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Mood Disorders and Female Sub Fertility- Any Relationship? A Pilot Study

Biochemistry Section

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ABSTRACT

Back Ground: Subfertility, which is clinically defined as the inability in conceiving a child in spite of having unprotected sex within a year, is a common problem which affects 5-10 % of the women. The subfertile women are at their greatest life time risk for mood disorders during their re-productive years. This work was focused on the contribution of depression to subfertility in the status of the menstrual cycle, the number of follicles and the hormonal profiles like oestrogen and FSH.

Materials and Method: Fifty subfertile women were included in this study. By using a questionnaire of Beck Depression Inventory, the subjects were divided into two groups, Group 1; subfertility without depression and Group2: subfertility with depression. This study was approved by the institutional ethical committee and a written consent was obtained from all the participants. Trans vaginal ultrasound was performed to measure the number of follicles on the cycle days, 3-10 .The blood sampling which was done to measure the hormones like FSH and oestradiol was also done on the same day of the cycle.

Results: The mean age of the subfertile patients with depression was 30 years. The older subfertile patients were more vulnerable to depression than the younger ones. 70% of the subfertile women with depression had irregular cycles with long periods of amenorhoea or oligimenorrhoea. The antral follicles in the size, 2mm-9mm were more in Group 2 and they showed a statistical significance between the two groups. The levels of FSH and E2 were not statistically significant between the groups.

Conclusion: No significant differences were found in the FSH and oestrogen levels between the subfertility without depression and the subfertility with depression groups. But the mood disorders or the depression may be associated with the quality and the number of the follicle counts.

Key Words: Depression, Subfertility, Menstrual pattern

INTRODUCTION

The inability in conceiving a child within one year of having unprotected sex is clinically defined as subfertility, which affects 5- 10% of the women [1]. High stress levels, positive and negative life events, a low socio economic status and the quality and the quantity of the personal relationships are some of the factors which are associated with the vulnerability of a woman to have depression. Although there are many factors that are predictive of depression, there are other factors which are more specific. Several workers have addressed stress, depressive symptoms and anxiety in relation to fertility [2,3].

Only few studies on the fertility rates in women with clearly diagnosed mood disorders have been published since 1980 [4-8]. During the evaluation of the association of fertility with depression, some studies have investigated the fertility before the onset of the first psychiatric episode [2,4,7] and others have investigated the fertility after the first psychiatric episode. A study which was done by Baron, which included 60 males and 74 females who were admitted to the Lithium Clinic of the New York State Psychiatric Institute between 1968 and 1974, reported a reduced fertility rate in both the genders [5].

In a similar study which was done by Jonsson 1991, irrespective of their marital statuses, 40 women with the diagnosis of mood disorders had birth rates which were lesser than the age matched norms [8]. In a Harvard study on moods and cycles, which was a unique prospective study, the lowest rate of fertility was observed in the women with a history of major depression [8].

The experts have long considered that the hormone levels have to be correlated with infertility and depression. More specifically, it has been hypothesized that the women who experience infertility and depression must differ from the unaffected women in terms of the levels of oestrogen and progesterone [9]. A similar and an associated hypothesis is that the fluctuations in the oestrogen and the progesterone levels across the menstrual cycle in depressed women may differ from the fluctuations in the unaffected women. The goal of this study was to find the status of the hormone level and the menstrual pattern in subfertility patients with depression and without depression.

MATERIALS AND METHODS

In this study, fifty infertile women who had no children after having unprotected sex for more than one year, were recruited through a camp by the Sree Balaji Medical College, Chennai, India. By using a questionnaire of Beck Depression Inventory (BDI), the subjects were divided into two groups, Group 1; Infertility without depression with a score of below 16 and Group 2; Infertility with depression with a score of above 16. This study was approved by the institutional ethical committee and a written consent was obtained from all the participants. The subjects with endocrinological diseases like diabetes and a history of an ovarian surgery were excluded

from this study. The Depression Rating Scale (DRS) is a psychiatric measuring instrument which has descriptive words that indicate the severity of the depression symptoms for a time period.

In our study, we used the Beck Depression Inventory for assessing the depression. It is a questionnaire with 21 questions, self report inventory that covers the symptoms such as irritability, fatigue, weight loss, a lack of interest in sex, feelings of guilt, a fear of being punished, pessimism, changes in the sleeping pattern, etc.

The total score can range from 0-63.The classification of the depression scores is as follows:

0-16 without depression.

17-27 mild depression.

