



Study of Hormonal Parameters in Depressive Women

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ABSTRACT

The world health organization (WHO) predicts that depression would be the second greatest cause of premature death and disability by the year 2020. A gender difference in depression, with a twofold greater prevalence of depression occurring in women than in men is demonstrated. The role of reproductive hormone is found in modulating depression.

This study was carried out with the aims and objectives to study

- 1. The levels of FSH, LH, estrogen and progesterone in depressive women.*
- 2. The level of total cholesterol in depressive women as compared to their non-depressive counterparts*

Materials & Methods: This was a case control study. We included 25 women suffering from depression as cases and 25 non depressions as controls. We used DSM-IV criteria for diagnosis of depression and 17 point Hamilton rating scale for severity of depression. Estimation of FSH, LH, estrogen and progesterone was done by using ELISA test during follicular and luteal phase of menstrual cycle. Student t-test was used for statistical analysis

Result: Hamilton scoring revealed mean score for group A as 20.08±4.7 (36% moderate & 46% severe depression) and group B as 2.12 ± 1.76 (no depression). We found that the level of estradiol was significantly lower in the depressed women both in follicular phase ($p<0.001$) and in the luteal phase ($p<0.037$) while the difference in FSH, LH and progesterone was not significant in both the group. The level of cholesterol was decreased in depressive women but this reduction was not significant ($p=0.07$).

Conclusion: There is an association with depression in women and decrease in estradiol level.

KEYWORDS : Depression, Hormonal parameter, women, estrogen**Introduction:**

Depression: "a global crisis", which is the theme of World Mental Health Day 2012, is the cause of substantial disability- disrupting the occupational and social life of individual. It is estimated that by 2020, depression will be the 2nd leading cause of disability¹ (WHO2001) and by 2030; it is expected to be the largest contributor to disease burden (WHO 2008) ¹ While depression is the leading cause of disability for both males and females, the burden of depression is 50% higher for females than males (WHO 2008)² throughout the world. Researches in developing countries suggest that maternal depression may be a risk factor for poor growth in young children³, which may in turn affect not only this generation but also the next.

In females besides socio-cultural factors, hormonal interplay is also suggested as a cause of depression. An increase in the incidence of depression in girls following the onset of puberty and destabilization of mood in perimenopause has suggested that reproductive hormones may play a role in modulating the depression^{4,5}. Stress is known to affect the reproductive axis leading to amenorrhoea in the most severe cases. Some studies have found that lower total serum cholesterol is also associated with depression⁶. This study was undertaken with the aims and objectives to study

The levels of FSH, LH, estrogen and progesterone in depressive women as compared to their non-depressive counterparts.

The level of total cholesterol in depressive women as compared to their non-depressive counterparts.

Material and Methods:

This was a case control study carried out in the department of Physiology. We included 25 women as cases aged 20-49 years (premenopausal) attending the psychiatric OPD on their first visit seeking treatment for new episode of depression. The patient was diagnosed according to the DSM-IV criteria in the OPD by consulting psychiatrist. Severity of depression was graded by 17 point Hamilton rating scale. A total of 25 controls with no current or past psychiatric illness were recruited from the Obstetrics and Gynaecology wards and OPD. Controls were matched with cases for age and menstrual period. Women taking oral contraceptive pills, pregnant and lactating females and women on any medication for more than 3 months prior to study were excluded. A written informed consent was taken after explaining the nature of study.

Estimation of FSH, LH, estrogen and progesterone was done using ELISA test during both follicular and luteal phase of menstrual cycle. Intracubital venous blood (4ml) was collected from subjects. The blood was allowed to coagulate for 60 minutes in incubator at 37. Serum was separated after centrifuging at 3000 rpm for 10 minutes and stored at -20 till the estimation of FSH, LH, estrogen and progesterone was done. Fresh serum was used to estimate cholesterol. Student t-test was used for statistical analysis. Data was analysed by SPSS version 16.

Results:

The mean age for group A was 30±7 years while for group B was 32±7 years (No significant difference $p<0.05$). As far as education was concerned around 50% of women in both the groups were either illiterates or educated up to 5th standard. Only 12 percent were post graduates in both the groups.

