6. DISCUSSION

This study has simultaneously examined the subjective and objective evidence of stress related to infertility and also the intervention to reduce stress. The present study was conducted to examine the effect of counseling among infertile women on several variables such as depression, anxiety and stress. The data proved that the infertile women with and without counseling had significant differences on the variables studied in the present research work. Results indicate that counseling supply evidence of positive effects in the alleviation of stress in infertile women. This is in line with the systematic review carried out by Boivin (2003)\textsuperscript{146}.

Emotional reaction towards infertility is an acute crisis for the couple who is unable to produce their biological child. Infertility is highly associated with emotional though some biological evidence proved that it could be due to emotional and psychopathology also. Though the rates of infertility are higher in underdeveloped countries, there is evidence shown from the survey undertaken from the developed countries also. This study was aimed at promoting the wellbeing of infertile women by maintaining good coping to lead near stress free life.

The study includes only female infertile women, because, when Andrews FM et al (1991)\textsuperscript{147} examined differences in distress between husbands and wives, women reported thinking about infertility six days a week, where as men reported four days on average. It has been suggested in both the qualitative and quantitative
research that infertility is more stressful for women because of a number of reasons. The relationship between husband, family members and relatives get disturbed. The women develop guilt which leads to failure in maintaining deep relationship. Women feel hopeless and worthless when her objective (of receiving their biological child) is not met. When these happen to women during IVF treatment, who are already in need of more support by her husband, family members, relatives, and friends and from the social network, they end with various stresses. Similar result was revealed from a population-based study by Klemetti et al (2010)\textsuperscript{148}, who reported that 20% of women and 9% of men experienced infertility. Childless women with infertility experience had increased risks of dysthymia and anxiety disorders compared to women who had not experienced infertility. This study states that infertility was associated with depression, anxiety and stress.

In our study, the average age of women in the study group was 29.86 years and control group was 29.17 years. This is similar to a meta-analysis conducted by Boivin J et al (2011)\textsuperscript{149}, in which the range across studies for average age of infertility was 29.7 to 36.8 years and Niharika Tripathi (2011)\textsuperscript{150}, which states that the problem of infertility is more among the women aged more than 25 years.

In this study, most of the women completed their primary education only. This is contradictory to the study conducted by Tripathi N (2011)\textsuperscript{150}, in which majority of the women were illiterate. This may be due to the fact that, now a days, in Tamilnadu, the literacy rate is increasing and all women are thinking that at least they should know to read and write.
Majority of the women were unemployed both in the study group and in the control group. It is similar to the study by Adamson PC (2011)\textsuperscript{151}. Most of the women completed only their primary level of education and they prefer to be housewives to meet their treatment procedures for infertility.

In this study, most of the women were adapting nuclear family. The reason behind this is in today's times, the Joint family systems have become almost extinct and in urban areas like Chennai, nuclear family is on the raise.

In our study, the average duration of infertility was 4.72 years in the study group and 4.29 years in the control group. In a meta-analysis conducted by Boivin J et al (2011)\textsuperscript{149}, the range across studies for average duration of infertility ranges from 2.6 to 7.8 years.

According to a study conducted by Pyari JS et al (2006)\textsuperscript{128}, unexplained infertility was the commonest among different causes of infertility. But in our study, endometriosis was the major factor affecting fertility in both the study and control group.

All the above details indicate that the background variables did not show any significant difference between study and control groups. It may be due to the randomization of sample selection. It showed homogeneity in samples, and it helped to compare the outcome measures effectively.
Study by Demyttenaere K et al (1988)\textsuperscript{152} has demonstrated that anxiety has a detrimental effect on fertility. Studies by Lapane LK et al (1995)\textsuperscript{153} and Domar AD et al (1999)\textsuperscript{154} indicated that depression could play an important role in the pathogenesis of infertility. Our study confirms that infertile women have high levels of depression, anxiety and stress.

Demographic variables (age, educational level, employment status, family type and duration of infertility) were considered because it has been generally accepted that these variables may be associated with different degrees of depression, anxiety and stress in infertile women\textsuperscript{120,155}. In our study, women with lower age, low educational level, unemployed and less duration of infertility had higher mean scores of depression.

There was a positive correlation between age and the anxiety and stress levels. This is similar to the study conducted by Donkor ES et al (2007)\textsuperscript{109}. Negative correlation of age on depression may be due to the fact that because participants have experienced years of infertility, the depression might have subsided during the years.

