

# YATARAK REHABİLİTASYON UYGULANAN KRONİK SPİNAL KORD YARALANMALI HASTALARDA YARALANMA BÖLGESİ VE YARALANMA ŞİDDETİ HASTA MEMNUNİYETİNİ ETKİLER Mİ ?

DOES THE LEVEL AND SEVERITY OF INJURY AFFECT PATIENT SATISFACTION IN PATIENTS  
WITH CHRONIC SPINAL CORD INJURY UNDERGOING INPATIENT REHABILITATION ?

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## ÖZET

**AMAÇ:** Bu çalışmanın amacı yatarak rehabilitasyon tedavisi alan kronik spinal kord yaralanmalı (SKY) hastaların memnuniyet düzeylerinin, yaralanma seviyesi ve şiddetine göre farklılık gösterip göstermediğini incelemek ve farklı memnuniyet düzeyine sahip hastaların fonksiyonel bağımsızlık ve yaşam kaliteleri arasında fark olup olmadığını ortaya koymaktır.

**GEREÇ VE YÖNTEM:** Hastaların lezyon seviyesi (servikal, torasik, lumbosakral) kaydedildi ve lezyonun şiddeti (komplet/inkomplet) *American Spinal Cord Injury Association* (ASIA) Impairment Scale'e göre belirlendi. Hastaların bağımsızlık derecesi, Fonksiyonel Bağımsızlık Ölçümü (*Functional Independence Measure-FIM*) motor skoru kullanılarak belirlendi. Sağlıkla ilişkili yaşam kalitesi değerlendirilmesi için kısa form-36 (*Short Form-36- SF-36*) kullanıldı. Memnuniyet, hasta memnuniyetini değerlendirmek için oluşturulmuş bir anket kullanılarak değerlendirildi. Ankette memnuniyet düzeyi "çok memnunum, memnunum, memnuniyetsizim, hiç memnun değilim" olarak ve doktor, hemşire, fizyoterapist, yemek hizmeti, temizlik hizmeti, teknik donanım ve genel memnuniyet kategorilerinde sorgulama yapılarak belirlendi.

**BULGULAR:** Bu kesitsel çalışmaya kronik SKY'li 84 hasta dahil edildi. Lezyon seviyesine göre bakıldığında, hastaların 19'unda servikal (ortalama yaş: 36.3 ± 14.5, % 78.9 erkek), 52'sinde torasik (ortalama yaş: 32.1 ± 13.6, % 61.5 erkek) ve 13'ünde lumbosakral (ortalama yaş : 38.8 ± 20, % 61.5 erkek) yaralanma bulunmaktaydı. SKY'nin şiddetine göre 36 hastada komplet (ortalama yaş: 34 ± 13, % 77.7 erkek), 48 hastada inkomplet (ortalama yaş: 35 ± 15, % 56.2 erkek) yaralanma vardı. Memnuniyet kategorilerinde servikal, torasik ve lumbosakral bölge yaralanmaları arasında anlamlı fark bulunmadı. Ancak, SKY şiddetine göre gruplandırılan hastaların memnuniyetleri karşılaştırıldığında, inkomplet SKY'li hastaların doktor ve teknik donanım memnuniyetleri daha yüksekti (sırasıyla p=0.03 ve p=0.02). Bunun dışında diğer kategorilerde anlamlı fark bulunamadı. Genel memnuniyet kategorisinde, memnuniyet düzeylerine göre gruplandırılan hastaların fonksiyonel motor bağımsızlıkları ve yaşam kaliteleri karşılaştırıldığında arada anlamlı fark bulunamadı.

**SONUÇ:** İnkomplet SKY'li hastaların doktor ve teknik donanım memnuniyeti daha yüksekti. Yaralanma özellikleri farklı olsa da beklentileri karşılandığında, yatarak rehabilitasyon uygulanan kronik dönem SKY'li hastaların memnuniyet düzeyleri benzer olabilir. Hastaların memnuniyetini etkileyen hastayla ilgili diğer değişkenler açısından daha kapsamlı çalışmalara ihtiyaç vardır.

**ANAHTAR KELİMELER:** Hasta memnuniyeti, Rehabilitasyon, Spinal kord yaralanması

## ABSTRACT

**OBJECTIVE:** This study aimed to investigate whether the level of satisfaction differed regarding the level and severity of injury in patients with chronic spinal cord injury (SCI) treated on an in-patient setting and whether patients with different satisfaction levels had distinct functional independence and health related quality of life (HRQoL) measures.

