

ANXIETY DISORDERS AND DEPRESSION IN CHILDREN WITH FUNCTIONAL SOMATIC SYMPTOMS- A CASE-CONTROL STUDY FROM INDIA**Sreedevi. P. A^{1*}, Suma Balan², Gitanjali Natarajan³, Bhanu Vikraman Pillai⁴, C. Jayakumar⁵, Sheejamol.V. S.⁶**¹Department of Mental Health Nursing, Amrita College of Nursing, AMRITA Vishwa Vidyapeetham, Health Sciences Campus, Kochi.41, India²Paediatric Rheumatology, Amrita Institute of Medical Sciences, Kochi-4, India³Clinical Psychology, Anamika Mind, Kakkanad. Kerala, India⁴Department of Paediatric Gastroenterology, Amrita Institute of Medical Sciences, Kochi-41, India⁵Department of Paediatrics, Amrita Institute of Medical Sciences, Kochi-4, India⁶Biostatistics, Amrita College of Nursing, AMRITA Vishwa Vidyapeetham, Health Sciences Campus, Kochi.41, India

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E-mail: sreedevipa2013@gmail.com**ABSTRACT**

Introduction: Nearly 10% of children and adolescents suffer from functional somatic symptoms (FSS) which are persistent, bothersome bodily symptoms not having demonstrable organic pathology. Associations have been reported between children's FSS, anxiety, depression, and certain parental factors. **Aims:** (i) compare the anxiety and depression levels between children with FSS and children not having FSS, (ii) identify the child and parent-related risk factors of FSS. **Methods:** Case-control design was used for this cross-sectional study. Cases constituted a hospital sample of 60 children, aged 9-15 years, who presented with FSS. Age, gender and class-matched 60 school children, who did not disclose any FSS while screening with Children's Somatic Symptoms Inventory-24 constituted the control group. Both the groups were administered with Revised Children's Anxiety and Depression Scale, Illness Behaviour Encouragement Scale, and Lum Emotional Availability of Parents (Child report). **Results:** Cases scored significantly higher than the control children on anxiety, depression ($p<0.001$), and parental illness behaviour encouragement ($p<0.001$), but reported low emotional availability of both parents ($p<0.01$). Significantly large number of children in the FSS group showed anxiety disorder ($p<0.05$), separation anxiety disorder ($p<0.001$) generalized anxiety disorder ($p<0.01$), and major depressive disorder ($p<0.01$). The stepwise multiple logistic regression analysis revealed over all anxiety, separation anxiety, generalized anxiety and high parental illness encouragement as the risk factors of FSS. Conversely, higher perception of maternal emotional availability significantly reduced its risk. **Conclusion:** Children with FSS must be screened for anxiety and depressive disorders as well as parental reinforcing responses and emotional availability before initiating treatment.

Key words: Depression, Emotional Availability, Functional Somatic Symptoms, Generalized Anxiety, Parental Illness Encouragement, Separation Anxiety

INTRODUCTION

Many children and adolescents in the nonclinical population suffer from persistent physical symptoms for which there is no demonstrable organic pathology can be found. These symptoms are known as functional somatic symptoms and are usually multiple, diffuse, and may appear as pain and other symptoms involving multiple body systems. Upper respiratory symptoms, lack of energy and fatigue,

headaches, back pain etc. are the commonly reported somatic symptoms in nonclinical child population (Vulić-Prtorić, 2016).

Among children seeking hospital treatment, stomach pain (40.7%), headache (36.6%), fatigue (23.6%), nausea (19.5%) and other body aches are reported (Wiggins et al., 2021; Tekkalaki 2017). Functional somatic symptoms- also referred to as somatic symptoms or medically unexplained symptoms- were previously known as somatization or somatoform

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disorders. According to DSM-5 and ICD-11, these are now classified as somatic symptom-related disorder and bodily distress disorder respectively, and are considered to represent the bodily expression of emotional needs in the affected children.

