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Investigating the association between demographic factors and patient satisfaction with recovery in the early phase after non-catastrophic musculoskeletal injuries: a cross-sectional study

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Abstract

Background Orthopedic injuries can negatively impact both the physical and mental health of patients. Ensuring patient satisfaction with their recovery is crucial for meeting patient-centered goals and enhancing overall health outcomes.

Objective We aimed to investigate whether satisfaction with recovery can be predicted based on demographic information and baseline characteristics in people with non-catastrophic musculoskeletal trauma.

Methods Participants with acute musculoskeletal injuries were recruited. The Satisfaction and Recovery Index (SRI) was used to assess the patient's satisfaction with their recovery. A multivariable linear regression model was created to determine factors that are associated with SRI scores.

Results A total of 100 patients participated, with a mean age of 32 years and 82% male. The majority had a high school education or lower, were employed, and sustained left-side injuries. Injuries were most often fractures/dislocations caused by motor vehicle collisions. The results of the multivariable linear regression analysis indicated no significant factors predicting satisfaction with recovery.

Conclusions The studied demographic variables and baseline characteristics are not associated with the level of satisfaction with recovery among patients with non-catastrophic musculoskeletal trauma. Clinicians can use these findings to rule out these variables as contributors to low (or high) satisfaction with recovery. Future studies must assess the contribution of other probable and relevant psychological and social characteristics.

Highlights

- Thirteen demographic variables that were studied (age, number of people the patient lives with, time since injury, sex, marital status, injured side, dominant side, education level, job, injury type, injured body part, and injury mechanism) cannot predict higher or lower satisfaction with recovery in people with non-catastrophic musculoskeletal trauma.

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- Clinicians can rule out these demographic factors and baseline characteristics as contributors to satisfaction with recovery.
- Other probable predictors should be considered to understand what factors can contribute to the patient's satisfaction with their recovery.

Keywords Demographic information, Patients' satisfaction with recovery, Non-catastrophic musculoskeletal injuries, Orthopedic trauma

Plain language study

Chronic pain that persists after an orthopedic injury can have a significant negative impact on a patient's mental health. It is also linked to poor quality of life, delayed return to work, and a high socio-economic burden. Preventing these issues early in the recovery process and ensuring patients' satisfaction with recovery is essential to avoid chronicity and to help them resume baseline levels of activity and work status. In this study, we examined the demographic characteristics of patients to determine if they can predict the level of satisfaction with recovery after orthopedic trauma and the results suggest that these factors are not associated with patients' level of satisfaction with their recovery. This pivotal finding shifts the focus to other potential contributors, such as psychological ones, in understanding patient recovery experiences. By recognizing that these factors do not play a significant role in patient satisfaction, healthcare providers are encouraged to delve deeper into the psychological and social dimensions that might influence patients' satisfaction with recovery

Introduction

Orthopedic trauma is an injury to a part of the musculoskeletal system, such as bones, joints, tendons, or ligaments [1]. Traumatic orthopedic injuries account for 16% of the total burden of disease worldwide [2]. Not fully recovering from orthopedic trauma can exert significant negative influences on a patient's life, including imposing a range of physical [1], social [1] functional [3], financial [3] and psychological [3] problems [4]. It is widely accepted that preventing issues early in the recovery process and ensuring patients' understanding and satisfaction with their recovery is crucial to avoid chronicity and to resume their normal levels of activity and work status. As Walton et al. explains, it is important to note that recovery does not, and at times cannot, always mean a return to the pre-injury state [5] but might be better conceptualized as a state of satisfaction with the current status or the trajectory of recovery [6]. Patients' sense of satisfaction with recovery is a subjective experience. It is what patients hope to experience as a consequence of recovery. Additionally, patient satisfaction with recovery can be an indicator of when and how patients return to normal activities of their living (ADLs) [6]. The landscape of patient care has evolved to prioritize greater patient involvement in decisions concerning their planned and received healthcare in order to increase their satisfaction regarding their recovery trajectory. Therefore, patients' sense of satisfaction with recovery is now considered a valuable measure of outcome of healthcare processes [7]. In addition, patient satisfaction with recovery is now being recognized as a key indicator of the quality of care patients receive from their perspective [8, 9]. Patients' satisfaction with recovery can potentially influence their mental and physical health [10, 11]. Given the importance of patient satisfaction with recovery, it is essential to understand the factors associated with it or that can help predict it. This is of course when the severity of injury and quality of care received is similar between patients. Healthcare providers need to be aware of factors that may be associated with satisfaction with recovery as this knowledge can allow them to have better insight regarding the healthcare path that needs to be taken [12].

