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Prediction of Illness Attitude Based on Early Maladaptive Schemas and Intolerance of Uncertainty in Patients with Multiple Sclerosis

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Abstract

Background: The present study was conducted to predict attitudes towards illness based on early maladaptive schemas and intolerance of uncertainty in individuals with Multiple Sclerosis (MS).

Methods: This was a cross-sectional study conducted on 62 patients with MS (72% of them were female). They were selected based on availability and voluntary participation. Data were collected through three questionnaires: the Illness Attitudes Scale, the Intolerance of Uncertainty scale, and the Yang Schema Questionnaire.

Results: The mean age ($\pm$SD) of the participants and duration of diagnosis was 36.10$\pm$7.05 yr, and 4.21$\pm$3.78 yr, respectively. The results showed that 18 early maladaptive schemas, together with intolerance of uncertainty, can predict up to 8.9% of illness attitude in patients with MS. Among the early maladaptive schemas, schemas of emotional deprivation, social isolation-alienation, abandonment-instability, failure, dependence-underdeveloped self, vulnerability, trapped-victim, emotional inhibition, stubborn/fault-finding standards, self-control disciplinary, seeking attention-seeking approval, and negativity/pessimism had a significant relationship with attitudes towards illness (p<0.05). Additionally, there was a significant relationship between intolerance of uncertainty and all its dimensions with attitudes towards illness (p<0.05).

Conclusion: Early maladaptive schemas and intolerance of uncertainty can predict illness attitudes in patients with MS. Patients with MS who have high intolerance of uncertainty are more likely to interpret ambiguous information as threatening. Therefore, effective interventions in the field of uncertainty intolerance for these patients can likely be effective in improving their attitudes towards illness and preventing the exacerbation of their symptoms.

Keywords: Cross-sectional studies, Female, Humans, Male, Multiple sclerosis, Pessimism, Social isolation, Uncertainty

Introduction

Multiple Sclerosis (MS) is an autoimmune disease of the brain and spinal cord, in which the body's immune system attacks the protective covering of peripheral nerve fibers. The symptoms of this disease include muscle weakness, balance problems, vision, and cognitive problems (1). This disease is chronic and, in some cases, debilitating, which can have adverse effects on various aspects of patients' lives and their families. Therefore, concern in patients with MS is very common and traumatic, and most patients have an attitude of concern a0nd uncertainty towards their illness and treatment process (2). Patients with MS are affected by events that activate their schemas and subsequent experiences.

Early maladaptive schemas play an important role in their way of thinking, feeling, behaving, and communicating with others. The activation of these schemas can cause unintentional recreation of traumatic experiences from childhood in adulthood (3). A schema is a format, framework, or cognitive concept that organizes and interprets information. Maladaptive schemas that patients learn to deal with are often the basis of symptoms of chronic disorders such as anxiety disorders, depression, substance abuse, and psychosomatic disorders (4).

Patients with a vulnerability schema towards harm or illness are extremely afraid of an imminent disaster and worry that they will not be able to cope with. Usually, the mentioned patients suffer from medical accidents, emotional events, environmental events, and intense and irrational fears (3). Intolerance of uncertainty is a personality trait consisting of negative beliefs about uncertainty that cause a great tendency for the patients to avoid unexpected events. This condition can be severe that any doubt leads to an inability to carry out daily activities (5).

Due to the idea that MS is a disabling disease, patients usually experience a combination of unpleasant feelings and doubt before receiving a diagnosis of the disease, and this causes more distress and anxiety in individuals with MS (6).

Worrying about the future in individuals with MS is completely natural, and the ability of coping strategies with problems changes over time. Often with the passing of time, the person's acceptance of MS disease will increase (6), for some patients, it is more difficult to accept it and it depends on the life style and personality trait of the person, thus it becomes important to examine the personality factors of the patients that cause acceptance and adaptation to the disease (6).

In a study that investigated psychodynamics on the performance of patients with MS, Muston stated that patients with chronic disorders such as MS need to have the right attitude in relation to their diseases, and this is probably associated with their previous schema. Hence, it is necessary to check the attitude towards this disease based on different factors (6).

