A study on phenomenology of Dhat syndrome in men in a general medical setting

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ABSTRACT

Background: “Dhat syndrome” is believed to be a culture-bound syndrome of the Indian subcontinent. Although many studies have been performed, many have methodological limitations and there is a lack of agreement in many areas.

Aims: The aim is to study the phenomenology of “Dhat syndrome” in men and to explore the possibility of subtypes within this entity.

Settings and Design: It is a cross-sectional descriptive study conducted at a sex and marriage counseling clinic of a tertiary care teaching hospital in Northern India.

Materials and Methods: An operational definition and assessment instrument for “Dhat syndrome” was developed after taking all concerned stakeholders into account and review of literature. It was applied on 100 patients along with socio-demographic profile, Hamilton Depression Rating Scale, Hamilton Anxiety Rating Scale, Mini International Neuropsychiatric Interview, and Postgraduate Institute Neuroticism Scale.

Statistical Analysis: For statistical analysis, descriptive statistics, group comparisons, and Pearson’s product moment correlations were carried out. Factor analysis and cluster analysis were done to determine the factor structure and subtypes of “Dhat syndrome.”

Results: A diagnostic and assessment instrument for “Dhat syndrome” has been developed and the phenomenology in 100 patients has been described. Both the health beliefs scale and associated symptoms scale demonstrated a three-factor structure. The patients with “Dhat syndrome” could be categorized into three clusters based on severity.

Conclusions: There appears to be a significant agreement among various stakeholders on the phenomenology of “Dhat syndrome” although some differences exist. “Dhat syndrome” could be subtyped into three clusters based on severity.

Key words: Culture-bound syndromes, Dhat syndrome, phenomenology, semen loss anxiety

INTRODUCTION

Culture-bound syndromes are recurrent locality-specific patterns of aberrant behavior and troubling experience generally restricted to specific geographical areas. They refer to certain conditions that are traditionally considered to be illnesses, have traditional explanations, and often have local names as well. They have been described all over the world. They often encompass various symptoms ranging from anxiety to psychotic symptoms and often are difficult to accommodate within one Western nosological category.

Dhat syndrome

Dhat syndrome is generally believed to be a culture-bound syndrome of the Indian subcontinent, although this has...
often been debated. It is characterized by excessive preoccupation with loss of “Dhat,” which is generally taken to be representing semen.

Cultural beliefs associated with “Dhat syndrome”
Various kinds of beliefs exist regarding Dhat syndrome in India. The Charaka Samhita mentions that imbalance of the bodily humors or excessive ejaculatory orgasm can lead to damage to the dhatus. Sukra or semen, although nutritional in origin, is supposed to be all pervading within the body. Many believe food is progressively transformed to blood, marrow, and then semen. Some believe that the cavernosal blood is lost as semen following ejaculation.

Patients of Dhat syndrome acquire knowledge regarding the illness from friends, relatives, colleagues, roadside advertisements, lay magazines, Hakims, and Vaids.

Perceived causes
People suffering from Dhat syndrome attributed the causes to bad company, financial worries, reading erotic literature or pictures, watching dirty movies, bad habits such as alcoholism, unfulfilled longings or desires, and betrayal in friendship or love. Venereal diseases, urinary tract infection (UTI), overeating, constipation, worm infestation, disturbed sleep, and genetic factors were also considered by the patients to be the cause of dhatu loss.

Eighteen percent believed Dhat to be pus, 12% believed it to be concentrated urine, and another 12% believed it to be sugar.

Perceived effects
Patients suffering from Dhat syndrome perceived that it could increase the chances of birth of more female children, death at early age, malformed fetus, betrayal in love, betrayal in friendship, and financial worries. Certain patients also felt that semen loss could lead to anemia, leprosy, or tuberculosis.

Perceived treatments
Patients suffering from Dhat syndrome perceived “desi” medicines, herbs, advice of Hakims and Vaids, dietary interventions, protein- and iron-rich food, B-complex tablets or injections, antibiotics, anti-anxiety drugs, aphrodisiacs, and marriage as possible cures.

Socio-demographic profile
Various reports suggest that Dhat syndrome is usually seen in young, unmarried, or recently married men of rural background with conservative attitude toward sex. They generally belong to low or medium socio-economic status and education level. However, based on a review of records of 1242 patients attending a sex and marriage clinic between 1979 and 2005, Kendurkar et al. suggested that it occurs irrespective of education status or domicile.

Bhatia and Malik found it to be present in patients from all religious backgrounds. Some authors have argued for a Dhat syndrome in females as well. In a study on 200 female patients, it was found that 32% of psychiatric and 13% of nonpsychiatric patients attributed somatic symptoms to nonpathological vaginal discharge.

Symptoms and comorbidities
Patients with Dhat syndrome presented with vague somatic symptoms, weakness, guilt, lethargy, anxiety, loss of appetite and sleep, multiple body pains, sexual dysfunction, and many other symptoms. However, several of these symptoms could possibly be of other comorbid disorders such as depression, anxiety, sexually transmitted diseases, or UTIs. A study of 366 symptomatic men presenting at rural private provider clinics in Northern India found a rate of 5.5% for chlamydial and gonorrheal infections using polymerase chain reaction techniques.

Several psychiatric disorders are comorbid with Dhat syndrome. Depressive neurosis was the most common comorbidity reported with a prevalence varying between 40% and 66% in various studies. Anxiety neurosis (21–38%) and somatoform and hypochondriacal disorders (30–40%), premature ejaculation (22–44%), erectile dysfunction, and impotence (22–62%) were also common. Other disorders found were stress reaction, phobias, depressive psychosis, obsessive ruminations, body dysmorphic symptoms, and delusional disorders.

