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Social cognition and attachment profiles of women with fibromyalgia syndrome: a case-control study

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Abstract

Background: Fibromyalgia Syndrome (FM) is a chronic syndrome primarily characterized by widespread musculoskeletal pain. Although its aetiology is not fully understood, complex interactions between biological, genetic and various psycho-sociological factors are thought to be effective in the onset and maintenance of FM.

Objectives: In this study, we aimed to examine social cognitive and attachment profiles of FM patients. Methods: 41 women with FM and 44 healthy women matched for education and age were included in the study. There was no significant difference in sociodemographic parameters between patient and control groups. The participants were recruited from a University Hospital in Istanbul. Sociodemographic data were questioned in both groups while FM group was also administered Fibromyalgia Impact Questionnaire to determine disease severity. In order to evaluate social cognition profiles of the participants, Reading Mind in the Eyes Test, Empathy Quotient and Experiences in Close Relationships-Revised were conducted.

Results: FM patients did not differ significantly from control subjects by means of Reading Mind in the Eyes Test and Empathy Quotient scores (p= 0.33). Although no significant difference found between groups in means of attachment anxiety (p= 0.92), Fibromyalgia patients were found to have more avoidant attachment style than control group (p= 0.01).

Conclusion: FM patients may have no social cognition impairments, especially in lack of any psychiatric comorbidities. Moreover, these patients may suffer from avoidant type of insecure attachment and this attachment style may affect social support seeking behaviour of these patients.

attachment; empathy; fibromyalgia syndrome; primary care; theory of mind

INTRODUCTION

Fibromyalgia Syndrome (FM) is a chronic condition characterized by symptoms like widespread musculoskeletal pains, depression, anxiety, sleep disturbances, fatigue. Although chronic musculoskeletal pain is frequently considered as the main symptom, most patients also complain about headache, abdominal pain, stiffness, social and cognitive dysfunctions and irritability [1]. Various studies show that FM is a common

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disorder seen in almost all societies. Most studies report a prevalence of 2-4% [2]. The aetiology of FM is not fully understood but it is conceptualized as a multifactorial condition, as there are many factors like genetic, neuroendocrine disorders, stress and psychiatric disorders contributing to the clinical manifestation. More specifically, FM patients show high levels of depression (20-80%) and anxiety disorders (13-64%), difficulties in expression of emotions and relational problems [3]. In this context, there are various studies showing impairments in social cognitive functions and attachment styles of FM patients and insights from these studies have contributed to develop attachment-oriented therapy modalities in this patient group [4].

Social cognition implies experiencing and detecting social stimuli and the capacity to infer or define these stimuli. Different subtypes of social cognition like Theory of Mind, empathy, face recognition, reflective functioning and attachment styles are well defined and researched [5]. In one of the few studies on ToM function in FM, Di Tella et al. found lower performance of FM patients in RMET compared to healthy controls [6]. Similarly, in their large FM and control subjects of 101 participants in each group, Ozsoy et al. found significantly low RMET scores in FM patients [7]. As a closely related concept to ToM, empathy is conceptualized as a competence to take the perspective of other people and react affectively in response to the emotions of others. There are only few studies on empathic abilities of FM patients. In one of them, Di Tella et al. reported that FM patients showed similar empathy levels with healthy controls [6].

Apart from ToM and empathic abilities of FM patients, various studies investigate attachment theory in this patient group. Oliveira et al. reported that attachment styles of FM patients could predict anxiety levels and physical and mental well-being [8]. Govender et al. reported more avoidant and less anxious type of attachment in FM and insecurely attached patients like avoidant type showed higher levels of depression, hopelessness and negative thoughts [9]. Kratz et al. showed that FM patients who have insecure attachments were more prone to perceive pain as more catastrophizing [10]. There are also studies showing FM patients manifest insecure attachment parameters like low self-confidence, more need for approval and fear of rejection [11].

