Effect of Acupressure on Anxiety among women undergoing Intrauterine Insemination in a Tertiary Referral Hospital, Tamil Nadu, India- A Randomized Controlled Trial

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ABSTRACT

Background: Anxiety is one of the most frequent manifestations of stress that is endured during the treatment of infertility. The anxiety of couples during an infertility workup can be countered using supportive and educative measures that enable them to overcome the negative emotions and thereby develop better self control. Materials and Methods: The study aimed at assessing whether acupressure can help relieve anxiety in women during the controlled ovarian stimulation period A prospective randomized controlled trial with an evaluative approach was used to assess the effect of acupressure on anxiety among women with unexplained infertility subjected to intrauterine insemination. A total sample of 124 women with unexplained infertility was included in the study. Women in the experimental group were subjected to self acupressure at P6 acupoint in addition to standard care as per the protocol at the department of Andrology and Reproductive medicine. The women in the control group received only the standard care. State Trait Anxiety inventory- Form Y was used to assess anxiety in the study. Data was analyzed using SPSS (Version 21). Results: Study findings revealed that the Post 1 and Post 2 S-Anxiety assessed half hour before and half hour after IUI procedure significantly lower among women in the experimental group when compared to the women in the control group at P < 0.05 levels. Conclusion: The study findings support the potential use of acupressure as an alternative nursing intervention in order to reduce anxiety among women undergoing assisted reproduction.

Key words: Acupressure, Anxiety, Unexplained infertility, State and Trait Anxiety, Intrauterine insemination
INTRODUCTION: Infertility and its treatment have proven to be a trigger for emotional upheaval, anxiety being reported as the most common manifestation. Supporting the above view, higher mental stress scores was reported among the infertile women in comparison to healthy pregnant women \(^1\). It has been reported that anxiety is one of the most frequent manifestations of stress that is endured during treatment of infertility \(^2\). Literature also supports that anxiety is more commonly experienced by the infertile women when compared to depression \(^3\).

Factors such as the women’s age, years of married life, type of infertility and the diagnostic findings influenced the degree of anxiety experienced by the infertile women. To make matters worse and even more challenging, most hormonal medications used in infertility treatment are associated with depression and anxiety as possible side effects.

A cross-sectional, self-report survey of 315 women on one or more cycles of CC or hMG were found to be associated with increased manifestation of side effects like irritability, mood swings, feeling low, and bloating\(^4\).

Interventions to reduce anxiety, therefore becomes important during infertility treatment in order to improve the outcome as there is evidence to indicate that anxiety may negatively affect the success rate of infertility treatment \(^5\).

Materials and Methods: A prospective randomized controlled trial with an evaluative approach was used to assess the effect of acupressure on anxiety among women with unexplained infertility subjected to intrauterine insemination.

Women with the following inclusion criteria were included in the study viz., primary or secondary unexplained infertility, in the age group of 20-35 years, duration of infertility from one- five years and in their first IUI cycle. Samples were excluded if they suffered from systemic illness, any unusual bleeding during the multiple ovulation induction periods, if they were on anxiolytic therapy, if they practiced any anxiety alleviating therapies like Yoga or Meditation and if they were unable to read Tamil/English.

The Subjective Anxiety variables such as Trait Anxiety (T-Anxiety) and State Anxiety (S-Anxiety) and the Objective Anxiety variables such as BP Systolic, BP Diastolic, Pulse and Respiration were used to assess Anxiety.
The Researcher opted to use only the S-Anxiety as repeat measure to evaluate the effect of Acupressure on Anxiety but considered the T-Anxiety as a baseline variable to define the existence of homogeneity among the women in the experimental and control group.

**Ethical Consideration**

Sample participation was voluntary, complying with the consent procedure in force, ensuring confidentiality and anonymity and the right to withdraw from the study at any given point during the study.

The research tools were tested for content validity and Reliability. A pilot study was carried out to assess the feasibility of the study and the applicability of the tools.

