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Original Article PHYSIOTHERAPY & REHABILITATION

Time perspective of patients with multiple sclerosis

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ABSTRACT

OBJECTIVE: The time perspective of individuals with chronic disease is a little-studied parameter. Our aim is to examine multiple sclerosis (MS) patients' time perspective and factors that may affect time perspective and to research the correlation of past, present, and future perspectives.

METHODS: Demographic characteristics, the Zimbardo Time Perspective Inventory (ZTPI) score, and the expanded disability status scale score were recorded. Overall, 50 with MS were included in the study.

RESULTS: We found that there was a significant difference between present-fatalistic (x=3.18), and present-hedonistic (x=3.49), (p=0.017); also between present-fatalistic (x=3.18), and future (x=3.57), (p=0.011). There was no significant difference in ZTPI scores between gender, place of residence, marital status, number of attacks, or education level.

CONCLUSION: MS patients focus mostly on the hedonistic dimension of the life than the fatalistic one in present time. We concluded that patients with MS focused mostly on the future. We found that our patients' present-fatalistic scores were lower, and the future was higher time perspective dimension.

Keywords: Expanded disability status scale; multiple sclerosis; time perspective.

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Time as a concept has attracted the attention of philosophers, thinkers, and psychologists for many years. Our perception of time has an important influence on our daily practice and on our understanding of the outside world. Once time was conceptualized as a subjective experience, shaped by human perception and cognition, and psychologists started to investigate time as an integral part of the human experience. Time perception shapes the personality and is developing with skills, shaped by sociocultural factors [1, 2]. Time perception affects the preferences of individuals in their lives and can perhaps lead the individual's life conceivable.

It has been suggested that time perspective, defined as perceptions of the past, present, or future, has a strong impact on the individual's current behavior, emotions and thoughts. Time perception has an important effect on all daily living activities [3, 4].

Accordingly, a past-positive time perspective is positively correlated with extraversion and openness, and positive evaluation with compatibility and responsibility, while a past-negative perspective is associated with neuroticism. A present-fatalistic perspective is correlated with extraversion and a present-hedonistic perspective with extraversion and openness. Compatibility with the future has a positive relationship with responsibility [3].

The Zimbardo Time Perspective Inventory (ZTPI) is a survey consisting of 56 statements based on five subscales, with patients evaluating expressions on a five point scale. ZTPI is preferred for determining the patient's time perspective. Zimbardo and Boyd developed the ZTPI, where the 3-time perspectives of past, present, and future are divided into five subscales. Past-positive and past-negative time trends express the attitude toward the past. High scores in these time frames mean

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that the old and the known are valued and the individual is naturally cautious. People whose scores are high in the present-hedonistic and present-fatalistic dimensions focus on the here and now. High scores in the future mean the patient focuses on the anticipation of future events and their consequences [5–7].

Cognitive impairment is a common companion of multiple sclerosis (MS), and its prevalence rates in the early and later stages of the disease are between 43% and 70% [8–10]. Recent rigorous research using donated brain tissue found that people who died with MS had a 39% lower number of neurons than those without MS. Cognitive health has great importance for MS patients and is impaired before motor functions. Cognitive impairment has the greatest impact on the employment status of people with MS [11–13]. Cognitive impairment is related to a depressive mood. Depression is defined as a sad mood and/or loss of interest and pleasure in usual activities [14, 15]. The prevalence of depression in MS is approximately 60%, with drugs, physical disability, cognitive deficits, fatigue, and disease duration being the factors responsible for depression [14–16].

Cognitive impairment and depressive mood affect time perception in MS patients. The mood of the individual in the past and at the present time affects their view of the future. At the same time, our positive or negative feelings about the past affect our feelings right now. Many experts state that feelings about the past, present, and future are correlated with each other. The time perspective of individuals with chronic disease is a little-studied parameter. Furthermore, to our knowledge, there are few studies are addressing the factors that may affect time perspective in MS patients. Our aim is to examine time perspective of MS patients, the factors that may affect time perspective, and to research the correlation of past-present and future perspectives.

