Original Article

Gender Variability of Perceived Stress and Negative Inferential Feedback in Depression

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ABSTRACT

Background: The role of negative inferential feedback and perceived stress in hopelessness depression is known. However, studies on their gender variability are lacking. The difference in various domains of negative inferential feedback and its impact on cognitive hopelessness, depression, and outcome of psychotherapy between men and women has been hypothesized. **Aims:** This study analyzed the difference in stress levels and hopelessness in the form of negative inferential feedback in depressed men and women. **Methodology:** In all, 35 men and 35 women suffering from depression were recruited. They were first assessed on the Hamilton's Depression Rating Scale, and their sociodemographical details were recorded. They were then administered the Perceived Stress Scale (PSS) and the Adaptive Inferential Feedback Questionnaire. **Results:** Perceived stress in depressed women showed a positive correlation with negative inferential feedback ($r = 0.39$, $P = 0.04$). Levels of depression were comparable in the two genders. Comparison between the two genders showed no difference in proportion across the levels of severity of depression ($\chi^2 = 5.44$, $P = 0.14$). Depressed women rated higher stress, mainly in the helplessness domain of the PSS ($P = 0.04$). Women were shown to have more negative inferential feedback and attribute their hopelessness to more stable and global causes when compared with men ($P = 0.04$). **Conclusion:** Depressed women perceive more stress and receive more negative feedback, than men, to negative life events. Women attribute their hopelessness to more stable and global causes when compared with men.

Key words: *Depression, hopelessness, inferential feedback, perceived stress*

Key messages: *Depressed women perceive more stress than depressed men. Depressed women also receive more negative inferential feedback from their social support as compared to depressed men, which leads them to attribute the cause of the stress to stable and global causes. These findings can help in planning better management strategies for depression, which could be gender specific.*

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Depression is a common and debilitating illness affecting many people.[1] While various theories of depression have been proposed, the one that has gained popularity in recent times is the expanded hopelessness theory. It is a stress-diathesis model which implicates a style or tendency to infer negative characteristics about the self, negative consequences for the future, and stable, global causes for negative events.[2] It implies that a negative life event (stress) and the inferential feedback received from friends and family based on the inferential style of the patient about the event (diathesis) lead to hopelessness and depression.[3,4] Inferential feedback can occur on a continuum ranging from adaptive to maladaptive.[3,4] Individuals with depressogenic inferential styles are likely to show increase in depressive symptoms following the occurrence of negative events. These depressogenic inferential styles have been described to be typically latent cognitive processes that are difficult to assess accurately.[5]

The expanded hopelessness theory explains four domains on which the inferential feedback is sought: *Globality of cause* – the negative event is likely to lead to other problems in a person's life; *Stability of cause* – the negative event is frequently going to lead to other problems in a person's life; *Consequences for the future* – the negative event is going to lead to a lot of other problems in the future, and *Implications for the self* – the person is responsible for the negative life event.[3] Depressive symptoms are more likely to occur when negative life events are attributed to stable (i.e., enduring) and global (i.e., likely to affect many outcomes) causes and viewed as important than when they are attributed to unstable, specific causes and are viewed as unimportant.[3] Thus, the four domains can be seen as constituents of the cognitions involved in hopelessness. Adaptive inferential feedback is a more precise concept of social support and can elucidate the protective or deleterious effects of adequate and inadequate social support, respectively.

Studies have documented differences between women and men with respect to symptom reporting, treatment seeking, coping style, and several neurobiological variables pertinent to depression.[6-9] Vulnerability to develop depression secondary to stress is different in the two genders. Women have been shown across many nations, cultures, and ethnicities, to be twice as likely as men to develop depression and experience stress.[10] Stress and depression have been shown to have a bidirectional relationship between cause and effect.[11] Several dimensions of stress, such as helplessness, distress, and coping, are relevant in understanding the pathophysiology of depression. Women have a lifetime prevalence for major depressive disorder of 21.3%, compared with 12.7% in men.[10-12] It has been hypothesized that the gender differences in depression could be possibly due to differences in vulnerability, negative inferential styles, and perceived stress. However, the evidence for this has been inconclusive.