**MATERIAL AND METHODS:** The SCI level (cervical, thoracic, lumbosacral) of the patients was recorded, and the severity of SCI (incomplete,complete) was determined according to the *American Spinal Cord Injury Association* (ASIA) Impairment Scale. The degree of functional independence of the patients was determined using the *Functional Independence Measure (FIM)* motor score. HRQoL was assessed using the *Short Form-36 (SF-36)*. Satisfaction was assessed using a questionnaire instituted to evaluate patient satisfaction. Satisfaction with the physician, nurse, physiotherapist, catering, cleaning service, technical equipment categories and the overall satisfaction were questioned and satisfaction levels were determined as "very satisfied, satisfied, dissatisfied, very dissatisfied".

**RESULTS:** 84 patients with chronic SCI were included in this cross-sectional study. Regarding the level of SCI, 19 patients had cervical (mean age:36.3±14.5, 78.9% male), 52 had thoracic (mean age: 32.1±13.6, 61.5% male), 13 had lumbosacral SCI (mean age: 38.8±20, 61.5% male). Regarding the severity of SCI, 36 patients had complete (mean age: 34±13, 77.7% male), 48 had incomplete (mean age: 35±15, 56.2% male) injury. There was no significant difference between cervical, thoracic and lumbosacral SCI groups in satisfaction categories. However, when the groups were compared in regard to the severity of SCI, patients with incomplete SCI had higher rates for satisfaction with the physician and technical equipment (p=0.03 and p=0.02, respectively). No significant difference was found in the other categories. Regarding the overall satisfaction, there was no significant difference in HRQoL and functional independence of the patients grouped according to their satisfaction levels.

**CONCLUSIONS:**Patients with incomplete SCI had higher satisfaction level with the physician and technical equipment. Although characteristics of injury are distinct, if the expectations are met similar satisfaction rates may be obtained in patients with chronic SCI. More comprehensive studies are needed in terms of other patient-related variables that affect patient satisfaction.

**KEYWORDS:** Patient satisfaction, Rehabilitation, Spinal cord injury

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## INTRODUCTION

Spinal cord injury (SCI) causes dramatic changes in lives of the patients and their relatives. Seventeen thousand new cases of SCI occur only in the United States of America every year and less than one percent of those have a complete recovery at discharge (1). Thus, the number of patients with chronic SCI gradually increases. Neurologic rehabilitation for this population is essential in regard to preventing and treating secondary complications and more importantly maximizing physical independence (1, 2).

Patient satisfaction is a significant indicator for measuring the quality of medical care. Patient satisfaction scales, largely used in recent years, allow the health care providers to assess the quality of performance and give data about how to improve patient experience (3). Moreover, satisfaction is associated with patients' compliance with therapy, decrease in costs and even functional results of the patients (4).

Prior studies on various diseases reported an increase in the level of disability might be related to dissatisfaction with the provided medical care (3, 5). Chronic disability related to SCI may also influence the level of satisfaction (6). Health-related quality of life (HRQoL) is expressed as the person's perception of well-being. One of the main goals of rehabilitation in patients with chronic disability is to increase HRQoL. If health care providers do not accurately evaluate the impact of disease on HRQoL in disabled patients, this may probably affect the quality of medical care and rehabilitation (5).

There are numerous studies to evaluate satisfaction in various populations (3, 4, 7), however to the best of our knowledge, there are few studies to investigate the level of satisfaction and the injury-related factors to directly affect satisfaction in chronic SCI. Thus, the present study aimed to evaluate; 1) satisfaction with medical care and rehabilitation in patients with chronic SCI on an in-patient setting, 2) whether satisfaction differed with regard to the level and severity of injury, 3) whether the level of satisfaction was associated with functional independence and quality of life measures. Our hypothesis was that patients with chronic SCI, who have

higher levels of injury and worse neurological impairment, might have decreased satisfaction because of the greater burden of care and unmet expectations. The second hypothesis was that satisfaction and the level of functional independence and HRQoL would have a positive relationship.

## MATERIAL AND METHODS

Patients with chronic SCI (>12 months from injury) hospitalized for medical care and rehabilitation in the Department of Physical Medicine and Rehabilitation, Afyonkarahisar Health Sciences University, were included in the study (8). Patients with no other psychiatric or neurologic diseases except SCI, who were literate and between 18-75 years of age were included. In accordance with the Helsinki Declaration Principles, "informed consent" was taken from the patients who participated in the study. The patients were evaluated in the week before discharge. Demographic data of the patients (age, gender, marital status, degree of education, site of living) and duration of disease were recorded.

