

Original Article

Analysis of changes of adverse emotions and self-efficacy of intrauterine insemination patients after an active psychological intervention

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Abstract: Objective: To investigate the changes of adverse emotions and self-efficacy of intrauterine insemination (IUI) patients after an active psychological intervention. Methods: A total of 180 IUI patients admitted to our hospital were selected as the study subjects and randomly divided into the study group and the control group in accordance with the odd and even numbers of visits, with 90 cases in each group. The control group received only conventional care for IUI, while the study group received active psychological intervention and conventional care for IUI. The differences in therapeutic outcomes of IUI, adverse emotions before and after intervention, Symptom Checklist-90 (SCL-90), self-efficacy, and social support scores were compared between the two groups. Results: The successful conception rate in the study group was higher than that in the control group ($P > 0.05$), while the mean conception cycle in the study group was lower than that in the control group ($P < 0.05$). There was no significant difference in the scores of self-rating anxiety scale (SAS), self-rating depression scale (SDS), SCL-90, self-efficacy and social support between the two groups at the beginning of intervention ($P > 0.05$). However, the scores of SAS, SDS and SCL-90 in the study group were lower than those in the control group at the end of intervention ($P < 0.05$), while the scores of self-efficacy and social support in the study group were higher than those in the control group ($P < 0.05$). The correlation analysis showed that the self-efficacy was negatively correlated with SAS and SDS scores. Conclusion: The active psychological intervention can effectively improve the therapeutic outcome, adverse emotions, self-efficacy, and social support of IUI patients, which exhibits a practical application value clinically.

Keywords: Intrauterine insemination, active psychological intervention, adverse emotions, self-efficacy, analysis of changes

Introduction

In recent years, the burgeoning development of social economy has led to the increase of work pressure of residents, the marked changes in diet structure, the fast life style, and the continuously intensifying environmental pollution, which has increased the prevalence rate of infertility to a certain extent [1]. Infertility is medically defined as the inability to conceive after a year or more of regular unprotected sexual intercourse. Infertility can be divided into primary and secondary infertility. Statistics show that infertility is a common disease, which affects about 10-15% of the couples of child-bearing ages [2, 3].

Intrauterine insemination (IUI) is an assisted conception technique that involves the deposition of a processed semen sample in the upper uterine cavity, overcoming natural barriers to sperm ascent in the female reproductive tract. According to the different fertilization sites, IUI can be divided into vaginal IUI, cervical IUI and tubal IUI [4, 5]. Recently, with the advances in the assisted conception techniques, IUI techniques tend to be mature and become a conventional assisted conception technique for infertility treatment. Compared with other assisted conception techniques, IUI, which is cost-effective, noninvasive and easy to implement, has been extensively recognized by infertile couples [6, 7].

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However, clinical practices suggested that most infertile women receiving IUI had serious adverse emotions and low self-efficacy due to the long-term infertility, family and social factors, and a lack of the understanding of IUI techniques. This is obviously unfavorable to the IUI treatment [8]. A retrospective analysis of 289 IUI patients showed that 65.40% of the patients had significant anxieties and 17.30% of the patients had marked depression. Some interventions revealed that most infertile patients were worried about discrimination and complaints, while some were concerned about their health [9, 10]. An investigation and analysis suggested that the psychological resilience, optimism, and tenacity of infertile women were lower than those of fertile women, and the scholars believed that this was not conducive to IUI treatment, and recommended to conduct targeted mental health education for infertile women [11]. The aforementioned studies have demonstrated that the active psychological intervention on IUI patients is crucial, and it may affect the therapeutic outcomes. The objective of this study was to investigate the changes of adverse emotions and self-efficacy of IUI patients receiving active psychological intervention, so as to provide more experimental data for the clinical intervention on IUI patients.

Materials and methods

General data

A total of 180 IUI patients admitted to our hospital from January 2017 to January 2019 were selected as the study subjects and randomly divided into the study group and the control group in accordance with the odd and even numbers of visits, with 90 cases in each group. This study has been approved by the Ethics Committee of the First Affiliated Hospital of Hainan Medical University. All the patients signed the informed consent.

