneity among the studies (P=0.003, $I^2=83\%$). There were statistical differences between the intervention group and the control group (MD =12.74, 95% CI: 6.34–19.14, P<0.0001).

Discussion: Psychological nursing intervention can significantly improve the quality of life of patients with missing breasts undergoing radical mastectomy, which has certain guiding significance for the formulation of clinically effective nursing measures.

Keywords: Psychological intervention nursing; breast cancer; radical mastectomy; quality of life (QOL); meta-analysis

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Introduction

Breast cancer is one of the most common malignant tumors that seriously affect women's physical and mental health (1-3). In total mastectomy group, the incidence of depression and anxiety was 21% and 26% respectively, while in breast-conserving surgery group, the incidence of sexual dysfunction was 38% (4,5). Breast cancer patients undergoing surgery not only have to bear the blow from the cancer itself, but also have to face the psychological blow caused by the body image defect caused by breast loss, which has a serious impact on the patients' physiology and psychology, and increases the occurrence of negative emotional reactions such as anxiety, depression, fear and despair (6-8). With the continuous development of medical and health level, the treatment of breast cancer is becoming more and more mature. The survival time of patients with breast cancer after operation is prolonged, which makes the quality of life (QOL) of patients after operation as an important index of treatment results, and becomes the focus of clinical experimental research on breast cancer (9,10). Therefore, besides the support of drugs and nutrition, the psychological nursing intervention of patients is also an important part of comprehensive treatment of breast cancer.

Psychological intervention mainly refers to the use of patients' psychological activities to produce positive effects on physiological and biochemical processes in the body, and to assist patients to recover from illness and recovery (11-13). In the process of diagnosis and treatment of breast cancer, positive psychological nursing intervention can improve patients' negative emotions, improve patients' treatment compliance, relieve physical symptoms, improve patients' immunity to a certain extent, hinder the development of cancer and improve patients' prognosis. Cohen *et al.* [2000] (14) conducted long-term psychological intervention nursing such as psychological counseling, cognitive intervention, pain intervention and health education intervention on breast cancer cases, and evaluated the quality of life. The results showed that the excellent and good rate of life quality in the study group was higher than that in the control group ($P<0.05$). However, some studies have pointed out that psychological nursing intervention has no obvious influence on the quality of life of breast cancer patients (15).

In recent years, although many studies use psychological nursing intervention to explore the quality of life of patients with breast cancer after operation, there is no unified conclusion on the therapeutic effect of psychological nursing intervention. Therefore, this study aims to explore the influence of psychological nursing intervention on the quality of life of patients undergoing breast cancer resection, and provide a theoretical basis for clinical prevention and treatment of breast cancer. We present the following article in accordance with the PRISMA reporting checklist (available at https://gs.amegroups.com/article/view/10.21037/gs-22-206/rc).

Methods

Literature inclusion and exclusion criteria

Literature inclusion criteria: randomized controlled trials (RCTs).

Literature exclusion criteria: reviews, conferences, abstracts, etc.

Subject inclusion criteria: (I) female patients aged over 18 years; (II) patients diagnosed with breast cancer accompanied by modified radical mastectomy or breast loss resulting from radical mastectomy; and (III) language communication barrier-free, patients willing to accept a variety of scales to fill in the survey.

Subject exclusion criteria: patients with anxiety or depression after chemotherapy.

Literature search

We retrieved relevant articles from English (including PubMed, Medline, and Embase) and Chinese (including China Biology Medicine DISC (CBMdisc), China National Knowledge Network (CNKI), Wanfang, China Science and Technology Journal Database (VIP) databases from the date of establishment of the database to July 18, 2021. The English databases were searched using a combination of the following search terms: psychological intervention, psychological nursing, psychotherapy, breast loss, radical mastectomy, modified radical mastectomy, and quality of life. The Chinese databases were searched using a combination of the following search terms: psychological intervention, psychological nursing, psychotherapy, mastectomy, radical mastectomy, modified radical mastectomy, and quality of life. The quality of the included literature was assessed according to using Rev Man 5.3 provided by the Cochrane system.

