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**Original Article**

# Emotional Intelligence (EI) of Patients with Multiple Sclerosis (MS)

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**Abstract**

**Background:** Multiple sclerosis (MS) is an autoimmune disease that affects physical and emotional aspects of patient's lives. The aim of this study was to evaluate Emotional Intelligence (EI) in cases with MS.

**Methods:** One hundred sixty six clinically definite MS and 110 healthy subjects were enrolled in this study. All participants filled valid and reliable Persian version Emotional Quotient inventory (EQ-i) questionnaire, which had been developed due to Bar-On model.

**Results:** Mean EI total score and 12 out of 15 subscales were significantly different between patients and controls. Total EI score and most of its subscales were significantly higher in patients with RR (Relapsing Remitting) than Secondary Progressive (SP) ones. There was significant negative correlation between EDSS and total EI score (rho=-0.4, $P<0.001$). Multiple linear regression analysis between the EI as a dependent variable and sex, type of disease, level of education, age and marital status as independent variables in patients showed that type of disease and level of education were independent predictors of EI.

**Conclusion:** Emotional intelligence as the ability to behave better and communicate with others should be considered in MS cases as their physical and psychological health are affected by their illness.

**Keywords:** Multiple sclerosis, Emotional intelligence, Iran

## Introduction

Multiple sclerosis (MS) is an autoimmune disease, which affects different aspects of patients' lives (1). It is one of the causes of disability all over the world. Affected cases suffer from physical, emotional, cognitive and social difficulties (2).

Emotional difficulties such as fatigue, depression, anxiety are among prevalent complains of patients which result in impaired quality of life and worsening of clinical symptoms (3, 4).

Emotional intelligence (EI) has been defined as the ability to manage and elucidate the one's own and other's emotions and feelings to apply proper information for verifying thoughts and actions (5). Perception, understanding and regulation of emotions are important factors of EI, which affect social, emotional and behavioral aspects of person's life (6, 7). There is little information about EI in patients with different disorders. MS cases are at risk of difficulties in behavioral and emotional health and behavioral concerns and adaptive functioning are related with different psychological problems (8).

As depression is the most common psychological problem in MS cases and there is little information about EI in MS cases, we designed this study to evaluate EI in cases with MS.

## Methods

In this cross-sectional study, 166 clinically definite MS patients (according to MC Donald) referred to MS clinic of Sina Hospital (affiliated to Tehran University of Medical Sciences) and 110 healthy subjects between January 2013 and January 2014 were enrolled.

All participants were asked to fill informed consent forms before study entrance. The study had been approved by local Ethics Committee.

Exclusion criteria were active MS and corticosteroids treatment during last 4 weeks.

Demographic data (sex, age), duration of the disease and disease course [Relapsing Remitting (RR), Primary Progressive (PP), Secondary Progressive (SP)] were extracted from patients medical files. All cases were examined by an expert neurologist to obtain Kurtzke Expanded Disability Status Scale (EDSS). All participants filled valid and reliable Persian version Emotional Quotient inventory (EQ-i) questionnaire that had been developed due to Bar-On model. The first version consisted of 133 questions as Persian version included 90 questions (9, 10). It is a self-report questionnaire, which includes 5 categories and 15 scales. The five categories are Intrapersonal (Self-Regard, Emotional Self-Awareness, Assertiveness, Independence, and Self-Actualization), Interpersonal Empathy, Social Responsibility and Interpersonal Relationship), Stress Management (Stress Tolerance and Impulse Control), Adaptability (Reality Testing, Flexibility and Problem Solving), and General Mood Scale (Optimism and Happiness). Each question is based on a 5-point Likhert scale scoring system ranging from 5 to 1 (completely agree: 5 to completely disagree: 1). Total score is the sum of all questions scores. Higher score is indicative of higher emotional intelligence. All data were analyzed using SPSS software version 18.0 (SPSS Inc., Chicago, IL, USA). Continuous variables compared by means of independent sample *t*-test. Correlation coefficient (Pearson or Spearman) applied to assess relationship between variables. Multiple regression analysis was used to calculate the predictive value of sex, age, level of education, type of disease and marital status for the EI score in patients. *P* value less than 0.05 was considered as significant.

## Results

One hundred sixty six patients and 110 healthy subjects enrolled in this study. Mean age of patients and controls was 32.8±8.9 and 30.3±5.6 years, respectively (Table 1).