Thus, we see that several studies have been conducted on Dhat syndrome. However, there is still no clear definition of Dhat syndrome. Loss could occur either through urine only or through any other route such as nocturnal emission, masturbation, homo/heterosexual sex, pre/extramarital sex, or through the anus. Further, the nosological position of Dhat syndrome in the official classifications of professional organizations is yet to be settled. In addition, there is as yet no clarity as to whether Dhat syndrome is a unitary entity or it comprises sub-syndromes. Therefore, there is a need for systematic studies on the phenomenology of Dhat syndrome to clarify the same.

The aims of the present study are to study the phenomenology of “Dhat syndrome” in men attending a sex and marriage counseling clinic and to explore the possibility of subtypes within the entity of “Dhat syndrome” in these subjects.

MATERIALS AND METHODS
The study was conducted in two phases:
- Phase I: Expert opinion and development of questionnaire
- Phase II: Administration of the questionnaire to patients with “Dhat syndrome.”
Phase I: Expert opinion and development of questionnaire

Generation of the item pool

Initially, an item pool was obtained by enlisting symptoms (items) gathered through the following methods. Literature search on Medline/PubMed, MedInd, Internet, Psychological Abstracts, Indian Journal of Psychiatry, other Indian Mental Health Journals, Indian Anthropological Journals, requests to prominent authors on “Dhat syndrome” through correspondence, and back references of the articles were obtained. Items from Postgraduate Institute Neuroticism Scale (PGI N2) and Dhat syndrome interview schedule were also considered. Focus group discussions (FGDs) were conducted with patients, mental health professionals, and other medical specialists on various aspects related to Dhat syndrome. Two FGDs each were conducted with patients (consisting of four and eight patients) and mental health professionals (consisting of eight psychiatrists each). Another FGD consisting of seven members was held with other medical specialists (dermatology, community medicine, medicine, surgery, and endocrinology) of All India Institute of Medical Sciences (AIIMS). The participants were either senior residents or faculty members. The FGDs were held at AIIMS and each lasted about 1–2 h. Despite best efforts, FGDs were not possible with traditional medicine practitioners and therefore, key individual interviews were conducted with three ayurvedic and two homeopathic practitioners. Audio recording of each session was carried out and transcripts were made. The recording was commenced on entry of the first member of the group and would be stopped only after the last person had left so that points that may have come up before the formal discussion had commenced and after it was over were also included. The grounded theory method was used to analyze the FGDs. The discussions/interviews were conducted using open, unbiased questions. The transcripts were prepared and read over and over again along with repeated listening to the audio recordings. The participants were given codes to avoid bias related to the person giving a particular opinion. All the answers to a particular question were initially noted under each question (initial coding) and as many different categories as possible were generated. Then, similarities between categories were looked for and emerging themes were noted (focused coding). Finally, after observing the various themes and refining them, an overall theoretical sense was made (theoretical coding). Memos were written on the discussions/interviews wherein the researcher summarized the information along with the key insights gained.

Development of proposed operational definition for Dhat disorder

During the FGDs, an operational definition for Dhat disorder was discussed and a set of proposed criteria was prepared. This definition was used for recruitment of patients in the next phase. A Dhat disorder diagnostic interview was also developed to assess these criteria.

Development of Dhat disorder severity scale

The attributes of the belief in the first section (health beliefs scale) and the associated symptoms in the second section (associated symptoms scale) besides additional descriptive information were recorded.

The items were obtained in Hindi and words used by patients were preferred. For the health beliefs section, one of the two items correlating >0.7 with each other and those items with nonsignificant correlations with the preliminary health beliefs scale total score were removed. An exclusion based on difficulty index (a score of “0” given by >80% patients) was also considered. Factor analysis (varimax rotation) was carried out to determine the structure of the “health belief scale” items and for extraction of meaningful items.

For the associated symptom section, similar method was followed. In addition, items that did not correlate with the total of the preliminary health beliefs scale and items correlating with the social desirability scale of the PGI N2 were also removed.

Phase II: Administration of the questionnaire to patients with “Dhat syndrome”

Type of study

It was a cross-sectional, descriptive study.

University of the study

All patients attending the sex and marriage counseling clinic, center for community medicine, AIIMS, who complained of loss of Dhat or white discharge as a symptom.

Subjects of the study

One hundred male patients of “Dhat syndrome” according to the operational definition as finalized in the Phase I of the study and the other inclusion and exclusion criteria (given below) formed the subjects of the study.

Selection criteria

Inclusion criteria

Male patients above 14 years of age suffering from “Dhat syndrome” as per the operational definition would be recruited. They should be able to understand and converse in Hindi at a primary level of education and be willing to participate in the study and give informed consent (or assent along with parent’s consent in those <18 years of age).

Exclusion criteria

History or examination suggestive of mental retardation, psychotic illness, organic mental disorder, and physical cause for discharge per urethra/anus (medical consultation/investigations were conducted as clinically indicated).

Procedure

Patients with the complaint of Dhat loss attending the sex and marriage counseling clinic, center for community
medicine, AIIMS, were screened with the operational definition for Dhat disorder and selection criteria for inclusion into the study. Valid informed consent was then taken from the subjects. Socio-demographic data were collected on the socio-demographic sheet. Mini International Neuropsychiatric Interview (MINI)\textsuperscript{[18]} was then applied to assess the psychiatric comorbidity. This was followed by application of Hamilton Depression Rating Scale (HAM-D),\textsuperscript{[19]} Hamilton Anxiety Rating Scale (HAM-A),\textsuperscript{[20]} PG1 N2,\textsuperscript{[15]} and finally, the Dhat disorder severity scale developed in Phase I of the study. All the instruments were administered and rated by the interviewer.

**Statistical analysis**

Socio-demographic and clinical data obtained were analyzed using descriptive statistics. Group comparisons involved the use of analysis of variance, with post hoc 2 × 2 comparison (least significant difference method) for statistically significant results. Correlation between measures was calculated using Pearson’s product moment correlation.