MATERIALS AND METHODS

The study was performed in MS patients and conducted at Mustafa Kemal University University Neurologia Department. Overall, 50 patients (12 males and 38 females) were included in the study. All MS patients that had no cognitive impairment were invited to participate in the study. Demographic characteristics, the ZTPI score, and the expanded disability status scale (EDSS) scores. The study was approved by Mustafa Kemal University University Ethical Council (ethical approval number: 6, April 02, 2020) and written consent was obtained from the patients.

Highlight key points

- MS patients focus mostly on the future.
- MS patients focus mostly on the hedonistic dimension of life than the fatalistic one in present time perception.
- MS patients that have cerebellar+visual lesions have more past-negative memories than patients with cerebellar+cerebral problems.

Exclusion Criteria

The following criteria were excluded from the study:

- Patients that have previously diagnosed psychiatric problems
- Patients that have mental disorders.

Inclusion Criteria

The following criteria were included in the study

- Patients whose native language is Turkish
- Patients whose age range is between 18 and 65 years.

Outcome Measures

The ZTPI, a Turkish adaptation by Umit Akirmak was used to examine emotional time perception [16]. ZTPI was developed by Zimbardo and Boyd [6], with the ZTPI questionnaire consisting of 56 statements based on five subscales (time factors) and allows to us determine the patient's time perspective: past-negative, present-hedonistic, future, past-positive, and present-fatalistic. The participants were asked to rate the statements on a five-point scale in terms of how much they agreed with them [6, 17, 18].

The EDSS is a method of quantifying disability in MS. Pyramidal, cerebellar, brainstem, sensory, bowel and bladder, visual, and cerebral systems are examined by a neurologist. EDSS scores range between 0.0 and 10.0, where a score of 0.0 defines a normal neurological examination and a score of 10.0 defines death due to MS [19].

Statistical Analysis

Statistical analysis was performed with the SPSS statistical software (SPSS 22.0 for Windows). Categorical variables were arranged by frequency, and scaled measurements were arranged as mean±standard deviation. Parametric data for normality were tested using the Kolmogorov–Smirnov test. Two group's differences were analyzed with the independent t-test, and multiple groups were analysed with One-Way ANOVA.

Table 1. Demographic characteristics of the patients

	n	%
Age (years)		
Minimum–Maximum	18–65	
Mean±SD	38.36±11.86	
Gender		
Male	12	24
Female	38	76
Marital status		
Married	34	68
Single	16	32
Education		
Primary	13	26
Secondary	6	12
High school-university	30	60
Not-educated	1	2
EDSS		
0.0	22	44
1	15	30
1.5	3	6
2	1	2
2.5	2	4
3	3	6
3.5	1	2
4	1	2
4.5	2	4
Affected system		
Cerebellar, visual	5	10.9
Visual	7	15.2
Cerebellar, cerebral	7	15.2
Cerebellar, cerebral, visual	8	17.4
Cerebral, visual	12	26.1
Cerebral	8	17.5
Cerebellar	3	6.6

SD: Standard deviation; EDSS: Expanded disability status scale.

Pearson's correlation test was used for the analysis of the correlation of the independent variables. Repeated measures ANOVA was used to examine statistical difference of ZTPI subscales. Bonferroni (p=0.5/5 groups: 0.1) was accepted as a p-value.

To categorize the level of Pearson's correlation coefficient (r), we adopted the following scores: r<0.40 corresponded to poor correlation, r=0.75 corresponded to moderate correlation, and r>0.75 corresponded to high correlation. The level of significance was 5%.

Table 2. The Zimbardo Time Perspective Inventory subscales' descriptive results

	Minimum	Maximum	Mean±SD
Past-negative	1.9	5	3.44±0.59
Past-positive	2.3	4.4	3.41±0.45
Present-fatalistic	1.11	4.11	3.18±0.59
Present-hedonistic	2	4.60	3.49±0.50
Future	2.69	4.62	3.57±0.38

SD: Standard deviation

RESULTS

Overall, 50 patients (12 males and 38 females) with MS were included in the study. Their age ranged between 18 and 65 years (X: 38.36±11.86). Their EDSS scores ranged between 0.0 and 4.5:22 patients had an EDSS score of 0, two patients had a score of 4.5, and the remainder scored between 1 and 4 (Table 1).

