

Mentalization in Multiple Sclerosis: The Role of Mentalization in Anxiety And Depression

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ABSTRACT

Background: Multiple sclerosis (MS) is a chronic inflammatory disease and is characterized by impairment in cognitive and social functioning during the disease. Mentalization is of great importance in social functioning as it is the ability to understand oneself and others. Impaired mentalization constitute a risk for psychiatric diseases. In our study, mentalization skills and their relationship with anxiety and depression symptoms were investigated in MS patients.

Method: 31 consecutive MS patients (%64.5 female and Mean age was 36.26) were included in the study. Sociodemographic form, Beck depression inventory, Beck anxiety inventory, and mentalization scale were administered to the participants. Mentalization was considered in three sub-dimensions: self-based mentalization (MentS-S), others-based mentalization (MentS-O) and motivation to mentalize (MentS-M).

Result: Patients with Anxiety have significantly lower MentS-O scores. MentS-S scores of those with depression were found to be significantly higher and MentS-O scores were found to be lower (respectively; $p=0.027, 0.032, 0.012$). While positive moderate correlation was found between MentS-S ($r=0.373$) dimension and depression is, negative moderate correlation was found between MentS-M ($r=-0.391$) and MentS-O ($r=-0.413$) dimensions.

Conclusion: Mentalization to other scores is connected with anxiety and depression in MS patients. Depression may be connected with increased mentalization of self.

Keywords: Social cognition, mentalization, multiple sclerosis, anxiety, depression

Multipl Sklerozda Zihinselleştirme: Anksiyete ve Depresyonda Zihinselleştirmenin Rolü

ÖZET

Giriş: Multiple skleroz (MS) hastalığı kronik inflamatuvar bir hastalık olup, hastalık seyrinde bilişsel ve sosyal işlevselliklerinde bozulma ile seyretmektedir. Mentalizasyon, kendini ve diğerlerini anlama becerisi olduğu için sosyal işlevsellikte büyük önem sahiptir. Mentalizasyon bozuklukları psikiyatrik hastalıklar için risk oluşturmaktadır. Çalışmamızda MS hastalarında mentalizasyon becerileri ve bu becerilerin anksiyete ve depresyon semptomları üzerindeki ilişkileri incelenmiştir

Method: 31 ardışık MS hastası (%64.5'i kadın ve yaş ortalaması 36.26) çalışmaya dahil edilmiştir. Katılımcılara sosyodemografik form, Beck depresyon ölçeği, Beck anksiyete ölçeği ve mentalizasyon ölçeği uygulanmıştır. Mentalizasyon üç alt boyutunda ele alınmıştır: kendine dayalı zihinselleştirme (MentS-S), başkalarına dayalı zihinselleştirme (MentS-O) ve zihinselleştirme motivasyonu (MentS-M).

Bulgular: Anksiyetesi olan hastaların MentS-O skorları anlamlı derecede düşüktür. Depresyonu olanların MentS-S puanları anlamlı olarak daha yüksek, MentS-O puanları ise daha düşük bulunmuştur (sırasıyla; $p=0.027, 0.032, 0.012$). MentS-S ($r=0.373$) boyutu ile depresyon arasında pozitif orta düzeyde korelasyon bulunurken, MentS-M ($r=-0.391$) ve MentS-O ($r=-0.413$) boyutları arasında negatif orta düzeyde korelasyon bulunmuştur.

Sonuç: Diğerini zihinselleştirme MS hastalarında anksiyete ve depresyon ile bağlantılıdır. Depresyon artmış kendini zihinselleştirme ile bağlantılı olabilir.