The scarcity of numbers and differences between methods of studies on social cognition and its relation with attachment theory in FM patients may require further investigation to address more specific clinical profiling, as various psychotherapy oriented treatment have been successfully implemented in FM [12]. Relatedly, it may be postulated that there are only limited number of studies which examine social cognition and attachment in the same study sample, unlike other similar pain related conditions [13]. In this regard, the main research question of the current study is whether variations in social cognition and attachment profiles of FM patients have a relationship between clinical parameters. In the light of abovementioned background, the current study aims to investigate social cognition in FM patients with a dimension of attachment and to contribute to the efforts of developing more sophisticated psychosocial interventions in these patients.

MATERIAL AND METHOD

Female patients between 18-65 years, who were evaluated and diagnosed by a PMR specialist with FM according to the American College of Rheumatology (ACR) guidelines [14], were recruited from Physical Medicine and Rehabilitation Outpatient Clinic of a University Hospital in Istanbul. Exclusion criteria consisted of any chronic pain syndrome except FM, pregnancy or postpartum period, any chronic medical condition, any diagnosis of psychiatric or neurological disorder. Control subjects without any medical or psychiatric disorders, who sought routine medical checkups were recruited from Family Medicine Outpatient Clinic of the same hospital, and matched with the patient group in age, sex and years of education. Informed consent of participants was obtained. Ethical approval for the study was obtained from the local ethics committee (Approval number: 09.2019.302.). The G* Power software version 3.01 was used for power analysis. A priori power analysis was based on the two independent sample t-tests. To reveal a medium effect size (d = 0.5) with 80% power at a = 0.05 significance level, 36 participants in each

study arm (totally 72 participants) were found to be necessary. Participants were interviewed by the authors of the current study using a structured sociodemographic data questionnaire and a semi-structured questionnaire to assess clinical parameters such as duration of illness, therapy status and comorbidities. All evaluations including data collection and implementation of tasks were conducted through live interviews by the same researcher.

Clinical and Psychometric Measures

1-The Fibromyalgia Impact Questionnaire

Developed by Burckhardt et al., Fibromyalgia Impact Questionnaire (FIQ) is one of the most used instruments to assess clinical severity of FM patients [15]. FIQ consists of 10 questions and each question can be scored between 0-10. A total score higher than 70 is considered as a severe form of FM. Turkish validity and reliability study of FIQ was conducted by Sarmer et al. and reported that Turkish version was valid and reliable to conduct clinical studies with FIQ [16].

2-The Reading the Mind in the Eyes Test

RMET is a frequently used task to study ToM abilities in various psychiatric disorders [17]., Turkish translation of RMET includes 32 pictures, 19 male and 13 female pictures of eye region, and there are four mental states assigned for each picture, one of which is the correct answer, as suggested by reliability and validity study [18].

3-Empathy Quotient:

Empathy Quotient is a 60-item self-report measure developed which has a Likert type design, allows to responders to code items from "strongly agree" to "strongly disagree". [19]. It Kose et al. reported that the Turkish version of the scale was valid and reliable to be used in Turkish population [20].

4-Experiences in Close Relationships-Revised (ECR-R):

ECR-R is a self-report scale and consists of 36 items which has two dimensions; attachment anxiety and avoidance and both dimensions have 18 items. Developed by Brennan et al.©, ECR-R has 7 point Likert type design and participants can have scores between 18-126 points in each dimension [21]. It is also reported valid and reliable in Turkish [22].

Statistical Analysis

IBM SPSS Statistics Version 26 and GraphPad Prism 8 were used to analyze data. Distribution analysis was evaluated by Kolmogorov-Smirnov and Shapiro-Wilks test. Independent samples t-test was used to analyze numerical variables with normal distribution and Mann-Whitney U-test was used with abnormally distributed variables. Categorical variables were analyzed with Chi-square test for independence and Fisher's exact test. For correlation analysis, Pearson correlation and Spearman correlation tests were used. Cut-off for significance were considered when p-values were below 0.05 [23].

