

Deficits in Theory of Mind and Emotional Awareness in Somatoform Disorders

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ABSTRACT

Introduction: Emotions develop from a less differentiated to a highly differentiated level, and their arrest at a lower level is hypothesized to result in somatization. The present study aimed at investigating the Theory of Mind and emotional awareness in patients with somatoform disorders. **Materials and Methods:** Twenty patients with somatoform disorders, along with 20 healthy controls matched for age, sex, and education, were recruited after obtaining informed consent. Assessments included semi-structured proforma for sociodemographic and clinical details; Scale for Assessment of Somatic Symptoms (SASS) for somatic symptoms; and Patients Health Questionnaire (PHQ) to assess somatic symptoms, depression, and anxiety. Emotional awareness was measured using the Levels of Emotional Awareness Scale (LEAS), in which the participants had to provide descriptions of feelings of self and the other person in 20 imaginary situations. The responses were scored using a standardized manual. The Theory of Mind was measured using the Social Cognition Rating Tool in Indian Settings (SOCRATIS). **Results:** The two groups did not differ on any demographic parameters. Patients with somatoform disorders scored significantly lower on emotional awareness ($t = -3.74$; $P < 0.001$) and the Theory of Mind ($t = -3.56$; $P < 0.001$). The above differences remained significant even after controlling for comorbid depressive and anxiety symptoms. **Conclusion:** Patients with somatoform disorders are likely to have Theory of Mind and emotional awareness deficits independent of mood states. Future studies are needed to assess whether these deficits are trait- or state-dependent and whether they are cause or effect.

Key words: Emotional awareness, somatization, somatoform disorder, Theory of Mind

Key messages: Patients with somatoform disorders are more likely to have emotion awareness deficits. These deficits seem to be independent of the mood states.


Somatoform disorders are common psychiatric disorders characterized by distressing, persistent, medically unexplained physical symptoms. The disability caused by them is comparable to that caused by major depression or anxiety disorders.^[1,2] The ability to identify and represent different emotions has been

a subject of investigation in somatoform disorders in the last few years. One of the best known theories was described by Sifneos who described “alexithymia” as an inability to perceive and describe emotions

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sufficiently.^[3] Alexithymia interferes with a person's ability to deal with emotionally related mental contents and interaction with others.^[4] People with alexithymia have a decreased ability to engage in abstract thinking, to elaborate their emotions, and to appreciate the possibility of psychological attribution of their physical symptoms, which might result in somatization.^[5] However, various measures of alexithymia were noted to be affected by negative affects like anxiety and depression, which are the most common comorbidities with somatoform disorders.^[6,7] In addition, there was a very little correlation between different measures of alexithymia, sharing only 2–9% of their variances.^[8] This led to the formulation of a new theory: emotional awareness.

Emotional awareness is defined as the ability to describe one's own feelings and to evaluate the feelings of others.^[9] Emotional awareness was postulated to develop from a less-differentiated level of experiencing emotions as physical sensations to a more differentiated state where one has the ability to perceive greatly differentiated emotions of others while remaining unbiased by one's own emotional state. Hence, emotional awareness is able to better describe and quantify the deficits, namely ability to elaborate emotions, appreciate other's emotions as opposed to alexithymia, while remaining unaffected by negative affect.^[9]

The Theory of Mind (ToM) concept is described as the ability to infer the mental states of others and the ability to determine one's actions.^[10] The above is also known as the cognitive ToM, to differentiate it from the affective ToM, which was used to describe the ability to infer the feeling of others.^[11] ToM deficits have been noted in multiple disorders like autism, schizophrenia, and borderline personality disorder. Patients with the above disorders have also been found to have high alexithymia scores.^[12–17] Hence, it appears that those with alexithymia probably have a difficulty in understanding one's as well as others' thoughts/feelings, which would result in maladaptive ways of regulating emotions.