Anahtar kelimeler: Sosyal biliş, mentalizasyon, multiple skleroz, anksiyete, depresyon

Multiple sclerosis (MS) is a chronic demyelinating central nervous system disease. MS patients may have impaired cognitive and social functioning as part of the complex neurological symptomatology (1). Social cognition is the process through which individuals process, remember, and use knowledge in social circumstances to explain and predict how people behave, so it needs a broad repertoire of cognitive and emotional skills that allows us to infer the mental and emotional states of others to interact effectively with others and be included in a social group (2). An important aspect of social cognition is the capacity to interpret and predict other people's mental states in terms of thoughts, intentions, desires, and beliefs, known as the theory of mind (ToM), also referred to as mentalizing but only mentalizing to other minds. Theory of mind is achieved by decoding non-verbal cues such as facial expression, eye gaze, body movements, and complex abstract reasoning about verbal information (3). Social cognition may be independent or separable from general intelligence (2). In studies conducted on MS patients, it has been observed that patients have difficulties in both recognizing facial emotions and understanding the intentions of others (4)

The ability to mentalize is another key aspect of social cognition. Mentalization is defined as a mental process in which an individual perceives and interprets his or her own and other people's behaviors in an indirect or direct manner based on designed mental states such as personal desires, needs, emotions, beliefs, and reasons (5). This process entails interpreting others' behavior in terms of mental states, comprehending one's own mental states, and being able to discern one's own and others' mental states from each other and from outward reality. Although theory of mind and mentalization are used synonymously, they do not mean exactly the same thing. While both Theory of Mind (ToM) and mentalizing include the ability to understand other people's thoughts and emotions, mentalizing goes beyond the Theory of Mind by including self-reflection and emotional regulation (6). Mentalizing is a more complex and nuanced skill that involves understanding not only others but also oneself and how one's thoughts and feelings influence one's behavior. According to research, mentalization boosts mental health and is linked to a variety of aspects such as psychological resilience (7). Mentalization also overlaps with constructs such as empathy and emotional intelligence. Individuals with low mentalizing capacity may experience a number of deprivations such as a lack of interest in mental states, a

lack of imagination about the mental world of others, and low awareness of the relationship between internal and external reality (8). This situation plays an important role in the development of various mental disorders (9, 10)

Depression and anxiety are common in MS (11, 12). In a tertiary neurological clinic, the prevalence of depression in MS patients is expected to be 50% (13). With depression, disease-related pain, fatigue and impairment in cognitive functioning can be exacerbated (11). Depression can also lead to the development of negative health behaviors such as excessive drinking or smoking (14). This process may also lead to the development of suicidal thoughts. The patient's treatment compliance may be impaired due to depression (11). All these variables mean the worsening of the disease course. Similarly, anxiety can increase to around 40% (12). Despite being the two most frequent concomitant diseases, they appear with distinct MS manifestations. The literature revealed that Depression has been linked to neuropathology, cognitive impairment, and poor social support, whereas anxiety has been linked to increased disability levels and a progressive disease course and gender differences (11). Although the effect of mentalization on anxiety and depression is known, the effect of mentalization on anxiety and depression in MS patients has not been studied. As these psychiatric comorbidities have a negative impact on the patient's quality of life and functioning, it is important to identify associated factors (15). Our study aimed to measure mentalization skills in the MS patient population and observe the relationship between mentalization and anxiety and depression. We hypothesized that individuals with lower mentalization scores would have higher anxiety and depression scores.

MATERIAL AND METHOD

Procedure

Patients admitted to the neurology outpatient clinic of Lokman Hekim University and diagnosed with MS were consecutively included in the study. The individuals were given the sociodemographic form, Beck depression scale, Beck anxiety scale, and Mentalization Scale. Individuals who scored higher than 15 on the Beck depression and Beck anxiety inventories were examined for anxiety disorder and depression. All participants provided informed consent. The Research Ethics Committee at 2023/105 granted ethics committee approval.

Participants

31 MS patients enrolled in the study (mean age = 36.26 ± 9.12). Of these, 20 were female (64.5%). Descriptive analyzes are given in Table 1.