Outcome indicators and interventions

There are mainly six scales included in the study outcome indicators to evaluate the quality of life (16). Cancer

rehabilitation evaluation system-short form (CARES-SF), Short Form 36 Questionnaire (SF-36), quality of life index questionnaire (QL-index), Functional Assessment of Cancer Therapy (FACT), Functional Living Index-Cancer (FLIC) and quality of life core questionnaire (QLQ-C30).

As for the intervention, the control group received routine nursing postoperatively, which mainly included observation of the illness, dietary nursing, surgical site nursing, auxiliary nursing, and upper limb function training. Psychological intervention nursing were adopted in the intervention group, and the nursing staff adjusted the patients' negative mentality according to medical psychology guidance. The specific measures included the psychological counseling for patients and their families, health education and for patients, relaxation therapy, music therapy, personalized psychological care, collective psychotherapy, and continuous psychological care outside of the hospital environment.

Data extraction

Two experts used uniform Excel (Microsoft, USA) tables to independently extract the data according to inclusion and exclusion criteria. In the first screening, the titles and abstracts of the articles were read, and those that did not meet the inclusion and exclusion criteria were eliminated. The full texts of documents that satisfied the requirements were browsed, and the included studies were finally determined. Differences of opinions between the experts were resolved through discussion. The extracted data included the title of the study, first author and year of publication, general information of the study subjects, sample sources, sample size, and observation indicators of the intervention and control groups.

Quality and bias risk evaluation

The quality evaluation criteria of RCTs (based on the Cochrane Handbook for Systematic Reviews of Interventions 4.2.5) were used to evaluate the methodological quality of the included literature. The evaluation criteria included whether a random grouping method was adopted, whether the subjects were blinded, whether allocation concealment was applied, integrity of the data, and research results, all of which were rated as "high risk bias", "low risk bias", or "unclear".

Statistical methods

RevMan 5.3 was used to conduct a meta-analysis on the quality of life of patients undergoing breast cancer surgery after psychological nursing intervention. For continuous variables, when the measurement standards were consistent, the weighted mean difference (WMD) method was used; however, when the measurement standards were inconsistent, the standardized mean difference (SMD) method was used. The relative risk ratio (RR) and 95% confidence interval (CI) were used to represent the dichotomous variables. Heterogeneity between the results was assessed by the χ^2 and I^2 tests. When $P>0.1$ and $I^2<50\%$, the fixed-effect model was used for meta-analysis, and when $P<0.1$ and $I^2>50\%$, the random effects model was used for meta-analysis. When $P<0.05$ was considered to indicate a statistically significant difference between the intervention and control groups.

Results

Search results and basic information of the included literature

A computer literature search of the databases yielded 723 articles. After excluding 215 repeated publications, 65 unqualified documents, and 23 studies for other reasons, 420 papers remained. After reading the titles and abstracts of these papers, 328 articles were eliminated. Of the remaining 92 articles, a further 54 articles, including conferences and reports, were excluded, and 38 articles remained. After removing 18 articles with incomplete observation indicators and 8 articles without mental state, 12 articles (17-28) were finally obtained for meta-analysis (*Figure 1*).

All 12 included articles were small-sample studies, and the research subjects were all over 20 years of age. Furthermore, all 12 articles described the number of cases, intervention measures, and observation indicators of patients in the intervention and control groups in detail (*Table 1*).