Studies which looked into emotional awareness, alexithymia, and ToM in patients with functional disorders have provided varied results. Studies carried out with three comparison groups, namely conversion disorders ($n = 29$), functional somatic syndromes ($n = 30$), and medically explained disorders ($n = 30$), without any matching, did not find any significant difference between the groups in terms of emotional awareness or cognitive ToM.^[18,19] In studies which had age-, sex-, and education-matched healthy controls ($n = 30$), there were significant deficits among patients with somatoform disorders ($n = 30$) with

regard to emotional awareness, cognitive ToM, and affective ToM.^[20,21]

Cultural factors are known to play a role in the degree of alexithymia and the prevalence of medically unexplained physical symptoms.^[22–26] Similarly, ToM and emotion recognition are also influenced by one's culture.^[27–29] The current study sought to extend the previous findings by using culturally validated tools to examine emotional awareness and ToM in patients with somatoform disorders. We hypothesized that patients with somatoform disorders would have deficits in emotional awareness and ToM compared to healthy controls.

MATERIALS AND METHODS

Subjects

Twenty patients with a clinical diagnosis of somatoform disorders as per the ICD-10 were recruited from the outpatient services of a tertiary psychiatry center, National Institute of Mental Health and NeuroSciences (NIMHANS) in Bangalore after obtaining informed consent. The inclusion criteria were: age between 18 and 60 years, able to read and write English or Hindi, and providing informed consent. The exclusion criteria included comorbid substance abuse or dependence within the past 6 months, history of cognitive impairment, and a current diagnosis or past history of psychosis. The selection was done on the basis of convenience sampling.

Twenty healthy controls were recruited from attenders of patients coming to NIMHANS, friends of the researchers, and the hospital staff. They were matched for age (± 5 years), gender, and educational level. Subjects were included after obtaining informed consent and following inclusion criteria: age between 18 and 60 years, no identifiable Axis I diagnosis (ruled out through a clinical interview by the investigator), and no family history of psychosis in first degree relatives.

The sample size was estimated, based on a previous study,^[20] to be 30 in each group. However, only 20 in each group could be recruited in the duration of the study.

Assessment of psychiatric symptoms and disease parameters

Patient Health Questionnaire-Somatic, Anxiety and Depressive Symptom (PHQ-SADS) was used in both the groups to screen for somatoform, anxiety, and depressive disorders and to assess the severity of somatoform disorders, anxiety, and depression. It is a self-report questionnaire comprising of the following modules:

PHQ-15 somatic symptom scale, PHQ-9 depression scale, and Generalized Anxiety Disorder (GAD-7) anxiety scale. It was designed primarily due to the frequent overlap of depressive, anxiety, and somatic symptoms in the patient population.^[30] Scale for Assessment of Somatic Symptoms (SASS) was used to measure the somatic symptoms and their severity in the somatoform group.^[31] Hindi Mental State Examination (HMSE), an adaptation of MMSE (Mini Mental State Examination), was used to rule out any cognitive deficits in the study subjects.^[32]

Outcome measures

Levels of Emotional Awareness Scale

Levels of Emotional Awareness Scale (LEAS) consists of 20 scenarios involving two people: self and the other. Subject has to answer, “How would you feel?” and “How would the other person feel?” Each of the scenarios receives a score of 0–5, depending on the degree of differentiation in using emotional words and differentiating self-emotions from others. A glossary of words was created to ensure uniformity in scoring.^[33] The vignettes try to evoke four basic emotions, namely anger, fear, sadness, and happiness. Some scenarios provide an opportunity for ambivalence regarding emotions in self and other.^[33] LEAS appears to be more specific in measuring a change in emotional awareness, unlike Toronto Alexithymia Scale (TAS-20) which is affected by negative affect.^[34] The scale has high internal consistency, inter-rater reliability, and test–retest reliability. Internal consistency reliability ranges from a coefficient alpha of 0.75–0.88, and inter-rater reliability ranges from 0.81–0.99.^[35] The scenarios in LEAS need to be modified to accommodate cultural differences, as responses can be influenced by the cultural regulation of affect.^[36] Hence, the scale was applied to all the study subjects after adapting it to the Indian settings.