Statistical Analysis

We used IBM SPSS Statistics version 26.0. Statistical significance was determined as $p < 0.05$. Descriptive statistics included mean and standard deviation, median, minimum and maximum scores, and absolute and relative frequencies. Depending on whether the data satisfied normal distribution assumptions, either the Student T test or the Mann-Whitney U test was employed to look for statistically significant differences. To address between MentS dimensions, anxiety and depression scores, Spearman's correlation analysis was used.

Measures

Beck Depression Inventory: The scale measures emotional, physical, cognitive, and motivational symptoms seen in depression (16). The scale has 21 components. Each item is assigned a score between 0 and 3. A greater overall score implies a more severe or level of depression. Hisli (1989) carried out validity and reliability investigations in our country. Cronbach's alpha coefficient was determined to be 0.80 (17) in a reliability analysis of the Turkish variant.

Beck Anxiety Inventory: It was developed by Beck et al. (1988) (18) and adapted to Turkish by Ulusoy et al. (1993) (19). In the scale consisting of 21 questions, the questions are scored between 0-3, and the severity of anxiety symptoms is determined by the total score. The total score varies between 0-63. Cronbach's alpha coefficient was determined to be 0.93.

Mentalization Scale (MentS): It is a self-report scale designed by Dimitrijevi et al to measure mentalization (6). The MentS consists of 28 items with a 5-point Likert scale (1- Completely incorrect, 5- Completely correct). It is divided into three dimensions: self-based mentalization (MentS-Self, MentS-S) is for the ability to mentalize one's own mind, others-based mentalization (MentS-Others, MentS-O) is for the ability to mentalize others' mind, and motivation to mentalize (MentS-Motivation, MentS-M). Every contribution receives a grade between 1 and 5, for a possible total of 140 points. Higher scores show a stronger mental processing capacity. The scale demonstrated good internal consistency in the non-clinical sample ($\alpha = 0.84$) and acceptable outcomes in the clinical sample ($\alpha =$

0.75). The Turkish validity and reliability of the scale were done by Torenli Kaya et. al 2023 (20).

RESULT

Demographics and Clinical Characteristics

A total of 31 participants were included in our study, including 29 Relapsing-Remitting Multiple Sclerosis (RRMS), 1 Primer Progressive Multiple Sclerosis (PPMS), and 1 Secondar Progressive Multiple Sclerosis (2PMS) patients. Twenty of them (64%) were female. The age of participants ranges between 21 to 57 and the mean of them was 36.26 ± 9.12 . The mean disease duration is 8.13 ± 5.17 . The descriptive analysis of the participants according to age, gender, marital status, employment status, and education level is shown in Table 1.

Mentalization, Depression, and Anxiety

Mentalization dimensions, depression, and anxiety values are shown in Table 1. The participants with anxiety have significantly lower MentS-O scores ($p = 0.012$). MentS-S scores of those with depression were found to be significantly higher and MentS-O scores were found to be lower (respectively; $p = 0.027$, $p = 0.032$). They are shown in Table 2.

Correlation between Mentalization and Depression and Anxiety

A positive moderate correlation was found between the MentS-S dimension and depression, a negative moderate correlation was found between MentS-M and MentS-O dimensions. ($p < 0.005$). MentS-M and MentS-O dimensions had a moderate negative correlation with anxiety scores according to r values, but p scores were found to be statistically insignificant. Correlation values are shown in Table 3.

DISCUSSION

This study was planned considering that it is important to reveal whether mentalization is associated with comorbid conditions in MS. In our research, we observed that, while depression scores increase, mentalization scores for self decrease and mentalization scores for others increase. In patients with anxiety, on the other hand, only the mentalization to other scores decreases. In other words, anxiety and depression increase when the mentalization to others decreases. Although our statistical methodology does not allow for a causal explanation, these findings suggest that increased mentalization of one's own mental state may lead to a more depressive state.