**Factor analysis**

Factor analysis (varimax rotation with Kaiser normalization) was used to study symptom dimensions of “Dhat syndrome” – both for the health beliefs scale as well as the associated symptoms scale. Initially, Kaiser–Meyer–Olkin (KMO) and Bartlett’s test were conducted to test the adequacy of sample for factor analysis. A KMO test value >0.6 and Bartlett’s test rejecting the hypothesis of the correlation matrix being unitary suggested that the sample met these criteria for factor analysis. Factors were extracted using principal component analysis. Initially, a scree plot was obtained to estimate the number of possible factors. Each model suggested by the scree plot was examined. Factors with very few items (<4) were discarded as unlikely to replicate across analyses. To ascertain the stability of the factors, the same process was repeated in two sub-samples derived from the odd and even halves of the sample (based on serial number) for the health belief scale. A cut off of 0.85 was taken as ideal factor congruence for factors obtained in the odd and even halves of the sample. This procedure was not attempted for factors obtained from associated symptoms scale because of an unfavorable variable: Subject ratio.

**Cluster analysis**

Hierarchical cluster analysis (with Ward method) was conducted to explore for the possibility of sub-types within Dhat syndrome. It was run using age, scores on the health beliefs scale, and the associated symptoms scale. The final model was characterized on various descriptive variables.

**Ethical issues**

Written informed consent/assent from subjects and ethical clearance from the Institutional Ethics Committee were obtained.

**RESULTS**

**Phase I**

**Qualitative analysis**

Box 1 shows the themes emerging from qualitative analysis of the FGDs and key informant interviews conducted with patients and professionals based on grounded theory method. For purposes of brevity, detailed description is not provided and less common themes were omitted.

**Proposed “Dhat” disorder diagnostic criteria**

Based on the review of literature and the above-described discussions, an operational definition of Dhat disorder was proposed for selecting subjects for the phase II of the study (Box 2).

**Development of preliminary Dhat disorder diagnostic interview**

The diagnostic interview consisting of seven questions was framed to elicit the diagnostic criteria. It pertained to the last several weeks.\textsuperscript{[17]}

**Development of the preliminary Dhat disorder severity scale**

The Dhat disorder severity scale begins with a description of the belief and its cause over the last week, followed by questions to rule out alternative causes of discharge and mode of passage of Dhat. The next section (health belief) consists of a list of 25 health belief dimensions which are to be rated from zero to three. These dimensions were derived from scales used to describe strongly held beliefs such as overvalued ideas, delusions, and culture-bound syndromes. The last section (associated symptoms) of the schedule included 139 symptoms, and overall distress and dysfunction to be rated on a scale of zero to three.\textsuperscript{[17]} Distress and dysfunction were measured based on clinical judgment. The enlisted items were further refined after phase II of the study which involved application of the draft instrument on 100 patents with (proposed) Dhat disorder.

**Phase II**

**Descriptive data**

**Socio-demographic profile**

The socio-demographic details of the patients studied are shown in Table 1. The vast majority was constituted by those in the 20–30 years age group and unmarried.
Mode of passage of Dhat/semen/white discharge
Patients reported passage of Dhat by various routes [Table 2]. Passage through urine (75%) and passive stimulation (75%) were the most commonly reported modes.

Dimensions of health beliefs related to Dhat disorder
The scores on the dimensions of health beliefs are shown in Table 3.

Symptoms associated with Dhat disorder
Dhat disorder patients were assessed on 139 symptoms of the associated symptoms scale. For purposes of brevity, the entire list has not been displayed. The list included a wide range of somatic, anxiety, depressive, sexual, and cognitive symptoms. Most common associated symptoms were (score ≥ 1): Sense of being unhealthy (99%), worry (99%), and feeling that there will be no improvement despite treatment (97%), tension (97%), tiredness (95%), fatigue (95%), weakness (95%), and anxiety (95%). Among sexual complaints, most common were loss of masculinity (83%), erectile dysfunction (54%), and premature ejaculation (53%). Most patients were rated to have mild or moderate level of symptoms; however, 47% of the patients reported severe weakness. The overall distress and dysfunction was rated as mild in 64% and 81% of the cases, respectively.

Depression, anxiety, and neuroticism scores of Dhat disorder patients
The HAM-D, HAM-A, and PGI N2 were used to measure the severity of depression, anxiety, and neuroticism in Dhat disorder patients [Table 4].

On HAM-D, 54 patients scored in the mild range, 42 in the moderate range, and four in the severe range. On HAM-A, 63 patients scored in the mild range, 28 in the moderate, and nine in the severe range.

Psychiatric comorbidity
About one-third of patients with Dhat disorder suffered from psychiatric comorbidities based on the MINI [Table 5].
Box 2: Dhat disorder diagnostic criteria

Persistent preoccupation with passage of “Dhat”/semen/whitish discharge, or symptoms/physical abnormality believed to be due to it; causes persistent distress or interference with personal functioning in daily living, or leads the patient to seek health interventions

Persistent belief (held with conviction), that the passage of “Dhat”/semen/whitish discharge has led or can potentially lead to serious health consequences. The belief (that the passage of “Dhat”/semen/whitish discharge has led or can potentially lead to serious health consequences) persists despite allopathic advice (following appropriate evaluation and investigations) that the passage of “Dhat”/semen/whitish discharge is benign and that the reported symptoms or physical abnormalities are not due to it; except for short periods of up to a few weeks at a time immediately after or during allopathic evaluation/investigations/interventions

The belief (that the passage of “Dhat”/semen/whitish discharge has led or can potentially lead to serious health consequences) is in keeping with the prevalent sociocultural (including traditional health systems’) understanding of the salience/consequences of passage of “Dhat”/semen/whitish discharge