The potential predictors of patients' satisfaction with recovery after musculoskeletal trauma have not been studied extensively. Mental health has been reported as a possible predictor [13], but there is a lack of research on demographic factors that could affect patient satisfaction after non-catastrophic musculoskeletal trauma. This study aimed to fill this gap. We hypothesized that demographic variables and baseline characteristics are associated with patient satisfaction with recovery among individuals with non-catastrophic musculoskeletal trauma. Identifying such predictors can help clinicians recognize patients who may experience persistent disability, thereby enabling more effective health management.

Materials and methods

Study design and participants

After obtaining approval for the study by the Institutional Review Board (IRB) of the first author's affiliated institution, patients with varying injury severity, who presented

with musculoskeletal injuries, were assessed for eligibility at three different orthopedic clinics in the city of Arak, Iran. The inclusion criteria were (1) native Persian-speaking adults (age ≥ 18 years) and (2) having recent (i.e., less than 30 days) non-catastrophic musculoskeletal injuries of any etiology. Non-catastrophic was defined as injuries that did not require inpatient hospital admission or surgery [14]. The exclusion criteria were (1) any major systemic illness including cancer, organ disease, blood clotting disorder, neuromuscular disorder, rheumatoid condition, or uncontrolled psychopathology, (2) any other comorbid chronic pain condition, (3) any cognitive limitation that would interfere with completing the questionnaires. After screening, a research assistant explained all the study information to participants, answered questions, and asked the participants to read and sign an informed consent form that included information about the project's purpose, inclusion and exclusion criteria, how the patients will participate, the advantages and disadvantages of the patient's participation, and an explanation that participation is voluntary. The sample size was determined based on the consideration that for examining the features of a tool or questionnaire, 3 to 10 individuals should be included for each item [15]. Moreover, according to the COSMIN risk of bias checklist, the total sample size should not be lower than 100 [16]. The rationale behind choosing a consecutive sampling technique, which involved patients from three orthopedic clinics, includes several key points: (1) practicality and feasibility, which allows the inclusion of every patient who meets the eligibility criteria, (2) reduction of selection bias, which ensures that the sample is more representative of the clinic population, as it does not rely on the discretion of the researcher to choose participants, and (3) improved generalizability of the findings to the broader population of patients with non-catastrophic musculoskeletal trauma.

Measures

At baseline, participants completed a study-specific form to provide detailed demographic information such as sex, age, time (days) since the injury, injured body part, mechanism of injury, type of injury, education level, employment status, number of people living with the participant, marital status, dominant side, and injured side.

The Satisfaction and Recovery Index (SRI) [17] is a self-reported importance-weighted health-related satisfaction tool that evaluates the recovery level in musculoskeletal injuries. The SRI measures the patient's current level of satisfaction, regardless of the previous level of function [17]. This tool includes nine items (plus one attention check), and to answer each, there are two 11-point scales, one for assigning a score between 0–10 in terms of satisfaction and the other for assigning a score between 0–10 in terms of the importance of the desired area for the patient. Assigning 0 means absence of satisfaction/importance, and ten means maximum satisfaction/importance. The score is calculated as the summed products of importance x satisfaction /10 for each item, ranging from 0% (completely dissatisfied) to 100% (completely satisfied). The importance weighting means that domains of high importance contribute more to the overall score than domains of lower importance. Our research team translated and cross-culturally adapted the SRI to the Persian language and culture (SRI-P) and evaluated its psychometric accuracy [18].

Statistical analysis

Demographic variables were described using frequencies (for categorical variables) and mean with standard deviations (for continuous variables).

In order to evaluate the factors that are linked to satisfaction with recovery (SRI scores), we created a multivariable linear regression model. Beta coefficients (β) were used to assess the strength and direction of the relationship between each independent variable and the dependent variable (SRI scores). To ensure 80% statistical power with a small to medium effect size of 0.15 for regression analysis with 12 predictors, we calculated that a sample size of 100 participants was necessary [19]. We used the Shapiro–Wilk test to check the normality of the data. The SPSS statistical package (version 26.0) was used to analyze and model the data.