RESULTS

A total number of 49 subjects in FMS group were interviewed. Due to incomplete answers or missing data, 8 of the 49 subjects were not included in the final statistical analysis. Similarly, 6 subjects from 50 interviewed control participants had missing data or incomplete answers regarding measures and therefore 44 healthy subjects were included in the final analysis. 4

Table 1. Comparison of sociodemographic variables between FM group and healthy controls

Variables	Categories	Study Group		
		FM	HC	p value
Sex	Female	41 (%100)	44 (%100)	
Age		46,10±8,23	44,70±8,03	p: 0,432
Total Years of Education		8,46±4,77	9,66±4,63	p: 0,244

Marital Status	Single	2	2	0.815
	Married	36	37	
	Other	3	5	
Work Situation	Employed	27	21	p: 0,092
	not employed	14	23	

*independent samples t-test

* significance: p < 0,05.

All participants in FM and control group consisted of female subjects. As shown in Table 1, two study groups did not differ in terms of sociodemographic parameters. None of the FM patients had a history of hospitalisation by reason of FM. Mean onset of age in FM group was 36.66 (±9.61), mean duration of illness was 9.44 (±8.23) years and total duration of treatment was 2.42 (±4.09) years. Mean FIQ score of FM patients was found as 66.79 (±13.67).

Table 2. Comparison of social cognition parameters and attachment scores between FM group and healthy controls

		N	Mean	SD	p*
RMET-M	FM	41	11,19	3,40	0,169
	HC	44	10,22	3,03	
RMET-F	FM	41	7,87	2,59	0,817
	HC	44	7,77	2,10	
RMET-T	FM	41	19,07	5,43	0,330
	HC	44	18,00	4,65	
ECR-Anx	FM	41	59,60	22,66	0,921
	HC	44	60,09	21,97	
ECR-Avo	FM	41	56,85	27,00	0,018
	HC	44	45,09	15,50	
EQ	FM	41	51,73	11,73	0,250
	HC	44	49,15	8,58	

RMET-T: Total RMET Score RMET-M: RMET Male Faces. RMET-F: RMET Female Faces

EQ: Empathy Quotient ECR-ANX: ECR Anxiety ECR-AVO: ECR Avoidance

[1] independent samples t-test

* significance: p < 0,05.

As shown in Table 2, study groups did not differ significantly by means of RMET and Empathy Quotient Q scores (p= 0.33). Although FM patients had similar scores with healthy controls in ECR-R anxiety dimension (p= 0.92), former group obtained significantly higher scores on ECR-R Avoidance dimension, 56.85 (±27.00) versus 45.09 (±15.50) with a p value of (p= 0.01). Moreover, categorical distribution of different attachment styles is shown in Table 3.

Table 3. Categorical distribution of attachment styles in FM and control groups

		Attachment Style				Total
		Secure	Insecure			
			Dismissing	Fearful	Preoccupied	
Study Group	FM	15	5	16	5	41
	HC	13	10	11	10	44
Total		28	15	27	15	85

As shown in Table 4, FIQ scores of FM patients negatively correlated with RMET (r = – 0.32; p = 0.03). Except for this correlation, FIQ seemed not to significantly correlate with other social cognition and attachment parameters with the exception of female faces in RMET. Correlation of task scores between each other is shown in Table 4.

Table 4. Correlation analysis between psychometric parameters and disease severity in FM patient group

		FIQ	RMET-M	RMET-F	RMET-T	ECR-Anx	ECR-Avo	EQ
FIQ	Correlation[1]	1						
	p value*							
RMET-M	Correlation	-,167	1					
	p value	,298						
RMET-F	Correlation	-,323*	,636**	1				
	p value	,039	,000					
RMET-T	Correlation	-,259	,929**	,876**	1			
	p value	,103	,000	,000				
ECR-Anx	Correlation	,286	-,064	,077	-,003	1		
	p value	,070	,692	,633	,984			
ECR-Avo	Correlation	,280	,096	,058	,088	,564**	1	
	p value	,077	,551	,716	,585	,000		
EQ	Correlation	,019	,052	,066	,064	-,011	-,260	1
	p value	,904	,746	,681	,690	,948	,100	

