Aim: The aim of this study was to examine psychological factors in the form of somatosensory amplification, alexithymia and hypochondriasis in patients with Dhat syndrome. Secondary aims of the study were: (1) To evaluate the influence of psychiatric comorbidity on the psychological correlates; (2) to compare the prevalence of psychological correlates in those with Dhat syndrome and in those with depression and somatoform disorders.

Materials and Methods: A total of 106 subjects diagnosed with Dhat syndrome as per International Classification of Diseases-10 (ICD-10) criteria were assessed on Toronto Alexithymia Scale (TAS-20), Somatosensory Amplification Scale (SSAS) and Whitely Index (WI). Psychiatric comorbidity was diagnosed as per ICD-10. Data on 50 patients with depression and 119 patients with somatoform disorder was used for comparison.

Results: The age at onset of Dhat syndrome was 22.54 (standard deviation [SD] - 7.5) years, and duration of illness was 5.04 (SD - 4.2) years. Depressive disorders were diagnosed in 13.2%, anxiety disorders in 15.1%, erectile dysfunction in 14.2% and premature ejaculation in 17% of cases. The mean SSAS total score was 23.12 (SD - 7.99), mean total TAS-20 score was 63.3 (SD - 13.3) and mean WI score was 8.23 (SD - 2.7). About two third of the patients had alexithymia (n = 67; 63.2%) and hypochondriasis (n = 69; 65.1%). Comparison of the psychological correlates between those with Dhat syndrome alone (n = 59) and those with comorbid psychiatric disorder (n = 47) revealed no significant differences. Patients with only Dhat syndrome had significantly higher scores for somatosensory amplification when compared with those with somatoform disorders, but no difference was seen between those with depression and Dhat syndrome alone. Compared to patients with Dhat syndrome alone, those with depression had higher prevalence of alexithymia and hypochondriasis.

Conclusion: There are differences in the prevalence of somatosensory amplification, hypochondriasis and alexithymia between those with Dhat syndrome alone and those with depression and somatoform disorders.

Key words: Alexithymia, Dhat Syndrome, hypochondriasis, somatosensory amplification

INTRODUCTION

Dhat syndrome is a culture-bound syndrome characterized by preoccupation with semen loss and attribution of physical and psychological symptoms to the same. Many studies, especially from India have studied the clinical picture of Dhat syndrome. In general these studies suggest that patients with Dhat syndrome present with neurasthenic symptoms in the form of multiple somatic and psychological symptoms, which they attribute to the passage of “Dhat.” The commonly reported symptoms include body aches,
burning micturition, increased frequency of micturition, difficulty in micturition and hypochondriasis. Many patients have comorbid psychiatric disorders; depressive and anxiety disorders being the most commonly reported symptoms.

Although Dhat syndrome is understood as a culture-bound syndrome, the underlying mechanism for this disorder is not clear. In view of the comorbidity and the symptom profile some of the researchers consider it as a variant of depression and others consider it as a variant of somatization disorder. However, if one attempts to understand this from a bio-psychosocial model, as is used to understand other functional somatic symptoms, it is suggested that factors like language and idiom, concept of health and disease and culturally sanctioned illness behavior play an important role in manifestation of various functional somatic symptoms. Ranjith and Mohan proposed a model for Dhat syndrome according to which people predisposed to somatization and preoccupied with their health, focus more on physiological symptoms, and cultural factors provide a meaning to the same.

However, very few studies have evaluated various psychological constructs like alexithymia, hypochondriasis and somatosensory amplification, which are thought to be associated with somatization and depression among patients with Dhat syndrome. Evaluation of these factors can provide better understanding about the relationship of Dhat syndrome with other well understood and recognized psychiatric disorders. Studies in patients with depression and somatization disorders have looked at the constructs of somatosensory amplification, alexithymia and hypochondriasis. These studies suggest that patients with disorders like depression and somatization have higher scores for these constructs. Only two studies have evaluated illness behavior, hypochondriacal beliefs and/or somatosensory amplification in patients with Dhat syndrome. These studies suggest that compared to healthy controls patients with Dhat syndrome have higher scores for general hypochondriasis as assessed by using Illness Behaviour Questionnaire, Somatization Screening Index, Whiteley Index (WI) and Chalder Fatigue Scale. However, these studies are limited by small sample sizes. Studying these constructs in patients with Dhat syndrome can help in understanding of this disorder and distinguishing it from disorders like depression and somatization. Further, understanding this relationship can help in formulating appropriate intervention strategies.