ToM scores

Social Cognition Rating Tool in Indian Settings (SOCRATIS) has been validated in the Indian sociocultural context to assess social cognition in patients with schizophrenia. Only the ToM domain was used in the current study. These tests had good content validity, discriminant validity, and known groups validity.^[37] ToM was assessed at three levels (first order, second order, and higher order) using false-belief stories/tasks adapted to the Indian context. The list of tasks used was:

1. First-order ToM – Shanti–Ravi story
2. Second-order ToM – Ice cream man story
3. Two metaphor-irony comprehension stories
4. Faux-pas recognition stories (two faux pas and three non-faux pas control stories).

The proportion of correct responses (range 0–1), calculated from the ToM stories and metaphor-irony comprehension stories, were averaged to calculate a ToM index (ToMI). Faux pas composite index (FPCI; range 0–1) was calculated based on the subject’s ability to correctly identify situations with and without social blunders, and correctly answer the clarifying questions.^[37] A combined index called the ToM Composite score (ToMCI), that gave equal weightage to scores on ToM tasks and faux-pas recognition stories, were calculated as an average of ToMI and FPCI.

Procedure

The study was carried out after obtaining ethical clearance from the Institutional Ethics Committee. A qualified psychiatrist assessed the patient for overall psychiatric morbidity, and patients with somatoform disorders were screened by the primary investigator for the study. The 20 scenarios of LEAS were modified to adapt them to the Indian settings, and expert validation was carried out with the help of six experts from the Departments of Psychiatry and Clinical Psychology. In the modified version, 9 scenarios were the same as the original LEAS, 10 scenarios had minor modifications, and 1 scenario had a major revision in accordance with cultural norms. Subsequently, modified scenarios and glossary of words were translated to Hindi using standard procedures for translation as per the World Health Organization.^[38]

(The modified scenarios will be available on request from the authors). LEAS was scored according to the instructions from the manual and using the glossary of words which were translated for Hindi speaking subjects.^[35] ToM was administered with the help of a software which displayed the scenarios and recorded the responses of the study participants.

Statistics

Data were expressed using descriptive statistic: mean and standard deviation (SD) for continuous variables, and frequency and percentage for categorical variables. Chi-square test and independent *t*-test were used to compare the group differences between the various measures. Analysis of covariance (ANCOVA) was done to compare the group differences between various measures after controlling for depression and anxiety. Correlations between ToMCI, LEAS, and somatoform symptom severity (PHQ-15 somatic symptom scale) were assessed using the Pearson’s product moment correlation coefficient.

RESULTS

The mean age (\pm SD) was 36.5 ± 9.3 years for patients with somatoform disorders and 36.7 ± 9.9 years for

healthy controls. The mean duration of education was 9.1 ± 4.9 years in patients with somatoform disorders and 11.2 ± 5.3 years in healthy controls. There were 10 women each in the patient and control groups. There was no statistically significant difference between patients and healthy controls in terms of age, gender, education, marital status, background, or socioeconomic status [Table 1].

The mean duration of illness in patients with somatoform disorders was 9.9 ± 7.6 years. The mean total score on SASS was 18.4 ± 5.3 . The mean scores on PHQ-15, GAD-7, and PHQ-9 in patients with somatoform disorders were 8.8 ± 1.9 , 5.4 ± 3.2 , and 4.8 ± 2.4 , respectively, which was significantly higher from those of healthy controls [Table 2]. The most common subtype was the undifferentiated somatoform disorder ($n = 12$ of the somatoform group) followed by persistent somatoform pain disorder ($n = 6$ of the somatoform group). Three subjects in the patients group had hypertension and one had diabetes mellitus.

LEAS scores

As hypothesized, patients with somatoform disorders had significantly lower scores on the LEAS than the healthy controls, with a large effect size (Cohen's $d = 1.2$, $P < 0.001$) [Table 3].

ToM scores

The ToMCI was found to be significantly lower in patients with somatoform disorders compared to healthy controls. The effect size of the difference was 1.1 [Table 3].