In a study conducted by Ramezanadeh F et al (2004)\textsuperscript{156}, anxiety and/or depression had negative correlation with education. In a study conducted by Beutel M et al (1999)\textsuperscript{157}, age and education level have no significant relationship with depression and/or anxiety. Another study by Domar AD et al (1992)\textsuperscript{118} showed that there was a positive correlation between them. But in our study, anxiety and stress are directly proportional and depression is inversely

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proportional to the level of education. This may be due to the fact that women who were educated learn more about infertility and they experience more anxiety and stress. In such closed societies as some parts of our country, education and job may be the lone gate leading women to joyful aspects of their life other than maternity. This is why education plays a considerable role in decreasing their depression. Negative correlation of educational level on depression indicates that more information and adequate counseling should be provided to infertile women with lower educational level.

In our study, women who were employed experienced the highest anxiety and stress score and lowest depression in relation to their infertility. This is in contrast to the study conducted by Ramezanzadeh F et al (2004)\textsuperscript{156}, in which anxiety and/or depression were observed more in housewives. According to Facchinetti F et al (1997)\textsuperscript{135}, having a job may reduce stress from infertility treatment. It seems being at work outside home decreases psychological signs of depression, at the same time that work environment and the people there questioning them about their infertility may aggravate the anxiety and stress levels.

According to our study, women from joint family experience more depression, anxiety and stress. Research from other cultures indicates that women may experience pressures to procreate, especially from their in-laws\textsuperscript{26,158,159}.

A finding from this study suggests that the greater the duration of infertility, the more their anxiety and stress levels. Domar A et al (1990)\textsuperscript{160}
reported that anxiety and/or depression increases with duration of infertility. A study by Ardenti R et al (1999)\textsuperscript{161} demonstrated that women who had experienced infertility for a long or medium range of time presented a significantly lower state of anxiety and there was a trend of decreasing psychological stress with lengthening of infertility time. It may be due to the fact that having a child is very important for our people, especially our women; therefore our women show higher and longer emotional reactions and psychiatric symptoms lasts longer in comparison to other countries.

Psychological difficulties of infertile patients are complex and influenced by a number of factors such as gender differences, cause and length of infertility. Freeman EW et al (1987)\textsuperscript{112} found that half of their sample of infertile couples described infertility as the most upsetting experience of their lives, whereas 80% of the sample reported by Mahlstedt PP et al (1987)\textsuperscript{113} described their experience of infertility to be either stressful or very stressful. In our study, we found that the duration of infertility had a significant positive association on stress. In other words, if the duration of infertility increases, the stress also increases. It is similar to the study conducted by Berg BJ et al (1991)\textsuperscript{115} and Chiba H et al (1996)\textsuperscript{162}, which states that the length of treatment changed the emotional stress.

In our country like India, family status especially childbearing is very important and valuable. Having a child stabilizes family and increases marital satisfaction. In our culture and society, negative attitudes to infertility are so throbbing. Having a child is psychologically or effectively, a vital factor for
women, and the absence of children may cause marital problems such as divorce or even second marriage. Intervention of relatives especially husband's family, negative attitude and behavior of surroundings (family, friends, neighbors, etc.) causes psychological problems for infertile women. Generally infertile women experience negative social consequences including marital instability, stigmatization and abuse. Infertility can have a serious effect on both psychological well-being and social status of women in our country.

In this study, at first visit, in both study and control group, the overall depression, anxiety and stress levels were extremely severe. After 3 months, in the study group, majority of the infertile women experienced mild depression, anxiety and stress, whereas in the control group, majority of the women experienced extremely severe depression, anxiety and stress. It shows that there was no change in the reduction of depression, anxiety and stress levels in control group. But after counseling the control group, majority of the women in the control group experienced only mild depression, anxiety and stress. Findings revealed that counseling had an influence on the levels of depression, anxiety and stress. To support the above results, the view on the impact of infertility on the psychological aspects of women with infertility, Salvatore P et al (2001) also found out higher levels of anxiety and emotional tension among infertile women. The impact of treatment and repeated experience of failure of infertility treatment may lead to increased distress. The observed high levels of depression, anxiety and stress of infertile women could be attributed to the unsuccessful attempts of women trying to conceive a child according to Moller A et al (1991), as well as to the long diagnostic procedures in view with Lee TY et al (2001). This
finding supports the ‘psychogenic hypothesis’ emphasizing the role of psychogenic elements among the causes of infertility (Fassino S et al 2002)\textsuperscript{155}, which may confirm the existence of a suggested causal link between psychogenic factors and infertility and is in accordance with many previous studies\textsuperscript{165-169}. Nevertheless, many researchers have not found significant relationships between psychogenic factors and infertility\textsuperscript{170,171}.

