A meta-analysis looking at the effects of continuous management for complications related to intraoperative pressure wound ulcers in women with breast cancer

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Abstract

Backgrounds

A meta-analysis research was executed to appraise the effect of the continuous intervention for intraoperative pressure wound ulcers (IOPWUs) associated problems in breast cancer (BC) females.

Methods

Inclusive literature research till March 2023 was done and 436 interconnected researches were revised. The 8 picked researches, enclosed 1267 BC females were in the utilized researches' starting point, 636 of them were utilizing CI, and 631 were control. Odds ratio (OR) and 95% confidence intervals (CIs) were utilized to appraise the effect of CI for IOPWUs associated problems in BC females by the dichotomous, or contentious approaches and a fixed or random model.

Results

Continuous intervention had significantly lower IOPWUs (OR, 0.18; 95% CI, 0.13-0.24, p<0.001), higher Braden risk score (BRS) (OR, 2.11; 95% CI, 1.91-2.31, p<0.001), and higher quality of life (OR, 9.75; 95% CI, 6.90-12.60, p=0.02) compared to control in BC females.

Conclusions

Continuous intervention had significantly lower IOPWUs, higher BRS, and higher quality of life compared to control in BC females. However, caution must be taken when interacting with its values since there was a low number of nominated research found for some comparison in the meta-analysis.

Keywords: breast cancer; continuous intervention; Braden risk score; intraoperative pressure wound ulcer

Introduction

About 430,000 new tumor cases and 290,000 cancer mortality occurred in China in 2021, representing 23.7% and 30% of the occurrence and death rates worldwide, respectively. [1] Malignant tumors pose a major hazard to human health and life because of their high occurrence and mortality rates. Breast cancer (BC) was the most

common malignant tumor in 2018 with 2.094 million new cases and 1.761 million mortality worldwide, Which is 11.6% of all cancer occurrences and 18.4% of cancer deaths. [2] Patients with BC experience complex and variable symptoms. [3] pressure wound ulcers (PWUs) are acknowledged as a typical consequence in clinical work. [4] Each year, 2.5 million persons in the United States, 23.1% in the Netherlands, 7.3-13.9% in Germany, 26.5% in Victoria and Western Australia, and 9-12% worldwide suffer from PWUs. [5] In China, PWUs are present in 1.14% and 1.78% of people. [6] Patients who use PWU endure more pain and may also feel lonely, afraid, anxious, and other negative emotions. Hospitalization expenses rise while social resources are wasted, adding to the financial strain on society and families while also lengthening patient stays. This in turn has an impact on how the primary disease is identified and treated. Because of the high cost of their management, PWUs have emerged as one of the most costly problems of the 20th century. Based on a particular scientific idea, continuous intervention entails engaging in a number of activities while being guided by diagnosis and specified intervention strategies. Continuous interventions are chosen in accordance with diagnosis characteristics, research findings, the potential for patients' functional rehabilitation, and the capabilities of both nurses and patients. Due to continuous intervention, there was a significantly lower occurrence of PWU problems in the experimental group compared to the control group (P0.05). [7] Though, a single-center randomized controlled trial (RCT) showed that long-term bed rest and whether continuous intervention was provided made PWU problems in BC patients after surgery inevitable. [8] To avoid PWU and enhance the quality of life (QOL) for immobile patients, good behavior on the part of carers is crucial. The primary carers' behavior and the level of PWUs are positively correlated. [9] Patients and carers are burdened more as a result of PWUs. It is important to think about and research ways to lower the occurrence of PWUs in patients with advanced BC while also enhancing their QOL. It is highly debatable if continuous intervention is useful for BC patients experiencing problems linked to intraoperative pressure wound ulcers (IOPWUs). As a result, a thorough meta-analysis is required to assess and address this problem. There are still a lot of questions regarding the management of IOPWUs in BC patients, despite the fact that continuous intervention is crucial. As a result, using the meta-analysis method, we thoroughly examined the effectiveness of continuous intervention in preventing IOPWUs in BC females.

Methods

Eligibility criteria

The research demonstrating the effect of continuous intervention for IOPWUs associated problems in BC females was selected in order to create an overview. [10]

Information sources

The entire research is represented in Figure 1. The literature was embedded into the research when the inclusion criteria were met:

1. The investigation was observational, prospective, retrospective, or RCT research.
2. Females with BC were the investigated picked persons.
3. The intervention was continuous intervention.
4. The research appraised the effect of continuous intervention for IOPWUs associated problems in BC females

The research was excluded if the comparison significance was not emphasized in it, research that didn't check the characteristics of the effect of continuous intervention for IOPWUs associated problems in BC females, and research on IOPWUs in females without continuous intervention.