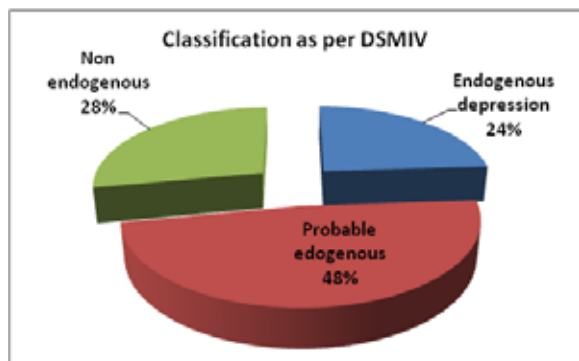
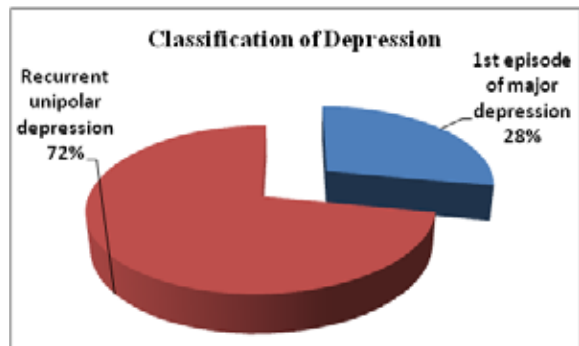
Table 1: Hamilton Scoring

Group	Hamilton Score	No Depression	Mild depression	Moderate Depression	Severe Depression
Gp A	20.88±4.73	0	0	9 (36%)	16 (64%)
Gp B	2.12±1.76	25 (100%)	0	0	0

Hamilton scoring in Table1 reveals that in case group 36% women were suffering from moderate depression and 64% from severe depression. No woman was suffering from depression in control group.

Out of 25 patients with depression, 7 (28%) patients were studied in the first episode of major depression; rest 18(72%) patients met DSM IV criteria for recurrent unipolar depression. (graph 1)

Of 25 patients, as per DSM IV criteria 6(24%) patients were having endogenous depression, 12(48%) patients probable endogenous depression and 7(28%) patients non endogenous depression (Graph 2).



Graph 1:

14 (56%) out of 25 depressed patients met criteria for at least on anxiety disorder; 11 with generalized anxiety and 3 with panic disorder. 23 of 25 depressed patients suffered from sleep disorder. Of these 16 patients suffered sleep difficulty in all the three phases, 5 had difficulty in initial and middle phases only and 2 in middle and late phase.

Graphs 3, 4, 5 & 6 show various hormone levels at different phase of menstrual cycle.

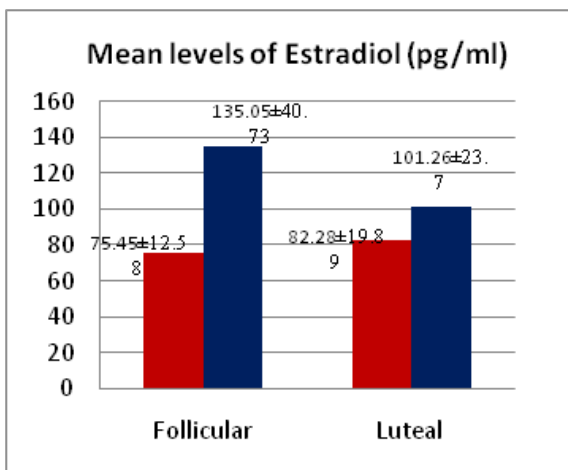
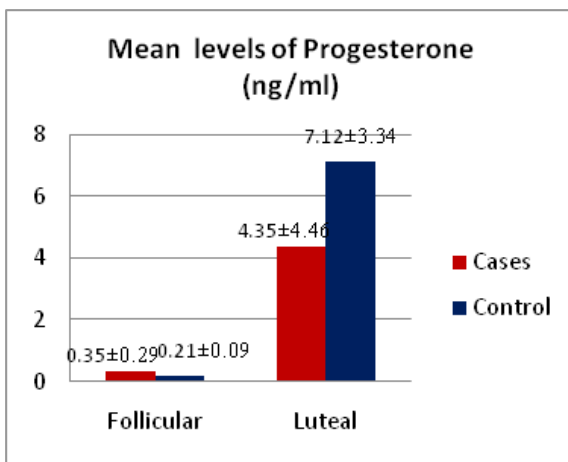
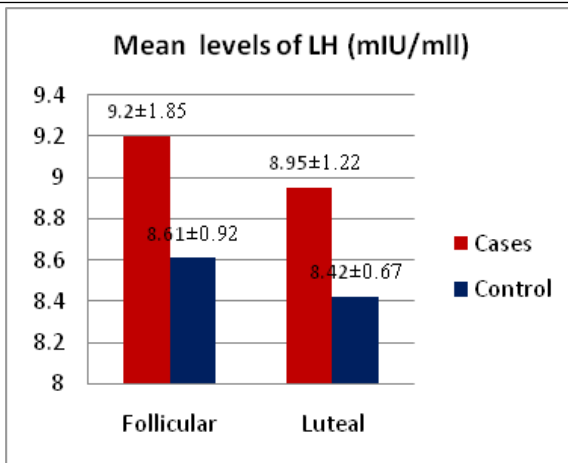
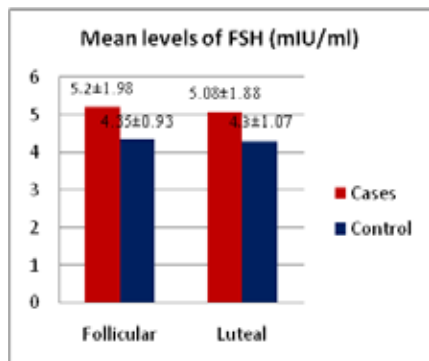
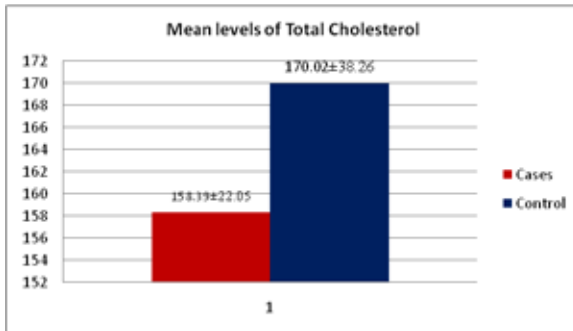