Patients were neurologically examined and level of injury (cervical (C1-T1), thoracic (T2-L12), lumbosacral (L1 and below)) and severity of disease were determined according to the American Spinal Cord Injury Association (ASIA) Impairment Scale (The International Standards for Neurological Classification of Spinal Cord Injury). ASIA A means complete injury and ASIA B-C-D-E reveals incomplete injury (9, 10).

Degree of patients' independence was determined according to the Functional Independence Measure (FIM) motor score. The FIM is an 18-item scale in which each of the items is graded 1 to 7 points (total assistance required (1 point) - completely independent (7 points)). FIM motor scale includes 13 items under self care, sphincter control, transfers and locomotion categories (one can get 13 points minimum to 91 points maximum) (6, 11). The Short Form-36 questionnaire (SF-36) was used to assess HRQoL. SF-36 consisted of 36 questions in physical function (PF), physical role (PR), general health (GH), mental health (MH), emotional role (ER), pain, vitality (VT) and social function (SF) subgroups and each is graded between 0-100

points. The greater score means the greater quality of life (12). Satisfaction was assessed using a self-assessment questionnaire instituted to evaluate patient satisfaction. It was filled by the patients themselves or by literate relatives of the patients who could not use hands. In the questionnaire, degree of satisfaction was defined as "very satisfied, satisfied, dissatisfied and very dissatisfied" and the patients were questioned for satisfaction with the physician, nurse, physiotherapist, catering, cleaning service, technical equipment categories and the overall satisfaction (13).

### Ethical Committee

This study was approved by Afyon Kocatepe University Faculty of Medicine Clinical Research Ethics Committee (02.12.2016 and 2016/5-65) prior to any data collection.

### Statistical Analysis

PASW Statistics 18 for Windows was used for statistical analysis. Categorical data was compared using Chi-square test. Kolmogorov Smirnov test was used to determine if distribution of the quantitative data had normal distribution. Mann-Whitney U test was used for two-group comparisons, and Kruskal Wallis-H test was used for comparing three or more groups.  $p < 0,05$  was accepted statistically significant.

## RESULTS

A total of 100 patients who received neurologic rehabilitation on an in-patient setting were enrolled for this cross-sectional study. Sixteen patients with accompanying head trauma or other neurological disorders (stroke, multiple sclerosis, polyneuropathy) and the ones out of the ranges for age were excluded. Of the 84 patients included in the study, the demographic and clinical characteristics of the patients are presented in (Table 1).

Patients were grouped in two ways according to; 1) the level of SCI (cervical, thoracic and lumbosacral), 2) the severity of SCI (complete vs. incomplete). Demographic data of the groups are given in (Table 2).

**Table 1:** Demographic and clinical characteristics of the study population (n=84)

Variable	
Age	34.4±14.7
Gender	
Male	55(%65.4)
Female	29(%34.6)
Duration since injury(year)	4.25±2.80
Ethiology of SCI	
Traumatic	76(90.5)
Nontraumatic	8(9.5)
Level of injury	
Cervical	52(61.9)
Thoracic	19(22.6)
Lumbosacral	13(15.5)
Severity of injury	
Complete	36(42.9)
Incomplete	48(57.1)
FIM motor	60.0±20.4
SF-36	
PF	25.0±23.4
PR	31.8±36.0
GH	59.4±18.9
MH	64.8±23.1
ER	47.8±36.3
Pain	65.8±31.3
VT	57.3±23.0
SF	63.3±29.2

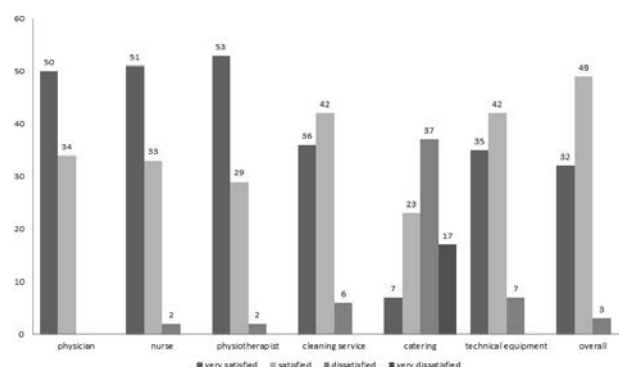
Data were presented as mean ± sd or n (%). Abbreviations: FIM motor; Functional Independence Measure motor subscale ; SF-36, Short form-36; PF, Physical functioning; PR, Physical role; GH, General health; MH, Mental health; ER, Emotional role; SF, Social functioning; VT, Vitality.