RMET-T: Total RMET Score RMET-M: RMET Male Faces. RMET-F: RMET Female Faces

EQ: Empathy Quotient **ECR-ANX**: ECR Anxiety **ECR-AVO:** ECR Avoidance

FIQ: The Fibromyalgia Impact Questionnaire

[1] independent samples t-test

* significance: p < 0,05. ** significance: p < 0,01.

FM patients were also compared by means of task scores according to their FIQ score severity.

Table 5. Comparison of Task Scores Between High and Low FIQ Scores in FM Group.

	FIQ	**Nr of Patients**	**Mean**[1]	**SD**	**p value***
RMET-M	>= 70,00	22	10,95	4,02	0,621
	< 70,00	19	11,47	2,56	

RMET-F	>= 70,00	22	7,04	2,83	0,025
	< 70,00	19	8,84	1,95	
RMET-Total	>= 70,00	22	18,00	6,45	0,163
	< 70,00	19	20,31	3,75	
ECR-Anx	>= 70,00	22	62,77	23,33	0,343
	< 70,00	19	55,94	21,89	
ECR-Avo	>= 70,00	22	64,13	31,53	0,054
	< 70,00	19	48,42	17,92	
EQ	>= 70,00	22	51,81	12,47	0,960
	< 70,00	19	51,63	11,15	

RMET-T: Total RMET Score **RMET-M:** RMET Male Faces. **RMET-F:** RMET Female Faces **EQ:** Empathy Quotient **ECR-ANX**: ECR Anxiety **ECR-AVO:** ECR Avoidance **FIQ:** The Fibromyalgia Impact Questionnaire

[1] independent samples t-test

* significance: p < 0,05. ** significance: p < 0,01.

As presented in Table 5, patients who have FIQ scores more than 70 differed significantly with a poorer performance only on RMET female faces (p= 0.02).

Table 6. Predictive values of RMET, attachment and empathy scores on FIQ score

		$CI_{95\%}$ for b					
Predictor	b	Lower	Upper	β	r	sr^2	p
RMET-T	0.282	-1.496	0.54	-0.287	-0.259	-0.284	0.067
ECR-Anx	0.112	-0.139	0.314	0.145	0.286	0.118	0.437
ECR-Avo	0.098	-0.071	0.325	0.250	0.280	0.195	0.203
EQ	0.1185	-0.253	0.497	0.104	0.019	0.099	0.515
Fit for model R^2 = 0.188, Adjusted R^2 = 0.098, p =0.104							

RMET-T: Total RMET Score **EQ:** Empathy Quotient **ECR-ANX**: ECR Anxiety **ECR-AVO:** ECR Avoidance **FIQ:** The Fibromyalgia Impact Questionnaire

As a further statistical analysis, the possible contributing factors on the variance in FIQ scores have been analysed with multiple regression. Although the parameters like RMET, EQ, ECR-R Anxiety and ECR-R Avoidance scores contribute similarly to the variance in FIQ scores, neither general model nor the individual parameters could reach the statistical significance (adjusted R^2 = 0.098, p= 0.10) as shown in Table 6.

DISCUSSION

The findings from the current study showed that although, as a group, FM patients had similar ToM abilities in terms of RMET performances and emphatic abilities in comparison to healthy subjects, they did differ in terms of attachment profiles, as FM patients had significantly higher scores in attachment avoidance. Although there are certain limitations regarding sampling, like gender, and confounding factors, like comorbidities, these findings can serve to a better understanding of psychological functioning of FM patients.