Patients with MS have to face the stresses of everyday life and on the other hand, deal with the unpredictable stresses caused by the symptoms of the disease. The unpredictable and fluctuating conditions of the disease can increase their stress level and affect their lives (7,8).

With the possibility of predicting the early maladaptive schema and intolerance of uncertainty based on the attitude towards the illness in patients with MS, it is possible to revise the rehabilitation programs and develop new treatment-rehabilitation approaches (9). Therefore, the aim of the present study was to investigate the prediction of disease attitude based on early maladaptive schemas and intolerance of uncertainty in individuals with MS.

Materials and Methods

Study design

The present study was a cross-sectional study with regression analysis which was conducted between November 2022 and May 2023 in Tehran.

Since the aim of this study was to predict the attitude towards MS illnesses based on maladaptive schemas and intolerance of uncertainty, the regression analysis method was used. In statistical modeling, regression analysis is a set of statistical processes to estimate relationships between a dependent variable (illness attitude) and one or more independent variables (maladaptive schemas and intolerance of uncertainty) which are often called "predictors".

Setting

After receiving the code of ethics from the Ethics Committee of Azad University of Medical Sciences (IR.IAU.TMU.REC.1401.234), the first researcher

attended the MS Association and announced the explanation and importance of conducting the present study, inviting patients with MS to cooperate.

Participants

In this study, 62 patients with MS aged 27-44 years, after completing the informed consent form, participated voluntarily.

The inclusion criteria for the participants were: they had received a definite diagnosis of MS from a neurologist and their file was registered in the MS Association. At least one year has passed since the definite diagnosis of the disease, and at the same time, they were not receiving interventions based on the attitude and acceptance of the disease, had no history of receiving psychological or psychiatric services for concerns related to the disease, *etc.*, and had the minimum ability to read and write to complete the questionnaires (at least cycle) so that they could easily read, understand and complete the questionnaires. Of course, the first author was present while completing the questionnaires and answered any doubts and questions.

In case of an attack or expressing any dissatisfaction, the participants were excluded from the study.

Outcome measures

In the present study, the maladaptive schemas and intolerance of uncertainty were considered as predictive variables for the illness attitude towards MS.

Illness Attitude towards Illness Scale (IAS)

IAS was developed by Kellner as an instrument for the general assessment of fears, beliefs and attitudes associated with hypochondriacal and abnormal illness behavior. The items are distributed in the following way in the 9 IAS: 1. Worry about illness (items 1-3), 2. Concerns about pain (items 4-6), 3. Health habits (items 7-9), 4. Hypochondriacal beliefs (items 10-12), 5. Thanatophobia (items 13-15), 6. Disease phobia (items 16-18), 7. Bodily preoccupations (items 19-21), 8. Treatment experience (items 22-24), 9. Effects of symptoms (items 25-27). For each question, the response "No" is scored 0, "Rarely" is scored 1, "Sometimes" is scored 2, "Often" is scored 3, and "Most of the time" is scored 4. The highest score is 12 for each scale and 108 for the total score, which is obtained by adding the scores of the 9 scales. A high score in each subscale indicates a negative attitude and fear about that sub-item (10). The reliability of its Persian version was determined by examining both the internal consistency and test–retest stability which showed adequate internal consistency ($\alpha \geq 0.70$) (11).

Intolerance of Uncertainty Scale (IUS)

IUS was developed by Freeston *et al* to assess emotional, cognitive, and behavioral reactions to ambiguous situations, implications of being uncertain, and attempts to control the future. The scale consists of 27 questions. The questions are scored on a five-point Likert scale, ranging from never (1) to always (5). The IUS has 27 items. The highest score indicates negative behavioral (12). The reliability of its Persian version was determined by examining internal consistency in which Cronbach's alpha ($\alpha = 0.89$) showed appropriate internal consistency (13).