Search strategy

A search protocol operations were recognized based on the PICOS view, and we characterized it as next: "population" for females with BC, P; continuous intervention is the "intervention" or "exposure," while the "comparison" was between continuous intervention and control; IOPWUs, Braden risk score (BRS) and QOL was the "outcome" and, "research design" the planned research had no boundaries. [11]

We have searched Google Scholar, Embase, Chinese Biomedical Literature Database, Cochrane Library, PubMed, and OVID databases thoroughly till March 2023 utilizing an organization of keywords and supplementary keywords for breast cancer; continuous intervention; Braden risk score; and intraoperative pressure wound ulcers as revealed in Table 1. [12-14] To evade an investigation from being unsuccessful to create a connection amongst the effect of continuous intervention for IOPWUs associated problems in BC females, paper replications were removed, they were grouped into an EndNote file, and the titles and abstracts were reevaluated.

Table 1. Search Strategy for Each Database

Database	Search strategy
Pubmed	#1 "breast cancer"[MeSH Terms] OR "intraoperative pressure wound ulcers"[MeSH Terms] [All Fields] #2 "Braden risk score"[MeSH Terms] OR "continuous intervention"[MeSH Terms] [All Fields] #3 #1 AND #2
Embase	'breast cancer'/exp OR 'intraoperative pressure wound ulcers' #2 'Braden risk score'/exp OR ' continuous intervention' #3 #1 AND #2
Cochrane library	(breast cancer) :ti,ab,kw (intraoperative pressure wound ulcers):ti,ab,kw (Word variations have been searched) #2 (Braden risk score):ti,ab,kw OR (continuous intervention):ti,ab,kw (Word variations have been searched) #3 #1 AND #2