Functional somatic symptoms are common reason for health care utilization and contribute significantly to increased expenditure in child and adolescent health care (Saunders et al., 2020). These children undergo enormous number of consultations before they approach psychiatric treatment facility (Menon, 2016). A retrospective review of admitted children and adolescents with somatic symptoms-related disorders revealed that 84.6% required inter specialty consultations for their physical symptoms. Psychiatric comorbidity was documented in 46.3%, with anxiety disorder, (23.6%) and depressive disorder, (11.4%) being the most prevalent (Wiggins et al., 2021). Indian studies have also documented psychiatric comorbidities in children with functional somatic symptoms. Studies conducted among children with medically unexplained pain symptoms, identified persistent somatoform pain disorder and major depression (Tekkalaki 2017), as well as intellectual subnormality, non-organic enuresis and attention deficit hyperactivity disorder as the common psychiatric diagnoses (Deshpande, 2015). Similar findings have been reported from Pakistan where conversion disorder and major depressive disorders were common in children with functional somatic symptoms (Rahman, et al., 2018).

Researchers from Pakistan have also shown that children having medically unexplained bodily symptoms exhibit more symptoms of anxiety and depression compared to healthy children and those with medical illnesses (Imran et al., 2014). Somatization was reported as the only predictor of anxiety among children with medically unexplained physical symptoms. Experiencing somatic symptoms during the preadolescent period can lead to anxiety and

depression in the later adolescence. Furthermore, the course of FSS- whether persistent, intermittent or remittent- has been found to be associated with increased degrees of depression and anxiety compared to children without FSS (Münker et al., 2024). The prevalence of anxiety among children in the general population is estimated to be around 5–10% (Rapee et al., 2023). However based on the findings of the aforementioned studies, the magnitude of anxiety and depressive disorders among children with FSS can be expected to be considerably higher. Environmental factors such as parental responses to the child's illness, as well as the nature of parent-child relationship have not yet been adequately studied in children with FSS.

Certain parental behaviors, during a child's illness such as being with the child for more time, providing special attention and privileges, exempting the child from undesirable responsibilities like school attendance, and daily chores- may inadvertently reinforce sickness behaviour. Parental encouragement of illness behaviour has been shown to be higher among children with functional gastrointestinal symptoms (Schurman et al., 2013). Authoritarian parenting style marked by high control and low warmth, has also been reported to be related with children's functional somatic symptoms (Richa, 2018) and has been identified as a predictor of such symptoms (White et al., 2014). Faulty dysfunctional parent-child relationships have similarly been linked to the occurrence of functional somatic symptoms in children (Singh et al., 2015). In a study of children with migraine and tension head aches, avoidant attachment to fathers was identified as a risk factor for greater somatic symptom severity (Renzi et al., 2024). Additionally limited communication about emotional problems within the family has been recognized as a family risk factor for somatization among children and adolescents (Fiertag et al., 2019).

In light of the above context, the present study aimed to (i) compare the levels of anxiety and depression between children with functional somatic symptoms (FSS) and those without and (ii) identify the child-related and parent-related risk factors associated with FSS. The researchers hypothesized that children with FSS would have higher anxiety and depression scores than their healthy counterparts. Furthermore, these children were expected to exhibit higher levels of parental illness behaviour encouragement and lower levels of both paternal and maternal emotional availability.

METHODS

The current research was a dual-setting study. The case group was selected from a hospital and the control group was recruited from two nearby schools. Sample size calculation was done based on findings from a pilot study. The pilot study conducted on 60 participants (30 in each group), reported mean anxiety score of (20.37 ± 4.55) for the case group and (14.07 ± 4.06) for the control group, and mean depression score of (5.9 ± 10.41) for the case group and (1.85 ± 2.29) for the control group. Based on these values, with 80% power and 95% confidence, the minimum estimated sample sizes were to be 25 for anxiety and 49 for depression. Therefore, the minimum sample size required was 50 per group totaling 100 participants. The investigators increased the sample size to 120, with 60 participants in each group.