Patients had significantly higher scores of depression and anxiety as measured by PHQ-9 and GAD-7, respectively [Table 2]. ANCOVA was conducted to test whether the above differences between the groups remained significant after controlling for depression and anxiety. The group differences in the LEAS scores remained significant after controlling for GAD-7 [$F(1, 37) = 21.5$, $P < 0.001$] and PHQ-9 [$F(1, 37) = 12.1$, $P < 0.001$]. The group differences in ToMCI scores also remained significant after controlling

for GAD-7 [$F(1, 37) = 17.5$, $P < 0.001$] and PHQ-9 [$F(1, 37) = 18.5$, $P < 0.001$] [Table 4].

When only the patients were included, LEAS ($r = 0.2$, $P = 0.3$) or ToMCI ($r = 0.2$, $P = 0.3$) did not statistically correlate with PHQ-15. Similarly, when the healthy controls were analyzed separately, LEAS ($r = -0.03$, $P = 0.8$) or ToMCI ($r = -0.2$, $P = 0.3$) did not correlate with PHQ-15. When PHQ-15 scores were considered for the entire group ($n = 40$), LEAS ($r = -0.4$, $P = 0.008$) and ToMCI ($r = -0.4$, $P = 0.006$) correlated negatively with severity of somatoform disorder as measured by PHQ-15. As hypothesized, LEAS also correlated positively with ToMCI ($r = 0.5$, $P < 0.001$).

DISCUSSION

The primary aim of the study was to assess the ToM and emotional awareness in patients with somatoform disorders, using culturally validated tools.

This study showed the presence of significant emotional awareness deficits in patients with somatoform disorders compared to healthy controls, and thus, replicates the findings from previous studies that had effect sizes (Cohen's d) ranging from 0.53–0.95.^[20,21]

This study also showed the presence of significant deficits in ToM in patients with somatoform disorders. The ToM domains of SOCRATIS measures predominantly cognitive ToM than the affective ToM. The deficits in cognitive ToM in patients with somatoform disorders, compared to healthy controls, have been noted previously in two studies where it was assessed using the Frith-Happé animation task.^[20,21] However, cognitive ToM measured using the Mental State Stories (MSS) and Frith-Happé animation task was not statistically different between patients with somatoform disorders and medical controls. The affective ToM, measured using the emotional content of animation tasks, has been found to be deficient in patients with somatoform disorders compared to healthy^[20] as well as medical controls.^[18] However, affective ToM, measured using the Reading the Mind

Table 1: Sociodemographic details of patients with somatoform disorders and healthy controls

Variables		Somatoform disorder (n=20)	Healthy controls (n=20)	t/ χ^2	P
Age (in years)	Mean	36.7	36.7	0.02	0.98
	Standard deviation	9.3	9.9		
Education (in years)	Mean	9.1	11.2	-1.3	0.18
	Standard deviation	4.9	5.3		
Females	n (%)	10 (50)	10 (50)	0	1
Married	n (%)	14 (70)	13 (65)	0.12	0.73
Below poverty line	n (%)	13 (65)	7 (35)	3.6	0.06
Urban background	n (%)	15 (75)	13 (65)	0.47	0.49

in the Eyes Test, was found to be not different between patients with somatoform disorders and medical controls.^[18,19] The reasons for the disparity in the results could be due to the difference in tools used to measure ToM, the sensitivity of tools in detecting subtle deficits, the severity of somatoform disorder, as well as a tendency to over-mentalize and type of controls used. For instance, Frith-Happé animation task is more sensitive in detecting mentalizing deficits, compared to false-belief tasks used in the SOCRATIS.^[39]

Together, the above findings suggest that patients with somatoform disorders have difficulty in inferring mental/emotional states of others as well as themselves. This deficit might result in experiencing implicit manifestations of emotional arousal, characterized by physiological and behavioral components, rather than a conscious experience of the emotion itself. Further, this may exacerbate interpersonal difficulties which are commonly found in patients with somatoform disorders.^[40] The interpersonal difficulties, in turn, might contribute to the maintenance of somatic distress.