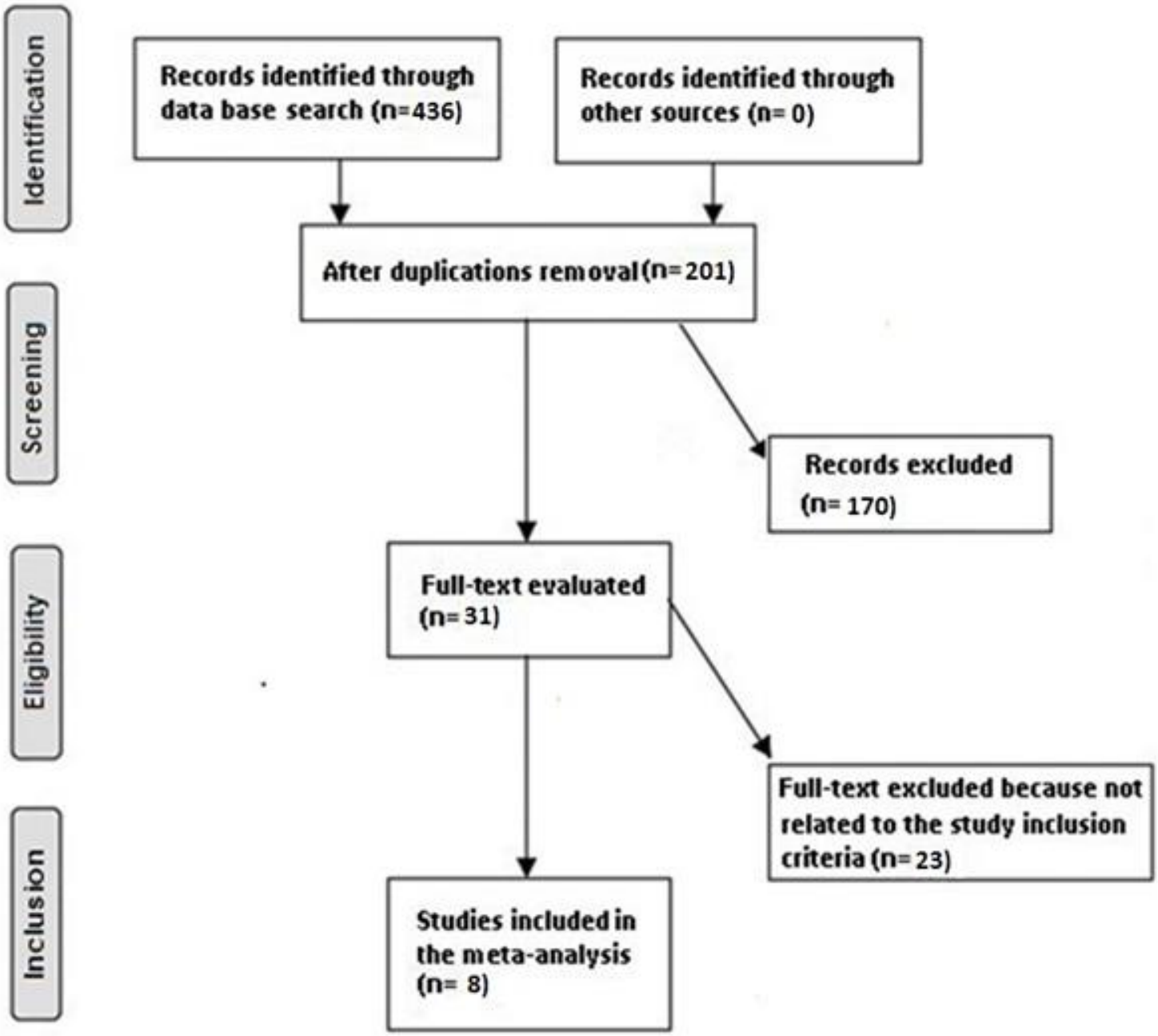

Figure 1 A flowchart of the research process.

Selection process

The process that followed the epidemiological declaration was later organized and analyzed utilizing the meta-analysis method.

Data collection process

The first author's name, the research data, the research year, the country or area, the population kind, the medical and treatment physiognomies, categories, the quantitative and qualitative estimation procedure, the data source, the outcome estimation, and statistical analysis were some of the criteria utilized to collect data. [15]

Data items

We separately collected the data based on an assessment of the effect of continuous intervention for IOPWUs associated problems in BC females when research had varying values.

Research risk of bias assessment

To determine whether each research may have been biased, two authors independently appraised the methodology of the picked articles. The "risk of bias instrument" from the Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 was utilized to measure procedural quality. Each research was assigned one of the following bias risks after being categorized by the appraisal criteria: If all of the quality requirements were met, the research was classified as having a low bias risk; if one requirement wasn't met or wasn't encompassed, research was classified as having a medium bias risk. If more than one quality requirements were wholly or partially unmet, the research was assessed to have a considerable bias risk.

Effect estimates

Only research that estimated and described the effect of continuous intervention for IOPWUs associated problems in BC females underwent sensitivity analysis. To compare continuous intervention to control in BC females' sensitivity, a subclass analysis was utilized.

Synthesis methods

The odds ratio (OR) and a 95% confidence interval (CI) were calculated utilizing a random- or fixed-effect model and a dichotomous, or contentious approach. The I2 index was calculated between 0 and 100%. No, low, moderate, and high heterogeneity were evident for the values at 0%, 25%, 50%, and 75%, respectively. [16] Other structures that display a strong degree of alikeness amongst the connected investigation were also analyzed to be confident the precise model was utilized. When I2 was 50% or higher, the random effect was employed; if I2 was <50%, the option of utilizing fixed-effect rose. [16] By dividing the initial estimation into the aforementioned consequence groups, a subclass analysis was carried out. In order to define the statistical significance of differences among subcategories, a p-value of less than 0.05 was utilized in the analysis.

Reporting bias assessment

The Egger regression test and funnel plots that show the logarithm of the ORs vs. their standard errors were utilized to quantitatively and qualitatively quantify investigation bias. Investigations bias was declared present if $p \geq 0.05$.[17]

Certainty assessment

Each p-value was inspected utilizing two-tailed testing. Utilizing Reviewer Manager Version 5.3, graphs and statistical analyses were created (The Nordic Cochrane Centre, the Cochrane Collaboration, Copenhagen, Denmark).

Results

8 publications, published between 2015 and 2019, from a total of 436 linked researches that met the inclusion criteria were chosen for the research. [18-25] The consequences of these investigations are accessible in Table 2. 1267 BC females were in the utilized researches' starting point, 636 of them were utilizing continuous intervention, and 631 were control. The sample size was 68 to 260 females.

Continuous intervention had significantly lower IOPWUs (OR, 0.18; 95% CI, 0.13-0.24, p<0.001) with no heterogeneity (I^2 = 0%), higher BRS (OR, 2.11; 95% CI, 1.91-2.31, p<0.001) with no heterogeneity (I^2 = 0%), and higher QOL (OR, 9.75; 95% CI, 6.90-12.60, p=0.02) with high heterogeneity (I^2 = 96%) compared to control in BC females as revealed in Figures 2-4.