Accordingly, the aim of this study was to examine psychological correlates in the form of somatosensory amplification, alexithymia and hypochondriasis in patients with Dhat syndrome. Secondary aims of the study were: (1) To evaluate the influence of psychiatric comorbidity on the psychological correlates; (2) to compare the prevalence of psychological correlates in those with Dhat syndrome and in those with depression and somatoform disorders.

It was hypothesized that patients with Dhat syndrome would score high on the factors of alexithymia, hypochondriasis and somatosensory amplification independent of comorbid diagnosis.

**MATERIALS AND METHODS**

**Setting**

This study was carried out in the out-patient psychosexual clinic of a multi-specialty teaching Tertiary Care Hospital in North India. The study was approved by the Ethics Committee of the Institute and all the patients were recruited after obtaining proper written informed consent.

To be included in the study, subjects diagnosed with Dhat syndrome as per International Classification of Diseases-10 (ICD-10) criteria by a qualified psychiatrist were approached and explained about the study. In addition, the subjects were required to be aged more than 16 years. However, those with comorbid mental retardation, psychotic disorders or organic brain syndrome were excluded.

Those who agreed to participate in the study were invited to complete the Hindi version of Toronto Alexithymia Scale (TAS), Somatosensory Amplification Scale (SSAS) and WI. Sociodemographic and clinical details were recorded in a specifically designed proforma. All the patients were also evaluated by a qualified psychiatrist for comorbid psychiatric diagnosis, if any, as per the ICD-10 criteria.

**Toronto alexithymia scale-20**

It is a 20 item self-reporting scale rated on a 5 point Likert scale, with the total score ranging from 20 to 100. It has three subscales: TAS-difficulty in identifying (TAS-DIF), TAS-difficulty in describing feeling (TAS-DDF) and TAS-externally-oriented thinking (TAS-EOT). A score >60 is considered as an indicator of alexithymia. The scale has high internal consistency with Cronbach’s alpha of 0.89. The TAS-Hindi version (TAS-20-H), translated from the original scale and that has adequate internal consistency and good test-retest reliability, was used in this study.

**Somatosensory amplification scale**

Somatosensory amplification was assessed by self-report SSAS, which is a 10 item scale rated on 5 point Likert scale. Test-retest reliability of this scale is good (0.79) and the Cronbach’s alpha is 0.82 indicating high internal consistency. Hindi translated version, used in one of our previous study was completed by the patients.

**Whiteley index of hypochondriasis**

The WI includes 14 dichotomous items assessing hypochondriacal concerns. A total score of ≥7 has
been considered the cut-off for health anxiety disorder or hypochondriasis. Data from psychometric evaluations suggest that the questionnaire has good internal consistency and stability.\textsuperscript{[21]} Again a Hindi translated version used in one of our previous studies was completed by the patients.\textsuperscript{[19]}

**International classification of diseases-10 description for dhat syndrome**
According to ICD-10\textsuperscript{[15]} description of Dhat syndrome a person is considered to have Dhat syndrome if he is experiencing passage of whitish discharge in urine, which is interpreted as semen loss, has undue concern about the debilitating effects of passage of semen and has associated anxiety and somatic complaints such as fatigue and muscle pain, which are related to the fear of semen loss. Patients fulfilling this description of ICD-10 were recruited.

**International classification of diseases-10 criteria for various sexual dysfunctions**
International Classification of Diseases-10 criteria\textsuperscript{[13]} were used to ascertain the presence of various comorbid psychiatric disorders and sexual dysfunctions.