The mean ZTPI score was 3.44 for the past-negative subscale, 3.41 for the past-positive, 3.18 for the present-fatalistic, 3.49 for the present-hedonistic, and 3.57 for the future (Table 2).

We found that there was a significant difference between present-fatalistic (x=3.18), and present-hedonistic (x=3.49), (p=0.017); also between present-fatalistic (x=3.18), and future (x=3.57), (p=0.011) (Table 3).

There was a positive and moderate correlation between past-negative and present-fatalistic (r=0.411), and past-negative and present-hedonistic (r=0.512) parameters (Table 4).

There was a significant difference between the affected system's past-negative scores, but there was no significant difference in ZTPI score in relation to gender, place of residence, marital status, the number of attacks, the affected system, and the education level (Table 5).

We found a significant difference in the affected system's past-negative scores. In the post-hoc test, we found that the past-negative score for patients with cerebellar + visual system problems was 3.40±4.10, while patients with cerebellar + cerebral problems scored 1.90±3.70; this difference was significant (p=0.013, t=2.997).

DISCUSSION

We conducted this study to examine time perspective in MS patients and we found patients' present-hedonistic

Table 3. Difference between ZTPI subscales

	MD	SE	p
Past-negative			
Past-positive	-0.031	0.113	1.000
Present-fatalistic	0.263	0.096	0.084
Present-hedonistic	-0.035	0.083	1.000
Future	-0.110	0.089	1.000
Past-positive			
Past-negative	-0.031	0.113	1.000
Present-fatalistic	0.232	0.115	0.498
Present-hedonistic	-0.065	0.094	1.000
Future	-0.141	0.070	0.485
Present-fatalistic			
Past-negative	-0.263	0.096	0.084
Past-positive	-0.232	0.115	0.498
Present-hedonistic	-0.0297	0.090	**0.017**
Future	-0.0373	0.108	**0.011**
Present-hedonistic			
Past-negative	0.035	0.083	1.000
Past-positive	0.065	0.094	1.000
Present-fatalistic	0.0297	0.090	**0.017**
Future	-0.076	0.092	1.000
Future			
Past-negative	0.110	0.089	1.000
Past-positive	0.141	0.070	0.485
Present-fatalistic	0.0373	0.108	**0.011**
Present-hedonistic	0.076	0.092	1.000

ZTPI: Zimbardo Time Perspective Inventory; MD: Mean difference; SE: Standard error; Bonferroni p=0.5/5: 0.1. Repeated measures ANOVA.

scores were higher than present-fatalistic in present time perception; also, future scores were higher than present-fatalistic ($p<0.01$). Our patients' present-fatalistic scores were lower, and the future was higher one. MS patients with cerebellar + visual system problems have statistically significantly higher past-negative scores than patients with cerebellar + cerebral problems.

Time perspective means people divide their experiences into divisions and time zones. The time perspective emphasizes that individuals show individual differences in their focus on the past, present, or future. From the perspective of the future, scoring higher than other time perspective parameters is interpreted as one's hope and motivation by focusing on making plans for the future, setting goals, and the possible future effects of the issues. Focusing on the future has a positive effect on social, psychological, and physical life [6, 7]. Present-fatalistic defines a helpless hopeless attitude toward the life and future. Present-fatalistic scores were lower in MS patients.

We found a moderate correlation between present-hedonistic and past-negative, and between present-fatalistic and past-negative. The past has an important effect on present feelings. Our results justify the approach of psychologists that focus on the patient's childhood and past memories to improve the patient's mood today, such as Freud. Our negative feelings about the past affect our present. Patients that have cerebellar + visual lesions have more past-negative memories than patients that have cerebellar + cerebral problems.

