The Effects of Acceptance and Commitment Therapy on Breast Cancer Patients:A Meta-Analysis

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Abstract

Purpose: The aim of this study was to evaluate the effects of acceptance and commitment therapy on empirical avoidance, quality of life and mental health in breast cancer patients.

Methods: Meta-analysis strictly followed the Preferred Report -ing Items for Systematic Reviews and Meta-Analyses (PRISMA) reporting guideline, and cloud analysis was performed on the 9 included literatures. Cochrane Risk Assess -ment manual was used for literature quality assessment. Review Manager5.3 software was used to conduct comprehensive quantitative analysis of the data, and I2 test and chi-square test were used to verify the heterogeneity among the studies.

Results: 9 literatures were included, all of which were randomized controlled trials. The results of meta-analysis showed that intervention group the patient's level of empirical avoidance [SMD=-0.50,95%CI (-0.9: 0.04),P=0.03] is lower than the control group, quality of life [SMD=-1.12, 95%CI(-1.87,-0.36),P=0.004] high than control group, mental health was improved[SMD=-1.50,95%CI(-1.95,-1.05),P<0.001], anxiety sc [SMD=-1.31,95%CI(-2.07,-0.56),P<0.001],depression[SMD=-1.69,95%CI(-2.29,-1.10),P<0.001]are lower th the control group, the difference has statistical significance.

Conclusions: The results show that acceptance and commitment therapy can reduce the level of experient avoidance, improve the quality of life and improve the mental state of patients. Clinical nurses can use acceptan and commitment therapy to inter- vene breast cancer patients to promote their recovery.

Key Words: act; empirical avoidance; quality of life; anxiety; depression; breast cancer; meta-analysis

1. Introduction

According to the latest report of the American Cancer Society [1], there were about 276,500 new cases of breast cancer in women in the United States and about 42,200 deaths from breast cancer in 2020.The World Cancer Report [2] published by the International Agency for Research on Cancer, points out that breast Cancer is the most common Cancer among women in the world, and its incidence has accounted for 30% of all cancers. It can be seen that breast cancer, as the first malignant tumor leading to female death, has seriously damaged the life and health of patients [3]. Some studies have found [4] that breast cancer patients have a high level of experiential avoidance, poor mental state and low quality of life, and they often adopt a neglective attitude towards the treatment and nursing of the disease. Therefore, in view of this phenomenon, effective intervention is needed to improve the physical and mental health of patients and improve the quality of life. Yao et al [5]. found that routine nursing intervention had an unsatisfactory effect on the rehabilitation and prognosis of breast cancer

patients, while acceptance and commitment therapy could effectively improve the prognosis of patients and promote their recovery.

Acceptance and commitment therapy, pioneered by Steven C. Hayes, a professor of Psychology in the United States [6], is one of the most recent approaches to treating psychological and psychiatric disorders in cognitive behavioral therapy. It refers to the individual self-value established by the individual through the experience and acceptance of the current situation, and mainly emphasizes the improvement of psychological flexibility after the change of individual behavior. The core of ACT aims to break the restricted cognition of individuals, help individuals identify the essence of things, and encourage themselves to face positively. The intervention measures[7] mainly include six parts: acceptance, cognitive dissociation, experiencing the present moment, taking oneself as the scene, clarifying values and committing to action.Studies [8] have shown that ACT can reduce patients' avoidance level, improve patients' quality of life, and improve

patients' negative emotions. However, the research on ACT in China is still in the exploratory stage, the intervention studies on ACT are few and unconvincing, and no meta-analysis on the effect of ACT on breast cancer patients has been found in China. So in order to obtain the latest information on the management of breast cancer patients, this study adopted an evidence-based research approach to verify whether ACT is more beneficial than conventional care to improve patients' quality of life, reduce negative emotions, and reduce the level of empirical avoidance. Based on scientific and rigorous evidence and results, to explore the possible internal mechanism, so as to provide a strong and reliable evidence-based basis for the comprehensive development of physical and mental health of breast cancer patients in different countries.

2.Methods

The articles included in this systematic evaluation have all been published and do not involve ethical issues.