**Symptom severity and level of distress**
Depending on the symptom severity and level of distress in the subjects, the treating psychiatrist rated the severity of Dhat syndrome on a 3-point scale as mild, moderate and severe. This was done to study the relationship between severity of Dhat syndrome and various psychological correlates.

**Statistical analysis**
Statistical analyses were performed using the Statistical Package for the Social Science Version 14 (SPSS for Windows, Version 14.0. Chicago, SPSS Inc.). Descriptive analyses were computed in terms of mean and standard deviation for continuous variables and frequency with percentage for nominal variables. Pearson’s Chi-square was used to compare categorical variables and independent sample t-test was used to compare continuous variables. ANOVA was used to compare means of multiple groups. Schefe’s post-hoc method was used to assess inter-group differences.

**RESULTS**
The study was conducted during the period of March 2013 to February 2014. During the study period, 126 patients were diagnosed to have Dhat syndrome, of which 8 had comorbid psychotic disorders, and one had comorbid mental retardation. Out of the remaining 117 patients, 106 consented to participate.

For comparison, published data on psychological correlates of depression\textsuperscript{[13]} and of somatoform disorder\textsuperscript{[19]} generated in the same center was used.

**Sociodemographic profile**
The mean age of the study sample was 27.42 years (standard deviation [SD] - 7.49; range: 17–57 years). Majority of the subjects were single (66%), received formal education for 10 years or more (78.3%), were employed (65.1%) and from middle socioeconomic class (75.5%), nonnuclear family (53.8%), and rural locality (59.4%).

**Clinical profile**
The mean age at onset of symptoms of Dhat syndrome was 22.54 years (SD - 7.5; range: 12–50 years), while the mean duration of illness at the time of assessment was 5.04 years (SD - 4.18; range: 2 months to 20 years).

Of the 106 patients included in the study, 59 patients had Dhat syndrome only, that is, without any psychiatric comorbid or sexual dysfunction. A small proportion (13.2%; n = 14) of patients fulfilled the criteria of comorbid depressive disorder and 15.1% (n = 16) fulfilled the criteria of one of the anxiety disorders. In terms of comorbid sexual dysfunction, 14.2% (n = 15) had erectile dysfunction and 17% (n = 18) had premature ejaculation.

About one-fifth (n = 19; 18%) had Dhat syndrome with premature ejaculation or erectile dysfunction or both, 23 (21.7%) patients had Dhat syndrome with either depressive disorder or anxiety spectrum disorder or both. Very few patients (n = 5; 4.7%) had Dhat syndrome with depressive disorder and/or anxiety disorder with premature ejaculation and/or erectile dysfunction (n = 5).

**Psychological correlates**
The scores on SASS, TAS-20 and WI are shown in Table 1. To study the influence of comorbidity on the psychological correlates, the study sample was initially divided into two groups, that is, those with one of the psychiatric comorbidities and/or sexual dysfunction (n = 47) and those without any comorbidity (n = 59). When these two groups were compared for the mean scores of SSAS, TAS-20, and WI score, no significant difference was seen on any of the three psychological constructs studied.

The whole study sample was further subdivided into four groups: Those with Dhat syndrome only (n = 59), Dhat syndrome with premature ejaculation or erectile dysfunction or both (n = 19), Dhat syndrome with either depressive disorder or anxiety disorder or both (n = 23), and Dhat syndrome with depressive disorder or anxiety disorder with premature ejaculation or erectile dysfunction (n = 5). On comparison, no significant differences were observed between the groups on any of the psychological parameters [Table 2].

Comparison of the individual groups with different psychiatric comorbidities with subjects Dhat syndrome only also revealed no significant differences for any of the psychological parameters.
In the further analysis, data on psychological correlates of patients with only Dhat syndrome was compared with published data on depression from this center.[13] As shown in Table 3, there was no statistically significant difference in the somatosensory amplification between the two groups. However, there was a higher prevalence of alexithymia and hypochondriasis in patients with depression. The score on 2 out of the 3 subscales of alexithymia in patients with depression was significantly more compared to those with Dhat syndrome alone.