Participants and sample selection criteria: The case group constituted 60 referred children, consecutively selected from the Clinical Psychology out-patient unit of Amrita Institute of Medical Sciences, Kochi. These children had been referred by consultant doctors from various pediatric departments- general pediatrics, surgery, gastroenterology, rheumatology) of the same hospital with persistent physical symptoms for which no organic

pathology or medical diagnosis could be established after detailed clinical examination and appropriate diagnostic investigations. Children aged 8 to 15 years, accompanied by their mothers were included in the study.

The control group consisted of 60 children matched with the case group for age, gender and class, and was recruited from two nearby schools. After obtaining permission from the school principals, the consent and assent forms were sent to the parents via the children. Children's Somatic Symptoms Inventory (CSSI-24) was administered to those children who returned the signed consent and assent forms and children who did not report any somatic symptoms were identified for inclusion. Children with any diagnosed medical conditions or receiving any treatment were excluded. Age, gender and class matching was done with the case group and the control group was finalized.

Instruments: Child's and parents' profile: This instrument collected information on the child's demographic and personal characteristics including age, gender, class, number of siblings, birth order etc. It also gathered certain parental information such as their education, occupation, family income and presence of chronic illness.

Children's Somatic Symptoms Inventory, (Child report)

Its former name was Children's Somatization Inventory. This 24 items scale identifies specific functional somatic symptoms experienced by the child and the extent to which the child was distressed with the symptoms over the past two weeks. The child's responses were scored using a 5-point scale; '0= not at all, 1= a little, 2= some, 3= a lot, and 4= a whole lot'. Total score was between zero and 96 and the reliability, Cronbach's alpha of the scale has been established as 0.91 (Essau et al., 2013). The CSSI-24 served as a screening tool to identify children without FSS for inclusion in the control group and

was administered to the case group to identify the symptoms and to assess their severity.

Revised Children's Anxiety Depression Scale (RCADS)

It is a 47-item standardized self-report questionnaire for assessing symptoms of anxiety and depression in children aged 8 to 18 years. It has six subscales: five measure various anxiety disorders- such as separation anxiety, social phobia, generalized anxiety disorder, panic disorder and obsessive compulsive disorder, while one subscale assesses major depressive disorder. A 4-point Likert-scale from 0 (never) to 3 (always) is used to rate the responses. The scale yields a total anxiety score, a depression score and separate scores for each of the anxiety subscale. Higher scores on the RCADS suggests the client is experiencing several symptoms of anxiety and depression. Raw scores for total anxiety, individual anxiety disorders and depression were converted into T scores as per the RCADS manual and interpretation was done as: T score below 65=normal range, 65-69= borderline clinical range and 70 and above= clinical range. The RCADS has Good internal consistency (Chorpita, 2005). This tool has been used and found to be suitable for assessing anxiety and depression among adolescent children in India in both clinical (Dharmayat, and Murthy, 2019) and nonclinical sample (Halder, 2016; Palmer et al., 2025; Trevethan et al., 2022).

Illness Behaviour Encouragement Scale (Child report).

To assess parental encouragement responses when children become sick, this 12-item scale was used. The scale evaluates two types of reinforcing parental responses: providing the child freedom from responsibilities and giving attention and privileges. The child's responses were scored on a 5-point Likert scale ranging from 1 (never) to 5 (always) with higher the

scores indicating greater parental encouragement to the child's illness behaviour (Walker and Zeman, 1992).

Lum Emotional Availability of Parents (LEAP)

To assess the quality of parent-child relationship, we measured the child's perception of the emotional availability of each parents separately using the LEAP. There are 15 items, each rated on a 6-point scale ranging from 1 (never) to 6 (always). Increased scores indicate high quality in parent-child relationship. The scale has established reliability, with a Cronbach's alpha coefficient of 0.98 (Lum and Phares, 2005)

Data collection procedure

The ethical approval for the study was received from the Institutional Review Board, Amrita Institute of Medical Sciences, Kochi (IRB-AIMS-2019-172A, dated 21-05-2019). The children in the case group and their mothers were individually approached and signed informed consent of the mother and assent of the child were obtained after explaining the study objectives and ensuring confidentiality. The Malayalam versions of the instruments were administered to the child by reading out the items along with their response options and marking the child's responses accordingly. Control group children were visited at their homes with their mothers, and data were collected using the same procedure. The principal investigator collected the data from both the groups and the data collection period was from June 2022 to December 2024.