Inclusion criteria: (1) patients who met the diagnostic criteria in Infertility Guidelines and IUI Treatment [12]; (2) patients aged < 35 years old; (3) patients who had clear consciousness and ability to cooperate with the study; (4) and who had complete case data.

Exclusion criteria: (1) patients who were complicated with mental illness; (2) those who were

complicated with IUI contraindications (e.g., urinary system infection or sexually transmitted diseases); (3) those who were combined drugs or alcohol abusers; (4) those with infertility due to uterus, cervix, fallopian tubes or immune factors; (5) and those who were complicated with severe hepatic and renal dysfunction.

Rejection criteria: (1) patients who died during intervention; (2) those who were lost to follow up during intervention; (3) those who did not comply with the intervention measures during the intervention.

Intervention methods

All the patients received the same perioperative care for IUI, including adequate rest before surgery, strict check, strict aseptic operations during surgery, precise injection, and luteal support after surgery.

Based on the above-mentioned interventions, the study group was additionally treated with active psychological intervention. The specific measures were as follows: (1) Psychological investigation. The psychological state of IUI patients with anxieties and depression was fully understood before treatment, multiple communication methods were adopted during conversation, and patients' complaints were patiently listened, so as to let their feelings be released and their inner needs be understood, thereby formulating the corresponding intervention measures in accordance with the investigation results; (2) Health education. Medical staff took multiple measures to carry out health education for patients regarding the principle of IUI treatment, common precautions, adverse consequences, and complications that may occur during the treatment, so that patients had a thorough understanding of IUI. The real cases could be used to educate patients to avoid their over-reliance on and distrust of treatment. The education could be performed in the form of pictures, videos, WeChat push, telephone introduction, etc.; (3) Social support nursing. Infertility patients, subject to social and family factors, often had greater mental stress, leading to the tensions of family relations. Therefore, health education should be properly conducted for their families during the treatment, so that their families could understand that infertility was curable and had a high success rate in treatment. The families of

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patients were asked to offer affirmation of support and give more care to the patients; (4) Behavioral nursing. Medical staff adopted the appropriate communication methods, and provided patients with a pleasant treatment environment and necessary emotional support during the treatment, thus boosting their confidence in treatment. The observation duration of the intervention in both groups was 6 months.

Observational indices and assessment criteria

Comparison of clinical outcomes between the two groups: The clinical outcomes in the two groups were assessed after intervention. The ratio of successful pregnant patients and the mean conception cycles in the two groups were calculated to compare the differences between the two groups.

Changes of anxiety and depression before and after intervention: The scores of self-rating anxiety scale (SAS) and self-rating depression scale (SDS) were calculated before intervention and at 6 months after intervention, and the comparisons between groups and within groups were performed before and after intervention. SAS, a commonly used assessment tool, was primarily used to assess the anxiety and psychological changes of subjects during the treatment. The scale comprises 20 items. The total score of the scale is the sum of the score of each item. The score below 50 points refers to normal, 50-60 points to mild, 61-70 points to moderate, and 70 points and above to severe. SDS consists of 20 items, including 10 forward questions and 10 reverse questions. The total score of the scale is the sum of the scores of each item. The score below 0.50 points refers to no depression, 0.50-0.59 points to mild depression, 0.60-0.69 points to moderate depression, and 0.70 points and above to severe depression [13].

Changes of Symptom Checklist-90 (SCL-90) scores before and after intervention: SCL-90 was selected to compare the psychological health status between the two groups before and after intervention. SCL-90, comprising 90 items, is applicable to those aged over 16 years, and it can assess the psychological health status of subjects based on feeling, emotions, thinking, consciousness and behaviors [14].

Analysis of self-efficacy before and after intervention: Before intervention and at 6 months after intervention, the self-efficacy scale was used to assess the conditions of patients. The scale consists of three dimensions, namely, strength, optimism and tenacity. The total score of the scale is the sum of the score of each dimension. A higher score indicates a higher self-efficacy of the subjects [15].