Young Schema Questionnaire Short Form (YSQ-SF)

YSQ-SF was developed by Young *et al* and consists of 75 items and 15 subscales, including Emotional Deprivation, Abandonment, Mistrust/Abuse, Social Isolation, Defectiveness/Shame, Social Undesirability (no longer a separate schema), Failure, Dependence/Incompetence, Vulnerability to Harm and Illness, Enmeshment, Subjugation, Self-Sacrifice, Emotional Inhibition, Unrelenting Standard, Entitlement, Insufficient Self-Control/Self-Discipline. Each subscale includes five questions, and respondents rate themselves on a six-point Likert scale, ranging from completely true (6) to completely false (1). The scores for each subscale are summed and a high score on a certain subscale most likely indicates a maladaptive schema for that individual (14). In Iran, Sadooghi *et al* demonstrated that the internal reliability of the scale through Cronbach's alpha was appropriate ($0.62 \leq \alpha \leq 0.9$) (15).

Procedure

After receiving the code of ethics from the ethics committee of Azad University of Medical Sciences, the researcher referred to the MS Association

by obtaining a letter of introduction from the research committee of Azad University. The first author provided explanations on completing the questionnaires and the importance of the present study on several occasions. Finally, patients with MS who met the inclusion criteria for entering the study and volunteered to cooperate completed the questionnaires. In case of any question or problem, the first researcher would provide explanations and solve the problem.

Sample size

The sample size was estimated to be 65 individuals based on previous studies (8,9) and by predicting the expected correlation coefficient of 25.0 at a confidence level of 95% ($\alpha=0.05$). The samples were selected purposefully and were available by attending the MS Association.

Statistical methods

The 62 samples were analyzed using $SPSS_{25}$ (IBM Corp., Armonk, USA) software. To investigate the relationship between disease attitude and early maladaptive schemas in individuals with MS, the linear multivariate regression model was used. As Kolmogorov-Smirnov (K-S) showed data followed a normal distribution ($p>0.05$), the Pearson's correlation parametric test was utilized.

Results

64 individuals with MS after completing the informed consent, completed the demographic characteristics questionnaire, Young Schema Questionnaire, Illness Attitude towards Illness Scale (IAS), and Intolerance of Uncertainty Scale (IUS), respectively. However, two of the samples were excluded from the study due to the incompleteness of their information. According to the results, the mean age ($\pm$SD) of the individuals with MS was 36.10 ± 7.05 yr. (with a range of 27-44) yr. The mean duration of diagnosis was 4.21 ± 3.78 year, and most of the participants were female (N=45, 72%).

Table 1. The relationship between attitude toward illness and early maladaptive schemas (N=62)

Schemas	Pearson's coefficient correlation (r)	p-value
Emotional depravation	0.886	<0.01*
Abandonment - Instability	0.264	<0.01*
Distrust - Abuse	0.198	0.128
Social isolation - Alienation	1.661	<0.01*
Deficiency - Shame	0.050	0.698
Failure	0.299	<0.01*
Dependence - Underdeveloped self	0.447	<0.01*
Vulnerability	0.773	<0.01*
Self-pity - Victim	0.352	<0.01*
Obedience	0.178	0.167
Sacrifice	0.207	0.107
Emotional inhibition	0.321	<0.01*
Stubborn criteria / Fault finding	0.526	<0.01*
Entitlement - Grandiosity	0.013	0.918
Self-control - Self-discipline	0.445	<0.01*
Approval-seeking Recognition-seeking	0.209	0.103
Negativity - Pessimism	0.525	<0.01*
Punishment	0.223	0.157

*Significance level: ≤0.05

Table 2. Relationship between attitude toward illness and intolerance of uncertainty (N=62)

Schemas	Pearson's coefficient correlation (r)	p-value
Inability to take action	0.677	<0.01*
Uncertainty stress	0.685	<0.01*
The negativity of unexpected events and avoidance	0.407	<0.01*
Uncertainty about the future	0.655	<0.01*
Intolerance of uncertainty (total score)	0.748	<0.01*

*Significance level: ≤0.05

Table 3. Predictive variables, and the relationship with the attitude towards illness