Results

In total, 115 patients met the inclusion criteria, and 15 (15%) declined participation, leading to a final sample size of 100. Participant characteristics are summarized in Table 1. The age range was between 22 and 58 years, with a mean of 32.0 (SD 11.4). The majority of participants were males (82%), had an education level of high school diploma or below (67%), were employers (51%), left side injured (54%), and single (54%). The mean number of people living with participants was 3.0 (SD 1.0), and they were injured for an average of 14 days (8.3). Fracture/dislocation was the most frequent type of injury. Motor vehicle collision was the most frequent (38%) injury mechanism, followed by a hit by another object/person (33%). The upper limbs were more frequently injured than the lower limbs (61%). The result of Shapiro–Wilk test showed that the data have a normal distribution ($P > 0.05$). There was no missing data.

To evaluate the factors associated with satisfaction with recovery (SRI scores), a multivariable linear regression analysis was conducted. The regression model did not find any of the variables to be significant predictors of

Table 1 Demographics and injury characteristics for the sample (N = 100)

Variable		Mean (SD)	Frequency %
Age		32 (11.39)	
Number of people living with the participant		3(1)	
Time since injury—days		14(8.3)	
Sex	Male		82
	Female		18
Injured side	Right		46
	Left		54
Dominant side	Right		72
	Left		28
Marital status	Single		54
	Married		46
Educational level	High school or below		67
	Bachelor or above		33
Employment status	Employee or worker		23
	Employer		51
	Unemployed		8
	Other		18
Type of injury	Fracture/dislocation		53
	Abnormal twist/elongation		9
	Rupture/crushing		38
Injured body part	Upper limb		61
	Lower limb		39
Mechanism of injury	Motor vehicle collision		38
	Fall		21
	Hit by object/person		33
	Crush injury		8

SRI scores. In the multivariable linear regression analysis of predictors of SRI Scores, the following results were observed: age (β = 0.22, P = 0.21), Number of people living with the participant (β = 0.77, P = 0.60), Time since injury (days) (β = 0.08, P = 0.73), Sex (β = − 6.32, P = 0.22), Injured side (β = 0.58, P = 0.88), Dominant side (β = 1.31, P = 0.76), Marital status (β = 0.66, P = 0.87), Educational level (β = 4.30, P = 0.30), Employment status (β = − 1.69, P = 0.70), Type of injury (β = 1.30, P = 0.67), Injured body part (β = − 5.51, P = 0.17), Mechanism of injury (β = 0.81, P = 0.60) (Table 2).

Discussion

In this study, we sought to determine whether baseline characteristics and demographic variables can predict patients' health-related satisfaction in non-catastrophic musculoskeletal trauma. We used the SRI total score for this purpose. By identifying the association between demographic variables and satisfaction with recovery, we aimed to help clinicians in identifying a risk profile for those that report poor satisfaction with recovery in patients with non-catastrophic musculoskeletal trauma

Table 2 Multivariable linear regression analysis of predictors of SRI scores

Variable	β value	Standard error (SE)	P value
Age	0.22	0.17	0.21
Number of people living with the participant	0.77	1.46	0.60
Time since injury (days)	0.08	0.24	0.73
Sex	− 6.32	5.07	0.22
Injured side	0.58	3.94	0.88
Dominant side	1.31	4.37	0.76
Marital status	0.66	3.94	0.87
Educational level	4.30	4.15	0.30
Employment status	− 1.69	1.97	0.70
Type of injury	1.30	2.08	0.67
Injured body part	− 5.51	3.99	0.17
Mechanism of injury	0.81	1.94	0.60

and identify those that have a higher risk early in the rehabilitation process to prevent the transition to chronicity and resulting in cost savings [20]. Clinical screening and knowing the predictors of poor satisfaction with recovery can help healthcare providers develop individualized care plans for each patient.