**Table 1:** Demographic characteristic of patients

| | Patients | Controls |
|---|---|---|
| Age (yr) (mean ±SD) | 32.8±8.9 | 30.3±5.6 |
| Sex (M/F) | 28/138 | 47/63 |
| Marital status(single/married) | 51/115 | 44/66 |
| Level of education (mean±SD) | 13±2.9 | 18.2±1.8 |

In 130 (78.3%) cases the type of disease was RR and in 36 (21.7%) the type of disease was SP. Median EDSS was 2. Mean EI total score and 12 out of 15 subscales were significantly different between patients and controls (Table 2). Responsibility and empathy subscales were significantly different between men and women in controls (Table 3). Total EI score and most of its subscales were significantly higher in patients with RR type of disease than SP ones (Table 4). Most scores of subscales were significantly different in patients with different EDSS scores (Table 5). There was significant negative correlation between EDSS and total EI score (rho=-0.4, $P<0.001$) and significant positive correlation with level of education (r=0.32, $P<0.001$) in patients.

Multiple linear regression analysis between the EI as a dependent variable and sex, type of disease, level of education, age and marital status as independent variables in patients showed that type of disease and level of education are independent predictors of EI (Table 6).

**Table 2:** Total score of EI and its subscales in patients and controls

| Subscale | Patients | Controls | *P* value |
|---|---|---|---|
| Problem solving | 21.1±3.4 | 22.7±3.2 | <0.001 |
| Happiness | 20.7±5.5 | 23.2±4.1 | <0.001 |
| Independence | 19.6±4.8 | 22.5±4.1 | <0.001 |
| Stress Tolerance | 16.8±4.1 | 20.3±4.7 | <0.001 |
| Self-Actualization | 20.6±4.3 | 23.7±3.5 | <0.001 |
| Emotional Self-Awareness | 20.5±4.3 | 22.9±3.7 | <0.001 |
| Reality Testing | 18.9±5.4 | 21.2±3.7 | <0.001 |
| Interpersonal Relationship | 24±4.1 | 23.9±3.4 | 0.7 |
| Optimism | 21.8±4.4 | 23.2±3.4 | 0.006 |
| Self-Regard | 21.7±4.3 | 23±4 | 0.01 |
| Impulse Control | 15.8±4.9 | 19.5±4.8 | <0.001 |
| Flexibility | 17.7±3.7 | 19.1±3.9 | 0.004 |
| Responsibility | 25.2±3.3 | 25.2±2.6 | 0.9 |
| Empathy | 25.1±3.3 | 24.7±3 | 0.3 |
| Assertiveness | 16.7±3.4 | 18.8±4.1 | <0.001 |
| Total score | 287.3±58.3 | 332.7±40.4 | <0.001 |

**Table 3:** Scores in male and female patients and controls

| Subscale | Men | Women | *P* value |
|---|---|---|---|
| Problem solving | | | |
| Patients | 20.7±4.3 | 21.2±3.3 | 0.6 |
| Controls | 22.9±3.5 | 22.6±2.8 | 0.6 |
| Happiness | | | |
| Patients | 22.1±6.9 | 20.4±5.1 | 0.1 |
| Controls | 23±4.6 | 23.4±3.6 | 0.5 |
| Independence | | | |
| Patients | 19.9±5.2 | 19.5±4.8 | 0.7 |
| Controls | 22.5±4.8 | 22.5±3.5 | 0.9 |
| Stress Tolerance | | | |
| Patients | 17±4.3 | 16.7±4.1 | 0.7 |
| Controls | 20.4±5.2 | 20.1±4.4 | 0.7 |
| Self-Actualization | | | |
| Patients | 20.5±4.2 | 20.7±4.3 | 0.8 |
| Controls | 23.5±3.9 | 23.7±3.2 | 0.7 |
| Emotional Self-Awareness | | | |
| Patients | 20.3±6.5 | 20.6±3.8 | 0.7 |
| Controls | 22.4±3.6 | 23.2±3.9 | 0.6 |
| Reality Testing | | | |
| Patients | 19±4.4 | 18.9±5.6 | 0.9 |
| Controls | 20.8±3.7 | 21.5±3.7 | 0.3 |
| Interpersonal Relationship | | | |
| Patients | 23±4.8 | 24.2±3.9 | 0.1 |
| Controls | 23.6±3.5 | 24±3.3 | 0.6 |
| Optimism | | | |
| Patients | 21.8±5 | 21.8±4.3 | 0.9 |
| Controls | 23.1±3.8 | 23.4±3.2 | 0.6 |
| Self-Regard | | | |
| Patients | 21.6±4.4 | 21.7±4.3 | 0.9 |
| Controls | 23.2±3.9 | 22.9±4 | 0.7 |
| Impulse Control | | | |
| Patients | 15.54±5.8 | 15.9±4.7 | 0.7 |
| Controls | 18.4±5.3 | 20.2±4.4 | 0.07 |
| Flexibility | | | |
| Patients | 17.8±3 | 17.6±3.8 | 0.8 |
| Controls | 18.9±3.8 | 19.3±4 | 0.6 |
| Responsibility | | | |
| Patients | 24.3±3.7 | 25.4±3.1 | 0.1 |
| Controls | 24.4±2.9 | 25.8±2.3 | 0.009 |
| Empathy | | | |
| Patients | 23.9±3.3 | 25.3±3.2 | 0.07 |
| Controls | 23.5±3 | 25.6±2.6 | <0.001 |
| Assertiveness | | | |
| Patients | 17.6±3.2 | 16.5±3.4 | 0.1 |
| Controls | 19.1±4.3 | 18.5±4.3 | 0.4 |
| Total score | | | |
| Patients | 281.3±70.4 | 288±55.8 | 0.5 |
| Controls | 328.2±43.2 | 335.5±37.9 | 0.3 |