2.1.Inclusion criteria

1）P: Patients diagnosed with breast cancer by histopathological examination;（2）I: The study was based on the intervention of acceptance and commitment therapy, which included acceptance, cognitive disengagement, experiencing the present moment, being self-centered, clarifying values, and committing to action;（3）O: AAQ-II(Acceptance and Action Questionnaire-2nd Edition) was used to evaluate the experiential avoidance level of patients, FACT-B (Functional Assessment of Cancer Therapy-Breast), FACT-C (Functional Assessment of Cancer Therapy-Colorectal) and FACT-G (Functional Assessment of Cancer Therapy-General) were used to evaluate the quality of life, SAS (Self-rating Anxiety Scale) and SDS (Self-rating Depression Scale) were used to evaluate the mental state of patients;（4）The included studies were randomized controlled trials in Both Chinese and English.

2.2. Exclusion criteria

1） Literature in which the review or data is missing or unreliable and the full text cannot be obtained after communication with the author;（2） Patients diagnosed with breast cancer on non-pathological examination;（3） Non-acceptance and commitment therapy intervention in the experimental group.

2.3. Search strategy

The meta-analysis was performed according to the guidelines in the systematic review. The Chinese and English literatures related to the subject published in the Cochrane Library, EMBASE, Web of Science, PubMed, CNKI(China National Knowledge Infrastructure), VIP and Wanfang database until July 2021 were retrieved by computer. The search is carried out by combining subject words with free words. The English search formula is: (breast cancer) and ("acceptance and commit -ment therapy"[Mesh]or"cognitive dissociation" [Mesh]or"ACT therap") and (anxiety or depression) and (quality of life) and (experiential avoidance) and (randomized controlled trial). The Chinese search formula is:(乳腺癌or乳腺恶性肿瘤）and（接纳与承诺疗法or第三代认知疗法or接纳疗法）and（焦虑or抑郁) and（生命质量) and（经验性回避) and（随机对照试验).

2.4. Literature screening and data extraction

The EndnoteX9 software was used to classify the literature, and two professional researchers independently screened the literature. After reading the title and abstract, the preliminary screening was completed according to the inclusion and exclusion criteria, and after reading the full text, the re-screening was completed to finally determine the literature to be included. A uniform table was used to extract data from the literature, including author and year, country, sample size, intervention, evaluation time, type of trial, and evaluation tool. In case of dissenting opinions during literature screening and data extraction, the results were determined after consultation with a third researcher.

2.5. Statistical method

The meta-analysis was conducted under the guidance of professor Xiang-shu Cui, corresponding author of this paper .Review Manager 5.3 software was used to conduct comprehensive quantitative analysis of the data, and I2 test and chi-square test were used to verify the heterogeneity among the studies. If $P>0.1$ and $I2<50\%$ are homogeneous, the fixed effects model is adopted. If $P\leq0.1$ and $I2\geq50\%$, heterogeneity is considered and random effects model is adopted. In this study, the data were counted, and the numerical variables were expressed by weighted mean square deviation (SMD). If $P\leq0.1$, $I2\geq50$ and no clinical heterogeneity, subgroup analysis random effects model was used for meta-analysis. Sensitivity analysis was used to evaluate the stability of the results of this study, and 95% confidence intervals (CI) were calculated for all effect sizes.