Data analysis

The data analysis was done using IBM SPSS version 30. Categorical data were described with frequencies and percentages. To compare categorical variables like background characteristics, total anxiety, types of anxiety and depression between the two groups of

children, Chi-square and Fisher's exact tests were done. Child reported parental illness behaviour encouragement between the two groups was carried out by independent t test as the data were normally distributed. The Mann Whitney U test was applied to compare between the two groups, the

nonnormally distributed T scores of anxiety and depression, and child perceived emotional availability of both parents. Multiple logistic regression was performed to identify independent risk factors for functional somatic symptoms. For all the tests, a significance level, $p < 0.05$ was set.

RESULT

Table 1. Comparison of background characteristics of children with functional somatic symptoms and control children

Background characteristics		Cases (60) n (%)	Control (60) n (%)	χ^2	<i>P</i> value
Age group	9-10 years	20 (33.3)	20 (33.3)	0.000	1
	11-13 years	28 (46.7)	28 (46.7)		
	14-15 years	12 (20.0)	12 (20.0)		
Gender	Male	32 (53.3)	32 (53.3)	0.000	1
	Female	28 (46.7)	28 (46.7)		
Standard	Lower primary	9 (15.0)	9 (15.0)	0.000	1
	Upper primary	31 (51.7)	31 (51.7)		
	High school	20 (33.3)	20 (33.3)		
Birth order	First child	30 (50.0)	43 (71.7)	5.911*	0.015
	2nd/3rd child	30 (50.0)	17 (28.3)		
Number of siblings #	Nil or one	48 (80.0)	58 (96.7)	8.086**	0.008
	Two or more	12 (20.0)	2 (3.3)		
Place of residence	Urban/Semi-	19 (31.7)	25 (41.7)	1.292	0.256
	Rural	41 (68.3)	35 (58.3)		
Type of family	Joint	27 (45.0)	25 (41.7)	0.136	0.713
	Nuclear	33 (55.0)	35 (58.3)		
Staying with #	Both parents	42 (70.0)	58 (96.7)	15.36***	<0.001
	One parent	18 (30.0)	2 (3.3)		
Type of syllabus	State	34 (56.7)	39 (65.0)	0.874	0.350
	CBSE/ICIC	26 (43.3)	21 (35.0)		
Extracurricular activities	Yes	31 (51.7)	51 (85.0)	15.40***	<0.001
	No	29 (48.3)	9 (15.0)		
Hobby	Yes	38 (63.3)	55 (91.7)	13.81***	<0.001
	No	22 (36.7)	5 (8.3)		
Mother's education	Up to secondary	18 (30.0)	18 (30.0)	0.00	1.000
	Plus two/diploma	20 (33.3)	20 (33.3)		
	Degree/PG	22 (36.7)	22 (36.7)		
Father's education	Up to secondary	27 (45.0)	22 (36.7)	1.372	0.504
	Plus two/diploma	21 (35.0)	21 (35.0)		
	Degree/PG	12 (20.0)	17 (28.3)		
Mothers occupation	Home maker	38 (63.3)	28 (46.7)	3.367	0.067
	Employed	22 (36.7)	32 (53.3)		
Illness in mother	Yes	23 (38.3)	10 (16.7)	7.064**	0.008
	No	37 (61.7)	50 (83.3)		

Background characteristics		Cases (60) n (%)	Control (60) n (%)	χ^2	P value
Illness in father	Yes	15 (25.0)	15 (25.0)	0.000	1
	No	45 (75.0)	45 (75.0)		

Comparison of the background data of the case and control groups is presented in Table 1. The two groups did not differ in terms of place of residence, type of family, type of syllabus studied, parents' education or paternal illness ($p>0.05$). However, there was difference between the two groups with respect to the number of siblings and birth order. Significant number of children in the FSS group were second or third child of their families ($\chi^2=5.911$, $p<0.05$) and had

two or more than two siblings ($\chi^2=8.086$, $p<0.01$). Compared to the control group, a significantly higher number of children in the case group were staying with only one parent ($\chi^2=15.36$, $p<0.001$), not participating in extracurricular activities at school ($\chi^2=15.40$, $p<0.001$), not having any kind of hobbies ($\chi^2=13.81$, $p<0.001$), and having illness in the mother ($\chi^2=7.064$, $p<0.01$).