	B	Standard error	Beta	t	Odds Ratio (OR) (CI:95%)	p-value
Constant	36.361	17.765		2.047	2.145	<0.001*
Emotional depravation	2.775	0.407	0.531	6.825	3.654	<0.001*
Abandonment - Instability	0.280	0.572	0.038	0.491	2.123	<0.001*
Distrust - Abuse	0.654	0.473	0.093	1.484	2.012	<0.001*
Social isolation - Alienation	2.712	0.924	0.357	2.934	2.093	<0.001*
Deficiency - Shame	0.250	0.350	0.046	0.713	0.651	0.480
Failure	0.323	0.427	0.655	1.574	3.121	<0.001*
Dependence - Underdeveloped self	0.941	0.924	0.473	1.740	2.098	<0.001*
Vulnerability	1.601	0.612	0.221	2.338	2.871	<0.001*
Self-pity - Victim	0.956	0.616	0.121	2.145	1.980	<0.001*
Obedience	0.453	0.390	0.065	1.162	0.871	0.252
Sacrifice	0.177	0.385	0.025	0.460	0.965	0.648
Emotional inhibition	1.244	0.545	0.180	2.90	3.665	<0.001*
Stubborn criteria / Fault finding	0.935	0.418	0.118	2.239	2.801	<0.001*
Entitlement - Grandiosity	0.778	0.651	0.081	1.196	0.918	0.238
Self-control - Self-discipline	2.030	0.686	0.027	0.234	0.841	0.881
Approval-seeking - Recognition-seeking	0.177	0.385	0.025	0.460	0.141	0.320
Negativity - Pessimism	0.992	2.232	0.177	2.323	3.980	<0.001*
Punishment	0.835	0.337	0.155	2.497	2.940	<0.001*
Intolerance of uncertainty	0.297	0.112	0.209	2.646	1.873	<0.001*

*Significance level: ≤0.05

The results demonstrated that there is a significant relationship (p<0.05) between various early maladaptive schemas, including emotional deprivation, abandonment/instability, social isolation/alienation, failure, dependence/practical incompetence, vulnerability, self-pity/victimhood, emotional inhibition, stubbornness/fault-finding, self-control/self-discipline, attention-seeking/need for recognition, and negativity/pessimism, with the attitude towards illness (Table 1).

According to table 2, there is a significant relationship (p<0.05) between the intolerance of uncertainty and all its dimensions (positive beliefs about worry, negative beliefs about uncertainty, cognitive avoidance, and behavioral avoidance) with the attitude towards the disease. Therefore, it can be concluded that there is

a significant relationship between the intolerance of uncertainty and its dimensions with the attitude towards illness.

Based on the results of the simple linear multivariate regression test using the simultaneous inter model, the R-squared value is >0.05, indicating that linear regression is an appropriate analytical method. The determination coefficient of 0.898 represented that all of the early maladaptive schemas, along with the intolerance of uncertainty, can collectively predict up to 8.9% of the variance in MS illness attitude.

The fact that the significance value is less than 0.05 indicates that the there is a significant relationship between early maladaptive schemas and the attitude towards illness in patients with MS. Table 3 displays the predictive variables, and the test results reveal which variables have a significant relationship with the attitude towards illness.

The results of the study indicated that there is a significant relationship (p<0.05) between the following early maladaptive schemas and intolerance of uncertainty with the attitude towards illness in patients with MS: emotional deprivation, abandonment/instability, social isolation/alienation, failure, dependence/ practical incompetence, vulnerability, self-pity/ victimhood, emotional inhibition, stubbornness/ fault-finding, self-control/self-discipline, attention-seeking/need for recognition, negativity/pessimism, and intolerance of uncertainty.

Discussion

The results of present study showed that individuals with MS are affected by events that activate their schemas, which in turn influence subsequent experiences. These schemas affect a person's thoughts, feelings, and behavior, as well as the way they deal with other individuals. They also cause them to involuntarily recreate traumatic experiences from their childhood in adulthood.

The results of present study demonstrated that early maladaptive schemas and intolerance of uncertainty can predict illness attitudes in patients with MS.