**Table 2:** Demographic characteristics of the patients in regard to the level and severity of spinal cord injury

	Cervical	Thoracic	Lumbosacral	p1	Complete	Incomplete	p2
Age	19(22.6)	52(61.9)	13(15.5)		36(42.9)	48(57.1)	
Gender	36.3±14.5	32.1±13.6	38.8±20	0.540	34±13	35±15	0.400
Female	4(21.1)	20(38.5)	5(38.5)	0.373	8(22.2)	21(43.75)	0.033*
Male	15(78.9)	32(61.5)	8(61.5)		28(77.7)	27(56.25)	
Marital status				0.820			0.432
married	10(52.6)	24(46.2)	8(61.5)		19(54.2)	23(51.1)	
single	9(47.4)	28(53.8)	5(48.8)		17(48.5)	25(52.08)	
Educator				0.208			0.750
-primary school	4(21.1)	18(34.6)	6(46.2)		12(33.3)	16(33.3)	
-secondary school	2(10.5)	8(15.3)	0(0)		4(11.1)	6(12.5)	
-high school	6(31.6)	20(38.6)	5(38.5)		12(33.3)	19(39.5)	
-university	7(36.8)	6(11.5)	2(15.4)		8(22.2)	7(14.5)	
Residential area				0.053			0.164
-urban	13(68.4)	27(51.9)	2(15.4)		20(55.5)	22(45.8)	
-rural	6(31.6)	25(48.1)	11(84.6)		16(44.4)	26(54.1)	
Injury duration (years)	3.2±1.4	4.5±2.6	4.5±3.5	0.120	3.4±2.1	4.8±3.1	0.010*

Data were presented as mean ± sd or n (%). \*p < 0.05, p1: p value regarding the level of injury, p2: p value regarding the severity of injury.

Regarding the severity of SCI, all characteristics except gender and duration of injury were similar between the groups. The level of satisfaction regarding the categories is given in (Figure 1).



**Figure 1:** Numbers of the patients expressing the levels of satisfaction regarding the categories (n=84).

Overall satisfaction rates were as follows; 38.1% for "very satisfied", 58.3% for "satisfied" and 3.6% for "dissatisfied". None of the patients were

"very dissatisfied". Totally, 96.4% of the patients (very satisfied+ satisfied) were satisfied with medical care and rehabilitation. Of the satisfaction categories, catering was the only one, with which the patients were commonly dissatisfied (Figure 1). The data on satisfaction rates in regard to the level and severity of SCI is given in Table 3 and Table 4. No significant differences were found in satisfaction categories between cervical, thoracic and lumbosacral SCI groups (Table 3).

**Table 3:** Satisfaction categories for patients with SCI grouped regarding the level of injury

		Cervical 19(22.6)	Thoracic 52(61.9)	Lumbosacral 13(15.5)	p
<b>Overall satisfaction</b>	Very satisfied	5(26.3)	21(40.4)	6(46.2)	0.580
	Satisfied	13(68.4)	30(57.7)	6(46.2)	
	Dissatisfied	1(5.3)	1(1.9)	1(7.7)	
	Very dissatisfied	-	-	-	
<b>The physician</b>	Very Satisfied	8(42.1)	34(65.4)	8(61.5)	0.206
	Satisfied	11(57.9)	18(34.6)	5(38.5)	
	Dissatisfied	-	-	-	
	Very dissatisfied	-	-	-	
<b>The nurse</b>	Very Satisfied	9(47.4)	33(63.5)	9(69.2)	0.372
	Satisfied	10(52.6)	19(36.5)	4(30.8)	
	Dissatisfied	-	-	-	
	Very dissatisfied	-	-	-	
<b>The physiotherapist</b>	Very Satisfied	10(52.6)	31(59.6)	12(92.3)	0.167
	Satisfied	8(42.1)	20(38.5)	1(7.7)	
	Dissatisfied	1(5.3)	1(1.9)	-	
	Very dissatisfied	-	-	-	
<b>The cleaning service</b>	Very Satisfied	6(31.6)	24(47.1)	6(46.2)	0.468
	Satisfied	10(52.6)	25(49)	6(46.2)	
	Dissatisfied	3(15.8)	3(3.9)	1(7.7)	
	Very dissatisfied	-	-	-	
<b>The catering</b>	Very Satisfied	1(5.3)	3(5.8)	3(23.1)	0.087
	Satisfied	7(36.8)	10(19.2)	6(46.2)	
	Dissatisfied	7(36.8)	27(51.9)	3(23.1)	
	Very dissatisfied	4(21.1)	12(23.1)	1(7.7)	
<b>The technical equipment</b>	Very Satisfied	9(47.4)	18(34.6)	8(61.5)	0.412
	Satisfied	8(42.1)	30(57.7)	4(30.8)	
	Dissatisfied	2(10.5)	4(7.7)	1(7.7)	
	Very dissatisfied	-	-	-	