In the subjects, MDA level was significantly (p<0.0001) lowered and SOD level was significantly (p<0.0001) raised after counseling. This is in accordance with the study conducted by Pyari JS et al (2006)\textsuperscript{128}, in which MDA level was high in infertile women and SOD level was low.

Oxidative stress due to free radicals precipitates a range of pathological changes that affect the reproductive functions in both men and women. Agarwal et al (2003)\textsuperscript{172} suggested the role of reactive oxygen species (ROS) in infertility. We studied the levels of MDA (marker of oxidative stress) and SOD (antioxidant protective enzymes) in blood and had similar findings.

The increased oxidative stress observed in our patient may play an important role in the pathophysiology of infertility, and is in agreement with earlier reported findings by Agarwal et al (2005,2006)\textsuperscript{66,88}.

Reduced SOD and increased MDA suggest that increased oxidative stress and one of its major consequences, increased LPO, may be the key factors
involved in the pathophysiology of infertility. Our analysis provides a better understanding of the mechanisms of pathophysiology.

In our study, depression, anxiety, stress and MDA were all decreased and SOD (oxidative enzyme) was increased after counseling. Results indicated that counseling was effective in reducing some aspects of self-perceived depression, anxiety and stress in these women. Hence counseling had a positive effect in reducing stress. This is consistent with the wordings of Dyer SJ et al (2005)\textsuperscript{173}, who stated that couples will benefit from counseling offered by professionals trained in mental health care. This information can assist practitioners with providing proper counseling to infertile women. This has particular relevance in developing countries like India, where the cost of treatment for infertility is not affordable for the majority.

Infertility is not only a physiological or patho-physiological condition in need of bio-medical intervention but also an emotional, social, cultural, religious and economic reality\textsuperscript{174-176}. Effective interventions require an understanding of these realities\textsuperscript{176,177}. Our study contributes to this understanding where it is currently most lacking, namely in communities from developing countries. Professional psychological interventions with aim to relieve or diminish these conditions might have significant therapeutic benefits for women attending infertility clinics. In line with Boivin J et al (2001)\textsuperscript{139}, the objectives of counseling to highly distressed patients are to enable the expression of their emotions, to identify the causes of distress and to provide interventions to minimize distress and help patients better manage distress. According to
Dunkel-Schetter C (1991), the goal of psychological interventions should be the minimization of identified risk factors for infertility-related distress and the strengthening of protective factors.

It has to be stressed here that all the women who came for follow-up were following their regular treatment procedure and adhered to medications. In the study group, 48 (41.74%) women were conceived after 3 months of counseling whereas in the control group, only 11 (9.57%) conceived after 3 months, since they did not receive counseling. The treatment outcome was more in the study group after counseling when compared to the control group. Hence counseling may be one of the factors to increase the pregnancy rate. Our study results indicate that counseling supply evidence of positive effects in the alleviation of stress and in increasing the pregnancy rate in infertile patients. This is in line with McRoberts et al (1998), Boivin (2003) and de Liz TM et al (2005), who state that group and individual / couple therapies have been similarly effective when compared with each other.

Among the women who have conceived, majority of the women belong to the unexplained infertility group. Our study result is in accordance with Hull et al (1985), who has reported that, in couples diagnosed with unexplained infertility, the pregnancy rate was 70%. According to a study conducted by Brandes M et al (2010), overall success rate in couples with unexplained infertility are high. Studies have shown that spontaneous conception occurs in the majority of couples with unexplained infertility if they continue to have fertility-focused intercourse. All other factors are normal in women with unexplained infertility and this may be the reason for their effective treatment outcome.
STRENGTHS

a) The questionnaires used in this study have been previously evaluated and have been proved to be reliable and valid measures.
b) All items of the questionnaires were answered by almost all the participants. These strengths ensure the reliability of study findings.
c) Both subjective and objective assessments were done simultaneously.

LIMITATIONS

a) An important factor that was not specifically addressed in the present study is the role of the male. Males were not assessed in the present study due to lack of compliance.
b) Infertile women attending only Sri Ramachandra Hospital were included in the study.