If patients in society, including those with MS, have beliefs and early incompatible schemas in dealing with and interpreting problems, symptoms of the disease, and so on, and react correctly to the emotions and symptoms of the disease, they can adapt to the

disease to a large extent and ultimately have a better life (6).

Sadooghi *et al*'s research, which aimed to investigate the relationship between early maladaptive schemas and the mental health of young people, showed that although early maladaptive schemas are related to psychopathology in adults, this relationship is less obvious in young people because the schemas are still emerging. The results showed that there is a relationship between early maladaptive schemas and depression, anxiety, eating disorders, borderline symptoms, and externalizing behaviors (15). The results of the study conducted by Borges & Dell'Aglio indicated that adolescents with a history of abuse during childhood had significantly higher scores in committing violence than adolescents without a history of abuse (16). These results are in accordance with present study from the point of view that individuals with MS are affected by events that activate their schemas, which in turn influence subsequent experiences. These schemas affect a person's thoughts, feelings, and behavior, as well as the way they deal with other individuals. The results of Kaya and Aydin's study demonstrated that insecure attachment to mothers who have disconnection/ ignoring relationships, causes the emergence of early maladaptive schemas on Turkish university students having a positive relationship with depression and anxiety symptoms. Interruption/non-acceptance and disturbance in autonomy significantly cause insecure attachment to parents and depression and anxiety symptoms (17). The results were in line with the present study in that maladaptive schemas were significantly associated with worry and anxiety. Boudoukha *et al* conducted research on the relationship between early maladaptive schemas, stating that early maladaptive schemas stimulate negative spontaneous thoughts and intensify mental distress and are the main focus of personality disorders, behavioral problems, and many mental disorders (18).

The results have shown that it is possible to predict the anxiety caused by MS disease as well as other disorders based on the initial maladaptive schema. Slepecky *et al* investigated the effect of psychosocial, psychophysiological, and anthropometric factors on the incidence of cardiovascular diseases among 200 healthy individuals over 21 years of age who do not

take drugs affecting the autonomic nervous system. The results of the study showed that in addition to the mentioned factors, initial maladaptive schemas, coping methods, and personality traits affect the risk of cardiovascular diseases (19). In the present study, it was shown that the activation of maladaptive schemas in individuals with MS was related to personality and childhood background and was significantly associated with attitudes towards illness and coping strategies toward illness, too.

In another study, Oreja-Guevara *et al* reported that early maladaptive schemas directly predicted executive functions in individuals with MS (20). It can be concluded that initial maladaptive schemas and feelings of loneliness were important factors in weakening the executive functions of individuals with MS, which was consistent with the results of the current research.

Based on the results of the present study, which showed that early maladaptive schemas and intolerance of uncertainty can predict disease attitudes in individuals with MS, and the results of similar studies in other groups and disorders, it can be stated that the life history of individuals, educational style in relation to views and attitudes related to problems, including disease, plays a significant role in the formation of individuals' schemas. These schemas will show themselves in the future and in the face of hardships and adversities of life, and people who have acted more successfully in the formation of schemas will be able to endure hardships and inconsistencies. Being indecisive and having vague views about the future can cause difficult psychological problems for individuals, including patients with MS. Thus, effective interventions in the field of uncertainty intolerance for these patients can likely be effective in improving their attitudes towards illness and preventing the exacerbation of their symptoms.

Limitations

This research was conducted only on 62 individuals with MS, and the results should be observed to verify them. Another limitation was that this research was carried out within a limited period of time. There was a lack of control over the subjects' family and cultural issues and the data was collected through a self-reported questionnaires. Also, IUS is not validated to be used among Iranian population, which is a major limitation of the study, hence the researcher was not in control of the accuracy and number of the respondents.

Conclusion

Early maladaptive schemas and intolerance of uncertainty can predict illness attitudes in patients with MS. Individuals with MS who have high intolerance of uncertainty, are more likely to interpret ambiguous information as threatening. Therefore, effective interventions in the field of uncertainty intolerance for these patients can likely be effective in improving their attitudes towards illness and preventing the exacerbation of their symptoms.

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Conflict of Interest

There was no conflict of interest in this manuscript.

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