Analysis of the Therapeutic Effect of Amitriptyline Combined with Music Therapy on Postpartum Anxiety and Depression in Women

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Abstract

The purpose of this study is to explore and compare the effects of drug therapy alone and amitriptyline combined with music therapy on postpartum anxiety and depression in women. The Hamilton Anxiety Scale (HAM-A), Edinburgh Postpartum Depression Scale (EPDS), and World Health Organization Quality of Life Assessment Tool (WHO QOL BREF) were used to analyze the treatment effects of the control group and intervention group on postpartum anxiety and depression in women. There was no significant difference in population baseline data between the control group and the intervention group ($p>0.05$); There was a significant difference in HAM-A scores between the two groups ($p<0.05$). In the EPDS score, there was a significant difference between the two groups ($p<0.05$), but after intervention in both groups, the treatment effect of the intervention group was significantly more significant than that of the control group ($p<0.01$).In the WHOQOL-BREF score, there were significant differences in physiological, psychological, and independence fields ($p<0.05$), except for no significant differences in the environmental field ($p>0.05$). Combining music therapy with conventional drug amitriptyline therapy can effectively alleviate and reduce postpartum anxiety and depression levels in women, improve their quality of life (except in the environmental field), and provide an effective reference plan for postpartum care for women to a certain extent.

Keywords: HAM-A, EPDS, WHOQOL-BREF, drug therapy, music therapy.

1. Introduction

The most important physiological stage in a woman's life is pregnancy and childbirth. During this period, pregnant women's mental fluctuations can undergo significant changes, becoming extremely sensitive to any external and internal stimuli, and experiencing significant emotional fluctuations, which were the main mental disorders leading to potential mental health problems[1], such as anxiety and depression (PPD)[2]. Previous research had shown that the impact of postpartum anxiety on women was about 5-20%[3]. Compared to the number of hospitalizations related to female mental health issues, postpartum depression accounts for about 12.5%[4], and the global incidence of postpartum depression was 13-32% [5,6]. This proportion was between approximately 22.4% -32.8% in South Korea[7]. It was estimated that approximately 18% of women experience anxiety and depression around three weeks after childbirth[8]. The overall disease rate were estimated to be 8.6% -9.9% in developed countries[9], and the incidence of postpartum depression was between 10% -20% in low - and middle-income countries (LMICs)[10]. A systematic evaluation shows that the incidence of postpartum depression was 18.3%, while the incidence of postpartum anxiety was 14%[11]. However, other studies have found a higher proportion. A study conducted in Cape Town found that 34.7% of postpartum women had symptoms of depression[12]. In a study conducted in Uganda, it was found that 43% of participants had symptoms of postpartum depression[13]. A systematic review reported that the prevalence of anxiety disorder after childbirth was 17.1%[14]. Another meta-analysis showed a prevalence of postpartum anxiety symptoms of

13.7%[9], and a review of African studies showed a prevalence of postpartum anxiety of 14%[11]. Due to the change in social roles of postpartum women, the pressure on women during the postpartum period generally increases[15], which in turn increases their stress response[16], often accompanied by mental health problems[17]. As of now, the treatment effect of postpartum anxiety and depression is not very good, indicating the need for more clinical research to explore the treatment effect and bring benefits to postpartum women. At present, many studies have explored the treatment of postpartum anxiety and depression in women through cognitive therapy[18], exercise intervention therapy[19], psychological care therapy[20], health care therapy[21], and drug intervention (paroxetine or paroxetine plus CBT) therapy, and have achieved significant therapeutic results[22]. Studies have found that sertraline[23], venlafaxine and bupropion, paroxetine, and fluvoxamine are effective in treating postpartum anxiety and depression[24-26]. Compared with previous scholars, there were currently few studies on the combination of drugs and other intervention methods to treat postpartum anxiety and depression in women. Most mathematicians used one intervention therapy, and rarely used combined intervention measures to treat postpartum anxiety and depression in women. Therefore, this study aims to use the combined effect of amitriptyline and music therapy to treat postpartum anxiety and depression in women, in order to provide a treatment plan for postpartum anxiety and depression in women.