Krol et al. examined ZTPI subscale differences in MS and healthy volunteers. They found that the past-negative score was 2.42, past-positive was 3.54, present-hedonistic was 3.22, present-fatalistic was 2.37, and future was 3.68 in healthy volunteers compared with past-negative 2.66, past-positive 3.60, present-hedonistic 3.49, present-fatalistic 2.90, and future 3.57 in MS patients. The Zimbardo inventory investigates how people project themselves in time, according to their orientation (to past, present, and future) and attitudes (positive, negative, fatalistic, or hedonistic) [5–7]. We found the ZTPI subscale mean score for past-negative was 3.44, past-positive was 3.41, present-fatalistic was 3.18, present-hedonistic was 3.49, and future was 3.57. Our results and Coelho et al.'s [20] results were similar in present-hedonistic, and future. In both of the studies, present-hedonistic score was 3.49; the future score was 3.57 in MS patients. However, other parameters were not similar.

Neurophysiological studies have shown that when we think of the past, our brain reacts in the same way that we think of the future. Therefore, the past affects the future. The past-negative subscale's score was 3.44 while, the past-positive was 3.41 in our study.

It is stated that people whose past-positive scores are high have a high degree of family support, reflect a warm, sentimental attitude toward the past, and see positive aspects of their past life, even if they experienced negative events. This means that they are resilient, optimistic, self-confident, and more positive toward life. For people who have a past-negative perspective, the past brings bad memories for them. These people remember the past in a negative way and are prone to be aggressive, depressive, and anxious. They have little family support and are characterized by a generally aversive view of the past, which may be due to negative events or the negative reconstruction of benign events [19, 21, 22]. Krol et al. defined patients whose past-negative scores are high as needing

Table 4. Correlation between past-negative, past-positive, present-fatalistic, present-hedonistic, and future parameters

	Past-negative	Past-positive	Present-fatalistic	Present-hedonistic	Future
Past-negative					
r	1	-0.012	0.411	0.512	0.344
p	–	0.934	0.003	0.000	0.014
Past-positive					
r	-0.012	1	-0.138	0.122	0.375
p	0.934	–	0.339	0.398	0.007
Present-fatalistic					
r	0.411	-0.138	1	0.380	-0.099
p	0.003	0.339	–	0.006	0.493
Present-hedonistic					
r	0.512	0.122	0.380	1	0.047
p	0.000	0.398	0.006	–	0.747
Future					
r	0.344	0.375	-0.099	0.047	1
p	0.014	0.007	0.493	0.747	–

Pearson correlation test.

Table 5. Gender, living place, marital status, the number of attacks, the affected system, and education level's ZTPI score differences

	Past-negative		Past-positive		Present-fatalistic		Present-hedonistic		Future	
	t/f*	p	t/f*	p	t/f*	p	t/f*	p	t/f*	p
Gender (male/female)	-1.965	0.055	-0.754	0.454	-1.075	0.288	-0.174	0.863	-0.155	0.878
Living place (urban/village)	-0.372	0.712	0.591	0.557	-0.532	0.597	-0.644	0.523	-0.492	0.625
Marital status (married/single)	0.304	0.762	0.053	0.958	0.669	0.507	-0.087	0.931	1.830	0.074
EDSS	0.529	0.827	0.751	0.647	0.464	0.874	1.038	0.424	0.898	0.527
Number of attacks	1.825	0.156	0.528	0.665	0.519	0.671	1.445	0.242	0.408	0.748
The affected system (cerebellar, visual system/visual system/ cerebellar, cerebral/cerebellar, cerebral, visual system/cerebral, visual system/cerebral/cerebral, urinary/cerebellar)	2.720	**0.022**	0.972	0.466	1.493	0.199	0.897	0.519	0.526	0.810
Education level (primary/secondary /high school/university/not-educated)	0.797	0.533	1.860	0.134	1.333	0.273	1.073	0.381	0.998	0.419

ZTPI: Zimbardo Time Perspective Inventory; EDSS: Expanded disability status scale; *One-way ANOVA, independent sample t-test.

help to redefine their life goals. In addition, past-negative scores are positively correlated with suicide in patients with chronic diseases [5–7]. In our study, past-negative perception had a moderate and positive correlation with present-fatalistic and present-hedonistic scores. Most psychologists focus on the past memories of the patient and believe that past feelings create present feelings. Our results support this idea. We found a relationship be-

tween past and present. We also found that patients that have cerebellar + visual lesions have more past-negative memories than patients with cerebellar + cerebral problems. Seeing is the most important parameter to sustain a person's life. While mild motor deficiencies can be tolerated in daily life, the slightest problem with vision is enough to paralyze life. Therefore, it is inevitable for those with vision problems to have negative feelings about the past.