Table 2: Results of Independent samples "t" test between different groups

Independent Sample "t" test (Group A vs. Group B)	t- value	P value
FSH Follicular phase:	1.35	0.190 (NS).
FSH Luteal phase:	1.30	0.204 (NS)
LH Follicular phase:	0.98	0.337 (NS)
LH Luteal phase:	1.36	0.185 (NS)
Progesterone follicular phase:	1.48	0.151 (NS)
Progesterone Luteal phase:	-1.75	0.093 (NS)
Estradiol follicular phase:	-4.82	0.001 (S <0.05)
Estradiol Luteal phase:	-2.21	0.037 (S<0.05)

After comparing the hormonal levels by independent "t" test it was found that level of estradiol was significantly lower in depressed women both in the follicular ($p=0.001$) and in the luteal phase ($P<0.05$). The difference in rest of the hormones was found not to be significant as indicated in table 2.

The results for total lipids are shown in **graph 7** below. The total lipids in group A (cases) is lower (158.39 ± 22.05) than the total lipids of group B (170.02 ± 38.26), but this difference is not found to be statistically significant in our study ($t= -1.85, p=0.070$).



Discussion:

Only female patients were taken in the study because it has been found consistently that females have a higher incidence of depression⁷. This depression is almost two times more than the incidence of depression in males and is associated with anxiety^{8,9}. In this study we included only those females who were in reproductive age group as we wanted to see the status of Hypothalamic pituitary ovarian axis (HPO) in females of reproductive age group who were suffering from depression.

On Hamilton scoring it was found that majority of depressive females were having higher scores. About 14 (56%) of patients were suffering from some kind of anxiety (11 from generalised anxiety & 3 from panic disorder) which was severely hampering their functions. This was in consonance with some other studies^{4,5,9}.

We can see from the graphs that levels of FSH and LH are slightly higher in cases than controls in both follicular and luteal phases but this difference is not statistically significant which indicates that any changes which are occurring in the levels of estradiol and progesterone are not having any effect on the feedback loop.

In our study no significant difference in the level of progesterone in cases and controls was seen which is in accordance with the findings of Young EA et al¹⁰. There is significant decrease in levels of oestrogen in both the phases of menstrual cycle in depressive women as compared to their normal counterpart. Young et al also found lower level of plasma estradiol in follicular phase in women with depression than their matched controls. We observed lower level of estradiol in both the phases of menstrual cycle.

Estradiol has effects on multiple sites in the cerebral cortex including memory, synaptic density and the neurotransmitter system of serotonin and norepinephrine^{10,11}. It has also been reported that oestrogen has an anxiolytic effect and may augment the action of antidepressants¹². Therefore hormone replacement therapy is being advised to menopausal women in order to alleviate the symptoms to mild depression especially in patients not responding to antidepressant therapy after investigating their estrogen level. This step has to be studied further as estrogen when administered alone has deleterious effects in the form of increased incidence of tumours.

The decrease in total cholesterol level in depressive women though statistically significant ($p=0.07$) is in consonance with some study^{6,13}. Shiny SY¹⁴ also recommended that lipid levels of depressive patients should be monitored as it has been reported that the risk of suicide is higher in patients with major depression with low total cholesterol levels.

Conclusion and Recommendations:

Level of estrogen and total cholesterol was found to be decreased in depressed females in our study. Since depression is 2-3 times more common in females than in males and also has intergenerational effect, it must be addressed in a holistic way.

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