2. Patients and Methods

2.1 Study object

The study recruited 42 female postpartum anxiety and depression patients from 10 residential communities in Zhengzhou City, Henan Province from June 5th to 29th, 2023. The clinical trial intervention began from July 1 to August 1, 2023, for a total of 1 month (approximately 4.4 weeks, 31 days). 42 patients with postpartum anxiety and depression were randomly assigned to a control group (CG) and an intervention group (IG) used Excel, with 21 individuals in each group randomly assigned. The diagnostic criteria must all comply with the latest version of the American Psychiatric Association (APA) Classification and Diagnostic Standards for Mental Disorders (DSM-5) released in May 2013[27] as well as the diagnostic criteria of the Chinese Psychiatric Association's Classification and Diagnostic Standards for Mental Disorders (CCMD-3) for patients with depression[28]. The study was approved by the Ethics Committee of Zhengzhou Sias University (Approval number: ZZSIASU20230603), and all participants signed an electronic version of the informed consent form. Please refer to Table 1 for details

Table 1 Inclusion and exclusion criteria of the grouped cases.

Inclusion criteria
① Complies with DSM-5 and CCMD-3 standards.
② Apart from postpartum anxiety and depression in women, there are no physical or other illnesses.
③ There were no drug allergies.
Exclusion criteria
① Patients with severe liver and kidney dysfunction, cardiovascular disease, diabetes, thyroid disease, prostate disease, bronchial asthma;
② Infants who consume breast milk;
③ Female postpartum patients with cognitive impairment, hypoglycemia, and syncope.

2.2 Operation steps

The CG was treated with amitriptyline. (2) On the basis of the CG, the intervention group added music intervention to treat female postpartum coke and depression patients. Music therapy requires 4 interventions per week (group choir and piano music), each lasting for 1 hour (60 minutes). Depending on the venue requirements, group choir interventions were conducted in the music hall and piano music interventions were conducted in the piano teaching and research room (Figure 1); The medication requirement for amitriptyline was to take one tablet three times a day, with the dosage gradually increasing or decreasing according to the condition (must be done under the guidance of a doctor). (3) Pharmacological effects of amitriptyline: Amitriptyline was a

commonly used TCA in clinical practice. Its sedative and anticholinergic effects were also more pronounced. It can improve the mood of patients with depression and improve symptoms such as slow thinking, delayed behavior, and loss of appetite. Amitriptyline can also alleviated chronic pain by acting on central opioid receptors. After 7 to 10 days of general medication, significant therapeutic effects can be achieved. Oral absorption was complete, reaching peak concentration within 8-12 hours, plasma half-life of 32-40 hours, and protein binding rate of 82% -96%. CYP2C19, 1A2, and 2D6 can all act on amitriptyline through liver metabolism, and the main metabolite was demethyltriptyline, which still has activity. Amitriptyline and its metabolites are distributed throughout the body, and the final metabolites are excreted from the body through the kidneys. The excretion is slow and can still be detected in urine after 3 weeks of discontinuation.

Figure 1 Music therapy

2.3 Primary Measurement Index

Hamilton Anxiety Scale (HAM-A)[29], Edinburgh Postpartum Depression Scale (EPDS)[30] and World Health Organization Quality of Life assessment instrument(WHOQOL-BREF)[31,32] were used to evaluate postpartum anxiety and depression in women. HAM-A adopts a 5-level scoring method of 0-4 points for all items, with an evaluation standard of<7 points indicating no anxiety; A score of 7 to<20 indicates possible anxiety; A score of 20~<29 indicates anxiety; $\geq$ A score of 29 indicates severe anxiety; EPDS was used to evaluate the determination of postpartum depression. Its evaluation criteria were: a total of 10 items in EPDS, with each item assigned a score of 0-3 and a score range of 0-30 points. Among them, a total score of<9 points indicates no postpartum depression, and a total score of $\geq$ 13 points indicates postpartum depression. The WHOQOL-BREF was divided into four fields. This study mainly adopts the physiological field, psychological field, and independence field. The evaluation standard was that the field score was scored in a positive manner, that is, the higher the score, the better the quality of life.

2.4 Statistical Analysis

SPSS 24.0 version statistical software was used for data processing and Used GraphPad Prism 8.0 for graphic production. The mean ± standard deviation (x ± s) is used to describe the data, and t-test was performed on the measurement data. $p>0.05$ indicates statistical significance, and $p<0.05$ indicates statistical significance.

3. Results

3.1 Baseline population data of participants in the study

Table 2 shows that there was no statistically significant difference in the social demographic characteristics of postpartum women between CG and IG groups (p>0.05), and the two groups were comparable. The average ages of CG and IG are 30.43±3.15 and 29.71±3.31, respectively The Vaginal delivery of the two groups of women accounted for 23.8% and 76.2%, respectively, while the Caesarian section accounted for 33.3% and 66.7%. In the CG, 61.9% of women needed to take care of their babies, and 81% of women participated in the work, while 38.1% of women did not need to take care of their babies, and 19% of women also had no other work. 71.4% of postpartum women in IG need to take care of their baby while also participating in work (85.7%), while only 14.3% of postpartum women were unemployed and do not need to take care of their baby (28.6%). Please refer to Table 2 for details

Table 2 Baseline demographic data of participants.