**Research Tools**: Outcome variables were measured with the following instruments: Spielbergers State Trait Anxiety inventory, Bio-Physiological parameters chart (Blood Pressure, Pulse and Respiration). Daily Self acupressure calendar (maintained by the women in the experimental group).

A structured interview schedule was used to elicit the demographic, psycho social and gynecological characteristics of the women. The demographic characteristics considered were women’s age, educational status, employment status, nature of occupation and family monthly income. The psycho social aspects such as family type (nuclear / joint), source of emotional support for treatment, whether accompanied by support person during stimulation and frequency of being accompanied by support person were included. The gynecological characteristics such as age at menarche, menstrual regularity, length of cycle, age at marriage, years of married life, type of infertility, duration of infertility and period of infertility treatment were considered in the study.

The research tools were tested for content validity and Reliability. A pilot study was carried out to assess the feasibility of the study and the applicability of the tools.

**Intervention in the Study**: Self acupressure at Pericardium 6 (P6) acupoint was used in the study for anxiety. The researcher earmarked the acupoint P6 for anxiety on the 2\textsuperscript{nd} / 3\textsuperscript{rd} day of menstrual cycle prior to initiating controlled ovarian stimulation for IUI among women in the experimental group.

The women were taught to apply gentle rhythmic on and off pressure on P6 acupoint with the thumb for 2 minutes (120 times), twice a day (morning and evening), from the 2\textsuperscript{nd} / 3\textsuperscript{rd} day of menstrual cycle through the controlled ovarian stimulation period until IUI.

An instruction leaflet on self acupressure for anxiety developed by the researcher was given to the women to reinforce the guidelines on self administration of acupressure for anxiety. A Daily self acupressure calendar was also
distributed to the women in the experimental group on the 2\textsuperscript{nd} / 3\textsuperscript{rd} day of their menstrual cycle and were instructed to make an entry of their practice of self acupressure for anxiety in the calendar as per the guidelines specified in the calendar and to hand over the calendar to the researcher on the day of their IUI procedure.

**Statistical Analysis:** Mann Whitney U test, Independent samples t-test, Odds ratio with 95% CI, One Way ANOVA, Two Way ANOVA, Regression Analysis, Correlation Coefficient and Chi Square were used to analyze the data.

**Results and Discussion:** Mann Whitney U test validates that the women in the experimental and control groups are homogeneous with respect to their demographic, psycho social and gynecological characteristics with the exception of their employment status in the demographic characteristic which was statistically significant at P < 0.05, as one third of women in the experimental group were employed against one sixth in the control group.

Women in both the groups were found to be homogeneous with respect to their BMI levels such as being underweight, normal, overweight and obese. The Mean BMI was around 25 in both the groups.

The Independent samples t-test validates that the women in the experimental and control groups are homogeneous with regard to their Trait and Baseline S-Anxiety assessed on the 2\textsuperscript{nd} / 3\textsuperscript{rd} day of their menstrual cycle before initiating controlled ovarian stimulation. The women in both the groups were found to have moderate Trait Anxiety and low Baseline S-Anxiety.

The Independent samples t-test validates that the Mean Baseline Objective Anxiety parameters such as BP Systolic, BP Diastolic, Pulse and Respiration to be significantly higher among women in the experimental group compared to the control group. However, the values in both the groups were within the normal range with no clinical significance.

Repeated Measures of One Way Analysis of Variance (RMANOVA) clearly indicated that the two groups differed significantly in the S-Anxiety levels as a steady decline is observed in the Subjective and Objective S-Anxiety parameters in the experimental group when compared to the control group from Baseline to Post 2 Time periods. The effect was statistically significant at P < 0.05 between Baseline (assessed on the 2\textsuperscript{nd} / 3\textsuperscript{rd} day of menstrual cycle prior to initiating controlled ovarian stimulation) and Post 1 S-Anxiety (assessed half hour prior to IUI procedure); Baseline and Post 2 S-Anxiety (assessed half hour after IUI procedure). The reduction was significant to the tune of
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nearly 28% in the Subjective S-Anxiety levels; 6% in BP Systolic levels; 4% in BP Diastolic levels; 7% in Pulse rate levels and 9% in Respiratory rate levels among women in the Experimental group.