Comorbid depression and anxiety are common in somatoform disorders.^[6] Hence, we tried to investigate the effects of depression and anxiety on the deficits in ToM and emotional awareness in somatoform disorders. In our study, the group difference in ToM and LEAS persisted even after controlling for comorbid depression and anxiety symptoms.

Table 2: PHQ-15, GAD-7, and PHQ-9 scores in patients with somatoform disorders and healthy controls

	Somatoform disorder (n=20)		Healthy controls (n=20)		t	P
	Mean	SD	Mean	SD		
PHQ-15	8.8	1.9	1.9	1.2	12.9	<0.001
GAD-7	5.4	3.2	1.3	1.2	5.4	<0.001
PHQ-9	4.8	2.4	1.4	1.5	5.2	<0.001

PHQ – Patient health questionnaire; GAD – Generalized anxiety disorder

Table 3: LEAS and ToMCI scores in patients with somatoform disorders and healthy controls

	Cases		Healthy controls		t	P	Cohen's d
	Mean	SD	Mean	SD			
LEAS	43.9	10.3	54.5	7.2	-3.7	<0.001	1.181
ToMCI	0.6	0.2	0.8	0.1	-3.5	≤0.001	1.124

LEAS – Level of emotional awareness scale; ToMCI – Theory of mind composite index

Table 4: Analysis of covariance with LEAS and ToMCI as dependent variables after controlling for GAD-7 and PHQ-9

	Patients		Healthy controls		Group effect with GAD-7 controlled (F)	GAD-7 effect (F)	Group effect with PHQ-9 controlled (F)	PHQ-9 effect (F)
	Mean	SD	Mean	SD				
LEAS	43.9	10.3	54.5	7.2	21.5***	6.2*	12.1**	0.9
ToMCI	0.6	0.2	0.8	0.1	17.5***	4.5*	18.5***	5.0*

*P<0.05, **P<0.01, ***P<0.001. LEAS – Level of emotional awareness scale; ToMCI – Theory of mind composite index

A number of studies have also found that LEAS scores are independent of the prevailing mood of the subject.^[21,34,41] Similarly, affective ToM deficits in the patients with somatoform disorders group, compared to the medical group, also persisted after controlling for negative affect.^[18] Studies using self-report scales like the Toronto Alexithymia Scale (TAS) have reported frequently association of alexithymia with negative affect states like depression.^[42,43] One of the drawbacks in self-report measures of alexithymia is the possible underreporting of deficits, as it is not necessary that the individuals are aware of the same. As LEAS measures a similar construct but in an implicit manner, it might have an advantage over the self-report measures.

This study also found that LEAS and ToM may have a negative correlation with severity of somatic symptoms, which has been demonstrated in a large study (n = 249) where LEAS scores and symptoms improved post 6 weeks of in-patient treatment, independent of negative affect.^[34] Our finding is, however, in contrast to another cross-sectional study (n = 60) that found no correlation of ToM or LEAS with symptom severity.^[21] It is also important to note that similar finding was not found when we attempted correlation within each group, probably due to lower statistical power. Hence, it is unclear at this point whether these deficits are a state or a trait factor.

This study has its limitations, with the first being a small sample size. No structured interview schedules were utilized to diagnose somatoform disorders or other comorbidities. Only expert validation was done for LEAS. The cross-sectional design allows only associations to be made and not causality. It may also have limited external validity, as the study population was recruited from a tertiary care center. There is also a probability of interviewer and selection bias, due to sampling methods and lack of blinding. Despite its limitations, the important strength of the study is the use of culturally validated tools to assess emotional awareness and ToM which is greatly influenced by one's culture.

The present study provides evidence for deficits in ToM and emotional awareness in patients with somatoform disorders, evaluated using culturally validated tools. Longitudinal studies are needed to establish causality, and controlled trials are needed to assess if interventions targeting these deficits have any therapeutic benefits.

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Conflicts of interest

There are no conflicts of interest.

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