Index		CG (n=21)	IG (n=21)	P
Age (year)		30.43± 3.15	29.71 ±3.31	0.53
Vaginal delivery		5(23.8%)	7(33.3%)	0.42
Caesarian section		16(76.2%)	14(66.7)	
Caring the baby	Yes	13(61.9%)	15(71.4%)	0.37
	No	8(38.1%)	6(28.6%)	
BMI=(kg/m2)	18.5≤BMI＜24	12(57.1%)	11(52.4%)	0.45
	BMI>24	6(28.6%)	8(38.1%)	
	BMI>28	3(14.3%)	2(9.5%)	
Working status	Works	17(81%)	18(85.7%)	0.27
	Does not work	4(19%)	3(14.3%)	

3.2 Changes in postpartum anxiety levels in women before and after intervention

The research results in Table 3 show that there was no significant difference in postpartum anxiety levels between CG and IG before intervention ($p>0.05$). After intervention, the CG and IG groups showed significant changes in postpartum anxiety levels in women ($p<0.05$). Among them, under the treatment of conventional drugs (amitriptyline), the anxiety level in the CG group decreased from 24.95 (before intervention) to 15.62 (after intervention); Under the effect of amitriptyline combined with music therapy, the anxiety level in the IG group decreased from the original 25.24 (before intervention) to 10.33. According to the HAM-A scoring standard, although both groups showed significant therapeutic effects after intervention, postpartum anxiety in women still existed after intervention in both groups, but there was a significant downward trend in anxiety levels compared to before intervention (15.62>7<10.33). It was not difficult to find in our research that the combination of amitriptyline and music therapy had a better effect than the treatment of amitriptyline alone ($p<0.05$). This result indicates that the combined effect of amitriptyline and music therapy was more conducive to reducing postpartum anxiety in women. Saw Figure 2 for details

Table 3 Changes in HAM-A scores of CG and IG.

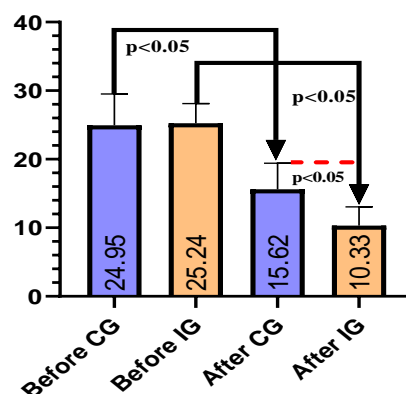| Index	Mean ±SD	P
Before CG(n=21)	24.95±4.58	0.31
Before IG (n=21)	25.24±2.86	0.45
After CG (n=21)	15.62±3.78	0.04
After IG (n=21)	10.33±2.78	0.02
After CG—After IG	-	0.02

Figure 2 Changes in anxiety levels between two groups

3.3 Changes in postpartum depression levels in women before and after intervention

We further investigated the postpartum depression levels of women in both groups through paired sample t-tests (Table 4). The intervention of CG and IG groups showed significant therapeutic effects on postpartum

depression in women ($p<0.05$, $p<0.01$). The difference in mean scores of CG before and after intervention was 3.76, while the difference in mean scores of IG group before and after intervention was 7.24. Furthermore, compared with the scores of CG and IG after intervention, the score reduction level of IG was significantly higher than that of CG ($7.24<3.76$, $p<0.01$). However, in the comparison between CG and IG, it is not difficult to find that IG after intervention was significantly more significant than CG treatment after intervention ($p<0.01$). This result indicates that the combination of amitriptyline and music therapy was more effective in treating postpartum depression in women than simply taking amitriptyline. Therefore, amitriptyline combined with music therapy was more conducive to reducing the incidence rate of postpartum depression in women. Saw Figure 3 for details