From a psychological point of view, what individuals believe happened in the past can, in fact, affect their current thoughts, feelings, and behaviors more than what actually happened. It can also be argued that individuals should strive for the dreams they hope will come true in the future. The effect of the past on the present, and on future expectations that shape our present, shows that the past, present, and future are related [6, 7, 21–23]. Negative feelings about the past shape our present thoughts, in both the present-hedonistic and present-fatalistic perspectives.

While present-hedonistic is active when we first come into the world, educational and cultural factors try to make us future-oriented. Therefore, some cultures also try to make it past-oriented. People whose present-hedonistic scores are high seeking innovation, excitement, and high energy. Present-hedonistic time perception is defined as enjoyment, pleasure, and excitement in the present, without making sacrifices today for rewards tomorrow; however, they find it difficult to control their ego. Present-fatalistic people are stated to be more desperate, pessimistic, low-energy, low-self-respecting, aggressive, anxious, and crime-prone, with a helpless and hopeless attitude toward life in general and a basic belief that one's life is controlled by outside forces [6, 7, 21–25]. In our study, we found present-hedonistic scores (3.49) were higher than present-fatalistic scores (3.18). Present-fatalistic scores were the lowest scores of ZTPI. The MS patients are focusing mostly on enjoying life. Patients' EDSS scores were not so high: the highest score was 4.5. A score of 4.5 means that patients are up and about for much of the day, able to work a full day, may otherwise have some limitation of full activity or require minimal assistance, and are able to walk without aid or rest for some 300 meters. Thus, scores between 1.0 and 4.5 refer to people with MS who are fully ambulatory. Therefore, we may define our patients as hopeful and enjoying the moment.

People who focus on the future make a daily plan, train their work on time and express that they usually have little free time. Future time perception is characterized by a focus on the planning and achievement of future goals. It is stated that such stable people cannot enjoy life as much as others [23–25]. In our study, the highest ZTPI score was the future perspective, possibly because they wonder what the future will bring to them. Because MS is a disease that causes disability, patients are concerned about the future and want to plan their future in order that they are not dependent on anyone else in the future. Wang et al. [18] defined that past-positive was positively correlated with reappraisal and negatively correlated with suppression emotion regulation strategies, and that present-hedonistic was positively correlated with reappraisal emotion regulation strategies [6, 7, 17–19, 21, 26].

Wassie et al. conducted a study in 286 healthy participants and found that respondents were relatively inclined to present-hedonistic time orientation (M=3.63, SD=0.37), future (M=3.48, SD=0.48), past-positive (M=3.35, SD=0.59), past-negative (M=3.15, SD=0.58), and present-fatalistic time perspective (M=2.78, SD=0.59), in that order. This implies that respondents favored the present conditions rather than focusing on their academic engagements [20, 26].

Nikolaev and Vasil'eva [27] conducted a study about time perspective in MS. They found that secondary progressive MS patients are ready to assess and prepare for the possible negative consequences of the disease. They also wanted the most efficient use of available resources for their own future and for their loved ones.

Our study's limitations are that we did not examine the depression status of the patients. We recommend future studies to question the depression and anxiety status of the patients and to investigate their effects on ZTPI scores.

Conclusion

MS affects the patient's motor and sensory functions, as well as their psychology and perspective on life, and it completely changes one's perspective and expectations of the past and future. MS patients focus mostly on the hedonistic dimension of life than the fatalistic one in present time perception. We concluded that patients with MS focused mostly on the future. We found that our patients' present-fatalistic scores were lower, and the future was higher time perspective dimension. We found that patients that have cerebellar + visual lesions have more past-negative memories than patients with cerebellar + cerebral problems. Seeing is the most important parameter to sustain a person's life. We recommend to the clinicians to consider the assessment and treatment of visual problems in MS patients.

Ethics Committee Approval: The Mustafa Kemal University Clinical Research Ethics Committee granted approval for this study (date: 02.04.2020, number: 6).

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