The effect of gender norms on the quality of the psychotherapy experience remains poorly understood, despite considerable interest reflected in the clinical and research literature.[13] Much of the focus has been directed at examining whether patient gender or therapist gender has an important impact on the outcome of therapy.[13] Understanding the gender differences in the etiological mechanisms of hopelessness depression (a subtype of depression defined under the expanded hopelessness theory, chiefly characterized by retarded initiation of voluntary responses and sad affect) can help in understanding the effect gender may pose for psychotherapeutic outcome, as it shows the exact mechanisms involved in cognitive therapy for depression based on the negative inferential styles of the patient and can predict the feedback and outcome of depressive symptoms, chiefly hopelessness.[14] Previous researchers have shown women to have poorer outcomes in psychotherapy when compared with their male counterparts, whereas others have shown that men have a poorer outcome.[15,16] Cuijpers *et al*., on the other hand, have found gender to have no predictive role in response to psychotherapy.[17] Joshi claims that given the patriarchal nature of Indian society, there is a strong need for integrating gender discourse within existing counseling services in India.[18]

Thus, the following study was devised to understand the gender differences in perceived stress of a negative life event and the negative inferential feedback in patients with depression. The authors also correlated the levels of perceived stress and negative inferential feedback with depression in men and women.

METHODOLOGY

Procedure

This is a cross-sectional observational study. It was conducted in the psychiatry department of a tertiary care hospital. Ethical clearance was obtained from the Institutional Ethics Committee. A convenient method of sampling was used, and consecutive patients who were willing to participate in the study were included. Thirty-five male and 35 female age-matched consecutive patients, between the ages of 18 and 45 years, suffering from major depressive disorder as diagnosed by the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) criteria, were recruited from the outpatient department. Patients suffering from other comorbid psychiatric or medical

illnesses were excluded. Age matching between male and female patients was done using the individual matching method. Patients were explained about the nature of the study, and written informed consent was obtained from them. After gathering their sociodemographic data, they were initially administered the Hamilton's Depression Rating Scale (HDRS) for severity of depression. They were subsequently administered validated versions of Perceived Stress Scale (PSS) and Adaptive Inferential Feedback Questionnaire (AIFQ), in their vernacular languages. Assessment of face validity of the scales was done for the population being studied. The scales were translated into Hindi and Marathi and later back-translated into English, and validation was carried out by a group of subject experts consisting of psychiatrists, psychologist, and psychiatric social worker, who found the validated versions of AIFQ and PSS appropriate for the population being studied.

Instruments

HDRS is designed to assess the severity of depression in patients already diagnosed with depressive disorder.[19] The total score is obtained by summing the score of each item, 0–4 or 0–2. For the 17-item version, scores can range from 0 to 54 with a rising severity of depression. Validity has been reported to range from 0.65 to 0.90 with global measures of depression severity.

AIFQ was developed as a measure of the inferential feedback a person receives following a stressful event.[3] The patients are asked to list a negative life event that was the most stressful for them in the last week. Then they are asked to list three significant individuals (social support) to whom they spoke about their stressor and how they felt after talking about it. The scale has a total of seven questions, where questions 4–7 address the feedback that they received and are rated on a 6-point Likert scale. A total inferential feedback score is calculated by summing the average scores of the type of feedback endorsed by each identified person on each domain of globality of cause (AIFQ1), stability of cause (AIFQ2), consequences for the future (AIFQ3), and self-implication (AIFQ4). Higher total scores indicate that the individual perceives receiving more negative inferential feedback, while lower total scores indicate the receipt of adaptive feedback.

PSS measures the degree to which situations in one's life are appraised as stressful. We used the 10-item version of PSS.[20] An exploratory factor analysis had revealed a two-factor structure measuring Perceived Distress or helplessness and Perceived Coping or self-efficacy.[20] Scores were analyzed on each subscale, and a total score was obtained. The test scores range from 0 to 40; the higher the PSS score, the more likely the individual will perceive that environmental demands exceed their ability to cope.