Table 2. Comparison of overall anxiety, depression, child reported parental illness behaviour encouragement and emotional availability scores between children of two groups.

Variables	Cases (n=60)	Control(n=60)	Tests	p value
Anxiety T score (Median,IQR)‡	43 (38- 48.5)	37 (36- 38)	U=782.50	<0.001
Depression T score (Median,IQR)‡	48 (43- 55.5)	33.5 (31-36)	U=374.50	<0.001
Parental Illness Behaviour Encouragement- total (Mean±SD)†	27.8 ± 6.213	20.08 ± 7.54	t=6.184	<0.001
- Releasing from responsibilities†	15.3 ± 3.203	12.2 ± 3.896	t=4.812	<0.001
- Providing attention and	12.57 ± 4.38	7.90 ± 4.77	t=5.580	<0.001
Emotional availability of father (Median,IQR)‡	68 (58-78.5)	78.5 (71-84)	U=1171.0	<0.01
Emotional availability of mother (Median,IQR)‡	76 (70.25-83)	84 (75.25- 88)	U=1153.0	<0.01

Mann Whitney U test, Independent t test

Table 3. Distribution of total anxiety, types of anxiety disorders and depressive disorder among children in the case and control groups

		Case group (n=60)			Control group (n=60)		
Total anxiety, types of anxiety disorders and depressive disorder		Normal range (T score <65)	Borderlin e clinical range (T score 65-69)	Clinical range (T score ≥70)	Normal range (T score <65)	Borderlin e clinical range (T score 65-69)	Clinica l range (T score ≥70)
I	Total anxiety	49 (81.7)	3 (5.0)	8 (13.3)	57 (95.0)	2 (3.3)	1 (1.7)
a.	SAD	39 (65.0)	5 (8.3)	16 (26.7)	55 (91.7)	1 (1.6)	4 (6.7)
b.	Social phobia	53 (88.3)	1 (1.7)	6 (10.0)	58 (96.7)	0 (0.0)	2 (3.3)
c.	GAD	50 (83.3)	3 (5.0)	7 (11.7)	59 (98.3)	1 (1.7)	0 (0.0)

Total anxiety, types of anxiety disorders and depressive disorder	Case group (n=60)			Control group (n=60)		
	Normal range (T score <65)	Borderline clinical range (T score 65-69)	Clinical range (T score ≥70)	Normal range (T score <65)	Borderline clinical range (T score 65-69)	Clinical range (T score ≥70)
d. Panic disorder	57 (95.0)	1 (1.7)	2 (3.3)	59 (98.3)	1 (1.7)	0 (0.0)
e. OCD	55 (91.7)	0 (0.0)	5 (8.3)	59 (98.3)	0 (0.0)	1 (1.7)
II MDD	48 (80.0)	0 (0.0)	12 (20)	58 (96.7)	0 (0.0)	2 (3.3)

SAD-Separation anxiety Disorder, GAD- Generalized anxiety disorder, OCD- Obsessive compulsive disorder, MDD- Major depressive disorder.

Table 2 showed the comparison of anxiety and depression levels of children in both the groups using Mann Whitney U test. Children with FSS significantly outperformed their healthy counterparts in terms of anxiety and depression scores with significance level, $p < 0.001$. The t test result showed that the child reported parental illness behaviour encouragement total score ($t = 6.184$, $p < 0.001$) and the component scores; releasing from responsibilities ($t = 4.812$, $p < 0.001$) and providing attention and privileges ($t = 5.580$, $p < 0.001$) are significantly high in children with functional somatic symptoms. It was also evident that the child reported emotional availability of both parents (father; $U = 1171.0$, and mother; $U = 1153.5$) were significantly low in children with FSS than the control children ($p < 0.01$).