3. Results

3.1. Literature retrieval Results

A total of 2420 literatures were retrieved, 1284 in Chinese and 1136 in English. According to the inclusion and exclusion criteria of the study, after reading the title, abstract and full text, 2240 literatures that did not meet the inclusion criteria were excluded. Finally, 3 Chinese literatures and 6 English literatures were included in quantitative analysis, a total of 9 literatures. The literature screening process and results are shown in Figure 1.
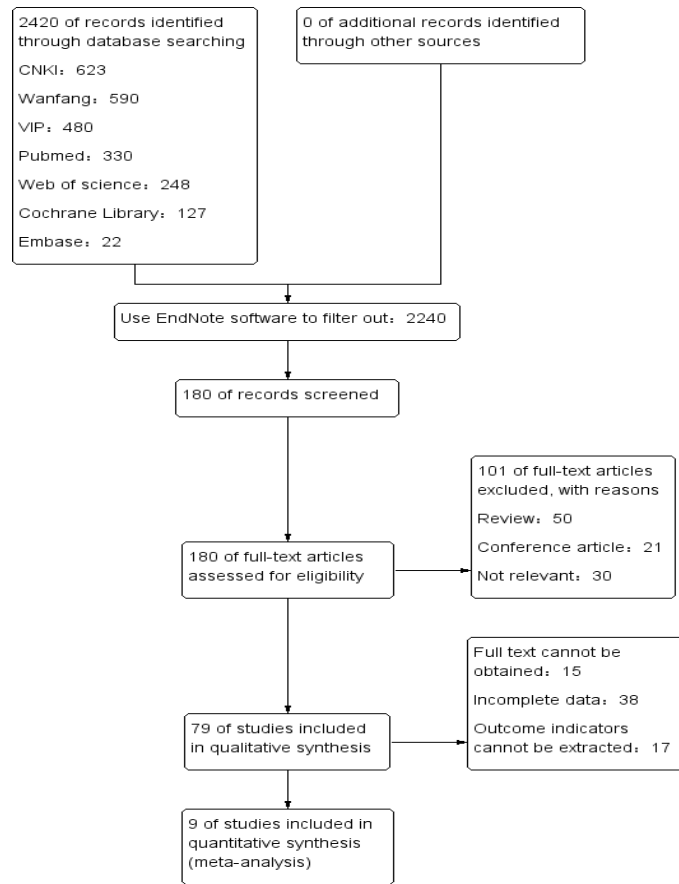
Figure 1: Literature Screening flow chart

3.2. Basic features included in the study

This study included randomized controlled trials from nine studies published from 2011 to 2021, one from South Korea, one from Malaysia, one from the United Kingdom, one from the United States, one from Australia, one from Spain, and the remaining three from China. A total of 530 breast cancer patients were included in the included studies, including 265 in the experimental group and 265 in the control group.All the studies conducted intervention studies based on acceptance and commitment therapy, with intervention duration ranging from 2 weeks to 24 weeks. The basic characteristics of the included studies were shown in Table 1.

Table1
Basic characteristics of the included studies.

Inclusion literature	Nation	Sample (cases) Experimental	Control	Intervening measure Experimental	Control	Design	Intervention time	Outcome indicator
Nurul et al-2020[9]	Malaysia	30	30	E	C	RCT	3weeks	AAQ-II、FACT-C
Gonzalez et al-2018[10]	Spanish	26	26	E+C	C	RCT	12weeks	AAQ-II
Han et al-2019[11]	China	42	42	E	C	RCT	4weeks	AAQ-II
Kim et al-2015[12]	Korea	6	9	E+C	C	RCT	24weeks	AAQ-II、FACT-B
Serfaty et al-2019[13]	Britain	20	22	E+C	C	RCT	24weeks	AAQ-II、FACT-G
Hu-2016[14]	China	41	39	E+C	C	RCT	2weeks	SAS、SDS、FACT-B
Ann et al-2012[15]	America	25	22	E+C	C	RCT	16weeks	FACT-G
Danielle et al-2011[16]	Australia	45	45	E+C	C	RCT	12weeks	AAQ-II、FACT-B
Zhou-2020[17]	China	30	30	E+C	C	RCT	2weeks	SAS、SDS

Note：E=Acceptance and commitment to therapeutic interventions；C=Conventional nursing intervention；AAQ-II：experiential avoidance；FACT-B、FACT-C and FACT-G：quality of life；SAS：anxiety；SDS：depression.

3.3. Literature quality evaluation

The included literature was independently evaluated by two evidence-based train -ed researchers using the Cochrane5.1.0 evaluation manual, including: (1) Random se -quence;(2)Distribution hides;(3)Researchers and subjects were double-blind;(4)Re -sult evaluator blindness;(5)Whether the outcome data is complete;(6)Selective report -ing of results;(7)Other bias. Each criterion was evaluated as "low bias", "high bias" and "unclear". If all the literatures meet the low bias of grade A, and some of them meet the bias of grade B; if all the literatures do not meet the bias of grade C, such literatures will be excluded. The literature quality evaluation see Table 2. And the risk assessment diagram is shown in Figure 2.