Statistical analysis

Statistical analysis was undertaken using SPSS version 20. Data were expressed as mean ± standard deviation. Correlation between stress, depression, and inferential styles was done using Pearson's correlation test. The difference in the proportion of depression and negative inferential feedback was done using Chi-square test of proportion. Gender differences were studied using unpaired *t*-test between males and females. A P value <0.05 after using Bonferroni's correction was considered as statistically significant.

RESULTS

Data from 35 men and 35 women who completed the structured proforma, HDRS, AIFQ, and PSS were considered for analysis. Table 1 shows the distribution of marital status, educational level, and socioeconomic status among males and females. There were no significant differences in the sociodemographic variables among the two genders. None reported a history of divorce/separation or death of the spouse.

Table 2 shows the comparison of scores on HDRS, PSS, and AIFQ among the two genders. Analysis of the severity of depression showed that men had a mean score of 15.31 ± 4.24 on HDRS, whereas women had a mean score of 16.63 ± 5.14. There was no statistically significant difference in the two groups as demonstrated by unpaired *t*-test ($P = 0.25$). Comparison of perceived stress between males and females by unpaired *t*-test showed that perceived stress was higher in females, and this difference was statistically significant ($P = 0.04$, $t = 2.06$). The difference was marked in the helplessness domain

Table 1: Distribution of marital status, educational level, and socioeconomic status among males and females

Sociodemographic variable	Depressed males (n=35)	Depressed females (n=35)	χ^2	P
Marital status	Married=30 (85.71%) Unmarried=5 (14.29%)	Married=32 (91.43%) Unmarried=3 (8.57%)	0.56	0.45
Education status (up to secondary level)	Yes=29 (82.86%) No=6 (17.14%)	Yes=28 (80%) No=7 (20%)	0.09	0.76
Socioeconomic status (as per modified Kuppuswamy's classification)	Upper middle class=15 (42. 85%) Lower middle class=20 (57.15%)	Upper middle class=13 (37.14%) Lower middle class=22 (62.86%)	0.23	0.63

Values expressed as n(%)

of perceived stress, and the self-efficacy domain did not show any statistically significant difference. A comparison of the AIFQ scores using the unpaired *t*-test showed that women had significantly more negative inferential feedback than men ($P = 0.04$) as per the total scale scores. The difference between the four domain scores varied. The domain of globality of cause had the most significant difference, being more in women ($P = 0.01$, $t = 2.61$). This was followed by stability of cause ($P = 0.02$, $t = 2.49$), which was also more in women than men. The other two domains did no vary significantly between the two groups.

Table 3 shows the proportion of grade of depression as classified by severity and the proportion of negative inferential feedback received among the two genders. Using Chi-square test, comparison between men and women showed no difference in proportion across the levels of severity of depression ($\chi^2 = 5.44$, $P = 0.14$). The proportion of depressed women receiving negative inferential feedback (0.40) was significantly greater than men (0.09) as analyzed by Chi-square test of proportion ($\chi^2 = 9.25$, $P = 0.002$).

Table 4 shows the correlation between depression, perceived stress, and negative inferential feedback among depressed men, while Table 5 shows the same correlation among women. Men only had a correlation between depression and perceived stress ($P = 0.03$), which was not significant after adjusting with Bonferroni's correction. However, women had a more significant correlation across all three scales. After using Bonferroni's correction, the correlation between PSS and AIFQ in depressed women was statistically significant ($P = 0.04$), indicating higher negative inferential feedback with increased perceived stress.