**Table 4:** Scores in patients with RR and SP type of disease

| Subscale | RR | SP | *P* value |
|---|---|---|---|
| Problem solving | 21.4±3.1 | 19.8±4.4 | 0.03 |
| Happiness | 21.4±5.5 | 18.1±4.9 | 0.005 |
| Independence | 20.3±4.8 | 16.7±4 | 0.001 |
| Stress Tolerance | 17.4±4.1 | 14.4±3.6 | 0.001 |
| Self-Actualization | 21.2±4.3 | 17.8±3.2 | 0.001 |
| Emotional Self-Awareness | 20.7±3.8 | 19.9±6 | 0.4 |
| Reality Testing | 19.2±5.7 | 17.6±3.4 | 0.2 |
| Interpersonal Relationship | 24.3±3.8 | 22.8±5.1 | 0.1 |
| Optimism | 22.2±4.2 | 20.3±5 | 0.04 |
| Self-Regard | 22.3±4.2 | 19.5±4 | 0.001 |
| Impulse Control | 16.2±4.8 | 14.4±4.8 | 0.08 |
| Flexibility | 18.2±3.8 | 15.5±2.6 | 0.001 |
| Responsibility | 25.6±2.9 | 23.6±3.9 | 0.01 |
| Empathy | 25.3±3.1 | 24.1±3.7 | 0.1 |
| Assertiveness | 16.8±3.4 | 16.6±3.2 | 0.7 |
| Total score | 295.3±56.8 | 258.1±55 | 0.001 |

**Table 5:** Scores in patients with different EDSS scores

| Subscale | 0-2 | 2.5-4 | 4.5-6 | 6.5-8 | *P* value |
|---|---|---|---|---|---|
| Problem solving | 21.7±3 | 21±2.8 | 20.2±4.3 | 19±4.5 | 0.03 |
| Happiness | 22.8±5.1 | 18.7±3.1 | 17.6±5.2 | 16.8±5.4 | <0.001 |
| Independence | 21.2±5 | 18.1±3.1 | 16.3±3.8 | 17.6±3.3 | <0.001 |
| Stress Tolerance | 18±3.9 | 15.8±3.6 | 15±4.2 | 13.8±3.4 | <0.001 |
| Self-Actualization | 22.5±3.7 | 18.7±3.2 | 17.8±4.5 | 17±3.2 | <0.001 |
| Emotional Self-Awareness | 21.7±3.1 | 18.8±3.3 | 19.4±6.3 | 18.4±4.6 | 0.003 |
| Reality Testing | 20.2±6.4 | 17.3±2.1 | 16.5±3.3 | 18.7±3.6 | 0.01 |
| Interpersonal Relationship | 24.9±3.5 | 22.1±4.3 | 24.1±4.1 | 20.8±5.5 | 0.003 |
| Optimism | 23.1±3.9 | 19.4±3.5 | 20.9±4.6 | 19.4±5.9 | 0.001 |
| Self-Regard | 23.3±3.8 | 19.7±3 | 20.3±4.4 | 17.2±4.3 | <0.001 |
| Impulse Control | 16.5±5.1 | 15±4 | 15.4±4.8 | 13.6±3.8 | 0.2 |
| Flexibility | 18.7±3.6 | 17±3.6 | 16.3±3.4 | 13.8±2.5 | <0.001 |
| Responsibility | 25.9±3 | 24.8±2.5 | 23.8±3.8 | 24.9±3.4 | 0.01 |
| Empathy | 25.7±3.2 | 23.8±2.9 | 24.4±3.6 | 25±2.8 | 0.06 |
| Assertiveness | 17.5±3.3 | 14.6±2.9 | 16.2±3.3 | 16.8±3.1 | 0.004 |
| Total score | 307.4±53.8 | 274.2±38.5 | 257.7±64.6 | 259.5±47.6 | <0.001 |