Multivariate tests Viz., Pillai trace and Wilks Lambda revealed that the Mean values of S-Anxiety parameters significantly differed between the experimental and control groups between different time periods and also between groups and time periods put together as the significant values of all the multivariate tests are < 0.05.

An attempt was made to find out whether the differences in the Subjective and Objective Anxiety parameters (baseline and post 1; baseline and post 2; and post 1 and post 2) statistically differ among women in the two groups studied.

Self Acupressure for Anxiety was effective in significantly reducing the Subjective and Objective S-Anxiety Parameters prior to and after IUI procedure since the Mean Values of S-Anxiety and Bio-Physiological parameters compared, are found to be significantly lower in the Post 1 and Post 2 values, assessed half hour before and half hour after IUI when compared to the Baseline values, assessed on the 2nd / 3rd day of menstrual cycle at P < 0.05 for each of the above comparisons among the women in the experimental group when compared to the women in the control group.

The findings of the study strongly support the hypothesis, ‘Women, who practice Self acupressure for anxiety during the controlled ovarian stimulation period for IUI, demonstrate a significant reduction in anxiety in comparison to those women who do not practice Self acupressure for anxiety.’

Literature also supports that as an alternative nursing intervention, acupressure is effective in reducing anxiety levels[6]. Stimulating precise acupoints stimulates the central nervous system to release chemicals which helps in the reduction of pain as well as in the release of chemicals such as hormones that control the ability of the body to heal naturally and improve physical and emotional well being at the same time[7].

It has been proved that the manual stimulation of acupressure points increases the production of serotonin and endorphin and also improves the regulation of serum cortisol.

Thus the findings of the study suggest acupressure as an alternative nursing intervention for the women undergoing infertility treatment not only to reduce their anxiety but also to promote quality of life and thereby facilitates long term psycho social functioning.
Regression analysis was carried out to identify significant contributors for the Mean differences in Baseline and Post1; Baseline and Post 2 and Post1 and Post 2 S-Anxiety levels using selected demographic and psycho social and gynecological variables.

In the experimental group, only the family type from the psycho social characteristics contributed significantly to the Mean difference between Baseline and Post 1 State anxiety at P < 0.05. In the control group, only occupation and monthly family income from the demographic characteristics were found to be significantly contributing to the Mean difference between the Baseline and Post 1 State anxiety at P < 0.05 for both the characteristics compared.

None of the demographic and psycho social characteristics contributed significantly to the Mean difference between Baseline and Post 2; Post 1 and Post 2 S-Anxiety both in the experimental and control groups.

In the experimental group, none of the gynecological characteristics contributed significantly to the Mean differences between Baseline and Post 1; Baseline and Post 2 and Post1 and Post 2 S-Anxiety levels as the P value of the F statistic used in ANOVA was more than 0.05 for all the gynecological characteristics compared in the experimental group. However, in the control group four gynecological characteristics contributed significantly to the Mean difference between Baseline and Post 1 S-Anxiety and they are identified as age at marriage (P < 0.05), years of married life (P < 0.01), type of infertility (P < 0.001) and duration of infertility at P < 0.01. The type of infertility and period of infertility treatment significantly contributed to the Mean difference between Baseline and Post 2 S-Anxiety at P < 0.01 for both the characteristics compared and only the period of Infertility significantly contributed to the Mean difference between Post1 and Post 2 S-Anxiety at P < 0.05.

Literature supports that women with good economic and social resources have stronger defenses and are better able to withstand the effects of stress than those with lesser resources. Therefore, it is expected that the socio demographic factors may influence levels of anxiety and stress during fertility treatment and that women with lower educational level, lower income and lower social class will experience higher levels of anxiety as they lack environmental buffers against psycho social stress.

Studies report anxiety and depression to be more commonly associated with advancing age. However, few studies do not support the above findings as they report anxiety and depression to be more frequently associated with younger participants, especially women. It is possible that older women have better coping mechanisms, hence lesser depressive reactions.