Table 1: Demographics and Clinical Description of People With Multiple Sclerosis (N=31)

Demographic Characteristics (n=31)	
Age	
Mean ± Sd	36.26 ± 9.12
Median	35
Min-Max	21-57
Gender	
Female	
n (%)	20 (64.5)
Working Status	
n (%)	
Paid	14 (45.2)
Housewife	7 (22.6)
Student	3 (9.7)
Unemployed	5 (16.1)
Retired	2 (6.5)
Marital Status	
Partner, no	5 (16.1)
Partner, yes	6 (19.4)
Married	20 (64.5)
Education	
Mean ± Sd	12.45 ± 3.25
Median	12
Min-Max	3-18
Clinical Features	
Multiple Sclerosis Type	
Ppms	1 (3.2)
Rrms	29 (93.5)
2pms	1 (3.2)
Number of recurrences	
Mean ± Sd	3.58 ± 3.11
Median	2
Min-Max	1-11
Disease Duration	
Mean ± Sd	8.13 ± 5.17
Median	7
Min-Max	1-18
MentS Dimensions	
MentS-M	
Mean ± Sd	28.32 ± 4.3
Median	29
Min-Max	19-39

MentS-O	
Mean ± Sd	35.97 ± 3.99
Median	35
Min-Max	28-44
MentS-S	
Mean ± Sd	22.23 ± 5.17
Median	23
Min-Max	12-30
Depression And Anxiety	
Beck Anxiety	
Yes	
n (%)	21 (67.7)
Beck Depression	
Yes	
n (%)	15 (48.4)
<i>PPMS: Primer Progressive Multiple Sclerosis, RRMS: Relapsing Remitting Multiple Sclerosis, 2PMS: Seconder Progressive Multiple Sclerosis MentS-S: MentS-Self, MentS-O: MentS-Others, MentS-M: MentS-Motivation</i>	

Psychiatric comorbidities are common in MS (11, 12). These comorbid conditions have been shown to have a negative relationship with social cognition skills (21, 22). Mentalization is one of these social cognitive domains (21). A person's perception and interpretation of their own and other people's behaviors, whether indirect or direct, are referred to as mentalization. This mental process is founded on predetermined mental states, such as individual needs, wants, emotions, and beliefs (23). Mentalization has been closely linked to depression and anxiety (9, 10). In addition, white matter lesions have been shown to impair mentalization due to dysconnectivity (24). As is well known, MS negatively affects many mental faculties and individuals with high mentalization may experience this with a more intense awareness. This can lead to a stronger confrontation with the difficulty and a negative emotional state. On the other hand, Fonagy claimed that mentalization disorder is not only hypomentalization but also hypermentalization. According to this, if a person is excessively mentalizing about himself, he may be disconnected from the outside world (23). This may explain why MS patients with depression have high MentS-S scores but low MentS-O scores.

Table 2: MentS dimensions of patients grouped in terms of depression and anxiety

(N)	Anxiety Yes (N=21)	Anxiety No (N=21)	P	Depression Yes (N=16)	Depression No (N=16)	P
MentS-M						
Mean ± Sd	27.33±4.32	30.4±3.59	0.062*	27.27±5.21	29.31±3.07	0.190*
Median				27	29.5	
Min-Max				19-39	24-34	
MentS-S						
Mean ± Sd	23.14 ± 5.13	20.3±6.65	0.2*	24.53±4.41	20.06±6.07	0.027*
Median	25	20		25	20	
Min-Max	12-30	12-30		16-30	12-29	
MentS-O						
Mean ± Sd	34.76 ± 3.98	38.50±2.71	0.012*	34.4±4.17	37.44±3.31	0.032*
Median	35	39		34	36.5	
Min-Max	28-44	34-42		28-44	33-43	

**Student T Test MentS-S: MentS-Self, MentS-O: MentS-Others, MentS-M: MentS-Motivation*

Table 3: The correlation between the MentS subgroups and anxiety/depression

	Anxiety		Depression	
	R	P	R	P
MentS-M	-0.341	0.06*	-0.391	0.029*
MentS-S	0.117	0.530*	0.373	0.039*
MentS-O	-0.329	0.071*	-0.413	0.021*