**Table 6:** Multiple linear regression analysis between the EI as a dependent variable and other variables as independent variables

| | B | *P* value |
|---|---|---|
| Sex | 0.006 | 0.9 |
| Age | 0.04 | 0.6 |
| Marital status | 0.14 | 0.1 |
| Type of disease RR=reference | -0.2 | 0.01 |
| Level of education | 0.3 | <0.001 |

## Discussion

The results showed that total EI score and its subscales except three items (Interpersonal relationship, responsibility and empathy) were significantly lower in patients than controls. This finding could be indicative that MS disease affects perception, understanding and regulation of emotions in patients but it does not affect interpersonal rela-

tionship, responsibility and empathy in affected cases.

EI is the ability to evaluate one's own and others emotions and utilizing essential information for determining thoughts and actions (11-13). It is related with team activities, functioning, academic success and life enjoyment (13, 14).

MS affects different aspects of patient's lives and MS patients suffer from difficulties in physical, emotional, cognitive and social part of their lives (2). These difficulties may result in dependence on relatives and family members. Most cases with MS suffer from depression, anxiety, fatigue, memory impairment and other problems which could affect their EI (1, 2, 15,16).

The result of current study also showed that total EI score and its subscales were not significantly different between men and women in patient group while only responsibility and empathy subscales were significantly different between men and women in controls.

In our previous study, in which we assessed EI in medical residents of Tehran university, we found that only responsibility subscale was significantly higher in male participants than female ones (5) which is compatible with Haghani et al. findings (17). EI score was higher in male nursery students than female ones although the difference was not statistically significant (12).

Szymanowicz and Furnham evaluated emotional intelligence of 261 British participants and found that female ones rated their EI higher than they rated men (18).

This difference in EI score of different gender groups could be due to differences in selection of study participants and the difference in the instrument applied for EI evaluation.

The results also showed that total EI score and most of its subscales were significantly higher in RR group of patients than SP ones. This finding could show that progressive from of the disease affected emotional regulation of the patients' more than relapsing form.

RR is the most common type of the MS disease while patients experience an initial disease phase followed by relapses and remissions while near half of RR cases after 10 years will shift to progression of disability without relapse phases, which is named SP type of MS disease. Patients who shifted to SP form of the disease suffer from psychological difficulties and memory impairment more than cases that has not shifted (2, 19).

As our results showed patients with SP form of the disease had significant lower scores in most EI subscales as well as total score which is indicative that disease pattern affects emotional well being and regulation in SP cases.

The relationship between level of disability and psychological difficulties has been considered in previous studies (2, 20, 21).

The Kurtzke Expanded Disability Status Scale (EDSS) is a method of quantifying disability in cases with MS that is rated between 0 and 10. More advanced the score more advanced disease related disability. We investigated significant negative correlation between EDSS and total EI score (rho=-0.4, $P<0.001$) and except two items (empathy and impulse control) all other subscales and total score were significantly higher in cases with lower EDDS (table 4). Previous studies showed that physical disability in related with psychological distress, depression and fatigue (22-24).

The regression analysis of our results also showed that level of education and type of disease (RR was considered as reference type) were independent predictors of EI score in patient group. It is not surprising that advanced education will help cases to have better emotional control and regulation.

## Conclusion

Emotional intelligence as the ability to behave better and communicate with others should be considered in MS cases as their physical and psychological health are affected by their illness.

## Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission,

redundancy, etc.) have been completely observed by the authors.

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