It is evident from Table 3 that out of 60 children in the case group (i.e, children with FSS), 11 (18.3%) were having clinical anxiety compared to only 3 (5%) of the control children. Regarding various anxiety disorders, such as separation anxiety disorder and generalized anxiety disorder were seen in 21 (35%) and 10 (16.7%) children of the case group respectively whereas these disorders were reported only by 8.3% and 1.7% respectively of the control children. Similarly, 11.7% and 8.3% of children in the case group were found to have social phobia and obsessive compulsive disorder in place of 3.3% and 1.7% respectively in the control group. It is also evident that 12 (20%) of the case group children were having major depressive disorder in place of 2 (3.3%) children of the control group.

Table 4. Association of anxiety disorders and major depressive disorder with functional somatic symptoms

Total anxiety, anxiety disorders and depressive disorder	Group	Disorder Absent (T score <65)		Disorder Present (T score ≥65)		χ^2	'p' value
		n	%	n	%		
Total Anxiety #							
	Case group	49	46.2	11	78.6	5.175*	0.043
	Control group	57	53.8	3	21.4		
Separation anxiety disorder							
	Case group	39	41.5	21	80.8	12.57***	0.0001
	Control group	55	58.5	5	19.2		
Social phobia #							
	Case group	53	47.7	7	77.8	3.003	0.163

Total anxiety, anxiety disorders and depressive disorder	Group	Disorder Absent (T score <65)		Disorder Present (T score ≥65)		χ^2	<i>p'</i> value
		n	%	n	%		
	Control group	58	52.3	2	22.2		
Generalized anxiety disorder #							
	Case group	50	45.9	10	90.9	8.107**	0.008
	Control group	59	54.1	1	9.1		
Panic disorder #							
	Case group	57	49.1	3	75.0	1.034	0.619
	Control group	59	50.9	1	25.0		
Obsessive compulsive disorder#							
	Case group	55	48.2	5	83.3	2.807	0.207
	Control group	59	51.8	1	61.7		
Major depressive disorder #							
	Case group	48	45.3	12	85.7	8.086**	0.004
	Control group	58	54.7	2	14.3		

Fisher's test * significant, $p < 0.05$, ** significant, $p < 0.01$, *** significant, $p < 0.001$

The Table 4. dictated the association of total anxiety, different types of anxiety disorders and depressive disorder with functional somatic symptoms of children. T score <65 was interpreted as normal (disorder absent) and T score ≥65 (which included both borderline and clinical range of each disorder) was interpreted as disorder present. Compared to the control group children, over all anxiety was more observed in children in the case group, that is children with FSS ($\chi^2 = 5.175$, $p < 0.05$). Anxiety disorders like separation anxiety disorder ($\chi^2 = 12.57$, $p < 0.001$) and

generalized anxiety disorder ($\chi^2 = 8.107$, $p < 0.01$) were seen in significantly higher number of children in the case group than the control children. Despite the case group had higher number of children identified with anxiety disorders like social phobia, panic disorder and obsessive compulsive disorder, compared to the control group children, the differences were negligible and were not statistically significant, $p > 0.05$. Regarding the major depressive disorder, it was also more observed in the case group than the control group children ($\chi^2 = 8.086$, $p < 0.01$)

Table 5. Stepwise multiple logistic regression analysis to predict the independent risk factors for functional somatic symptoms

Variables	OR	95% CI of OR	<i>p</i> value
High total anxiety	37.534	1.221-1154.013	<0.05
Separation anxiety disorder	0.070	0.010-0.473	<0.01
Generalized anxiety disorder	0.004	0.000-0.362	<0.05
IBES child report	0.833	0.761-0.912	<0.001
Emotional availability of mother	1.096	1.019-1.179	<0.05
Number of siblings >2	0.075	0.010-0.589	<0.05
Staying with one parent	0.086	0.014-0.537	<0.01