Analysis of social support before and after intervention: Before intervention and at 6 months after intervention, the social support scores were adopted to assess the social support in the two groups. The scale consists of three dimensions, namely, objective support, subjective support and availability of support. The total score of the scale is the sum of the score of each dimension. A higher score indicates a higher social support of subjects.

Statistical method

The collected data were input into an EXCEL table, and SPSS 22.0 was adopted for statistical analysis. The collected data were detected using normal distribution. The data conforming to normal distribution were expressed as [n (%)]. The differences between groups were analyzed using *Chi-square* test. The measurement data were expressed as mean \pm standard deviation (mean \pm SD). The differences between groups were analyzed using *t* test, and the correlation analysis was performed using Spearman. $P < 0.05$ indicated a statistically significant difference.

Results

Comparison of differences in general clinical data between the two groups

The comparison exhibited that there was no marked difference in general clinical data such as mean age, mean weight, mean course of disease and basic diseases between the two groups ($P > 0.05$), and the data were comparable (**Table 1**).

Comparison of clinical therapeutic outcomes between the two groups

There were 24 successful pregnant patients (successful conception rate: 26.67%) in the study group, and 20 successful pregnant pa-

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Table 1. Comparison of general clinical indices between the two groups ($\bar{x} \pm sd$)/[n (%)]

General clinical data		Study group (n=90)	Control group (n=90)	t/ χ^2	P
Mean age (years)		25.98±4.33	26.01±4.29	0.047	0.963
Mean weight (kg)		64.29±3.91	64.34±3.89	0.086	0.932
Mean BMI (kg/m ²)		22.19±2.11	21.87±1.98	1.049	0.296
Mean course (years)		2.89±0.28	2.93±0.18	1.14	0.256
Education level	University and above	41	46	0.928	0.311
	High school	36	34		
	Junior high school and below	13	10		
Monthly income	< RMB 1000	10	9	0.989	0.301
	RMB 1000-5000	46	40		
	RMB 5000 and above	34	31		
Hypertension	Yes	10	13	0.449	0.503
	No	80	77		
Diabetes	Yes	15	11	0.719	0.396
	No	75	79		

Table 2. Comparison of clinical therapeutic outcomes between the two groups ($\bar{x} \pm sd$)/[n (%)]

Group	Number of cases	Successful conception rate	Mean conception cycle (times)
Study group	90	24 (26.67)	3.29±0.21
Control group	90	20 (22.22)	4.43±0.31
t/ χ^2	-	0.481	28.884
P	-	0.488	< 0.001

the control group ($P < 0.05$) (Table 2).

Changes of anxiety and depression before and after intervention

The comparison suggested that there was no marked difference in SAS and SDS scores between the two groups before intervention ($P > 0.05$). After intervention, the scores of SAS and SDS in both groups were remarkably reduced ($P < 0.05$). The comparison between groups exhibited that at 6 months after intervention, the scores of SAS and SDS in the study group were lower than those in the control group ($P < 0.05$) (Figure 1).

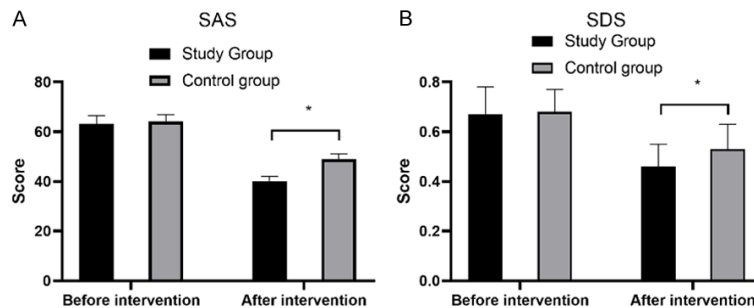


Figure 1. Comparison of SAS and SDS scores between the two groups before and after intervention. The comparison shows that there was no significant difference in the comparison of SAS (A) and SDS (B) scores between the two groups before intervention ($P > 0.05$). At 6 months after intervention, SAS and SDS scores in the study group were markedly lower than those in the control group ($P < 0.05$). *indicates a statistical significance in the comparison of the same index between groups.