The utilization of stratified models to examine the effects of specific components was not possible due to a lack of data, e.g. age, and ethnicity, on comparison outcomes. No evidence of research bias was found (p = 0.89) operating the quantitative Egger regression test and the visual interpretation of the funnel plot as shown in Figures 5-7. Though, it was discovered that the mainstream of the implicated RCTs had poor procedural quality and no bias in selective reporting.

Table 2. Characteristics of the selected researches for the meta-analysis

Study	Country	Total	continuous intervention	Control
Zeng, 2015 [18]	China	68	35	33
Guan, 2015 [19]	China	218	110	108
Hu, 2016 [20]	China	260	130	130
Wang, 2017 [21]	China	165	83	82
Cao, 2017 [22]	China	130	65	65
Li, 2017 [23]	China	200	100	100
Chen, 2017 [24]	China	120	60	60
Liu, 2019 [25]	China	106	53	53
	Total	**1267**	**636**	**631**

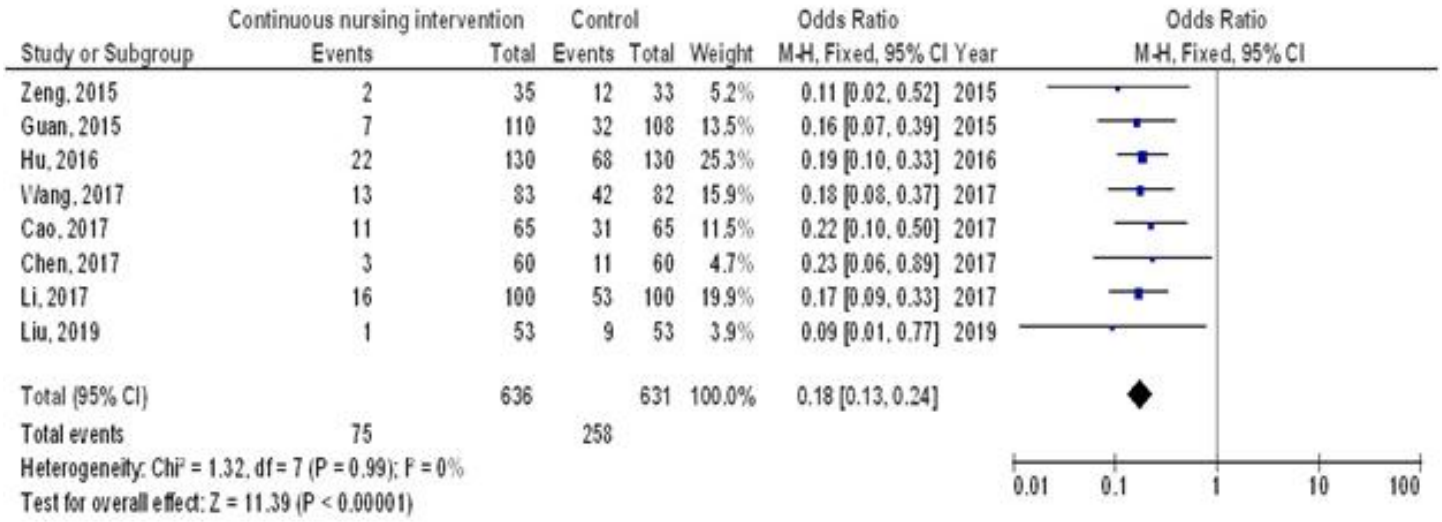

Figure 2. The effect's forest plot of the continuous intervention compared to control on IOPWUs in BC

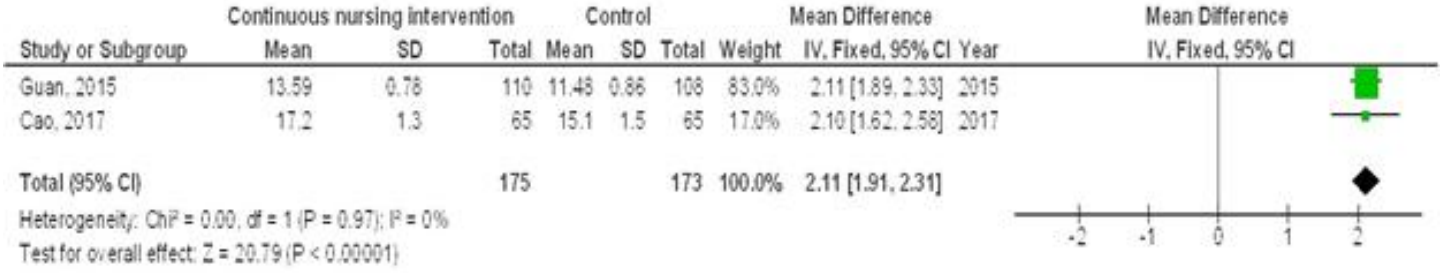

Figure 3. The effect's forest plot of the continuous intervention compared to control on BRS in BC