Variables	OR	95% CI of OR	<i>p</i> value
Not having hobby	0.140	0.031-0.621	<0.01
Homemaker mother	6.476	1.626-25.799	<0.01

The stepwise multiple logistic regression analysis to identify the independent risk factors of functional somatic symptoms (Table. 5) showed that higher scores on total anxiety (OR= 37.534, $p<0.038$), presence of separation anxiety disorder (OR= 0.070, $p<0.01$) and generalized anxiety disorder (OR= 0.004, $p<0.05$) increased the risk for FSS in children. Higher scores on the IBES Child report, indicating greater encouragement responses of parents to child's illness behaviour, was strongly associated with increased FSS risk (OR= 0.833, $p<0.001$) in children. Conversely, higher perception of emotional availability of the mother significantly reduced the likelihood of FSS (OR= 1.096, $p<0.05$) in children. Children having more than two siblings (OR= 0.075, $p<0.05$), living with one parent (OR= 0.086, $p<0.01$) not having a hobby (OR= 0.140, $p<0.01$) were at high risk of developing functional somatic symptoms. Homemaker status of mothers also was associated with increased odds of functional somatic symptoms (OR= 6.476, $p<0.01$).

DISCUSSION

The current study aimed to compare the anxiety and depression levels between children with functional somatic symptoms and their healthy counterparts. Sixty children and adolescents referred to the clinical psychology department with FSS were compared with 60 age-, gender- and class-matched children selected from two schools who reported no FSS on screening with CSSI-24. Children in both the groups provided data on anxiety, depression, parental illness behaviour encouragement and emotional availability of both parents. There were no significant differences between the patient and control groups in most background variables, such as place of

residence, family type, and type of school syllabus, which is congruent with the findings of Chaudhry et al., (2023). However, the two groups differed in birth order and number of siblings. Previous research has also reported that somatic symptoms are more frequently observed in children with siblings (Beyers-Carlson et al., 2017). Compared with the control group, the case group had a significantly higher number of children who did not participate in extracurricular activities at school, had no hobbies, lived with one parent, or had a mother with an illness. Due to their bodily complaints, children in the case group may experience difficulties that limit participation in school extracurricular activities or leisure activities at home. Associations between children's somatic symptoms and parental illness have been well established, including in a recent systematic review, in which, 13 of 17 studies reported a significant association (Koen et al., 2023; Elliott et al., 2020).

Regarding the first objective, children with FSS in this study exhibited increased levels of anxiety and depression than the control children. (Table 2). Further analysis using the T score cut off (Table 4) revealed that 18.3% and 20% of the children with FSS were having clinical anxiety and depression respectively (with significance levels $p<0.05$ and $p<0.01$) but in the control children, these were significantly low; only 5% and 3.3%. Similar results have been reported in a study conducted among children with complex regional pain syndromes (Logan et al., 2013). Anxiety disorders like separation anxiety disorder, and generalized anxiety disorder were more found in children with FSS than their healthy counterparts. Even though the number of children identified with social phobia, panic disorder and obsessive compulsive disorder were higher in the FSS

group, these variations were not statistically significant. Studies identifying the magnitude of anxiety, different types of anxiety disorders and major depressive disorder in children with functional somatic symptoms seem to be scarce in the literature. However the researchers could find some studies which reported strong associations between FSS, anxiety in general and depression in children (Lu et al., 2025; Mahirah et al., 2025; Gershfeld-Litvin et al., 2022). In a case control study conducted in Pakistan, higher anxiety and depression scores were predicted by somatization in children aged between eight and sixteen years (Imran et al., 2014). No studies were found which report the association of somatic symptoms with specific anxiety disorders. One very important point that the researchers noticed was even though many children in the FSS group had the signs and symptoms of both anxiety and depression, they were taken to the hospital because of the physical symptoms. At the same time, the control children's psychological issues never gained any attention of their parents.