When the data on psychological correlates was compared with that of somatoform disorders,[19] as shown in Table 4, those with Dhat syndrome had significantly higher scores for somatosensory amplification but there was no statistically significant difference in the total scores of TAS and WI. However, those with somatoform disorders had a higher prevalence of hypochondriasis, a significantly higher score on TAS-DDF subscale and significantly lower score on the TAS-DIF subscale.

### Table 1: Somatosensory amplification, alexithymia and hypochondriasis in the study group

| Variables | Whole group (n=106) | With comorbid psychiatric disorder (n=47) | Without comorbid psychiatric disorder (n=59) | t-test/Chi-square test |
|-----------|---------------------|---------------------------------|---------------------------------|------------------|
| **Somatosensory amplification** | | | | |
| SSAS total score | 23.12±7.99 | 22.30±6.87 | 23.78±8.78 | 0.948 |
| **Alexithymia** | | | | |
| TAS-DDF subscale | 15.38±3.73 | 15.59±3.45 | 15.20±3.97 | 0.535 |
| TAS-DIF subscale | 22.82±5.83 | 23.06±5.58 | 22.63±6.07 | 0.381 |
| TAS-EOT subscale | 25.09±6.11 | 25.42±5.39 | 24.83±6.66 | 0.497 |
| TAS-total | 63.29±13.28 | 64.08±11.53 | 62.66±14.60 | 0.547 |
| TAS-total >60 | 67 (63.2) | 29 (27.4) | 38 (35.8) | 0.082 |
| **Hypochondriasis** | | | | |
| Whiteley index total score | 8.23±2.70 | 8.19±2.53 | 8.25±2.85 | 0.118 |
| Whiteley index >7 | 69 (65.1) | 32 (30.2) | 37 (34.9) | 0.332 |

**SSAS** – Somatosensory amplification scale; **TAS** – Toronto alexithymia scale; **DDF** – Difficulty describing feelings; **DIF** – Difficulty identifying feeling; **EOT** – Externally-oriented thinking.

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### Table 2: Comparison of psychological correlates in the different groups determined on the basis of comorbidity

| Variables | Dhat only (n=59) | Dhat+PME/ED (n=19) | Dhat+depression/anxiety (n=23) | Dhat+PME/ED+depression/anxiety (n=5) | F/Chi-square test |
|-----------|-----------------|-------------------|-------------------------------|-------------------------------------|----------------|
| **Somatosensory amplification** | | | | | |
| SSAS total score | 23.8±8.8 | 23.7±6.7 | 21.4±7.3 | 21.0±5.4 | 0.617 |
| **Alexithymia** | | | | | |
| TAS-DDF subscale | 15.2±3.9 | 15.2±4.1 | 15.9±3.1 | 16.0±3.0 | 0.239 |
| TAS-DIF subscale | 22.6±6.1 | 22.6±5.8 | 23.0±5.9 | 25.2±3.0 | 0.311 |
| TAS-EOT subscale | 24.8±6.7 | 27.1±4.5 | 24.6±5.7 | 22.6±6.2 | 1.04 |
| TAS-total | 62.7±14.6 | 64.8±11.1 | 63.5±12.5 | 63.8±10.7 | 0.132 |
| TAS-total >60 | 38 (64.4) | 13 (68.4) | 14 (60.9) | 2 (40) | 1.471 |
| **Hypochondriasis** | | | | | |
| Whiteley index total score | 8.2±2.8 | 8.1±2.6 | 8.1±2.6 | 9.2±1.6 | 0.259 |
| Bodily preoccupation | 3.1±1.3 | 3.0±1.4 | 3.1±0.9 | 4.0±0.7 | 0.899 |
| Disease fear | 3.4±1.0 | 3.2±0.7 | 3.1±1.1 | 3.4±0.5 | 0.463 |
| Disease conviction | 1.8±1.2 | 1.8±1.2 | 1.9±1.2 | 1.8±0.8 | 0.053 |
| Whiteley index >7 | 37 (62.7) | 11 (57.9) | 16 (69.6) | 5 (100) | 3.464 |

**SSAS** – Somatosensory amplification scale; **TAS** – Toronto alexithymia scale; **DDF** – Difficulty describing feelings; **DIF** – Difficulty identifying feeling; **EOT** – Externally-oriented thinking; **SD** – Standard deviation; **PME** – Premature ejaculation; **ED** – Erectile dysfunction.