Studies have found higher levels of depression and/or anxiety among infertile women who were housewives.
It is reported that the level of education among infertile women influences their emotional reactions \(^{(15)}\). Similarly, it was found that the anxiety levels among infertile women in Kayseri, Turkey were influenced by the educational level of the childless women \(^{(16)}\). Further, depression was more prevalent among women with only a primary school education \(^{(16)}\).

Supporting the above finding, few more studies found an association between higher educational level and lower rate of psychological anxiety and depression among infertile women \(^{(303, 300)}\). One study observed infertile women with higher levels of education to be going about their life independent of their wish for a child with more focus on career goals or leisure activities \(^{(17)}\).

The comparison of the demographic characteristics with the Anxiety parameters reveals that the T-Anxiety, Baseline S-Anxiety, Post 1 and Post 2 S-Anxiety do not differ significantly among women of different age groups, levels of education, employment status, and nature of occupation. As the critical value of F-Statistic used in ANOVA is more than 0.05 for each of the Anxiety parameters compared in the above cited demographic characteristics both in the experiment and control group.

A significant difference is found only with the Monthly family income of the women in the control group with respect to T-Anxiety as validated by One way Analysis of variance (ANOVA) which indicates that the T-Anxiety is significantly higher among women with a family monthly income of less than or equal to ₹ 10,000 and significantly lower among women with a Family Monthly income of ₹10001 – 20000 at P < 0.05. Supporting the above findings, literature supports that the stress during infertility treatment stems from the unaffordability of the infertility treatment costs \(^{(18)}\).

The comparison of the psycho social characteristics of the women with the Anxiety parameters reveals that the T-Anxiety, Baseline, Post 1 and Post 2 S-Anxiety do not differ significantly among women from different Family type (Joint / Nuclear) and different sources of emotional support for treatment both in the experimental and control group.

A significant difference is observed only with regard to the T-Anxiety and whether accompanied by the support person among women in the control group. The T-Anxiety is found to be significantly higher among women in the control group who were not accompanied by a support person when compared to the women accompanied by a support person on the 2\(^{nd}\)/ 3\(^{rd}\) day of their menstrual cycle for initiation of multiple ovulation induction for IUI at P < 0.05.
The Mean Post 1 S-Anxiety is also found to be significantly higher among women in the control group when compared to the women in the experimental group, irrespective of the number of times being accompanied by their support person during the multiple ovulation induction period for IUI at \( P < 0.05 \) for being accompanied 1-3 times and \( P < 0.01 \) for being accompanied 4-6 times. However, the Mean Post 2 S-Anxiety is found to be the same among women irrespective of the frequency of being accompanied by support person both in the experimental and control group.

Social support such as social coping resources, growth-fostering relationships, partner support and family support is reported to decrease stress associated with infertility among women.\(^{(19)}\) Perceived social support signifies the cognitive evaluation of the availability and adequacy of support. This perceived support helps the individual to believe that she is respected and is part of a network of mutual duties.\(^{(20)}\) Hence seeking social support is observed as an important coping mechanism used by couple treated for infertility.\(^{(21)}\)

Personal coping methods, level of support, level of hope and resilience are identified as important factors influencing the infertility stress.\(^{(22)}\) Lack of social support during infertility treatment can be a source of stress contributing to anxiety and depression among infertile women. Due to the stigma often associated with infertility, women chose to conceal their treatment from their friends and relatives which in turn reduces the emotional support. Hence most of the infertile women fail to have adequate psycho social support to bear the emotional and physical discomfort caused by the treatment procedure.

Several studies report higher levels of stress among infertile women who experience rejection or pressure from their husbands and family.\(^{(23,24)}\) Similarly, studies have also identified lack of support especially from their partners to be a contributing factor for anxiety and depression among infertile women.\(^{(24)}\) So also the anxiety level among the infertile women in Kayseri, Turkey was found to be influenced by the husband's support.\(^{(16)}\) On the contrary, one study reported absence of a significant relationship between social supports and infertility stress.\(^{(25)}\)

The comparison of the gynecological characteristics of the women with the Anxiety parameters in the present study reveals that the T-Anxiety, Baseline S-Anxiety and Post 2 S-Anxiety to be similar irrespective of age at menarche, length of cycle, age at marriage and years of married life in both the experimental and control group.