The duration of the disturbance is at least 1 month

The preoccupation is not better accounted for by other anxiety, depressive, or somatoform disorders

Table 1: Socio-demographic profile of patients with Dhat disorder (n=100)

| Variable               | Number of patients (%) |
|------------------------|------------------------|
| Age (years)            |                        |
| <20                    | 8                      |
| 20-30                  | 74                     |
| 30-40                  | 13                     |
| >40                    | 5                      |
| Marital status         |                        |
| Married                | 33                     |
| Unmarried              | 64                     |
| Others                 | 3                      |
| Occupation             |                        |
| Professional           | 8                      |
| Executive              | 3                      |
| Skilled                | 36                     |
| Unskilled              | 11                     |
| Student                | 28                     |
| Unemployed             | 10                     |
| Others                 | 4                      |
| Education              |                        |
| Postgraduate           | 14                     |
| Graduate               | 19                     |
| Intermediate           | 23                     |
| Matric                 | 17                     |
| Middle                 | 22                     |
| Primary                | 2                      |
| Literate               | 3                      |
| Monthly income (rupees)|                        |
| <5000                  | 52                     |
| 5000-10,000            | 23                     |
| 10,000-15,000          | 13                     |
| 15,000-20,000          | 1                      |
| >20,000                | 11                     |
| Religion               |                        |
| Hindu                  | 82                     |
| Muslim                 | 17                     |
| Sikh                   | 1                      |

Table 2: Mode of passage of semen among study subjects (n=100)

| Mode of passage | Number of patients (%) |
|-----------------|------------------------|
| Urine           | 75                     |
| Defecation      | 49                     |
| Passive stimulation | 75                  |
| Nocturnal emission | 73                   |
| Masturbation   | 49                     |
| Sexual intercourse | 15                    |
| Others         | 4                      |

*Subjects could respond in affirmative to multiple options

Table 3: Scores on the items of preliminary health beliefs scale related to Dhat disorder

| Cognitive items                                      | Number of patients (%) |
|------------------------------------------------------|------------------------|
| Core conviction/conviction/testimony                 |                        |
| Fixity/lack of flexibility/adjustability             |                        |
| Response to disagreement                             |                        |
| Perception of others’ views                          |                        |
| Logical organization/adjustability of belief         |                        |
| Fluctuation in conviction/lack of stability/adjustability |                    |
| Accuracy of belief                                   |                        |
| Extent of acceptance by others/idiosyncrasy          |                        |
| Extent of acceptance by experts in traditional systems of medicine |          |
| Insight into pathology of belief                    |                        |
| Insight into accuracy of belief                      |                        |
| Strength of resistance                               |                        |
| Speed of formation of belief                         |                        |
| Egosyntonic                                          |                        |
| Extension                                            |                        |
| Salience/importance                                  |                        |
| Influence of experience                              |                        |
| Interference                                         |                        |
| Influence on cognition                               |                        |
| Influence on behavior                                |                        |
| Influence on affect                                  |                        |
| Time spent                                           |                        |
| Intensity of preoccupation                           |                        |
| Pressure                                             |                        |
| Self-evidentness                                     |                        |
| aReverse scored                                      |                        |

Table 4: Depression, anxiety, and neuroticism scores in patients of Dhat disorder (n=100)

| Scale        | Minimum | Maximum | Mean (SD)   |
|--------------|---------|---------|-------------|
| HAM-D        | 4       | 36      | 15.8 (5.3)  |
| HAM-A        | 4       | 30      | 15.9 (4.7)  |
| PGI N2       | 5       | 41      | 16.56 (6.5) |

HAM-D – Hamilton Depression Rating Scale; HAM-A – Hamilton Anxiety Rating Scale; PGI N2 – Postgraduate Institute Neuroticism Scale; SD – Standard deviation

Multivariate analysis

Development of the final health belief scale related to Dhat disorder

Item analysis

Item-item correlations eliminated four items. No items were eliminated on the basis of difficulty index or correlation with
the social desirability index of PGI N2. Item-total correlation eliminated three more items. Eighteen items were left in the final version of the health belief scale.

Factor analysis
Factor analysis was conducted on these 18 remaining items. The scree plot [Figure 1], factor congruence [Table 6], and factor meaningfulness suggested that a three-factor model should be retained [Table 7].

Factor I was named “salience,” factor II was named “coherence,” and factor III was named “strength of belief” (factor III).

Development of the final associated symptoms scale related to Dhat disorder
Item analysis
Fifty-two items were eliminated based on the difficulty index, 8 items on item-item correlation, 9 items based on nonsignificant item-total correlation, 2 items based on significant correlation with the social desirability scale of PGI N2, and 21 items based on nonsignificant correlation of factor scores and total score of the health belief scale. This brought down the number of items in the final scale to 47.

Factor analysis
A three-factor model was retained [Table 8 and Figure 2]. Factor I was named “loss of vitality,” factor II as “preoccupation,” and factor III as “retardation-arousal,” which was somewhat reminiscent of “agitated depression.”

Correlations between the measures of Dhat disorder severity and anxiety, depression, and neuroticism
Correlations were calculated between the measures of Dhat disorder severity and those of depression, anxiety, and neuroticism [Table 9].

The health belief scale (total) had moderately significant correlation with associated symptoms scale, HAM-A, HAM-D, and PGI N2 (r = 0.4–0.65); whereas the associated symptoms scale had a high correlation (>0.7) with HAM-A, HAM-D, and PGI N2.