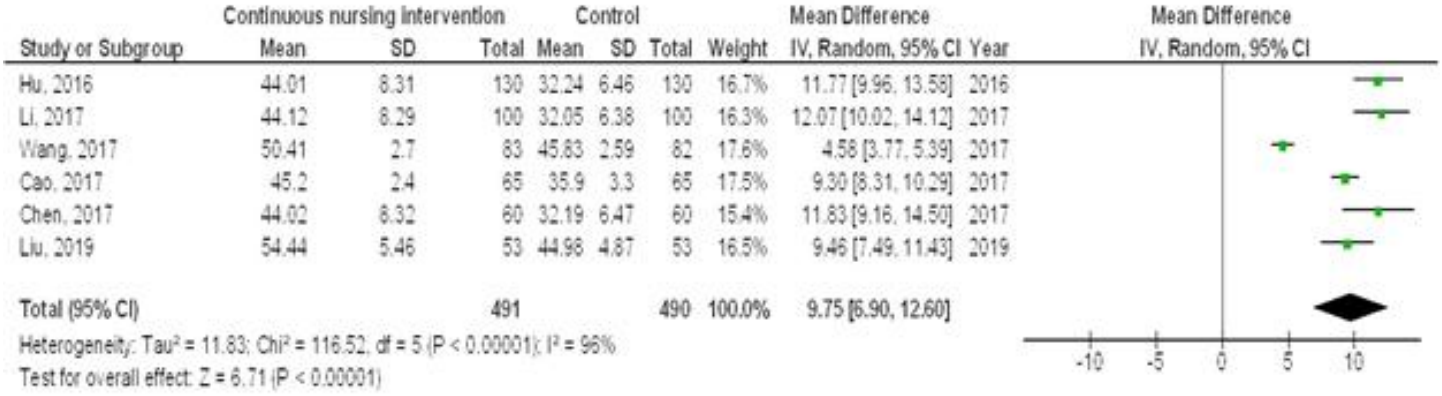

Figure 4. The effect's forest plot of the continuous intervention compared to control on QOL in BC