Table 4. Changes in EPDS scores of CG and IG

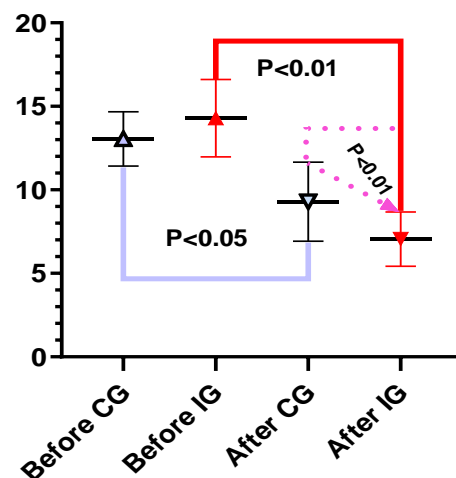| Index	Mean ±SD	P
Before CG(n=21)	13.05 ±1.62	0.02
After CG (n=21)	9.29 ±2.37	
Before IG (n=21)	14.29 ±2.32	***
After IG (n=21)	7.05 ±1.45	
After CG─After IG	-	***

Note: *** represents $p<0.01$.

Figure 3 Changes in depressed levels between two groups

3.4 Changes in WHOQOL-BREF levels in postpartum women before and after intervention

The results in Table 5 indicate changes in the physiological, psychological, independence, and environmental scoring levels of WHO QOL BREF. Through paired t-tests, it was found that the mean values of CG and IG groups showed different changes before and after intervention in physiology, psychology, and independence. According to the scoring criteria of WHO QOL BREF, the postpartum physiology, psychology, and independence scores of women in both groups after intervention increased. Compared with before intervention, CG intervention increased by 7.1, 7.85, and 5.11, and IG increased by 10.05, 12.15, and 6.98, respectively. Compared with CG intervention, the IG group had significantly higher scores in physiology, psychology, and independence (2.9, 3.3, and 2.53 higher, respectively), indicating that the IG group had significantly better effects than the CG group. However, it was undeniable that both groups showed significant differences in physiology, psychology, and independence after intervention ($p<0.05$). However, in our survey, we found no significant difference ($p>0.05$) in the Environment score between the two groups, which may be related to women's postpartum social security, housing environment, economic sources, and surrounding environmental conditions. This progress indicates that their quality of life was also generally affected by economic pressure, environmental pressure, and other pressures. Therefore, we predicted that only by making changes in the environmental field can we reduce the distress caused by economic, environmental, and other pressures on

women. But this study undoubtedly concludes that compared to CG, amitriptyline combined with music therapy can significantly improve women's postpartum quality of life (in addition to the environment). Saw Figure 4 for details

Table 5 Changes in WHOQOL-BREF scores of CG and IG

Index	Mean ±SD				P
	Physiology	Psychology	Independence	Environment	
Before CG(n=21)	15.38 ±2.71	14.33 ±2.45	6.12 ±1.45	19.78±3.45	***
After CG (n=21)	22.48 ±1.62	22.18 ±1.47	11.23 ±1.14	20.13±3.13	
Before IG (n=21)	15.33 ±2.72	13.33 ±2.36	6.78 ±1.34	20.12±3.33	***
After IG (n=21)	25.38±1.73	25.48 ±1.57	13.76±1.24	20.30±3.24	
P[1]	-	-	-	0.56	-

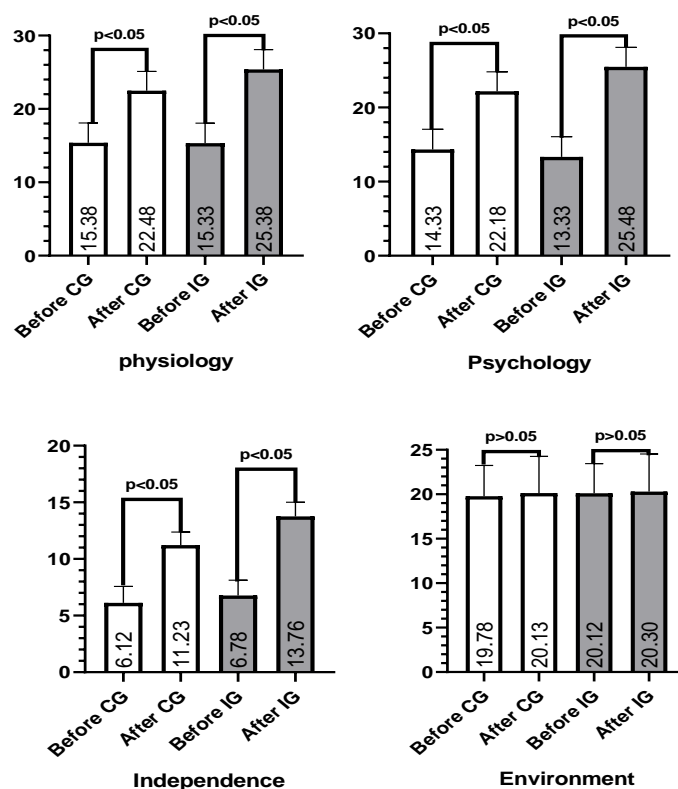Note: *** represents $p<0.05$; P[1] represents Environment ($p>0.05$)