Data were presented as n: number of patients,(%): percentage of patients.\*p < 0.05, p: p value regarding the level of injury. SCI: spinal cord injury

However, when the groups were compared in regard to the severity of SCI, patients with incomplete SCI had higher rates for satisfaction with the physician and technical equipment (p=0.03 and p=0.02, respectively). No other difference in satisfaction was found between groups in terms of severity of SCI (Table 4).

**Table 4:** Satisfaction categories for patients with SCI grouped regarding the severity of injury

		Complete 36(42.9)	Incomplete 48(57.1)	p
<b>Overall satisfaction</b>	Very satisfied	12(33.3)	20(41.7)	0.664
	Satisfied	23(63.9)	26(54.2)	
	Dissatisfied	1(2.8)	2(4.2)	
	Very dissatisfied	-	-	
<b>The physician</b>	Very Satisfied	17(47.2)	33(68.8)	0.039*
	Satisfied	19(52.8)	15(31.2)	
	Dissatisfied	-	-	
	Very dissatisfied	-	-	
<b>The nurse</b>	Very Satisfied	19(52.8)	32(66.7)	0.144
	Satisfied	17(47.2)	16(33.3)	
	Dissatisfied	-	-	
	Very dissatisfied	-	-	
<b>The physiotherapist</b>	Very Satisfied	19(52.8)	34(70.8)	0.235
	Satisfied	16(44.4)	13(27.1)	
	Dissatisfied	1(2.8)	1(2.1)	
	Very dissatisfied	-	-	
<b>The cleaning</b>	Very Satisfied	13(37.2)	23(47.9)	0.355
	Satisfied	18(51.4)	23(47.9)	
	Dissatisfied	4(11.4)	3(4.2)	
	Very dissatisfied	-	-	
<b>The Catering</b>	Very Satisfied	2(5.6)	5(10.4)	0.532
	Satisfied	9(25)	14(29.2)	
	Dissatisfied	16(52.8)	18(37.5)	
	Very dissatisfied	6(16.7)	11(22.9)	
<b>The technical equipment</b>	Very Satisfied	9(25)	26(54.2)	0.021*
	Satisfied	24(66.7)	18(37.5)	
	Dissatisfied	3(8.3)	4(8.3)	
	Very dissatisfied	-	-	

Data were presented as n: number of patients,(%): percentage of patients.\*p < 0.05, p: p value regarding the severity of injury. SCI: spinal cord injury

Patients were grouped into three (because no patients expressed satisfaction as "very dissatisfied") regarding the satisfaction levels for "overall satisfaction category" of the satisfaction questionnaire. For each satisfaction level, the mean values of FIM motor and SF-36 subgroups were calculated and compared. P values for those comparisons are given in (Table 5). No significant differences in the categories were found between the groups.

**Table 5:** Comparison of the functional independence and HRQoL in patients with SCI grouped regarding the overall satisfaction level

	Very Satisfied	Satisfied	Dissatisfied	p
<b>FIM motor</b>	32 (38.09)	49(58.3)	3(3.57)	0.900
<b>SF-36</b>	59±19	60±20	57±31	
• PF	32±29	20±17	15±13	0.119
• PR	32±35	33±37	8±14	0.607
• GH	60.6±19	59.2±18.9	50±5.0	0.476
• MH	64.2±24	65.3±23	62.6±9.2	0.955
• ER	49.8±33.8	46.8±39	44±19	0.634
• Pain	70±33	64±30.8	47.5±4.3	0.255
• VT	57±24.4	56.6±22.4	70±21.7	0.677
• SF	71 ±27	58±30	62.5±21	0.152

Data were presented as n: number of patients,(%): percentage of patients, mean ± SD, \*p < 0.05. Abbreviations: HRQoL, health related quality of life; FIM motor, Functional Independence Measure motor subscale; SF-36, Short form-36; PF, Physical functioning; PR, Physical role; GH, General health; MH, Mental health; ER, Emotional role; SF, Social functioning; VT, Vitality.