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**Table 5: Psychiatric comorbidity in patients with Dhat disorder (n=100)**

| Comorbid diagnosis                  | Number of patients (%) |
|-------------------------------------|------------------------|
| Major depression                    | 14                     |
| Generalized anxiety disorder        | 3                      |
| Social anxiety disorder             | 1                      |
| Panic disorder                      | 3                      |
| Agoraphobia                         | 1                      |
| Obsessive compulsive disorder       | 3                      |
| Alcohol abuse                       | 2                      |
| Alcohol dependence                  | 3                      |
| Other substance abuse               | 1                      |
| Other substance dependence          | 1                      |
| Antisocial personality disorder     | 1                      |

**Table 6: Factor congruence scores**

| Even half | Factor I   | Factor II  | Factor III  | Factor IV  | Factor V   | Factor VI  |
|-----------|------------|------------|-------------|------------|------------|------------|
| 3-factor solution | 0.978  | 0.386  | 0.069  | 0.300  | 0.892  | 0.547  |
| 4-factor solution | 0.976  | 0.405  | 0.977  | 0.076  | 0.304  | 0.723  | 0.237  |
| 5-factor solution | 0.991  | 0.304  | 0.273  | 0.390  | 0.814  | 0.390  | 0.289  |
| 6-factor solution | 0.891  | 0.304  | 0.273  | 0.390  | 0.814  | 0.390  | 0.289  |

**Table 7: Factor structure of the health belief scale**

| Health belief dimensions | Component (%) |
|--------------------------|---------------|
|                         | Factor I  | Factor II | Factor III |
| Variance                 | 46.12     | 11.31     | 7.33       |
| Conviction               | 0.849     | 0.869     |            |
| Fixity                   |           |           |            |
| Logical organization     | 0.304     | 0.498     |            |
| Accuracy                 | 0.543     | 0.653     |            |
| Acceptance by others     | 0.835     |           |            |
| Acceptance by traditional medicine experts | 0.743 | 0.349 | |
| Strength of resistance   | 0.837     |           |            |
| Egosyntonic              | 0.707     | 0.542     |            |
| Extension                | 0.502     | 0.602     |            |
| Salience                 | 0.567     | 0.550     | 0.362      |
| Influence of experience  | 0.556     |           |            |
| Interference             | 0.868     |           |            |
| Influence on cognition   | 0.761     | 0.433     |            |
| Influence on behavior    | 0.858     |           |            |
| Influence on affect      | 0.834     |           |            |
| Time spent               | 0.760     | 0.336     |            |
| Pressure                 | 0.892     |           |            |
| Self-evidentness         | 0.347     | 0.487     | 0.454      |

**Figure 1: Scree plot of unrotated components of the health belief scale in Dhat disorder patients (n = 100)**
To explore the possibility of sub-types within the entity of Dhat disorder, we conducted a cluster analysis by analyzing the age, ratings on the health belief scale, and the associated symptoms scale. The three-cluster model was considered the best fitting model [Figure 3]. Cluster I represented patients with mild symptoms, cluster III as moderate symptoms, and cluster II as the most severe symptoms.

Cluster I differed from others on all health belief scale factors and associated symptoms scale factors whereas Cluster III differed on all three factors of the associated symptoms scale, but only on one of the factors of the health beliefs scale, i.e., “salience” [Table 10].

**Group comparisons**

**Comparison of clusters of Dhat disorder patients**

The three clusters were also compared on the socio-demographic variables [Table 11] and clinical variables [Table 12]. The results reflected the severity patterns as described above. Cluster I had the oldest patients. Cluster II had only unmarried patients and was constituted largely by students. There was a trend (P = 0.06) toward more severely ill clusters having more comorbidity than less severely ill clusters.

**Comparison of Dhat disorder patients subgroups based on psychiatric comorbidity**

Significant socio-demographic differences were noted as shown in Table 13.

The depression subgroup had higher scores than anxiety and substance use groups on HAM-D, which in turn had higher scores than the no comorbidity groups [Table 14].

**DISCUSSION**

The present study was done in a series of steps based on the guidelines for research in culture-bound syndromes.[22] Sufficient information was obtained regarding the illness from the various stakeholders, interview schedules were prepared, and statistical methods such as factor analysis and cluster analysis were used to study symptom dimensions and sub-types of the illness.

The FGDs revealed that there was congruence between the stakeholders regarding the salience of belief; routes of passage of Dhat, associated symptoms, and that the associated symptoms include both psychological and somatic symptoms. The socio-demographic profile and the associated symptoms were also in keeping with

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**Table 8: Factor analysis (symptoms) - three-factor model for associated symptoms scale**