Table 2

Quality evaluation of included studies.

| Author（year）	Random sequence	Allocation concealment	Research object/Researcher blind method	Outcome tester	Selective reporting	Other bias	Literature quality
Nurul et al-2020[9]	Low bias	Low bias	Low bias	Low bias	Low bias	Low bias	A
Gonzalez et al-2018[10]	Low bias	Unclear	Low bias	Unclear	Low bias	Low bias	B
Han et al-2019[11]	Low bias	Low bias	Low bias	Low bias	Low bias	Low bias	A
Kim et al-2015[12]	Low bias	Unclear	Low bias	Low bias	Low bias	Low bias	B
Serfaty et al-2019[13]	Unclear	Highly bias	Low bias	Low bias	Low bias	Low bias	B
Hu-2016[14]	Low bias	Unclear	Highly bias	Low bias	Low bias	Low bias	B
Ann et al-2012[15]	Low bias	Low bias	Low bias	Low bias	Low bias	Low bias	A
Danielle et al-2011[16]	Low bias	Unclear	Highly bias	Low bias	Low bias	Low bias	B
Zhou-2020[17]	Low bias	Unclear	Highly bias	Low bias	Low bias	Low bias	B
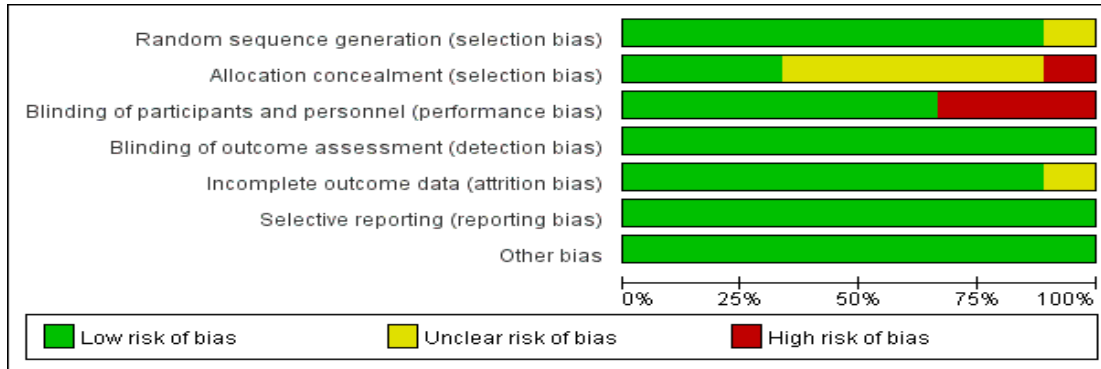
Figure 2: The risk assessment diagram

3.4. Meta-analysis results

3.4.1. Effect of ACT on quality of life in breast cancer patients

The quality of life of patients was reported in 6 literatures[12-16], involving a total of 334 patients.Heterogeneity test showed ($P<0.00001, I2=89\%$), so the random-effects model was used for meta-analysis. The results showed that the scores of patients in the experimental group were better than those in the control group, indicating that ACT could improve the quality of life of breast cancer patients, and the difference was statistically significant [SMD=-1.12,95%CI(-1.87,-0.36),P=0.004], as shown in Figure 3.
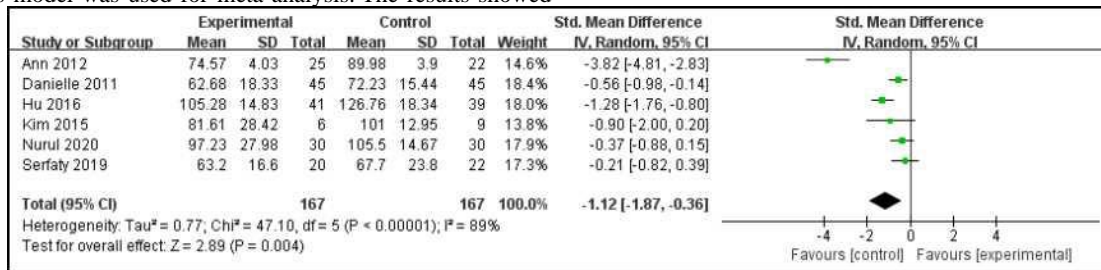