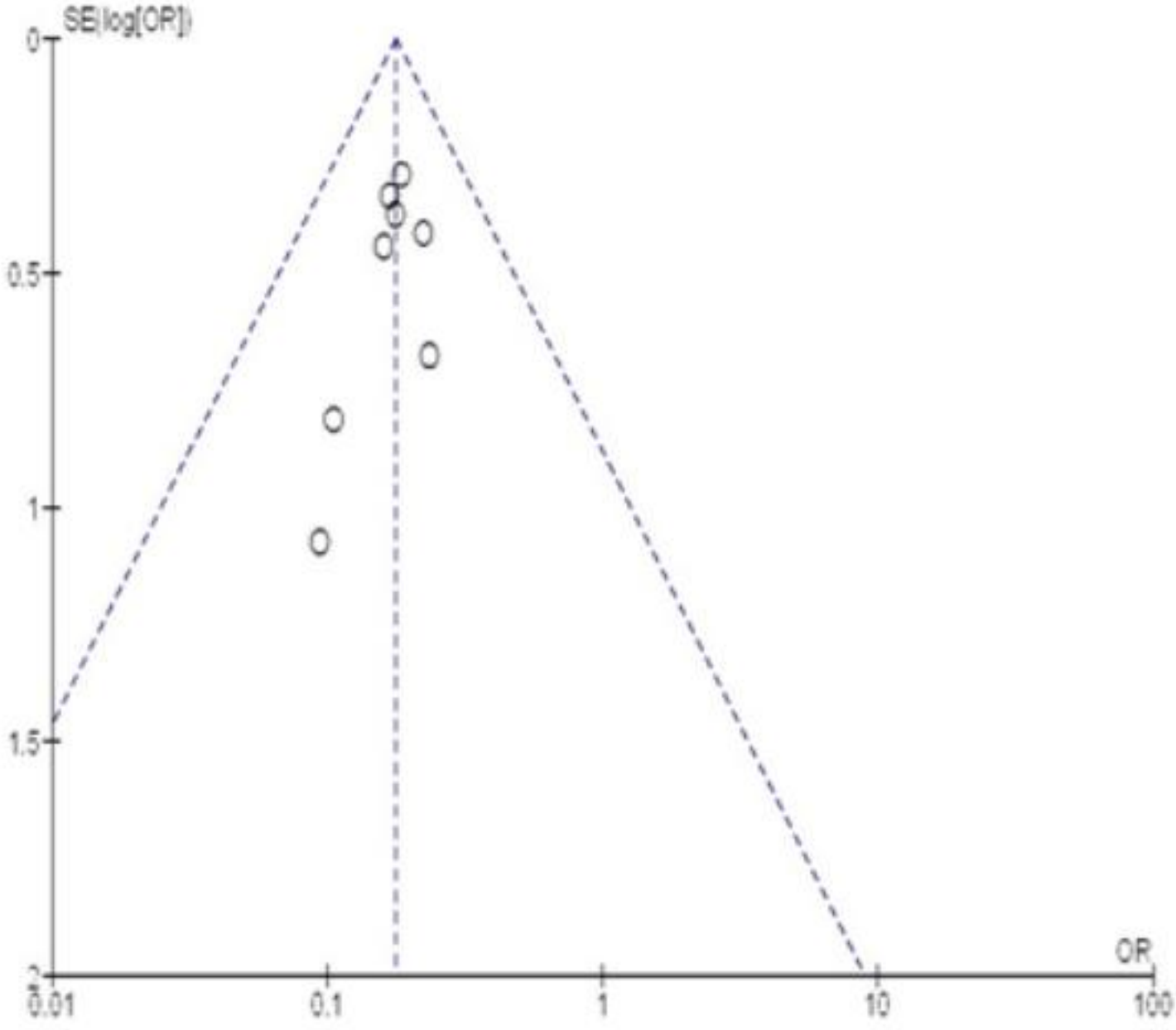

Figure 5. The funnel plot of the continuous intervention compared to control on IOPWUs in BC