| Associated symptoms                          | Component (%) | Factor I | Factor II | Factor III |
|----------------------------------------------|---------------|----------|-----------|------------|
| Variance                                     | 32.04         | 10.15    | 5.31      |
| Fatigue                                      | 0.654         |          |           |            |
| Weakness                                     | 0.635         |          |           |            |
| Lethargy                                     | 0.563         | 0.356    |           |            |
| Loss of energy                               | 0.588         |          | 0.408     |            |
| Loss of control over body                    | 0.564         |          |           |            |
| Failing memory                               | 0.620         |          | 0.369     |            |
| Mental fatigue                               | 0.718         |          |           |            |
| Perceived change in size of genitals         |               |          |           | 0.413      |
| Impotence                                    |               | 0.716    |           |            |
| Nervousness                                  |               | 0.761    |           |            |
| Decreased self esteem                        |               | 0.785    |           |            |
| Decreased self confidence                    |               | 0.635    | 0.524     |            |
| Decreased desire to talk to others           | 0.431         |          | 0.567     |            |
| Everything feeling like effort               | 0.551         |          | 0.580     |            |
| Guilt                                        |               | 0.376    | 0.432     |            |
| Loss of interest                             | 0.358         |          | 0.666     |            |
| Tension                                      | 0.473         |          | 0.684     |            |
| Multiple aches and pains                     | 0.585         |          |           |            |
| Weakness in nerves                           | 0.448         |          | 0.362     |            |
| Fear of losing vital component               |               | 0.545    |           |            |
| Worry                                        |               | 0.757    |           |            |
| Sadness                                      | 0.393         | 0.419    | 0.499     |            |
| Hopelessness                                 |               |          | 0.681     |            |
| Apprehension regarding future               |               | 0.545    | 0.374     |            |
| Worries regarding betrayal in love          |               |          | 0.517     |            |
| Backache                                     | 0.490         |          |           |            |
| Discomfort in stomach                        | 0.580         |          | 0.377     |            |
| Discomfort in head                           | 0.532         |          |           |            |
| Inability to concentrate                    | 0.658         |          | 0.391     |            |
| Loss of control over mind                    | 0.583         |          |           |            |
| Nervousness that cannot be calmed            | 0.419         | 0.547    | 0.365     |            |
| Suicidal feeling                             | 0.553         |          | 0.458     |            |
| Death wishes                                 | 0.619         |          | 0.421     |            |
| Pessimistic thinking                         | 0.522         |          | 0.458     |            |
| Fidgeting/restlessness                        | 0.368         |          |           |            |
| Fidgeting/restlessness that cannot be calmed | 0.386         | 0.518    |           |            |
| Gas                                          | 0.468         |          | 0.490     |            |
| Decreased sleep                              | 0.447         |          |           |            |
| Indigestion                                  | 0.555         |          | 0.408     |            |
| Flatulence                                   | 0.471         |          | 0.367     |            |
| Palpitation                                  | 0.376         |          | 0.498     |            |
| Increased sweating                           |               |          | 0.667     |            |
| Sense of being unhealthy                     |               | 0.539    |           |            |
| Pacing around                                | 0.482         |          | 0.468     |            |
| Inability to decide which task of many to be carried out | 0.518 |          |           |            |
| Not feeling like doing anything              |               |          | 0.348     |            |
| Excessive thirst                             |               |          | 0.749     |            |

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**Figure 2: Scree plot of unrotated components of the associated symptoms scale in Dhat disorder patients (n = 100)**
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Table 9: Correlations (Pearson’s product moment) between Dhat disorder severity and depression, anxiety, neuroticism (n=100)

|                      | Health belief scale total | Associated symptom scale total | HAM-D | HAM-A | PGI N2 |
|----------------------|---------------------------|--------------------------------|-------|-------|--------|
| Health belief scale  |                           |                                 |       |       |        |
| Total                | -                         | 0.543                           | 0.643 | 0.604 | 0.407  |
| Factor I (salience)  | 0.865                     | 0.297                           | 0.429 | 0.401 | 0.199  |
| Factor II (coherence)| 0.820                     | 0.349                           | 0.499 | 0.418 | 0.247  |
| Factor III (strength)| 0.707                     | 0.666                           | 0.695 | 0.684 | 0.565  |
| Associated symptoms  |                           |                                 |       |       |        |
| Total                | 0.543                     | -                               | 0.726 | 0.838 | 0.759  |
| Factor I (loss of vitality) | 0.406                 | 0.886                           | 0.581 | 0.748 | 0.761  |
| Factor II (preoccupation) | 0.597                  | 0.825                           | 0.739 | 0.751 | 0.473  |
| Factor III (retardation-arousal) | 0.341                  | 0.763                           | 0.523 | 0.597 | 0.696  |

All values were significant (P<0.01). HAM-D – Hamilton Depression Rating Scale, HAM-A – Hamilton Anxiety Rating Scale, PGI N2 – Postgraduate Institute Neuroticism Scale

Table 10: Comparison of three clusters of Dhat disorder subjects based on factor totals of health belief and associated symptom scales

| Factors                | Mean (SD) | ANOVAa F (df), P | Pairwise comparison (LSD method), P<0.05 |
|------------------------|-----------|------------------|-----------------------------------------|
| Salience (Factor I)    | 10.52 (2.27) | 14.83 (3.71) | 12.50 (2.28) | 18.92 (2), 0.000 | II > III > I |
| Coherence (Factor II)  | 10.96 (2.64) | 12.89 (1.56) | 11.86 (2.04) | 4.95 (2), 0.009 | II, III > I |
| Strength of belief (Factor III) | 7.33 (2.03) | 8.89 (2.22) | 8.31 (1.93) | 4.62 (2), 0.012 | II, III > I |
| Loss of vitality (Factor I) | 9.72 (4.81) | 24.06 (10.25) | 16.89 (3.97) | 42.23 (2), 0.000 | II > III > I |
| Preoccupation (Factor II) | 11.63 (3.70) | 25.11 (7.33) | 17.39 (3.77) | 58.27 (2), 0.000 | II > III > I |
| Retardation-arousal (Factor III) | 4.46 (2.89) | 13.72 (7.95) | 6.94 (3.83) | 27.36 (2), 0.000 | II > III > I |

Table 11: Comparison of clusters of Dhat disorder patients regarding socio-demographic variables

| Category                        | Mean (SD) | ANOVAa, F (df), P | Pairwise comparison (LSD method), P<0.05 |
|---------------------------------|-----------|------------------|-----------------------------------------|
| Age                             | 30.41 (7.97) | 22.50 (30.61) | 24.78 (3.74) | 14.62 (2), 0.000 | II, III > I |
| Number of patients (n=100)      | 15        | 4                | 8 | 19.00 (4), 0.165 |
| Education                       |           |                  |                                         |
| Literate/primary/middle         | 15        | 4                | 8 | 19.00 (4), 0.165 |
| Matric/intermediate             | 15        | 7                | 18 |                                  |
| Graduate/postgraduate/professional | 16    | 7                | 10 |                                  |
| Marital status                  |           |                  |                                         |
| Married                         | 24        | 0                | 9 | 24.67 (2), 0.002 |
| Unmarried/others                | 22        | 18               | 27 |                                  |
| Occupation                      |           |                  |                                         |
| Professional/business           | 6         | 0                | 5 | 17.88 (4), 0.001 |
| Skilled/unskilled/student       | 28        | 4                | 18 |                                  |
| unemployed/retired              | 12        | 14               | 13 |                                  |
| Religion                        |           |                  |                                         |
| Hindu                           | 38        | 16               | 28 | 2.39 (2), 0.665 |
| Non-Hindu                       | 8         | 2                | 8 |                                  |