## DISCUSSION

This study investigated whether satisfaction with medical care and rehabilitation was affected by the level and severity of injury in patients with chronic SCI who were treated on an in-patient setting at a specialized tertiary hospital. In regard to the level of SCI, there was no significant difference in satisfaction among patients with cervical, thoracic and lumbosacral SCI. Likewise, the severity of SCI also had no significant influences on satisfaction. Satisfaction levels were similar in patients with incomplete SCI, except for higher satisfaction with the physician and technical equipment.

Patient satisfaction is an essential indicator for patient-focused medical care. Given the fact that, satisfied patients are more compliant to therapy and have higher rates for HRQoL, researches on satisfaction are of greater importance (4). SCI rehabilitation is an active process that aims to maximize physical, psychological and social functions of the patients. All stages of rehabilitation require intensive effort and compliance to the therapy of the specialized team members and particularly the patient himself/herself (14). Tooth et al., in their retros-

pective study including 6205 patients with SCI treated in 134 hospitals/rehabilitation centers, reported that satisfaction rate was 94% (6). In accordance with this study, we also detected that overall satisfaction with medical care and rehabilitation was high. It has previously noted that global satisfaction measures tend to report higher satisfaction rates and the tendency of higher satisfaction rates could be reduced by using multi-item questionnaires (15). Therefore, we aimed to enhance descriptive features of the present study by evaluating satisfaction in distinct categories (i.e., satisfaction with the physician, nurse, physiotherapist, catering, cleaning service, technical equipment categories and the overall satisfaction. Although, apart from the study of Tooth et al., we had questioned various components of medical care and rehabilitation, we also found high satisfaction rates.

Catering is increasingly recognized a part of high-quality patient care in studies on satisfaction. More importantly, patients should be followed up to protect them from malnutrition (16). New models for more personalized, patient-centered catering have been developed and implemented in some centers (17). It was remarkable in our study that catering was the only category in which patients were dissatisfied among other categories. Patients from all over the country receive medical care and rehabilitation in our hospital. However, local trends and tastes can be effective in catering. Given that regional tendencies in tastes can be effective, the low level of satisfaction can be explained. In regard to the level of SCI, there were no significant differences in satisfaction with medical care and rehabilitation on an in-patient setting. Patients with incomplete SCI had higher satisfaction rates with the physicians. Ronca et al. reported, in their study on 488 patients with SCI, that incomplete paraplegic patients had higher dissatisfaction rates for general medical care (2). Likewise, Hagen et al. also reported that dissatisfaction rate for general medical care was higher in incomplete paraplegic patients (18). In both studies, it was stated that patients with incomplete and complete SCI experience similar problems and complications, however, the ones with incomplete SCI thought that their complaints were less

recognized by physicians and therefore their satisfaction rates were low (2, 18). The reported cause for the issue was that non-specialist physicians tend to neglect the problems of patients with incomplete SCI. Apart from those studies; patients in the present study were treated by an experienced and specialized team on an in-patient setting. In-patient medical care provided by specialized physicians and team might meet patients' expectations at a higher rate. In the acute phase, the higher level and severity of SCI results in significant functional loss, psychological distress and increased burden of care, thus it may result in a decrease in satisfaction (19, 20). However, in our study including patients with chronic SCI, there were no significant differences in satisfaction level of patients with complete vs. incomplete SCI and cervical, thoracic and lumbosacral injuries. A possible explanation for similar satisfaction rates is that chronic patients may develop coping strategies with their disabilities (21).