Risk bias evaluation of the included literature

The Cochrane Handbook 5.0 was used to assess the risk bias, and the risk ratios of bias were plotted in *Figures 2,3*. Among the 12 included studies, 11 adopted random grouping, 9 adopted the computer random number table method, and 2 adopted applied grouping by lottery. None of the studies mentioned the use of allocation concealment. Incomplete data and selective literature were excluded. The quality of the included literature was medium to high, including 8

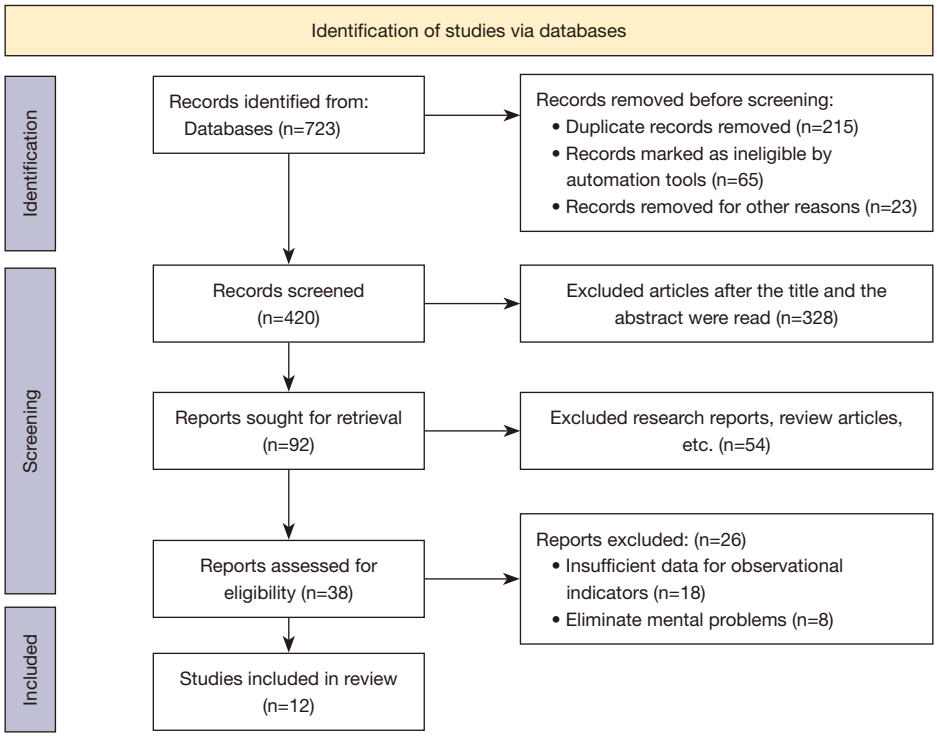

Figure 1 Literature retrieval flowchart.

Table 1 Basic information of the included studies

First author	Published year	Case number		Surgery type	Interventions		Observation indicators
		Intervention group	Control group		Intervention group	Control group	
Boesen (17)	2011	89	97	A	Expert health education, relaxation therapy	Routine care	QLQ-C30
Bower (18)	2015	39	32	A	Mindful Awareness Practices	Routine care	Quality of Life in Adult Cancer Survivors
Cousson-Gélie (19)	2011	33	33	B	Expert psychosocial intervention	Routine care	QLQ-C30
Gabriel (20)	2019	54	54	A	Psychosocial intervention	Routine care	QLQ-C 30
Gok Metin (21)	2019	32	29	A	Mindfulness meditation	Routine care	FLIC
Hoffman (22)	2012	114	115	A	MBSR	Routine care	FACT
Kim (23)	2018	30	30	A	MBSR	Routine care	QLQ-C 30
Lengacher (24)	2011	17	17	C	MBSR	Routine care	SF-36
Lengacher (25)	2009	40	42	A	MBSR	Routine care	SF-36
Li (26)	2021	142	121	A	Evidence-based nursing	Routine care	FACT
Park (27)	2020	38	36	A	MBCT	Routine care	FACT
Wengström (28)	1999	67	67	A	Nursing intervention	Routine care	CARES-SF

Type A, radical mastectomy or total breast tumor resection; Type B, conservative mastectomy; Type C, breast cancer lumpectomy; MBSR, mindfulness-based stress reduction; MBCT, mindfulness-based cognitive therapy; QLQ-C30, Quality of Life Questionnaire Core 30; SF- 36, Short Form 36 Questionnaire; FACT, Functional Assessment of Cancer Therapy; FLIC, Functional Living Index-Cancer; CARES-SF, cancer rehabilitation evaluation system-short form.