In the literature, there are various studies consistently showing insecure attachment styles of FM patients. It is shown that insecure attachment can be defined as a predisposing factor for chronic pain as well as a mediator between chronic pain and perception of pain like catastrophizing, difficulties in coping with pain, depression and anxiety [24]. In this current study, no difference found between FM patients and

healthy controls in terms of secure/ insecure attachment dichotomy. However, only 15 of 41 FM patients showed a secure attachment style when the ECR-R scores assessed categorically. Relatedly, the healthy control group also showed high numbers of subjects with insecure attachment with a ratio of 13 secure to 31 insecurely attached subjects. It is known that secure attachment is highly related to social support seeking behavior [24] and this finding may explain development of anxiety and depression through low perceived social support in insecurely attached FM patients [10].

Findings of the current study may be discussed in comparison with Govender et al.'s study, as they also found that FM patients showed more avoidant type and less anxious type of insecure attachment compared to general population [9]. However, there are several other studies showing increased rates of both types of insecure attachment in FM patients. In one of these studies, Penacoba et al. found that significant higher levels of attachment avoidance and anxiety did not correlate with pain perception, which supported the lack of correlation between FIQ and ECR-R scores in the current study [11]. The finding regarding the dissociation of avoidant and anxious types in FM patients may also be caused from high attachment anxiety scores in control subjects and the type of measure to assess attachment, as there are various discussions on how to measure attachment in categorical or continuous dimensions [25].

The role of attachment insecurities in FM patients in the light of relatively recently developed attachment based psychotherapies should be emphasized as one of the focus of the current study, as studies showing that the relevant psychotherapeutic interventions in patients with insecure attachment can help to establish more secure attachment relationships [26]. Such interventions can also be adapted to FM patients with insecure attachment and may help to diminish difficulties in pain perception, perception of illness and seeking social support [27]. Moreover, such psychotherapeutic interventions may also help to overcome depressive symptoms in FM patients, which has been found to be closely related with insecure attachment in this patient group [28]. In this regard Sechi et. al. discusses the possible role of avoidant / dismissive attachment patterns seen in FM patients as a risk factor causing delay the help and therapy seeking behaviour in means of low trust and restricted emotional involvement, also tendency to minimizing the impact of symptoms. Same authors emphasize the importance of attachment based therapy modalities in this patient group, since FM patients tend to have negative representation of themselves, ignore negative feelings and try to be self-reliant; which are well described patterns of avoidant attachment and are well known foci of attachment based therapies [29]. Similarly in their recent study, Santos et. al. reported the positive effect of attachment based compassion therapy (ABCT) in means of reducing anxiety and depression in FM patients [30]. The results of this study suggest that positive effect of ABCT is related to improvements in self-compassion und mindfulness, which are core elements of attachment theory. Similar results were also reported by Montero-Marin et al, as they suggested that significant improvements in various clinical parameters like disease severity, anxiety, depression, quality of life, and psychological flexibility in FM are related to therapeutic effect of ABCT on attachment relationships [4].

Although it has not been measured in the current study, it has been shown that various psychopathologies like depression, anxiety, self-esteem and personality are closely related to the insecure attachment profiles in FM patients. In one of these studies Sechi et al. showed that insecurely attached FM patients suffered from lower self-esteem and relatedly lower quality of life [29]. As a closely related concept with self-esteem, personality traits have been also extensively studied in FM patients and these studies reveal that FM patients have significantly higher levels of neuroticism, alexithymia and type-D personality compared to healthy subjects [31,32]. This relationship can be discussed with the well-known relationship between attachment and personality, as Romeo et al. reported that insecure attachment mediated alexithymic personality traits in FM patients [33]. Despite these findings from literature, FM patients are regarded non-homogenous in means of personality traits, therefore standard questionnaires have limited reliability to evaluate personality in FM. Moreover, the current literature suggest that the personality traits associated with FM patients are

more likely related to clinical symptoms like depression and anxiety. Nevertheless, various studies report the core dysfunctionality related to personality traits in FM is low self-esteem, which is a frequent aspect of both attachment insecurities and personality disorders. In this regard Torres et al reported in their study with relatively large sample that FM patients differ from other chronic pain patients or nonpainful chronic illnesses[34]. In summary the current literature suggests that apart from relatively close relationship between avoidant type of attachment and alexithymic personality traits, FM patients do not share a common personality trait.