tients (successful conception rate: 22.22%) in the control group. The differences in the comparison between groups were not remarkable ($P > 0.05$). The mean conception cycle in the study group was significantly lower than that in

scores between the two groups before intervention ($P > 0.05$). The comparison between groups at 6 months after intervention revealed that the SL-90 scores in the study group were markedly lower than those in the control group,

Changes of SCL-90 scores before and after intervention

The comparison between groups showed that there was no significant difference in SL-90

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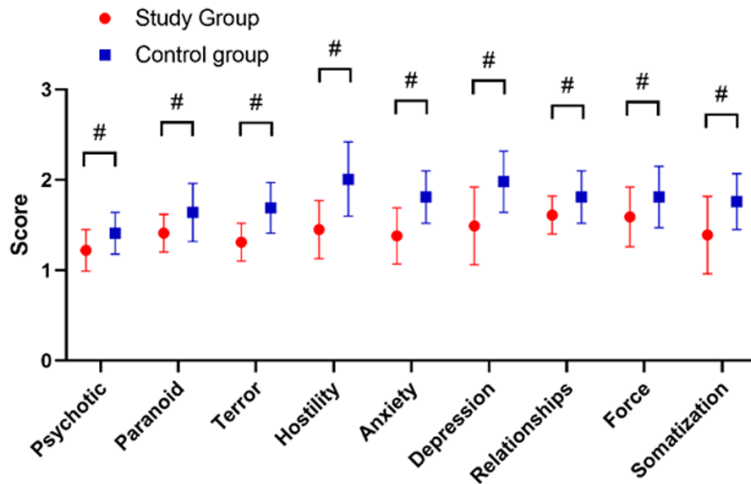


Figure 2. Comparison of SCL-90 scores before and after intervention. The comparison shows that the scores of psychosis, paranoia, terror, hostility, anxiety, depression, interpersonal relationship, compulsion and somatization in SL-90 scale in the study group were significantly lower than those in the control group. #indicates a statistical significance in the comparison of the same index between groups.

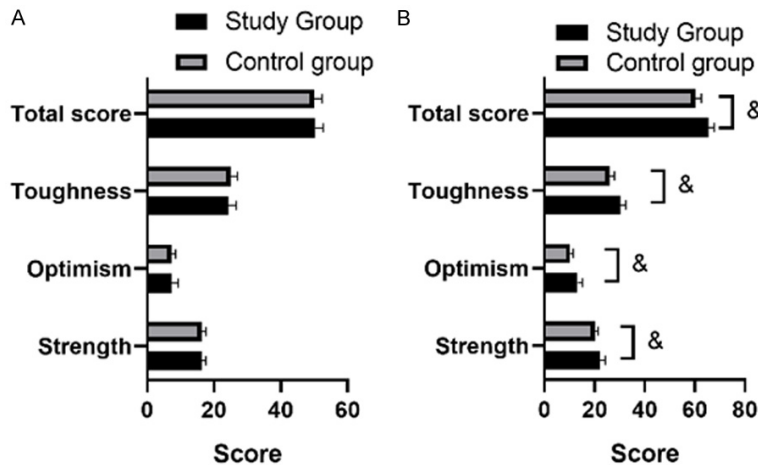


Figure 3. Comparison of self-efficacy scores between the two groups before and after intervention. There was no significant difference in the comparison of self-efficacy strength, optimism, tenacity and the total score of self-efficacy scale between the two groups before intervention (A). After intervention, the comparison between groups revealed that the scores of the aforementioned indices in the study group were markedly higher than those in the control group (B). #indicates a statistical significance in the comparison of the same index between groups.

and the differences between groups were significant ($P < 0.05$) (Figure 2).