Interval data. Analysis of variance, SD – Standard deviation; LSD – Least significant difference

previous literature[5] While patients and traditional medicine experts considered the passage of Dhat to be mainly a physical disorder, allopathic practitioners considered it to be a psychological illness. Since there is no consensus definition of Dhat syndrome, the current study suggested diagnostic criteria for Dhat disorder based on the opinions of various stakeholders—patients, psychiatrists, other medical specialists, and traditional healers. The interview schedule developed to assess Dhat disorder covers in detail the various aspects of phenomenology of the illness, could also be used to follow-up and measure improvement, and has definite time frame improvements over a previous instrument. The second phase of the study revealed the socio-demographic profile in keeping with the previous studies.[9]
Dhat has been variably defined as discharge of semen only or any whitish discharge, the loss of which the patient perceives to be debilitating. In the present study, about 25% of the patients diagnosed as having Dhat disorder did not report passage of Dhat through urine. A somewhat unusual finding is that 49% of our patients reported passage of Dhat through the anal route. Earlier studies\textsuperscript{[23]} have reported lower figures, for example 12.5% leading to a view that it is somewhat rare.\textsuperscript{[24]} Earlier studies have either not looked at the issue systematically or have not allowed participants
the possibility of multiple responses. Most patients who reported passage by anal route in the present study did so in addition to other routes.

Close to one-third of patients with Dhat disorder had comorbid psychiatric disorders. Common comorbidities were major depression (14%), anxiety disorders (11%), and substance use disorders (7%). The rates of major depression (40–66% in earlier studies) and anxiety disorders (20–38% in earlier studies) in the present sample were lower than that reported in previous studies.[5,6] However, our findings were in keeping with the opinions of mental health experts who participated in the FGDs, who felt that although depressive symptoms were very common, syndromal depression or anxiety may not be as common as reported in the literature. Another reason for

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**Table 12: Comparison of clusters of Dhat disorder patients regarding clinical variables**

| Cluster | Mean (SD) | ANOVA*, F (df), P | Pairwise comparison (LSD method), P<0.05 |
|---------|-----------|--------------------|------------------------------------------|
| I       | 12.67 (3.87) | 22.61 (4.91) | 16.67 (3.91) | 21.59 (2), 0.000 | II > III > I |
| II      | 13.30 (3.24) | 20.94 (6.46) | 16.28 (4.04) | 21.26 (2), 0.000 | II > III > I |
| III     | 13.50 (4.76) | 23.44 (7.25) | 17.03 (5.30) | 39.22 (2), 0.000 | II > III > I |

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**Table 13: Comparison between subgroups defined by comorbidity in Dhat disorder patients - socio-demographic variables (n=100)**

| Category                  | No comorbidity | Depressive disorders | Anxiety disorders | Substance use disorders | Chi-square test value (df), P |
|---------------------------|----------------|----------------------|-------------------|------------------------|-------------------------------|
| Education                 |                |                      |                   |                        |                               |
| Literate/primary/middle   | 17             | 6                    | 2                 | 2                      | 23.056 (4), 0.341            |
| Matric/intermediate       | 13             | 8                    | 6                 | 1                      |                               |
| Graduate/postgraduate/professional | 10 | 5                    | 6                 | 1                      |                               |
| Marital status            |                |                      |                   |                        |                               |
| Married                   | 51             | 5                    | 6                 | 2                      | 21.111 (2), 0.049            |
| Unmarried/others          | 24             | 9                    | 2                 | 1                      |                               |
| Occupation                |                |                      |                   |                        |                               |
| Professional/business     | 8              | 3                    | 0                 | 0                      | 24.120 (4), 0.287            |
| Skilled/unskilled         | 38             | 5                    | 5                 | 2                      |                               |
| Student/unemployed/retired| 29             | 6                    | 3                 | 1                      |                               |
| Religion                  |                |                      |                   |                        |                               |
| Hindu                     | 58             | 14                   | 7                 | 3                      | 5.047 (2), 0.538             |
| Non-Hindu                 | 17             | 0                    | 1                 | 0                      |                               |

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**Table 14: Comparison between subgroups defined by comorbidity in Dhat disorder patients - clinical variables (n=100)**