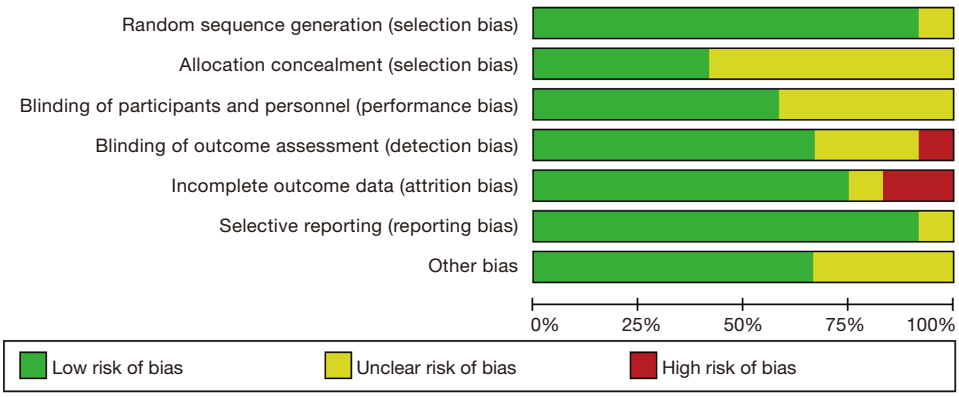

Figure 2 Risk bias evaluation results.

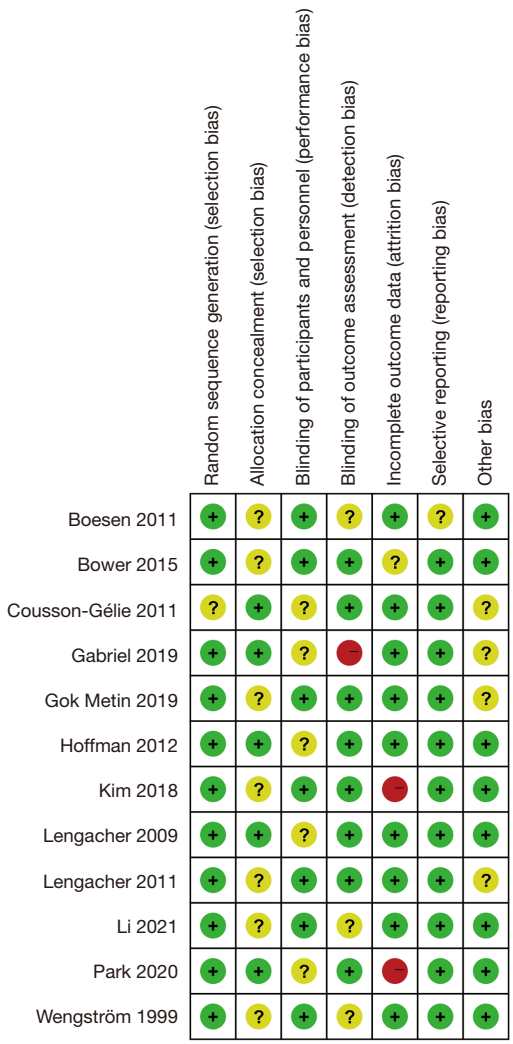

Figure 3 Distribution of multiple risk bias evaluation results corresponding to the included studies. "+", low risk; "-", high risk; "?", unclear.

high-quality articles and 4 medium-quality articles.

Meta-analysis of QLQ-C 30

Five articles analyzed and discussed the QLQ-C 30 scores (*Figure 4*). The QLQ-C 30 scores were evaluated, and there was heterogeneity among studies (P<0.00001, I^2=92%), so a random effects model was used for meta-analysis. The results showed no significant difference between the intervention and control groups (SMD =0.58, 95% CI: −0.11–1.27, P=0.10).

The funnel plot showed that circles were distributed near the midline, suggesting high accuracy of the study and no publication bias (*Figure 5*).