28-34 moderate depression. and

35-63 severe depression.

In our study, most of the women belonged to the mild depression category (i.e.) with scores of between 17-27.Three patients presented with moderate depression scores and two patients had scores of severe depression.

The transvaginal sonography measurements: Trans vaginal ultrasound was performed to measure the number of follicles. It was carried out on the cycle days, [3-10]. The sonographic measurements were performed by the same observer by using a 7.5 MHz trans vaginal probe. The examination of the ovary was established by scanning from the outer to the inner margin of the ovary. All the follicles which were 2-9mm in size were measured and counted in each ovary and the sum of both the counts was taken as the follicle count.

ENDOCRINE TESTING

Both the blood sampling and the ultrasonographic measurements were performed on the same day. The sera was separated and the specimens were stored at -20^{0}C until they were processed. The hormones like FSH and E2 were measured..

RESULTS

The mean age of the infertile patients with depression was 30 years. The older subfertile patients were more vulnerable to depression than the younger ones. 70% of the subfertile patients with depression had irregular cycles with long periods of amenorrhoea or oligomenorrhoea. The follicles were more in Group 2 and there was a statistical significance between the two groups. The levels of FSH and E2 were not statistically significant between the groups.

	Infertility		
	Group1 Without depression	Group 2 With depression	
Age	22.47±2.40	30.9 ±2.79	0.000
History of cycle	Irregular cycles	Irregular cycles with long duration	
BMI	23.8 ±3.3	25.0 ±3.3	0.337
FSH	8.74± 2.4	10.4±5.7	0.509
E2	127.25± 48.05	134.8 ±38.9	0.990
No of follicles in size 2mm-9mm.	13.1± 4.63	18.2 ±5.68	0.000

[Table/Fig-1]: AScreening Parameters - Student t-test

DISCUSSION

Subfertility is universally described as a stressful experience for the patients, especially for women, which affects all the aspects of their lives, like marital, social, physical and emotional issues, etc. Childlessness in women is a social stigma with profound negative consequences. Depression is a very frustrating and a debilitating condition which affects all the aspects of a person's life. When a woman suffers from depression, her normal ovulation pattern can easily become disrupted. A woman may either miss a complete cycle of ovulation or the cycle may be significantly altered. When a woman wants to have a baby, that too, when she is older, she begins to worry if she does not become pregnant. This chronic worry may lead to depression, which in turn interferes with the necessary hormonal balance, ultimately resulting in an interrupted cycle. Considering depression, it is like the chicken and the egg debate, whether infertility leads to depression or vice versa.

The women who are in their reproductive ages, who have mental disorders, may experience a fluctuating course of illness during their menstrual cycles [10]. In our study, it was observed that the depressive symptoms were associated with the changes in the length of the menstrual cycle [11]. The women with a depression score of more than 16 as per the Beck Inventory Scale were associated with either a late menarche or secondary amenorrhoea or with irregular menstrual cycles [12].

In our study, the difference in the mean levels of FSH in Group 1 (8.74± 2.4 IU/l) and in Group 2 (10.4± 4.7) and that in the mean levels of E2 in Group1 (127 .25 ± 48.05 IU/L) and in Group 2 (134.8± 38.9 IU/L) were not statistically significant. In a similar study which was conducted by Young et al in 2000 on 25 women with major depression and their comparison with healthy controls of the same age group, the day 3 hormonal levels like FSH , LH and E2 showed no significant, except the lower oestrogen levels in the follicular phase [13]. The menstrual cycle linked disorders can be understood by the fact that they are caused by the action of the endogenously produced GABA steroids through the following three mechanisms [1]. Direct action [2]. Tolerance induction and [3]. Withdrawal effect, ultimately resulting in sedation , an increased appetite, irritability, and depression during the hormone treatment and the premenstrual dysphoric disorder. A malfunctioning GABA –a receptor system, is related to stress sensitivity , irritability , anxiety and depression [14].

The follicles with sizes of 2- 9mm (small) were found to be more in the group with infertility which was associated with depression as compared to those in the group with infertility which was not associated with depression. The changes in the length of the menstrual cycle may be the factors for the arrest of the maturation of the follicles, ultimately leading to more number of small follicles. The probable mechanisms which cause the depression which affects infertility include elevated prolactin levels, disruption of the hypothalamic –pituitary adrenal axis and the thyroid function. Menstrual cycle regularity in assessing an interrelationship between mood disorders and fertility needs validated measures to confirm the diagnosis of mood disorders [15]. Whatever the cause , infertility has more psychological impact on women as compared to men.