Similarly, the T-Anxiety, Baseline S-Anxiety, Post 1 and Post 2 S-Anxiety parameters of the women do not significantly differ with regard to menstrual regularity, their duration of infertility and period of infertility treatment in both the groups studied.
In the comparison of Anxiety Parameters such as T-Anxiety, Baseline S-Anxiety, Post 1 and Post 2 S-Anxiety of women diagnosed with different types of infertility such as Primary and Secondary Infertility. It is found that in the control group, the Baseline S-Anxiety among women with primary infertility is significantly higher compared to women with secondary infertility. The Mean values of all other Anxiety parameters such as T-Anxiety, Post 1 and Post 2 S-Anxiety are found to be similar irrespective of the type of infertility both in the experimental and control groups.

Three way analysis of data demonstrates significant differences in the following: Post 1 S-Anxiety, assessed half hour before IUI procedure is found to be significantly lower among women in the experimental group who were, (i) Accompanied by support person at least 6 times during the multiple ovulation induction period for IUI; (ii) Age at menarche between 11 and 15 years; (iii) Length of menstrual cycle ranging between 2 to 6 days; (iv) Age at marriage less than 25 years; and (v) Years of married life less than 5 years.

With regard to the impact of duration of infertility on the mental status of infertile women, it is reported that infertile women with 2-3 years duration of infertility had higher levels of depression compared to women with less than one year or more than 6 years duration of infertility.\(^{26}\)

Contrary to the above findings, few studies have reported that the length of infertility treatment was not related to the level of stress.\(^{27-28}\) However, the debate is whether changes in stress over time are a response to treatment or whether it is the result of the duration of infertility.

Few studies among IVF women have identified the outcome of the treatment rather than its duration that gives rise to increased levels of distress.\(^{29-30}\) One study reported that the trait anxiety scores among childless women increased with the duration of their marriage.\(^{30}\)

The Correlation of the Dependant variables- Subjective Anxiety parameters (Trait with Baseline S-Anxiety) reveals a significant positive correlation between T-Anxiety and Baseline S-Anxiety both in the experimental and Control groups.

Correlations between the Demographic and Gynecological characteristics of the women such as age, age at menarche, length of cycle, age at marriage, years of married life, duration of infertility and period of infertility treatment with post 1 and post 2 S-Anxiety are found to be insignificant in the experimental group. A Significant negative correlations in the control groups was observed between age & post 1 S-Anxiety, age at marriage & post 1 S-Anxiety; A positive correlation was found between duration of infertility and post 2 S-Anxiety.
One study observed a positive correlation between age and depression and anxiety scored using self-rating depression scale (SDS) and Hospital Anxiety and Depression Scale (HADS), as patient age increased, total HADS and depression scores also increased \(^{(31)}\).

![Figure 2: Profile plot of S-Anxiety assessed at different time periods among women in the experimental and control groups](image)

![Figure 3a: Profile plot of BP Systolic at different time periods among women in the experimental and control groups](image)
Figure 3b: Profile plot of BP Diastolic at different time periods among women in the Experimental and control groups.

Figure 3c: Profile plot of Pulse rate at different time periods among women in the experimental and control groups.
Figure 3d: Profile plot of Respiratory rate at different time periods among women in the experimental and control groups

CONCLUSION: Acupressure techniques are easy to learn and can be adopted to relieve symptoms in a wide range of clinical scenario. Self-Acupressure can be easily taught to patients, thereby increasing self-reliance, while helping them gain their independence and improve their quality of life.

Literature review of few randomized controlled trials supports safety and efficacy of Self acupressure with positive effects among clinically diverse population.

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DECLARATIONS:

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