Meta-analysis of SF-36

Two articles analyzed and discussed the SF-36 scores (*Figure 6*). The SF-36 scores were evaluated, and there was no heterogeneity among studies (P=0.40, I^2=0%), so a fixed effects model was used for meta-analysis. The results showed a significant difference between the intervention and control groups (MD =6.12, 95% CI: 5.17–7.06, P<0.00001).

The funnel plot showed that circles were distributed near the midline, suggesting high accuracy of the study and no publication bias (*Figure 7*).

Meta-analysis of FACT

Three articles analyzed and discussed the FACT scores (*Figure 8*). The FACT scores were evaluated, and there was heterogeneity among studies (P=0.003, I^2=83%), so a random effects model was used for meta-analysis. The results showed

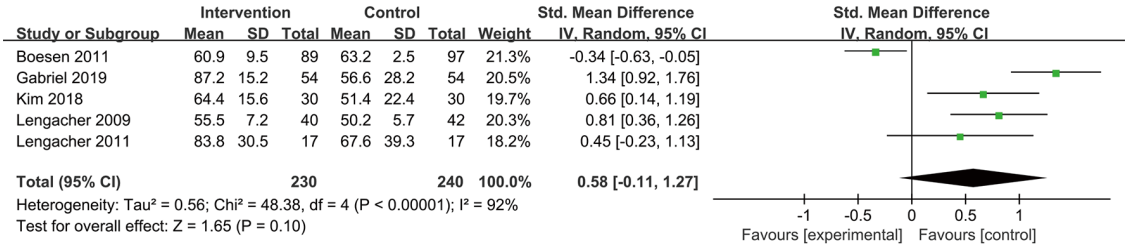

Figure 4 Forest plot of the random effects model of QLQ-C 30. SD, standard deviation; CI, confidence interval; df, degree of freedom; QLQ-C 30, Quality of Life Questionnaire Core 30.

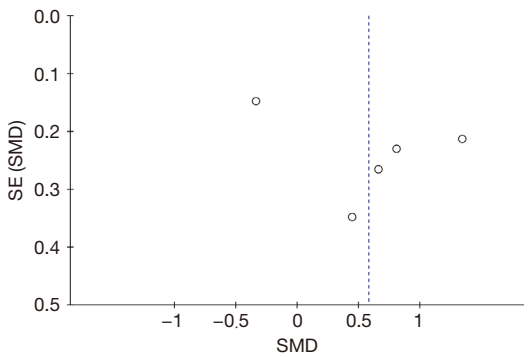

Figure 5 Funnel plot of QLQ-C 30. SMD, standardized mean difference; QLQ-C 30, Quality of Life Questionnaire Core 30.

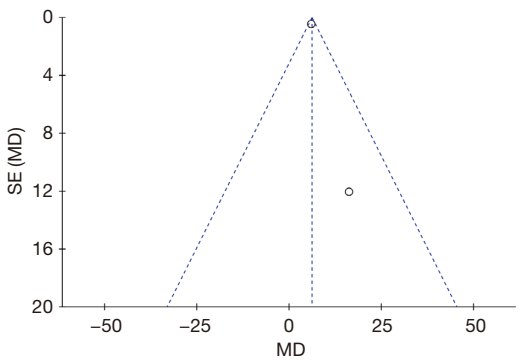

Figure 7 Funnel plot of SF-36. MD, mean difference; SF-36, Short Form 36 Questionnaire.

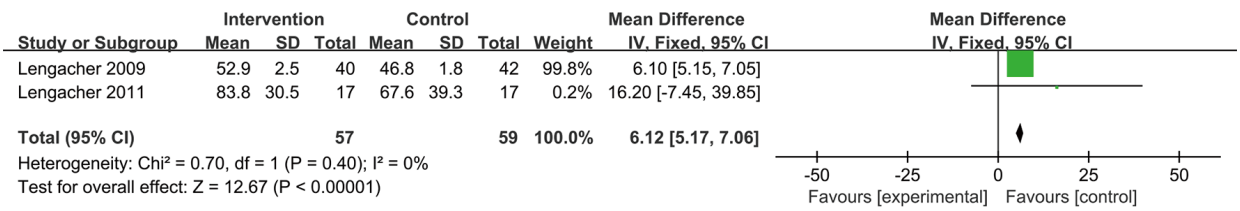

Figure 6 Forest plot of the fixed effects model of SF-36. SD, standard deviation; CI, confidence interval; df, degree of freedom; SF-36, Short Form 36 Questionnaire.