Table 2: Comparison of HDRS, PSS, and AIFQ scale scores among males and females

Variable being compared	Depressed males (*n*=35)	Depressed females (*n*=35)	Mean difference (95% CI)	*t*	*P*
Depression					
Severity of depression (HDRS score)	15.31±4.24	16.63±5.14	1.31 (−0.93-3.56)	1.17	0.25
Perceived stress					
Self-efficacy domain (PSS-S)	9.00±3.16	10.09±3.23	1.09 (−0.44-2.61)	1.42	0.16
Helplessness domain (PSS-H)	14.09±4.38	16.26±4.87	2.17 (0.04-4.38)	1.96	0.04*
Total perceived stress (PSS-T)	23.09±6.13	26.29±6.86	3.2 (0.10-6.30)	2.06	0.04*
Inferential feedback					
Globality of cause domain (AIFQ 1)	0.95±1.25	1.91±1.78	0.96 (0.23-1.69)	2.61	0.01*
Stability of cause domain (AIFQ 2)	1.01±1.32	1.93±1.72	0.91 (0.18-1.65)	2.49	0.02*
Consequences of future domain (AIFQ 3)	1.12±1.52	1.72±1.72	0.60 (−0.18-1.38)	1.54	0.13
Implications for the self-domain (AIFQ 4)	0.76±1.39	0.92±1.35	0.16 (−0.50-0.82)	0.49	0.63
Total maladaptive feedback (AIFQ-T)	3.84±4.8	6.59±5.94	2.75 (0.16-5.33)	2.12	0.04*

CI: Confidence interval; HDRS: Hamilton Depression Rating Scale; PSS-S: Perceived Stress Scale, self-efficacy domain; PSS-H: Perceived Stress Scale, helplessness domain; PSS-T: Perceived Stress Scale, total score; AIFQ: Adaptive Inferential Feedback Questionnaire; *Statistically significant

Table 3: Comparison of the proportion of grades of depression based on severity and proportion of negative inferential feedback received between males and females

Variable being compared	Proportion among males	Proportion among females	Difference (95% CI)	χ^2	*P*
Grade of depression					
Mild depression	0.31	0.37	0.06 (−15.64-26.89)	5.44	0.14
Moderate depression	0.37	0.14	0.23 (−2.49-41.32)		
Severe	0.26	0.34	0.08 (−13.16-28.24)		
Very severe	0.06	0.15	0.09 (−6.41-24.81)		
Negative inferential feedback received					
Negative inferential feedback	0.09	0.40	0.31 (0.11-0.48)	9.25	0.002*

CI: Confidence interval, *Statistically significant

Table 4: Correlation of HDRS, PSS, and AIFQ scores in depressed males

Variables being correlated	Coefficient of correlation (*r*) (95% CI)	*P*	Adjusted *P* (using Bonferroni's correction)
Severity of depression (HDRS) and perceived stress (PSS)	0.38 (0.05-0.63)	0.03*	0.08
Perceived stress (PSS) and Negative inferential feedback (AIFQ)	0.29 (−0.04-0.57)	0.09	0.25
Depression (HDRS) and Negative inferential feedback (AIFQ)	0.12 (−0.22-0.43)	0.49	1.00

*Statistically significant. HDRS: Hamilton Depression Rating Scale; PSS: Perceived Stress Scale; AIFQ: Adaptive Inferential Feedback Questionnaire; CI: Confidence interval

Table 5: Correlation of HDRS, PSS, and AIFQ scores in depressed females

Variables being correlated	Coefficient of correlation (*r*) (95% CI)	*P*	Adjusted *P* (using Bonferroni's correction)
Severity of depression (HDRS) and perceived stress (PSS)	0.35 (0.017-0.61)	0.04*	0.12
Perceived stress (PSS) and Negative inferential feedback (AIFQ)	0.39 (0.06-0.64)	0.02*	0.04*
Depression (HDRS) and Negative inferential feedback (AIFQ)	0.42 (0.09-0.66)	0.01*	0.06

*Statistically significant. HDRS: Hamilton Depression Rating Scale; PSS: Perceived Stress Scale; AIFQ: Adaptive Inferential Feedback Questionnaire

DISCUSSION

Depressed men and women differ in a number of important aspects that may alter the course of an affective disorder. Women, in general, tend to experience more stressful events in a lifetime than men.[21,22] Using the expanded hopelessness model, our study showed that stress generated in response to a negative life event is higher in women than men. Various mechanisms have been hypothesized to account for this difference. It could be the difference in their biology, primary social roles, or metacognitions. Other researchers have also shown a significant difference in distress scales among the two genders.[23,24] Even when women and men have similar psychopathology affecting them, women are more likely than men to perceive stress, possibly because of the differences in their biological responses to stressors, self-concepts, or coping styles.[10] On comparing the severity and grades of difference, it was found that both men and women had comparable scores on HDRS.