| Parameter                | Mean (SD) | ANOVA*, F value (df), significance | Pair-wise comparisons (LSD method), P<0.05 |
|--------------------------|-----------|------------------------------------|------------------------------------------|
| Age                      | 27.27 (7.42) | 26.64 (4.46) | 25.38 (5.26) | 25.00 (6.24) | 0.278 (3), 0.841 | - |
| HAM-A                    | 14.43 (4.79) | 20.79 (5.11) | 20.5 (4.37) | 17.67 (6.35) | 9.586 (3), 0.000 | II, III>1, IV |
| HAM-D                    | 14.21 (3.75) | 22.86 (5.99) | 17.75 (3.57) | 15.67 (2.51) | 18.184 (3), 0.000 | II>III, IV>1 |
| PGI N2                   | 15.20 (5.78) | 21.29 (6.12) | 21.50 (8.78) | 15.33 (5.16) | 5.883 (3), 0.000 | II, III, IV |
| Health belief scale      | 30.61 (6.21) | 36.50 (5.55) | 31.00 (5.52) | 35.00 (3.46) | 4.092 (3), 0.009 | II>III, IV |
| Factor I salience        | 7.85 (2.17)  | 8.57 (1.82)  | 7.38 (1.50)  | 9.33 (2.89)  | 1.090 (3), 0.357 | - |
| Factor II coherence      | 11.40 (2.44) | 12.79 (1.67) | 11.25 (2.31) | 13.00 (2.00) | 1.799 (3), 0.153 | - |
| Factor III strength of belief | 11.36 (2.79) | 15.14 (2.93) | 12.38 (2.32) | 12.67 (1.59) | 7.480 (3), 0.000 | II>III, IV |
| Associated symptoms scale | 33 (14.2)  | 50.93 (14.4) | 55.50 (24.5) | 37.33 (17.3) | 3.986 (3), 0.000 | III>II, IV |
| Factor I loss of vitality | 13.36 (7.09) | 19.00 (6.52) | 25.13 (12.09) | 19.33 (7.64) | 7.664 (3), 0.000 | III>II, IV |
| Factor II preoccupation  | 14.25 (5.69) | 22.00 (6.33) | 23.5 (6.59)  | 16.00 (4.36) | 11.487 (3), 0.000 | III>II, IV |
| Factor III retardation- arousal | 5.93 (4.87)  | 11.86 (5.12) | 9.25 (8.10)  | 5.67 (5.51)  | 5.639 (3), 0.001 | III>II, IV |

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1) Analysis of variance. HAM-D – Hamilton Depression Rating Scale; HAM-A – Hamilton Anxiety Rating Scale; PGI N2 – Postgraduate Institute Neuroticism Scale; SD – Standard deviation; LSD – Least significant difference.
lower rates of depression/anxiety disorder comorbidities might be the setting of sample collection for the present study - a sex and marriage counseling clinic of the center for community medicine rather than a psychiatry clinic in most previous studies. The setting in the present study might have favored the recruitment of patients with somatic rather than psychological presentations. This, in a sense, argues for a separate status for Dhat syndrome apart from other disorders as against suggestions made by some authors,[23] and fits into Guaraccia and Rogler[22] suggestion that culture-specific syndromes have symptomatology that cut across many traditional nosological categories; however, they may be recognized separately due to their culture-determined pattern of symptoms. On the other hand, if Dhat syndrome is a somatized and culturally appropriate manifestation of depression,[25] it is possible that some depressed patients might have been missed by the conventional Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition criteria that MINI uses to diagnose depression.

The mean HAM-D score in the present sample was 15.8 (mild to moderate range) with 42 patients having scores in the moderate range and four in the severe range. The discrepancy between the rates of depressive disorder and depression severity might be because a number of items in the HAM-D which overlap with Dhat-specific symptoms (associated symptoms scale) and are reported as present even in the absence of a persistent pervasive sadness or anhedonia. Similar explanation appears to be true for HAM-A scores and rates of anxiety disorders.

About 7% of the patients with Dhat disorder (internalizing disorder) had comorbid substance use disorders (externalizing disorder),[26] which has not been described earlier. This figure probably represents the rates of substance use disorder in an urban general medical setting, for example, 7.9%.[27]

Although subjects for the current study were recruited from a clinical setting, two-thirds reported only mild distress and four-fifths reported only mild dysfunction. This suggests that focused treatment may be directed at about one-third of patients with the rest probably needing counseling/psychoeducation. Earlier, Gautham et al.[5] had noted that half of the patients had a significant distress based on GHQ.

The health belief scale with a three-factor structure replicated in two sub-samples of patients. We were unable to find published work on the factor structure of Dhat syndrome although there exists such work in some related areas such as illness attitude.[28] The associated symptoms scale also revealed a three-factor model, although the retardation–arousal factor is likely to break up into two factors.

The health belief scale had a moderate correlation with measures of depression, anxiety, and neuroticism, whereas associated symptoms scale had a high correlation with anxiety, depression, and neuroticism and did not correlated best with PGI N2. The findings suggest that Dhat syndrome is somewhat distinct from depression and anxiety in its core (health belief) features and overlaps with them in terms of its associated features differing from previous hypothesis of it to be a depressive disorder[25] or a variant of a somatoform disorder.

The cluster analysis revealed clusters mainly on the basis of severity differentiating mild, moderate, and severe groups, although the differences between moderate and severe clusters were not statistically significant on a few factor scores. Those with younger age (and probably younger age of onset) had more severe illness, an interesting finding similar to other psychiatric disorders, for example, bipolar disorders[29] and alcohol use disorders.[30] Some authors have earlier divided Dhat syndrome into three groups – Dhat alone, Dhat with comorbid depression and anxiety, and Dhat with comorbid sexual dysfunction.[11] This sub-grouping was not supported by the cluster analysis. The severity-based sub-classification has a parallel in the classification of depression in International Classification of Diseases 10.[31]

The depression and the anxiety comorbid groups had higher scores on health belief scale and associated symptom scale (and factor scores) in comparison with substance abuse and noncomorbid groups suggesting that Dhat syndrome is closer to internalizing psychopathology than to externalizing psychopathology.

**Limitations and future directions**

The study suffered from certain limitations. FGDs were conducted with a limited number of patients and experts from one city. The purposive sampling from a single outpatient sex and marriage counseling clinic of a tertiary care hospital limits the generalizability. The study was cross-sectional and sample was small, particularly for the associated symptoms scale for which the variable: Subject ratio was 1:2 (adequate samples should provide for variable: Subject ratios of 1:4–1:10). Future studies should apply the instrument on different samples (larger, different settings, and geographical areas) by different investigators and with more items. The cluster-based subtyping achieved in the present study is preliminary, needs further exploration.

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