Figure 4 Changes in WHOQOL-BREF levels between two groups

4. Discussion

This study aims to analyze the effects of medication intervention (amitriptyline) combined with music therapy on postpartum depression and anxiety symptoms. Compared with conventional medication for postpartum anxiety and depression, the intervention of amitriptyline combined with music therapy can significantly alleviate the level of anxiety and depression in women after childbirth. The implementation of amitriptyline combined with music therapy can effectively reduce postpartum anxiety and depression tendencies in women, and improve their quality of life after childbirth. In recent years, with the rapid development of society, various explosive information has been overwhelming, including women's postpartum anxiety and depression, which have also made headlines and gradually gained the attention of the general public. After childbirth, women often face various life pressures brought about by life, work, baby care, and other issues, which in turn cause various psychological changes and significantly increase mental problems[33]. Clinical studies have shown that the role transformation of women after childbirth, as well as changes in social relationships and functions, further

exacerbates anxiety and depression problems in women after childbirth, resulting in significant mental subhealth abnormalities[34]. Global statistical data shows that 8% -13% of women suffer from anxiety and depression after childbirth [35]. In China, the incidence rate of postpartum depression among women has risen to about 20%, which has brought a great burden to China's medical system and society[35]. To alleviate postpartum anxiety and depression in women, many studies have shown that sertraline[23], venlafaxine and bupropion[24], paroxetine[25], and fluvoxamine[26] were effective treatments for postpartum anxiety and depression. Scholars have proposed that Paroxetine and Wuling Capsule have better therapeutic effects on postpartum anxiety and depression[36]. Scholars have pointed out in clinical research that commonly used anti anxiety and depression drugs, such as sertraline and paroxetine, have relatively low serum concentrations and are almost undetectable when feeding infants breast milk; On the other hand, after taking fluoxetine, the serum concentration is relatively high when breastfeeding infants. Therefore, it is recommended to choose sertraline or paroxetine for clinical treatment of anxiety and depression, and to avoid the use of fluoxetine[37]. Excluding breast milk, some scholars suggest that the use of fluoxetine has a more significant effect on the treatment of depression and anxiety[38]. Related clinical interventions have shown that trazodone has a significant impact on the sleep quality of patients with mixed anxiety and depression disorders accompanied by sleep disorders[39]. A review suggests that drug or non drug interventions can improve depressive symptoms in pregnant and postpartum women[40]. Scholars have found in clinical practice that compared to placebo, paroxetine has a lower average severity score and a higher remission rate after 8 weeks of treatment[41]. This study compared medication and combination therapy for 4.4 weeks (31 days) and found that although there were significant changes in the treatment of anxiety, depression, and quality of life (except for the environment) ($p<0.05$), amitriptyline combined with music therapy was more effective in treating postpartum anxiety, depression, and quality of life in women than medication alone. This may be due to the sedation effect of amitriptyline treatment, Adjusting the patient's emotions may effectively stimulate them in music therapy, alleviate various pressures and troubles brought by postpartum women, high nervous tension, and role discomfort through soothing and pleasant winter music, and enable postpartum women to relax their physical and mental health through music.

5. Conclusions

Through this study, compared to simply taking medication, the combination of amitriptyline therapy and music therapy was more conducive to the recovery of postpartum anxiety and depression in women, polished up their quality of life (except for the environment). However, in order to better enhance and raised the quality of life of women after childbirth, great attention and support from society were needed. I hope that in future research, more drugs or combinations of drugs with other therapies can be used to treat postpartum anxiety and depression in women, improve their quality of life, and thus bring reference plans and benefits to more women.

Funding

Ethics Approval

This study was approved by the Ethics Committee of Art College of Xi Chang University (Approval Number: XCUAC20240301).

Informed Consent

All participants signed an electronic version of the informed consent form.

Conflict of Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Authors' Contribution

Conceptualization, W.X. D.; methodology, W.X. D.; software, W.X. D.; validation, W.X. D.; formal analysis, W.X. D.; investigation, W.X. D. ; resources,W.X. D.; data curation, W.X. D.; writing—original draft preparation, W.X. D.; writing—review and editing, W.X. D.; visualization, W.X. D.; supervision, W.X. D.; project administration, W.X. D. The authors have read and agreed to the published version of the manuscript.

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