The women who attempted the questionnaire can be given a series of cognitive behavioural therapy before they proceed for IVF, for better results. Significantly lower BDI scores were noticed

in the patients who received a psychological intervention before the infertility treatment [16]. In our follow up study, it should be planned like, after a course of cognitive behavioral therapy, BDI depression analysis can be repeated.

There are only a limited number of studies which have explained the relationship between the mood disorders and infertility. This was because of the lack of a prospective assessment, which included a small sample size and the use of unreliable methods of determining the menstrual cycle phases.

CONCLUSION

Various psychosocial predictors can be used to identify the women who may be at risk for reproductive depression. If women feel one type of reproductive depression, the likelihood of experiencing other types of reproductive depressions is more.

70% of the subfertile women with depression have irregular cycles with long periods of amenorhoea or oligimenorrhoea No significant differences were found in the FSH and oestrogen levels between the subjects with (BDI) scores which were less than 16 or more than 16. But the mood disorders or depression were associated with the number and the quality of the small follicular count.

This basic study may not be adequate enough to explore the complex relationship between the hypopituitary gonadal function and depression, because of its small sample size. Further studies are needed to signify our findings.

REFERENCES

[1] Abma JC, Chandra A, Mosher WD, Peterson LS, Piccinino LJ. Fertility, family planning and the women's health: estimates from the National Survey of Family Growth. *Vital Health Stat* 1997; 23:1-14.

[2] Edelmann RJ, Connolly K. The psychological aspects of infertility. *Br J Med Psychol* 1986; 59 (Pt 3):29-219.

[3] Greil AL. Infertility and psychological distress: a critical review of the literature. *Soc Sci Med* 1997; 45:1679-1704.

[4] Odergard O. The fertility of the psychiatric first admissions in Norway 1936-1975. *Acta Psychiatr Scand* 1980; 62:212-20.

[5] Baron M, Risch N, Mendlewicz J. The differential fertility in bipolar affective illness. *J Affect Disord* 1982; 4:103-12.

[6] Calzeroni A, Conte G, Pennati A, Vita A, Sacchetti E. The celibacy and the fertility rates in patients with the major affective disorders: the relevance of the delusional symptoms and the suicidal behavior. *Acta Psychiatr Scand* 1990; 82:309-10.

[7] Jonnson SA. The marriage rate and the fertility in cycloid psychosis: a comparison with the affective disorders and schizophrenia in the general population. *Eur Arch Psychiatry Clin Neurosci* 1991; 24:119-25.

[8] Harlow BL, Cohen LS, Otto MW, Spiegelman D, Cramer DW. The early life menstrual characteristics and the pregnancy experiences among women with and without major depression: the Harvard study on moods and cycles. *J Affect Disord* 2004; 79:167-76.

[9] Rubinow DR, Hoban MC, Grover GN, et al. The changes in the plasma hormones across the menstrual cycle in patients with menstrually related mood disorders and in control subjects. *Am J Obstet Gynecol* 1998; 158; 5-11.

[10] Akdeniz F, Karadag F. Does the menstrual cycle affect the mood disorders? Turk Psikiyatri Derg 2006; 17 :(4) 296-304.

[11] Bisaga K, Petkova E, Cheng J, Davies M, Feldman JF, Whitaker AH. The menstrual functioning and the psychopathology in a county-wide population of high school girls. *J. Am Acad Child Adolesc Psychiatry* 2002; 41:1197-204.

[12] Smeenk JMJ, Verhaak CM, Eugster A, Minnen A, Zielhuis GA, Braat DDM. The effect of anxiety and depression on the outcome of in-vitro fertilization. *Hum Reprod* 2001; 16:1420-23.

[13] Young EA, Midgly AR, Carlson NE. Alterations in the hypothalamic-pituitary ovarian axis in depressed women. *Arch Gen Psychiatry* 2000;57:1157-62.

[14] Backstrom T, Andersson A, Andree L, Birzniece V, Bixo M, Bjorn I, Haage D y8 et al. The pathogenesis of the menstrual cycle- linked CNS disorders. *Ann N Y acad Sci* 2003; 1007; 42-53.

[15] Katherine E, Wendy K, Natalie L. Mood disorders and fertility in women: a critical review of the literature and the implications for future research. *Human Reprod* 2007; 13(6); 607-16.

[16] Carl C. Bell . Infertility and Mood Disorders :Breaking the cycle. *Clinical Psychiatry News* 2008;

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