The expanded hopelessness theory hypothesizes that individuals with negative attributional styles are vulnerable to develop depression in the presence of negative life events.[2] The elaborated causal chain posits that negative events contribute to initial elevations of general negative affect. Cognitive vulnerability factors then moderate the likelihood that the initial negative affect will progress to full-blown depression. Increase in severity of depression can further lead to more negative life events and thus begin the causal chain again.[25] Our analysis reveals that depressed women use a more negative attribution style about a stressor than depressed men. Fourteen (40%) of the women received maladaptive feedback from their social support as opposed to only 3 (8.6%) of the men. Nolen-Hoeksema *et al*. had shown similar findings in adolescent women.[26]

Our study shows that depressed women tend to attribute the stressor to stable and global causes more than men, and this difference was significant. These attributional dimensions of stable-unstable and global-specific are crucial for understanding how negative life events may contribute to the formation of hopelessness.[27] In our study, women were shown to be using sentences like "the stressor is likely due to a cause that frequently causes problems" and also "the cause of the stressor will lead to problems in other areas of my life." Whereas depressed men used such statements less frequently. The implications of self and consequences of future domains did not show significant difference, indicating it does not vary differently in the two genders. The negative inferential feedback has been shown to depend on several factors including genetic susceptibility, social support, and personality factors, and further research should be undertaken to elucidate them.

This research also attempted to elucidate the correlation between the severity of depression, negative inferential feedback, and perceived stress. Our analysis found a significant correlation only between perceived stress and negative inferential feedback among depressed women. The other correlations were statistically insignificant. However, other researchers have demonstrated that a linear correlation exists between stress, negative inferential feedback, and severity of depression, which is in keeping with the model given by Abramson *et al*.[28-31] Thus, vulnerability of developing depression after exposure to a stressor is decided by the inferential feedback a person receives, which in turn modulates the level of perceived stress.

Relatively absent from the literature of psychotherapy is the issue of whether male and female patients respond similarly to different forms of psychotherapy or not. No research hitherto has described which forms of therapy may be most suitable for male or female patients. However, a number of writers have suggested that male and female patients may prefer or benefit more from different aspects of psychotherapy.[13] Ogrodniczuk *et al*. had suggested that women may need a greater focus on external problem-solving to counter a ruminative response style that amplifies vulnerability to depression, while men would benefit more with affective awareness.[13] The difference in cognitive vulnerability to hopelessness seen in women could account for a poorer outcome to psychotherapy.[15,16] Other researchers have similarly argued that female patients benefit more from an approach that considers external pressures.[32,33] This is in keeping with our finding of women having a more negative inferential attitude toward negative life events, which is stable and global. As our research also suggests them to have more helplessness and distress related to their perceived stress, they may refrain from

using more effective problem-solving coping strategies, as has been previously suggested.[34] This argument suggests that a supportive form of therapy may be more beneficial to female patients when compared with males. Male patients, on the contrary, do not possess such attributional styles and may benefit from affective awareness. Thus, they may prefer a form of treatment that provides them with a relationship that allows some emotional distance and sense of independence.[13]

Our study was not without limitations. Sample size was too small. Hence, we may not have been able to establish the correlation of depression, negative inferential feedback, and perceived stress to a robust extent. Moreover, after Bonferroni's correction, only one correlation remained significant. Only the face validity of the scales being used was carried out, and they were not validated for the population. Gender differences in negative inferential feedback were seen only in two domains, and even the self-efficacy domain of perceived stress did not show gender variability in this analysis, when compared with other data. A small sample size may account for this.

Our findings may necessitate a different psychotherapeutic approach in depressed women: one more focused on handling their attribution of cause of stressor. They should be directed to attribute it to unstable and more localized causes. This may reduce the severity of their depression, allay hopelessness, and facilitate an earlier and more robust response. Since hopelessness has been linked to higher suicide risk, this approach can help in reducing the risk of suicide in depressed women.

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Conflicts of interest
There are no conflicts of interest.

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