Figure 3: Forest plot of quality of life

3.4.2. Effect of ACT on mental state in breast cancer patients

2 literatures[14,17] reported the mental state of breast cancer patients, including 140 subjects. Heterogeneity test showed (P=0.04, $I2$=64%), so random effects model was used for meta-analysis.The results of meta-analysis showed that ACT could improve the mental state of patients [SMD=-1.50,95%CI(-1.95,-1.05),P<0.001]. Subgroup analysis of different instruments for measuring mental states showed that:ACT could effectively reduce the anxiety level of patients [SMD=-1.31,95%CI (-2.07,-0.56),P<0.001]and reduce the depression level of patients [SMD=-1.69,95%CI (-2.29,-1.10), $P < 0.001$], and the difference was statistically significant. As shown in Figure 4.
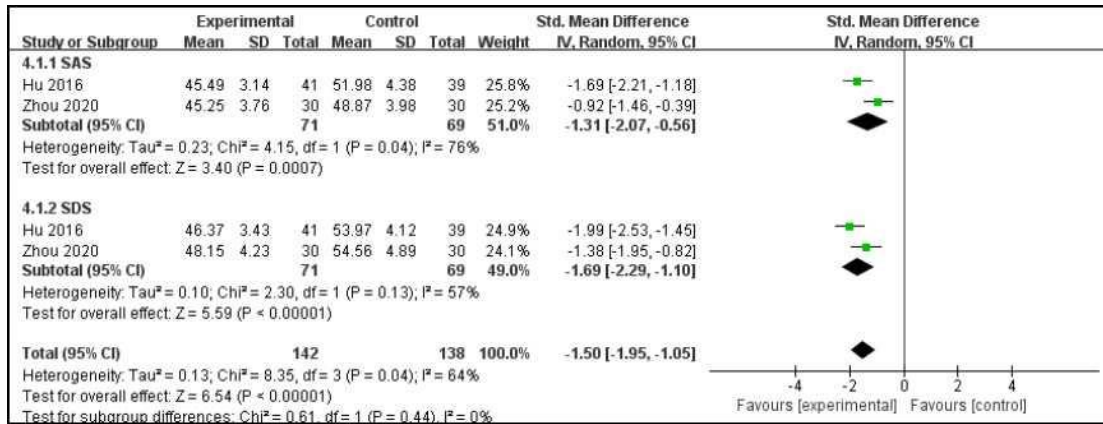
Figure 4: Subgroup analysis of mental health

3.4.3. Effect of ACT on experiential avoidance in breast cancer patients

Empirical avoidance levels were reported in 6 studies [9,11-13,16] involving 328 patients with breast cancer. Sensitivity analysis after eliminating Kim etal[12] study showed that heterogeneity was significantly reduced (P=0.003,$I2$=75%), and the source of heterogeneity may be related to low literature quality. The results of meta- analysis showed that ACT reduced the level of empirical avoidance of patients [SMD =-0.50,95%CI(-0.95,-0.04),P=0.03],and the difference was statistically significant. As shown in Figure 5.
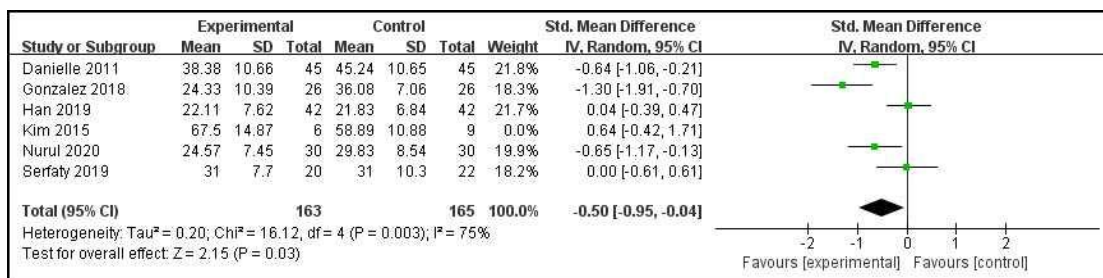

Figure 5: Forest plot of experiential avoidance

4. Discussion

4.1. The effect of ACT on improving the quality of life of breast cancer patients

ACT can significantly improve patients' quality of life. Jin[18] established an acceptance and commitment therapy expert group to intervene 60 breast cancer patients, and found that acceptance and commitment therapy plays a positive role in promoting the quality of life of patients, which is consistent with the results of the meta-analysis of this study. In this study, it was found that the experimental group could further improve the quality of life of patients and change the occurrence and development outcome of diseases more than the control group.