The study further compared the children's reports of parental responses during their illness. Children with FSS reported significantly higher levels of parental illness encouragement responses-both in total score and its two components, "giving freedom from responsibilities" and "providing attention and privileges"-compared with control children (Table. 2). Through these parental accommodation behaviours, parents try to help the child decrease distress and negative affect caused by somatic symptoms; however children often derive secondary gains from these parental responses and continue to exhibit somatic symptoms. Gershfeld-Litvin et al., (2022) have observed that parental accommodating behaviours contribute to children's somatic symptoms. Additionally children with FSS perceived lower emotional availability of both parents compared with their controls. Chaudhry et al., (2023) reported that parents of children

with somatoform disorders often show deficiencies in the parent-child relationship, parental handling, and attending to the children's needs.

The current study also attempted to find out the independent risk factors of FSS. The child-related risk factors of FSS identified were high score in total anxiety, and presence of specific anxiety disorders like separation anxiety disorder and generalized anxiety disorder (Table.5). Previous studies have identified significant positive associations between somatization, symptoms of anxiety and depression in children (Imran et al., 2014; and Kumar and Vallabhaneni, 2025). Other risk factors for FSS in children included having more than two siblings, living with one parent and not having a hobby.

The parent-related independent risk factors of children's FSS identified in the current study were high illness behaviour encouragement by parents and low maternal emotional availability (Table 5). Karaca et al., (2015) observed high somatic symptoms in children who discerned their parents as either tolerant of or sanctioning bodily symptoms. Although previous studies have demonstrated associations between FSS in children and parental factors such as authoritarian parenting style, strained interpersonal relations in the family, poor parental mental health and certain psychological characteristics of parents (Fostini, 2025; Richa et al., 2018; Marwah et al., 2016), the identification of child perception of low maternal emotional availability as an independent risk factor for FSS is a novel finding of our study.

Bizzi et al., (2015) have demonstrated association between somatic symptom disorders in children and poor quality in parent-child attachment. Berg et al., (2022) have reported poor connection with the mother during adolescence as a risk factor for continuing the functional somatic symptoms from adolescence to middle age. These results necessitates the need for parental interventions in the treatment of children with FSS. Other risk factors for

FSS identified were children having more than two siblings, living with one parent, not having a hobby and children of homemaker mothers. Children without a hobby were also at higher risk, indicating that engagement in leisure activities may have a protective effect. Maternal unemployment was associated with increased risk of functional somatic symptoms, possibly reflecting better socioeconomic conditions or role modeling reducing the risk. Appak et al., (2017) have identified higher rates of functional constipation among children of unemployed mothers.

This study is the first of its kind to quantify anxiety and depression and to identify specific types of anxiety disorders in children with functional somatic symptoms (FSS) using a control group for comparison. The study also compared the parental factors like parental illness behaviour encouragement and emotional availability. Age, gender and class matching ensured sample homogeneity. Limitations of the study include a reliance primarily on child self-reports and relatively small sample size for the multiple logistic regression analysis, although the sample size was adequate for the primary objective. Future research could focus on identifying anxiety and depressive disorders among children with FSS using larger sample sizes. There is also scope for intervention studies to evaluate the effects of parental training and education on children's somatic symptoms and psychological morbidities. Parental skill building modules can be developed to promote healthy responses to children's illness behaviours and to enhance parental emotional availability.

CONCLUSION

This study showed that anxiety and depressive disorders are more reported in children with functional somatic symptoms than their age, gender and class-matched healthy counterparts. Specific anxiety

disorders like generalized anxiety and separation anxiety are also more found in this group. Presence of anxiety disorders, high parental illness behaviour encouragement and low perceived emotional availability of parents, especially of the mother, reflecting poor quality in parent-child relationship increase the children's risk for functional somatic symptoms. Based on the findings, the researchers recommend strict screening of these children for various anxiety disorders and depression, and also, parental encouragement responses and parental emotional availability so that child and parent-directed specific treatment strategies can be designed. Treating the underlying anxiety and depressive disorders are very important in the management of FSS in children. Parental education and training can be planned to reduce their encouragement behaviour to the child's somatic symptoms and to adopt strategies to become more emotionally available to their children.

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