Analysis of self-efficacy before and after intervention

The comparison demonstrated that there was no significant difference in strength, optimism, tenacity, and the total score of self-efficacy

scale between the two groups before intervention ($P > 0.05$). However, the comparison between groups after intervention revealed that the strength, optimism, tenacity and the total score of self-efficacy scale in the study group were significantly higher than those in the control group ($P < 0.05$) (Figure 3).

Analysis of social support before and after intervention

The comparison showed that there was no remarkable difference in objective support, subjective support, availability of support and the total score of social support between the two groups before intervention ($P > 0.05$). However, the social support scale scores in the study group after intervention were significantly elevated compared with those before intervention ($P < 0.05$). The comparison between groups suggested that the scores of all dimensions in the study group were higher than those in the control group ($P < 0.05$) (Figure 4).

Discussion

Multiple factors have contributed to the rising incidence rate of female infertility in recent years. In accordance with the concept of bearing and rearing better children and improving the newborn quality, the assisted conception techniques have been developed rapidly [16]. IUI

technique is a commonly used assisted conception technique in clinic, which is suitable for infertile women with a normal fallopian tube at at least one side. The application of IUI technique has achieved satisfactory outcomes in clinical practice. However, with the clinical promotion and application of IUI technique, more and more scholars have found that emotional

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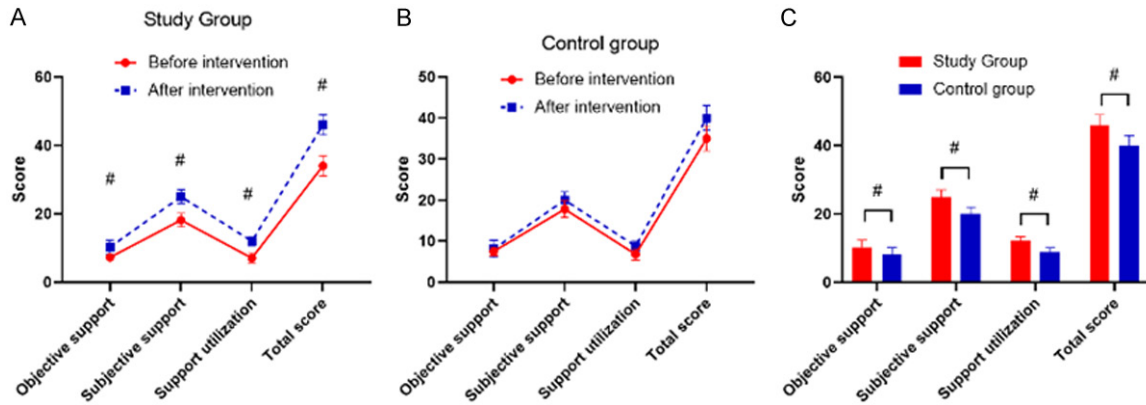


Figure 4. Comparison of differences in social support between the two groups before and after intervention. The objective support, subjective support, availability of support and the total score of social support in the study group were remarkably increased after intervention compared with those before intervention (A). There was no marked difference in the comparison of objective support, subjective support, availability of support and the total score of social support in the control group before and after intervention (B). The comparison between groups after intervention exhibited that the scores of all dimensions in the study group were higher than those in the control group (C). #indicates a statistical significance in the comparison of the same index between groups.

and psychological factors have a certain impact on IUI treatment, and IUI treatment seriously affects the psychological states of patients, especially the senses of loss, isolation and guilty [17]. A retrospective analysis of 90 infertile patients showed that the mean scores of SAS and SDS (68.29 ± 4.33 points and 0.67 ± 0.11 points) were remarkably higher than the domestic norm. The report revealed that most of the patients had insufficient confidence in treatment, and felt lonely at home, and were seriously anxious. This may be related to the domestic cultural background [18]. An investigation of SL-90 targeting infertile patients showed that infertile patients scored significantly higher regarding compulsion, somatization and paranoid factors, and some patients complained that infertility seriously affected their normal life and work. Although the conditions were slightly relieved after treatment, the repeated treatment led to gradually increased anxiety and depression. Additionally, infertile patients were eager to receive the psychological comfort from their families [19].