Another finding deserves to be discussed is that, although as a group FM patients had similar ToM abilities by means of RMET performances with healthy controls, severe patients with FIQ scores higher than 70 performed significantly worse in RMET-Females subcategory compared to FM patients with FIQ scores lower than 70. The similar results of both groups must be discussed in the light of other studies using RMET in Turkish population. Compared to these studies, participants of both FM and health control groups in the current study performed below average in RMET. In this regard, although FM patients showed poor performance in RMET, it may be effected mostly from sociodemographic statuses, specifically education levels of the patients [18]. This finding may be further discussed in line with better ToM abilities of healthy women compared to men, a well-known phenomenon. Although number of subjects in this comparison were limited to conclude any firm relationship, it can be speculated that ToM abilities of FM patients incline to deteriorate with increased severity of FM symptoms.

Empathy and ToM are two concepts regarded as closely related social brain functions and share common neural networks and brain structures. Similar to ToM findings in current study, there has been found no significant difference in empathic abilities of FM patients and healthy subjects. This finding is in line with the findings from the only study up today on empathic abilities of FM patients, as Di Tella et al. also found that FM patients did not differ from healthy subjects in terms of empathic abilities [6]. As two closely related concepts, it can be discussed that similar ToM and empathy performances of FM patients and healthy controls deserve special attention and may indicate that overall social cognitive function is preserved in FM patients without history of psychiatric disorders.

Taken together, the relative predominance of negative results in means of attachment anxiety, ToM scores and emphatic abilities of FM patients seems to be related to the phenomenon of more avoidant type of attachment then anxious type seen in this patient group. As shown by other studies FM patients tend to suffer more attachment avoidance then attachment anxiety and this avoidance strategies seem also be closely related to higher levels of alexithymia[9,33]. We believe that the this relative normal levels of attachment anxiety, since probably also overall anxiety levels, may cause the lack of significant differences between ToM and empathic abilities of patients and control subjects, as there is a well-known association between increased anxiety and lower ToM and empathy [35]. Nevertheless we suggest that there are also FM patients who suffer from rather anxious type of attachment, since our sample size might have been nor enough to compare social cognition abilities of such subgroups.

One of the main limitations of current study is the sociodemographic parameters of participants. The patient and control groups consisted of only female subjects, the level of education was relatively low and the patients were recruited from Physical Medicine and Rehabilitation outpatient clinic at a university hospital and these three factors may limit the generalization of these findings in primary care settings. In addition, lack of any objective measures to assess depression and anxiety levels of FM patients, which are closely related with FM symptomatology [36], may have caused inclusion of participants with depression or anxiety, although diagnosis of such conditions was tried to be excluded with clinical interview. One of the strengths of current study is that all tasks and clinical interviews were conducted by the same clinician to minimize the risk of bias. Moreover, to our knowledge, this is the first study to investigate social brain parameters like ToM and empathy with attachment, two highly related concepts which are extensively researched in other pain related disorders.

Further studies with larger patient and control groups with subjects from both genders can

elaborate more precisely the relationship between attachment and social cognition in FM. We suggest that in the light of increased use of attachment-based therapies in FM patients, more studies focusing on social cognition and clinical parameters like personality traits are needed to examine the nature of this therapeutic process in such patients.

CONCLUSION

The current study reports that FM patients may suffer from avoidant type of attachment although they perform relatively comparable with healthy population in terms of social cognition parameters like Theory of Mind and empathy. Social cognition and attachment are two important social brain parameters, which are subjects of various psychosocial interventions. Profiling such parameters more specifically in FM can offer more efficient diagnostic tools and treatment possibilities to clinicians and may improve therapeutic relationship between patient and health care workers.

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