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### Table 3: Comparison of psychological correlates between those with Dhat syndrome alone and those with depression

| Variables | Mean (SD)/frequency (%) | Chi-square test/t-test |
|-----------|------------------------|-----------------------|
| **Somatosensory amplification** | | |
| SSAS total score | 23.8±8.8 | 21.56±2.65 | 1.73 |
| **Alexithymia** | | | |
| TAS-DDF subscale | 15.2±3.9 | 24.96±4.03 | 12.82*** |
| TAS-DIF subscale | 22.6±6.1 | 16.28±2.89 | 6.60*** |
| TAS-EOT subscale | 24.8±6.7 | 26.66±3.19 | 1.83 |
| TAS-total | 62.7±14.6 | 67.9±7.44 | 2.27* |
| TAS-total >60 | 38 (64.4) | 43 (86) | 6.61* |
| **Hypochondriasis** | | | |
| Whiteley index total score | 8.2±2.8 | 9.5±2.2 | 2.65** |
| Whiteley index >7 | 37 (62.7) | 45 (90) | 9.4** |

*P<0.05; **P<0.01; ***P<0.001; *Chi-square test with Yate’s correction.

**SSAS** – Somatosensory amplification scale; **TAS** – Toronto Alexithymia Scale; **DDF** – Difficulty describing feelings; **DIF** – Difficulty identifying feeling; **EOT** – Externally-oriented thinking.
Depending on the symptom severity and level of distress in the subjects, the treating psychiatrist rated the severity of Dhat syndrome into mild, moderate, and severe. The majority of the subjects (79.2%) were placed in moderate severity category, followed by severe (16.0%) and mild (4.7%). Further, the relationship of the psychological factors with the severity of illness and distress with symptoms of Dhat syndrome was studied [Table 5]. There was no statistically significant difference in the scores of various scales assessing the psychological correlates between those with mild, moderate and severe illness.

**DISCUSSION**

The aim of this study was to examine the psychological correlates and to study the influence of psychiatric comorbidity on psychological correlates in patients with Dhat syndrome. The majority of the participants in the current study were single and from a rural locality. This sociodemographic profile of the patients is in concordance with that reported for Dhat syndrome in earlier studies. [2,4,7]

The age of onset and the duration of illness of passing “Dhat” were also akin to that reported in earlier studies. [3,22] An earlier review of studies on Dhat syndrome has reported prevalence of comorbid depression to be 40–66% and that of anxiety disorders to be 21–38%. [7] The prevalence rates of depression and anxiety disorders in the present study were less than that reported earlier. These differences in prevalence could possibly be accounted for by the diagnostic methods used when compared to the earlier studies. [5,15] The rates of sexual dysfunction in the form of premature ejaculation and erectile dysfunction were nearly similar to earlier reported in the literature. [7]

Scores on SSAS in the present study were comparable to those reported earlier in patients with Dhat syndrome, psychosomatic disorders, and depression. [9,12,23] Around two-third of patients were found to have alexithymia, which is also comparable to that seen earlier in somatoform and depressive disorders. [12,24]

In the present study, nearly two-third of the subjects scored more than 7 on WI, which is used as a cut-off to consider the presence of hypochondriasis. This finding is akin to that reported in an earlier study in which authors used Illness Behaviour Questionnaire for general hypochondriasis factor in patients with Dhat syndrome. [13] The mean WI score in the present study was also similar to that reported in an earlier study in subjects with Dhat syndrome. [9]

To understand the impact of psychological factors, subjects with Dhat syndrome alone were compared with the subjects presenting with different comorbid psychiatric disorders. No statistically significant differences were observed among any of the psychological correlates.