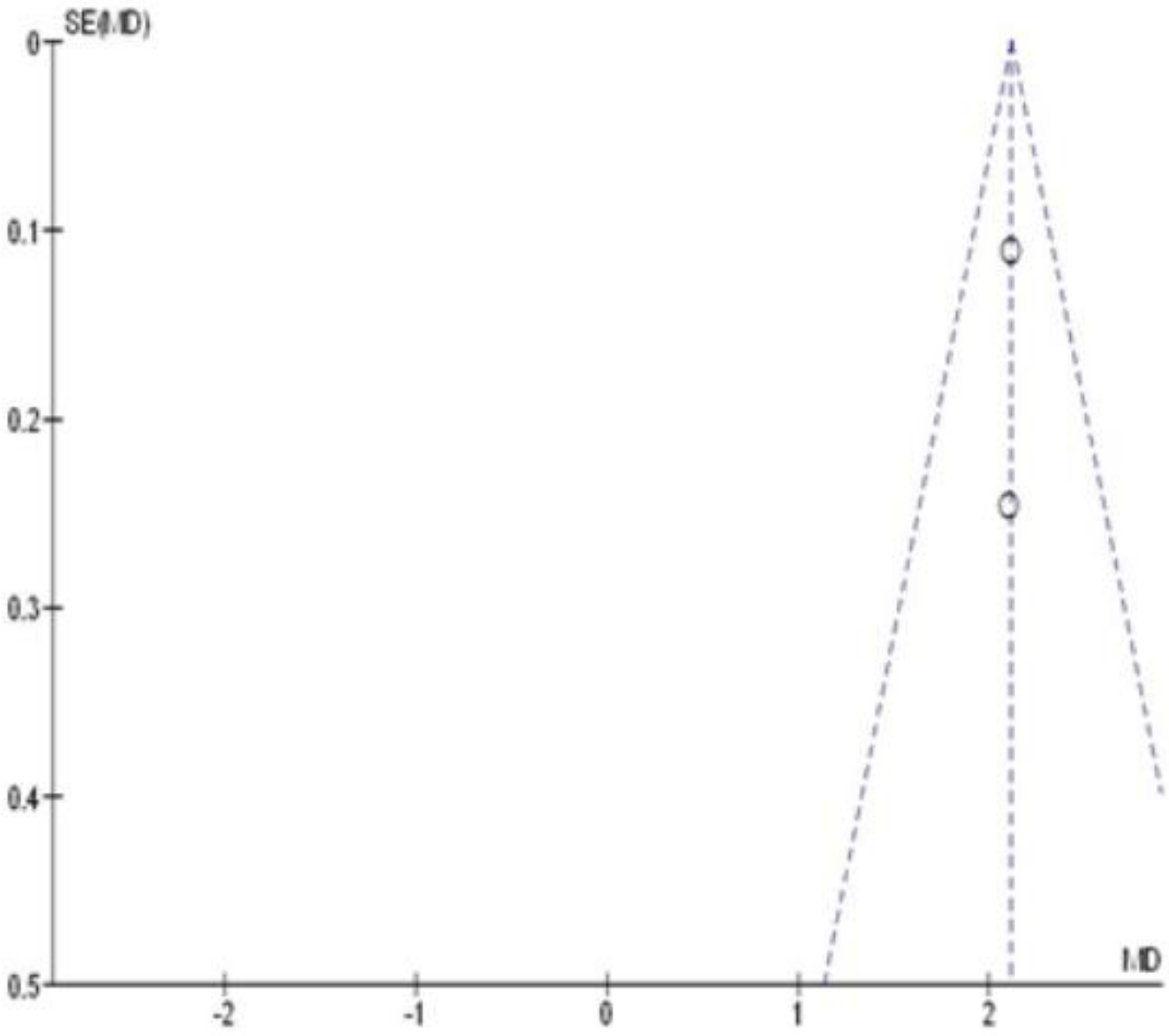

Figure 6. The funnel plot of the continuous intervention compared to control on BRS in BC