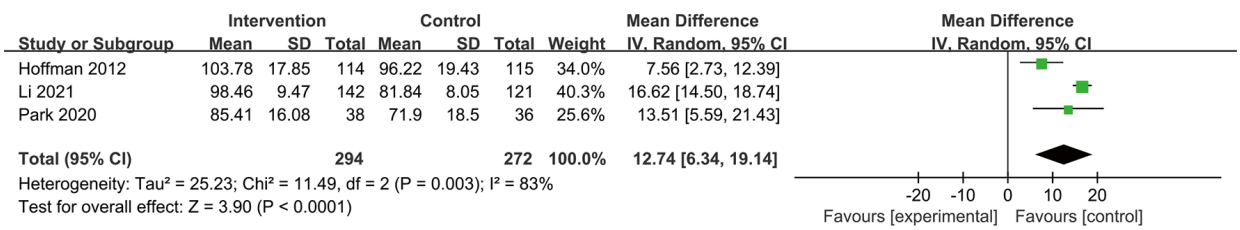

Figure 8 Forest plot of the random effects model of FACT. SD, standard deviation; CI, confidence interval; df, degree of freedom; FACT, Functional Assessment of Cancer Therapy.

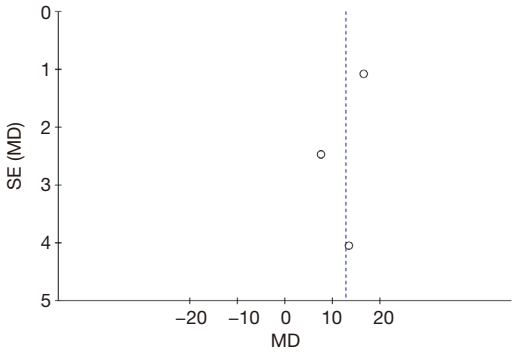

Figure 9 Funnel plot of FACT. MD, mean difference; FACT, Functional Assessment of Cancer Therapy.

a significant difference between the intervention and control groups (MD =12.74, 95% CI: 6.34–19.14, P<0.0001).

The funnel plot showed that circles were distributed near the midline, suggesting high accuracy of the study and no publication bias (*Figure 9*).

Analysis of single quality of life scale

Meta-analysis can't be done with a single scale included in the literature, so descriptive analysis is used. One study (21) adopted Functional Living Index-Cancer (FLIC), and the results showed that the scores of the intervention group (98±6.5) were significantly different from those of the control group (95±4.5) after psychological intervention (P<0.05). One study (28) used Cancer Rehabilitation Evaluation System-Short Form (CARES-SF), and the score of the intervention group (0.76±0.52) was better than that of the control group (0.54±0.46), and the difference was statistically significant (P<0.05).

Discussion

With the updating of the medical model, it has been gradually recognized that the treatment of diseases should not only address physiological treatment, but also pay attention to psychological therapy. Moreover, QOL should include take into account both physical and mental health. The incidence rate of breast cancer in women is high, and despite the fact that the 5-year survival rate of patients after surgery is over 80%, their postoperative QOL is very low (29-31). Breast cancer patients suffer a significant psychological impact after diagnosis. After mastectomy, the damage to the body becomes the main source of pressure diminishing the QOL of patients. After surgery, patients experience constant anxiety, depression, fear, and other negative emotions after surgery, which will not only affect their own condition, but also impact the mood of their family members and reduces their happiness (32). If nursing staff can understand the psychological activities of patients after surgery and promptly adopt different psychological treatments according to the individual differences and psychological capacities of patients, breast cancer patients may correctly and comprehensively understand the disease. Thus, they can come to terms with the physical changes after surgery, relieve their own emotions, and confront the disease, which will improve their treatment compliance and improve enhance their QOL.