**Spearman's correlation test coefficient
MentS-S: MentS-Self, MentS-O: MentS-Others, MentS-M: MentS-Motivation*

Understanding the thoughts of others was lower in the anxious and depression groups. It is well established that high levels of stress when confronted with a threat or danger result in an arousal state that affects higher-order cognitive functioning(25). Such a stressful circumstance triggers the fight-or-flight response, which causes the sympathetic nervous system to fire in an effort to preserve essential organs and maintain survival. As a result, mentalization is compromised, and we begin to respond reflexively. According to the "biobehavioral switch model" of mentalization, the same reaction takes place under extreme relational stress even when there isn't a life-threatening situation (25) Mentalizing becomes temporally unavailable when there is a threat to a significant relationship, such as a dispute with a close friend or relative. Reflexive inferences, namely, can take the place of mentalization.

In the context of complicated human relationships, this change to an automatic process could be misleading since it could encourage a quick and skewed view of mental states. According to some research, those who are already anxious will have lower arousal thresholds, meaning they will require less stress to transition from controlled to automatic mentalization(9). On the other hand, being able to see the behavior of others as meaningful and to attribute states of mind to that behavior makes it predictable. When mentalization is impaired, you may have difficulty attributing to others and thus feel more stressed. MS patients may have difficulty making sense of the outside world due to the loss of mentalization and therefore feel more anxious. Two important recent meta-analyses have shown that mentalization is impaired in patients with anxiety (9, 26). Therefore, the Ments-0 scores of MS patients with anxiety in this study may have been lower.

Patients with major depressive disorder (MDD) struggle with a variety of cognitive and affective skills, this makes people with MDD have impaired executive functions (EFs) and deficiencies in ToM, which is the capacity to guess other people's mental states. Impairment in executive functioning may impair perception of the environment and others, which may make it difficult to make inferences about others and thus impair mentalization, as secondary . Depression is also associated with helplessness, loss of recreational opportunities, low-quality relationships, and high stress(10). Mentalization is critical for the perception of stress and coping with it(27). Therefore, depression may occur when there is a change in the mentalization to others due to white matter involvement.

Through the theory of mind test, social cognition in MS patients has frequently been researched in the literature. This examination analyzes understanding others' intentions, even though it covers mentalization-related skills. According to reports, anxiety and depression are linked to the theory of mind impairment in MS patients (1). This is supported by the finding that MentS-O was related to both depression and anxiety in our study. According to recent reports, one's own and other people's mental states reflect them in distinct ways (28). This viewpoint is also supported by the disparate effects of MentS_S and MentS-O on anxiety and depression.

Being the first study to measure mentalization in MS patients is our strength, but we also have limitations. First, there was no healthy control group to compare mentalization skills, so a clear comparison of mentalization skills and its relationship with depression and anxiety could not be made in the general population. Secondly, because this study is cross-sectional and correlational in nature, we cannot determine the direction of causality. Finally, the current study's conclusions are tentative due to the small sample size. Future studies with larger samples and longitudinal evaluations will help us better understand the association between mentalization and depression and anxiety symptoms. Increasing the sample size will increase the generalizability of the findings.

CONCLUSION

In MS patients, lower mentalization to other scores are associated with both anxiety and depression. Increased mentalization to self may be associated with depression. Mentalization should be considered during the follow-up of patients in terms of predicting and treating anxiety and depression.

DECLARATIONS

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Conflict of interest

The authors disclose that they have no competing interests. The authors state that they do not have any known competing financial interests or personal ties that could appear to have influenced the work disclosed in this study.

Ethical approval

The study was approved by the Local Ethics Committee of Lokman Hekim University Ethics Committee (date: 13/06/2020 – 2023/105).

Author Contributions

Y.H.A: Conceptualization, methodology, statistical analysis, and writing - original draft. M.K.K: Conceptualization, methodology, Data collection, statistical analysis, review, and editing

Data availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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