In the hospital where the study was carried out, therapy program for patients with SCI include current treatment modalities, such as robotic assisted gait training, virtual reality and aquatic therapy. In regard to severity of injury, patients with incomplete SCI had higher satisfaction rates with technical equipment. One possible cause for that is, although patients with incomplete SCI may reach expectations for functional improvement and mobilization with use of conventional rehabilitation practice, the use of current technical equipment might have improved their functionality further. It was previously reported that robotic assisted gait training improves mobility-related parameters in patients with incomplete SCI (22). Aquatic exercises for patients with SCI, support motor skills which cannot be done completely on ground, facilitate limb mobility and provide independent mobilization (23). Since this influence is more prominent in patients with incomplete SCI, patient satisfaction might also be higher. The Functional Independence Measure (FIM) is utilized as an assessment tool to evaluate the amount of assistance required by disabled patients to conduct their daily living activities (14). As much as FIM, increasing the quality of life is the main goal of rehabilitation. While HRQoL depends on patients' personal perceptions and

values, their capacity to adapt and adopt, it is also likely to affect their level of satisfaction. Different patients in terms of FIM and HRQoL may also differ in terms of satisfaction levels.

It was interesting in our study that, in regard to the relationship between satisfaction levels (very satisfied, satisfied, dissatisfied, very dissatisfied) in overall categories of HRQoL and FIM scores, there were no differences between the groups. This situation might be related that satisfaction rate in the assessed overall category were mostly high and the number of patients in "dissatisfied and very dissatisfied" group was low. Bernal et al., assessed coordination and quality of medical care, reach to medical care and patients' satisfaction with physician. Using a FIM-like scale, they divided the patients into five groups regarding limitations in daily living activities and reported that satisfaction in category of reach to medical care was diminished when the limitation in daily living activities increased (4). However, besides the ones with physical limitation related to SCI, that study included patients with a wide range of disabilities such as mental retardation, loss of sight and hearing. Tooth et al. investigated satisfaction in patients with SCI, using FIM scale and reported that as functional independence level increased, satisfaction rates were also increased (6).

However, the relationship between satisfaction and HRQoL has not been studied much in the literature. Thus, more comprehensive studies to investigate this point are needed.

Apart from the previous studies, the present study investigated satisfaction of patients with medical care and rehabilitation on an in-patient setting in the week before discharge. Some studies have examined satisfaction after a period from discharge, using an online questionnaire or phone interview with the patient himself/herself or his/her relatives. It was previously reported that when the interview was done with the relatives, they stated lower satisfaction rates than the patients themselves (4, 6).

#### Limitations

Some limitations of the study are the cross sectional design and the limited number of patients treated in one hospital. Thus, generalization of the results to all patients with chronic SCI and

to other facilities may not be appropriate. Besides, although satisfaction was questioned in the last week, the on-going hospital stay might have caused bias for the patients. Therefore, higher satisfaction rates than the actual could have been found.

In conclusion, patients with chronic SCI were satisfied with the medical care and rehabilitation provided on an in-patient setting (in the physician, nurse, physiotherapist, cleaning service and technical equipment categories). Patients with incomplete SCI were more satisfied with the physician and technical equipment. Although characteristics of injury are distinct, if the expectations are met, similar satisfaction rates may be obtained in patients with chronic SCI. More comprehensive studies are needed, regarding other patient related variables to affect satisfaction.

#### REFERENCES

1. Yeo E, Chau B, Chi B, Ruckle DE, Ta P. Virtual Reality Neurorehabilitation for Mobility in Spinal Cord Injury: A Structured Review. *Innovations in clinical neuroscience*. 2019;16(1-2):13-20.
2. Ronca E, Scheel-Sailer A, Koch HG, Essig S, Brach M, Munzel N, et al. Satisfaction with access and quality of healthcare services for people with spinal cord injury living in the community. *The journal of spinal cord medicine*. 2020;43(1):111-21.
3. Bogner HR, de Vries McClintock HF, Hennessy S, Kurichi JE, Streim JE, Xie D, et al. Patient Satisfaction and Perceived Quality of Care Among Older Adults According to Activity Limitation Stages. *Archives of physical medicine and rehabilitation*. 2015;96(10):1810-9.
4. Bernal OA, McClintock HF, Kurichi JE, Kwong PL, Xie D, Streim JE, et al. Patient Satisfaction and Perceived Quality of Care Among Younger Medicare Beneficiaries According to Activity Limitation Stages. *Archives of physical medicine and rehabilitation*. 2019;100(2):289-99.
5. Jha A, Patrick DL, MacLehose RF, Doctor JN, Chan L. Dissatisfaction with medical services among Medicare beneficiaries with disabilities. *Archives of physical medicine and rehabilitation*. 2002;83(10):1335-41.
6. Tooth LR, Ottenbacher KJ, Smith PM, Illig SB, Linn RT, Granger CV. Satisfaction with medical rehabilitation after spinal cord injury. *Spine*. 2004;29(2):211-9.
7. Hills, R. and S. Kitchen, Satisfaction with outpatient physiotherapy: focus groups to explore the views of patients with acute and chronic musculoskeletal conditions. *Physiother Theory Pract*. 2007. 23(1):1-20.