This meta-analysis showed that appropriate psychological nursing intervention could effectively prevent and treat the mental health problems of breast cancer patients. Tu *et al.* [2020) (33) performed meta-analysis to compare the effects of psychological nursing on postoperative depression and anxiety in patients with liver cancer, and reported that psychological nursing could effectively relieve the depression and anxiety of patients with liver cancer after surgery, which was consistent with our findings. Also, Xiao *et al.* [2017] (34) found that early psychological intervention nursing can relieve the anxiety of breast cancer patients, which was similar to the results of this meta-analysis, but they did not analyze the QOL of breast cancer patients. Psychological intervention nursing can effectively relieve some psychological perception pressures and certain mental burdens of breast cancer patients, so that patients can receive effective tumor surgery in a relatively good emotional state (35,36). In addition, with a healthy psychological state, the immune ability of breast cancer patients can be improved through the positive feedback effect of the nerve reflex axis of the neuro-endocrine-immune system. Improving the QOL of breast cancer patients and forming a virtuous cycle can further improve the confidence of patients in treatment (37,38). In addition, patients can actively accept tumor treatment after appropriate psychological intervention nursing, which can effectively eliminate the doubts and worries of patients. Moreover, it is also feasible to assist patients in establishing correct and positive treatment emotions, so that they can strengthen self-regulation consciousness and actively cooperate with treatment.

The QLQ-C 30 questionnaire was established by the European Cancer Research and Intervention Group in 1993, and was used to evaluate the QOL of patients from

multiple dimensions. It can well reflect the QOL of cancer patients, and is widely used in various kinds of cancer QOL assessments worldwide. The scale includes five sub-scales of physical, role, cognitive, emotional, and social functioning, three sub-scales of fatigue, pain, and malignant vomiting symptoms, as well as six separate items. Higher scores in functional areas and general health indicate a better functional status and QOL, while higher scores in symptom areas indicate more symptoms or problems and poorer QOL. The present meta-analysis showed that the intervention group (who received psychological intervention nursing) had improved QOL compared to the control group after conventional care.

SF-36 includes seven subscales: physical pain, physiology, emotional function, physiology, social function, mental health, and vitality. The higher the score, the better the function and the better the quality of life. Meta-analysis showed that the scores of intervention group were significantly higher than those of control group ($P<0.05$). In the study using a single scale, CARES-SF scale includes five sub-scales: psychosocial dimension, physiological dimension, medical relationship dimension, marital relationship dimension and sexual relationship dimension. Meta-analysis showed that the difference between the experimental group and the control group was statistically significant ($P<0.05$). It can be seen that the patients in the intervention group had a higher level of life quality after taking psychological intervention measures.

8 articles included in this meta-analysis were of high quality, and 4 were of medium quality, which may have potential selection bias, lost to follow-up bias, information bias, confounding bias, recall bias, etc., which increases the likelihood of biased original data. The sample sizes of the studies were generally small, the follow-up times were short, which may have a certain impact on the overall quality of the study.

Conclusions

This meta-analysis confirmed that psychological nursing intervention could significantly improve the QOL of patients with receiving mastectomy for breast cancer, which has a certain guiding significance for the clinical development of effective nursing measures. However, the limitation of this study lies in the limited number of documents included. Therefore, more high-quality studies are needed for further experimentation in the future. Moreover, multi-center and large-sample RCTs are needed to confirm the conclusions of this study. In conclusion, this meta-analysis provides a theoretical basis for the formulation of nursing measures for clinical breast cancer.

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Footnote

Reporting Checklist: The authors have completed the PRISMA reporting checklist. Available at https://gs.amegroups.com/article/view/10.21037/gs-22-206/rc

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://gs.amegroups.com/article/view/10.21037/gs-22-206/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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