However, on comparing the scores obtained by the patients with Dhat syndrome alone with those of patients with depression [3] and somatoform disorders, [9,20] it was seen that patients with Dhat syndrome alone had lower scores on WI in comparison to those obtained by the patients of depression. There was no significant difference between Dhat syndrome and somatoform disorders on WI. Lesser number of patients with Dhat syndrome alone scored above the cut off for hypochondriasis when compared with those with depression and somatoform disorders. This suggests that possibly patients with Dhat syndrome have a lower level of hypochondriasis compared to patients with depression and somatoform disorders.

Previous studies have not evaluated somatosensory amplification and alexithymia in patients with Dhat syndrome.
syndrome. Findings of the present study suggest that there is no difference in the somatosensory amplification in those with Dhat syndrome alone and in those with Dhat syndrome and psychiatric comorbidities. In addition, there is no statistically significant difference in somatosensory amplification between those with depression only and those with Dhat syndrome only. However, those with Dhat syndrome alone have more somatosensory amplification compared to patients of somatoform disorders. Somatosensory amplification may thus be a useful concept in distinguishing Dhat syndrome alone from patients of somatoform disorders.

With regard to the alexithymia, present study suggests that compared to patients with depression, it is less prevalent in patients with Dhat syndrome alone. The prevalence of alexithymia, however, did not differ from those with somatoform disorders. Patients with Dhat syndrome alone have significantly higher scores on the subscale of “DIF feelings” when compared to patients of depression and somatoform disorders. Conversely, patients of depression and somatoform disorders scored higher on the subscale of “difficulty in describing feelings.” There was no statistically significant difference in the “externally-oriented thinking.” Thus, alexithymia could be a useful psychological construct to help differentiate Dhat syndrome alone from depression and somatoform disorders.

Findings of the present study suggest that Dhat syndrome, depression, and somatoform disorder lie on a continuum. The interaction between the psychological factors, cultural factors, life stage of the subject and stressful situations could possibly determine the clinical manifestation, as suggested by Ranjith and Mohan. Subjects in their adolescence or young adulthood from cultures with importance to semen loss and who are high on perception for somatic sensations and hypochondriasis possibly go on to develop Dhat syndrome. Those high on alexithymia and hypochondriasis possibly manifest with depression on experiencing stressful situations. Similarly, those high on alexithymia and hypochondriasis when exposed to life stresses but unable to verbalize their distress possibly manifest with somatoform disorders.

Comorbidity of depression with Dhat syndrome can be understood in the background of the cultural belief that the loss of semen is considered equivalent to the loss of vitality. The relationship of psychological factors with the severity of distress associated with symptoms of Dhat syndrome was also studied. Distress associated with Dhat syndrome was not seen to be influenced by the psychological correlates like alexithymia, hypochondriasis, and somatosensory amplification.

To conclude, the present study demonstrated that patients with Dhat syndrome have a high prevalence of somatosensory amplification, hypochondriasis, and alexithymia. It provides further credence to the findings reported in earlier studies. However, the earlier studies did not take into account the comorbid psychiatric disorders, which could have influenced the findings. Compared to the earlier studies, the present study had relatively larger sample size.

Future studies should study the relationship of Dhat syndrome and psychological correlates in much larger sample size derived from the general population to improve the understanding between Dhat syndrome and various psychological factors. There is also a need to develop effective interventions focused on the identified psychological factors in Dhat syndrome to improve the outcome.

A major limitation of this study is the absence of a healthy control group. This study involved participants attending a tertiary care center, which may not be representative of the patients of Dhat syndrome in the general population. The data of somatoform disorder and depression published previously from our center was used for comparison. It is important to note that in that sample the study subjects had also scored higher on beck depression inventory. Further, in the previous studies the findings of the psychological correlates pertain to subjects of both the genders, compared to the present study, which included only male subjects. This could have influenced the differences reported from those with Dhat syndrome alone.

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Conflicts of interest
There are no conflicts of interest.

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