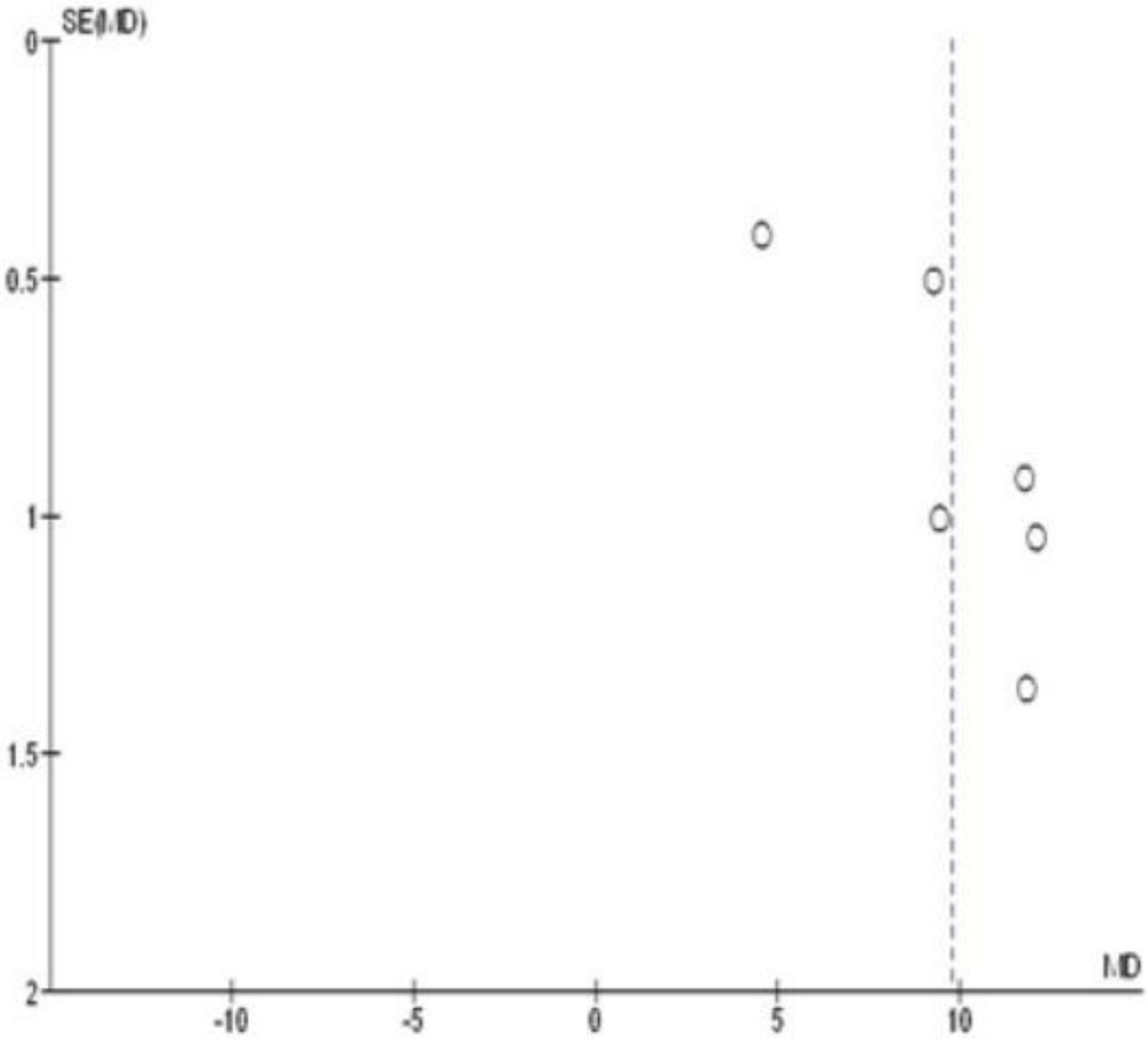

Figure 7. The funnel plot of the continuous intervention compared to control on QOL in BC

Discussion

In the researches that were utilized for the meta-analysis, 1267 BC females were in the utilized researches' starting point, 636 of them were utilizing continuous intervention, and 631 were control. [18-25] Continuous intervention had significantly lower IOPWUs, higher BRS, and higher QOL compared to control in BC females. However, when interacting with its values, caution must be taken since a low number of nominated researches were found for some comparison in the meta-analysis e.g. BRS. That would affect the level of significance of the evaluations studied. Of all malignant tumors in women, BC has the highest overall mortality rate. [26] BC females experience a significant prevalence of PWUs due to their population's complicated and diverse symptoms. As a result of many anti-tumor therapies, patients experience progressive cancer

pain, hypoalbuminemia, severe malnutrition, and other problems. These therapies also alter the nutrition metabolism of the patients, absorption barriers, food intake, catabolism of tumor cells, and tumor biological activity. PWUs can form quickly if the proper actions are not taken in a timely manner. [27] China's community healthcare system isn't perfect just now. The majority of relatives of patients with advanced BC are responsible for their home care, and their knowledge of PWUs has a direct impact on the patient's QOL. PWU occurrence is also closely associated with QOL. [28] The continuation of care from the hospital to the patient's home includes hospital discharge plans, referrals, and ongoing follow-up and counseling once the patient has returned to his or her family or community. The primary elements of the continuity of care model in various studies include the integration of the telemedicine-specific model, and telemedicine platform, including the utilization of web-based education programs, promoting self-management patient applications, and the peer-based patient-driven platform of PWU continuity care model. [29, 30] Instead of solely depending on for management and stoppage, researchers from many nations are increasingly employing a multidisciplinary approach of management for PWUs. Guidelines for PWU treatment include PWU laser therapy, with the lowest recommended grade, but they also expand our knowledge of how to treat PWUs. [31] From the standpoint of the patients, continuity of care entails having direct experience with the coordination and continuation of medical treatments. Patients will accept continuity in health care services if it is presented in a way that appeals to their knowledge base, cognitive abilities, and acceptance style. [32] This will intrinsically encourage them and have a positive impact on the promotion of their health.

This meta-analysis presented the influence of continuous intervention and control in the management of BC females on IOPWUs, BRS, and QOL. More examination is still necessary to illuminate these possible impacts. This was similarly emphasized in former research that utilized a connected meta-analysis practice and originated comparable values of the impact. [33, 34] Though the meta-analysis was unable to determine if differences in these variables are connected to the research results, properly-led RCTs must take these factors into account in addition to the variety of diverse ages, and ethnicities of people. In conclusion, continuous intervention had significantly lower IOPWUs, higher BRS, and higher QOL compared to control in BC females.

Limitations

There might have been assortment bias since several of the researchers chosen for the meta-analysis were excluded. Though, the removed research did not encounter the requirements for inclusion in the meta-analysis. Furthermore, we lacked the knowledge to assess whether parameters like age, and ethnicity affected outcomes. The goal of the research was to determine how continuous intervention and control will affect IOPWUs for BC management. Due to the inclusion of inaccurate or missing data from previous research, bias might have been amplified. The females' nutritional state in addition to their race, and age were probable causes of bias. Inadvertently distorted values may result from missing data and some unpublished work.

Conclusions

Continuous intervention had significantly lower IOPWUs, higher BRS, and higher QOL compared to control in BC females. However, when interacting with its values, caution must be

taken since a low number of nominated researches were found for some comparison in the meta-analysis e.g. BRS. That would affect the level of significance of the evaluations studied.

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