- 8.** Jain NB, Sullivan M, Kazis LE, Tun CG, Garshick E. Factors associated with health-related quality of life in chronic spinal cord injury. *American journal of physical medicine & rehabilitation*. 2007;86(5):387-96.
- 9.** Theriault ER, Huang V, Whiteneck G, Dijkers MP, Harel NY. Antispasmodic medications may be associated with reduced recovery during inpatient rehabilitation after traumatic spinal cord injury. *The journal of spinal cord medicine*. 2018;41(1):63-71.
- 10.** Kirshblum S, Waring W, 3rd. Updates for the International Standards for Neurological Classification of Spinal Cord Injury. *Physical medicine and rehabilitation clinics of North America*. 2014;25(3):505-17.
- 11.** Hall KM, Cohen ME, Wright J, Call M, Werner P. Characteristics of the Functional Independence Measure in traumatic spinal cord injury. *Archives of physical medicine and rehabilitation*. 1999;80(11):1471-6.
- 12.** Gurcay E, Bal A, Eksioğlu E, Cakci A. Quality of life in patients with spinal cord injury. *International journal of rehabilitation research Internationale Zeitschrift für Rehabilitationsforschung Revue internationale de recherches de readaptation*. 2010;33(4):356-8.
- 13.** Kaya E, Kaplan C, Özyürek S, Güzelkücü U, Kıralp MZ. Alexithymia and Patient Satisfaction in Patients Treated with Balneotherapy. *Turkish Journal of Physical Medicine and Rehabilitation*. 2014;60:41-6.
- 14.** AlHuthaifi F, Krzak J, Hanke T, Vogel LC. Predictors of functional outcomes in adults with traumatic spinal cord injury following inpatient rehabilitation: A systematic review. *The journal of spinal cord medicine*. 2017;40(3):282-94.
- 15.** Hudak PL, Wright JG. The characteristics of patient satisfaction measures. *Spine*. 2000;25(24):3167-77.
- 16.** Hannan-Jones M, Capra S. Impact of type, size and shape of plates on hospital patients' perceptions of the quality of meals and satisfaction with foodservices. *Appetite*. 2018;120:523-6.
- 17.** McCray S, Maunder K, Krikowa R, MacKenzie-Shalders K. Room Service Improves Nutritional Intake and Increases Patient Satisfaction While Decreasing Food Waste and Cost. *Journal of the Academy of Nutrition and Dietetics*. 2018;118(2):284-93.
- 18.** Hagen EM, Grimstad KE, Bovim L, Gronning M. Patients with traumatic spinal cord injuries and their satisfaction with their general practitioner. *Spinal cord*. 2012;50(7):527-32.
- 19.** Lusilla-Palacios P, Castellano-Tejedor C. Acute spinal cord injury patients' satisfaction with care: Results from an intervention study in a specialized rehabilitation unit. *Journal of health psychology*. 2017;22(10):1289-99.
- 20.** Lusilla-Palacios P, Castellano-Tejedor C, Lucrecia Ramirez G, Navarro-Sanchis JA, Rodriguez-Urrutia A, Parra-Puig G, et al. Training professionals' communication and motivation skills to improve spinal cord injury patients' satisfaction and clinical outcomes: Study protocol of the ESPELMA trial. *Journal of health psychology*. 2015;20(10):1357-68.
- 21.** Peter C, Muller R, Cieza A, Geyh S. Psychological resources in spinal cord injury: a systematic literature review. *Spinal Cord*. 2012;50(3):188-201.
- 22.** Nam KY, Kim HJ, Kwon BS, Park JW, Lee HJ, Yoo A. Robot-assisted gait training (Lokomat) improves walking function and activity in people with spinal cord injury: a systematic review. *Journal of neuroengineering and rehabilitation*. 2017;14(1):24.
- 23.** Li C, Khoo S, Adnan A. Effects of aquatic exercise on physical function and fitness among people with spinal cord injury: A systematic review. *Medicine*. 2017;96(11):e6328.