The aforementioned investigation results provide a theoretical basis for this study. This study investigated the changes of adverse emotions and self-efficacy of IUI patients after psychological intervention. The results showed that in terms of clinical therapeutic outcomes, the successful conception rate (26.67%) in the study group receiving psychological intervention was

higher than that (22.22%) in the control group without receiving psychological intervention at 6 months after treatment, and there was no marked difference between groups. However, the mean conception cycle in the study group was markedly lower than that in the control group. This suggested that although psychological intervention did not remarkably improve the successful conception rate, it could significantly shorten the therapeutic cycle, reduce the medical cost, and improve the utilization rate of medical resources. In a controlled study on 80 IUI patients, the additional implementation of psychological intervention significantly improved the awareness rate of patients on therapeutic knowledge (80.00% vs 37.50%) and the clinical cycle conception rate (20.00% vs 15.00%), and the researchers believed that psychological intervention was conducive to relieving the psychological pressure of IUI patients and had a positive significance to improve the clinical therapeutic outcome [20]. The authors in this study believed that psychological intervention is actually the abbreviation of comprehensive intervention. In this study, the psychological intervention included psychological interview, health education, and psychological relaxation training. Based on the characteristics of IUI patients (e.g., the poor self-awareness, low social support, obvious anxiety and depression), the targeted intervention was implemented, and the results showed that psychological intervention facilitated the concep-

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tion [21]. In the study, the causes for the therapeutic outcomes were analyzed. Regarding anxiety and depression, the study group was superior to the control group, and the scores of SAS and SDS in the study group were significantly decreased after intervention. A study showed that adverse emotions significantly affected individual hormone levels. A clinical study on 109 menopausal women showed that with the decrease in individual estrogen levels, the scores of anxiety and depression scale were remarkably increased, and the estrogen levels were negatively correlated with SAS and SDS scores [22]. An investigation on 288 parturients showed that the increase in the estradiol levels reduced the incidence rates of anxiety and depression of parturients. All these have proved a correlation between adverse emotions and hormone levels. The improvement of anxiety and depression in the study group affected the hormone levels, thereby affecting the therapeutic outcome [23].

The changes of self-efficacy and social support scale scores in the two groups after intervention were analyzed. The results suggested that the strength, optimism, tenacity and the total score of self-efficacy scale in the study group after intervention were markedly higher than those in the control group. Some scholars indicated that self-efficacy reflected the individual's cognitive attitude towards self-ability, or the individual's tolerance towards frustration. Although the overall success rate of IUI is high, most patients have the obvious psychology of being swayed by considerations of gain and loss due to the long therapeutic cycle, intensifying frustration after treatment failure and further aggravating the adverse emotions of infertile patients. Therefore, a good self-efficacy is crucial to strengthen the therapeutic compliance of patients [24, 25]. In this study, the strength, optimism, tenacity and the total score of the self-efficacy in the study group were significantly increased after intervention, exhibiting that psychological intervention was conducive to improving the failure threshold of patients. The further assessment of social support suggested that psychological intervention helped improve the social support of patients. This may be related to the patients' family initiatives fully mobilized by the social support nursing intervention. The psychological intervention stimulates family members to take the

initiative to care for and help the patients, and stay with them to complete the treatment, effectively alleviating the loneliness of patients and positively supporting the treatment [26].

In summary, the active psychological intervention can effectively improve the therapeutic outcome, adverse emotions, self-efficacy, and social support of IUI patients, exhibiting a practical application value clinically. The innovation of this study lies in the detailed analysis of the influences of psychological intervention on the psychological state of IUI patients through establishing a controlled study from the perspectives of adverse emotions, social support and self-efficacy, thus providing detailed theoretical data for the follow-up studies. The deficiencies lie in the assessment of therapeutic results only using the scales, and the insufficient analysis of the mechanism of corresponding intervention results. Based on the aforementioned deficiencies, we will analyze and explore the intervention mechanism from the perspective of laboratory or biology in the future studies.

Disclosure of conflict of interest

None.

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