4.2. The effect of ACT on improving mental state of breast cancer patients

Studies have shown [19] that treatment cost and fear of death are the main causes of negative emotions in breast cancer patients. With the continuous development and improvement of the concept of health, the traditional standard of normal physical function has gradually expanded to mental health. Anxiety, depression and other negative emotions will aggravate the function and psychological vicious circle of patients. The results of this meta-analysis showed that ACT had a good effect on improving anxiety and depression symptoms of cancer patients. In addition, accord -ing to Yao et al. [5], ACT can also arouse patients' desire for rehabilitation by improving their negative emotions and further stimulate patients' correct under - standing of life.

4.3. The effect of ACT on reducing the level of emprimortional avoidance in breast cancer patients

Meta-analysis results showed that positive acceptance and commitment therapy can effectively promote patients accepted disease caused by the body, such as cognitive dysfunction, face up to the disease itself, prompting patients on the basis of acceptance, constantly to learn how to deal with and how to more effectively to adapt to the occurrence of diseases and the development, rather than blindly to escape, to resist. Datta et al[20]. ACT was used as an intervention measure for 107 breast cancer patients for 2 months, and the results showed that ACT can promote the positive psychological structure of breast cancer patients and help them rebuild their own values, which is consistent with the research results of Savard et al. [21]. However, this study only included breast cancer populations from 7 countries in Asia, Europe and America, which was underrepresented. Therefore, it is still necessary to conduct systematic studies with large samples and large populations in the future to verify the effect of ACT on empirical avoidance in different regions and different populations.

4.4. Significance of the study and future recommendations

By reading literature, some scholars think that acceptance and commitment therapy on quality of life of patients with breast cancer, negative emotions and acceptance level to have the good effect, but the scholars study limited east crowd, this research study demonstrates the results of combination of eastern and western people, for the current study provide a more powerful theory support.

The mental health and avoidance level of breast cancer patients are closely related to their own quality of life. Studies [22] have pointed out that quality of life, as one of the important indicators of the prognosis of breast cancer patients, plays an important role that cannot be ignored in the whole process of the occurrence and development of the disease. This study is based on a

population of breast cancer patients. It has been proven that acceptance and commitment therapy can improve patients' quality of life, improve patients' mental state, and reduce patients' experiential avoidance level. However, the effect of intervention on other indicators of patients needs further study. In the future, researchers can apply acceptance and commitment therapy more broadly to breast cancer caregivers and caregivers to seek more meaningful results.

4.5. Limitations of this study

Due to the limited conditions, this study has some limitations:（1）Only Chinese and English databases were retrieved in this study, and literatures in other languages were not included, which may result in language bias. （2） Due to the influence of sample characteristics, intervention methods, evaluation criteria and other factors included in the study, there is a large heterogeneity between studies. Therefore, it is recommended to use a unified and standardized intervention plan for the implemen -tation of intervention. （3） The quality of the literature included in this study is mostly grade B, which will affect the reliability of the research conclusion to some extent.

Conclusion

Meta-analysis of 10 randomized controlled trials showed that acceptance and commitment therapy could effectively improve patients' quality of life, improve their mental state, and reduce their avoidance level of disease. However, although some progress has been made in the study of acceptance and commitment therapy in China, there is still a lack of accurate clinical studies to confirm the reliability of its intervention effect. Therefore, the impact of acceptance and commitment therapy on breast cancer patients needs to be studied with a large sample, large population and high quality. To further demonstrate the long-term effects of acceptance and commit - ment therapy in patients with breast cancer.

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Author contributions

Yi-yan Chen: Design the research framework, direction and thinking of the research, and write the manuscript.

Hong-Yan Chen: Provide language modification and the overall structure of the article grasp.

Guo-Ping Liu: Responsible for literature retrieval and screening.

Bo Zhang: Completed literature re-screening and responsible for the optimization of the article content.

Yu-Zhi Song: Provide guidance on statistical methods and further enriched the manu -script.

Ethics in Publishing

Animals and patients were not included in the study so there is no need for ethical approval.

Conflict of interest statement:

There is no conflict of interest in this study.

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