This study is the first to explore the association between demographic variables and patients' satisfaction with their recovery. Previous research has primarily focused on demographic factors as predictors of patients' satisfaction with care and treatment outcomes rather than satisfaction with recovery [20, 21]. Therefore, extrapolating data from these previous reports to this study is not appropriate. Satisfaction with care can consist of both a cognitive evaluation and an emotional reaction to provided care [22] and satisfaction with treatment refers to a patient's rating of their treatment experience [23]. Among studies that focused on satisfaction with care and treatment, some found no difference between satisfied and dissatisfied patients in terms of their baseline characteristics and demographic profile such as age [21], educational level [24], employment status [25], sex [26], marital status [26], the affected side [26, 27], the dominant side, and the type of the injury [26, 27]. Conversely, some studies showed a significant correlation between patient satisfaction with care and treatment and demographic variables such as sex [25], age [28], educational level [29] and employment status [26, 27]. Therefore, it remains unclear whether demographic information can reliably predict satisfaction with care and treatment. However, our findings provide a unique perspective on the factors influencing patient satisfaction with their recovery from non-catastrophic musculoskeletal trauma, highlighting a distinction from existing literature. While satisfaction with recovery goes beyond the resolution of symptoms, it involves returning to a functional and meaningful life, achieving a sense of fulfillment and autonomy, and participating in valued activities [17]. The variables investigated in this study were number of people living with the participants, time since injury, age, sex, marital status, injured side, dominant side, educational level, job status, type of injury, injured body part, and mechanism of injury. While our findings did not reveal significant associations between these variables and patient satisfaction with recovery, several plausible explanations can be considered. Below, each variable is discussed in more detail:

Age and sex: Based on the notion that there was no significant association between age and sex and the SRI scores, it is possible that younger and older patients, as well as male and female patients, reported similar levels of satisfaction with their recovery and that age and sex do not create substantial differences in how patients perceive their recovery outcomes. This implies that recovery goals and expectations might be more universally applicable across different age groups and sexes. However, it is important to note that the majority of patients were male and the sample consisted of mainly young individuals. While this sample reflects the typical patient population of the clinic, a broader age distribution or a more balanced male-to-female ratio might yield different results.

Education: Education level often influences health literacy and patient expectations[30, 31]. However, our findings suggest that within the scope of non-catastrophic musculoskeletal trauma, education level does not significantly impact satisfaction with recovery. This might indicate that patient education regarding recovery processes is effectively mitigating any differences in baseline educational attainment.

Living situation and marital status: Our study suggests that the presence of social support (e.g., living with others or being married) does not directly correlate with satisfaction levels. This could imply that the quality of support, rather than its mere presence, may affect satisfaction.

Type of injury and injured body part: The lack of association here may indicate that the perception of recovery is more closely tied to the overall functional outcome rather than the specific injury type or location. This finding is valuable for clinicians, as it emphasizes the importance of functional rehabilitation across all injury types.

Mechanism of injury: Whether the injury was due to an accident, sport, or other mechanisms did not affect satisfaction. This suggests that it is possible that once the injury occurs, the focus shifts to recovery quality rather than the injury's cause.

Job and time since injury: Employment status and the duration since injury might influence financial stability and psychological well-being. However, the lack of association in our study could imply that these factors are either being managed effectively or that their impact is overshadowed by other elements of the recovery process.

Although these interpretations are plausible, they remain speculative given the limitations of the current study. To gain deeper insights, future research should explore these variables in larger, more diverse samples. Additionally, longitudinal designs may help clarify the temporal relationships between these variables and patient satisfaction with recovery.

Implications for clinical practice

Our findings suggest that demographic factors and patient characteristics are not associated with patient satisfaction with their recovery. Instead of focusing on demographic and baseline characteristics, healthcare providers might consider modifiable factors such as

effective communication and patient education, ensuring they receive comprehensive care.

Future research directions

Future studies should investigate psychological factors such as mental health status and coping strategies as well as more detailed social factors such as presence of chronic conditions in the family, social support quality and community resources as potential factors that can impact satisfaction with recovery. Moreover, prior experience with therapy, prior injuries, and amount and type of medications need to be considered in order to understand what factors can contribute to the satisfaction of patients with their recovery. In addition, longitudinal studies that include patients with chronic non-catastrophic musculoskeletal injuries can help understand how satisfaction with recovery evolves over time and what factors might influence changes in satisfaction levels throughout the recovery process.

Strengths and limitations

The principal limitation of this study is that not all potentially important predictors were included and only a subset of demographic data was considered. However, the results are essential to consider due to the insignificant contribution of these factors. Another limitation is that we included patients in the acute stage. It is possible that differences in satisfaction with recovery would become more apparent as more time passes. However, our aim was to capture their initial perceptions of recovery, which we believe provide valuable insights into the early recovery experience. We agree that this early period may not reflect significant functional recovery. However, it offers an opportunity to understand patients' satisfaction at a critical stage in their journey. In addition, test–retest reliability studies of the SRI have showed that responses to the SRI does not change after one month [18]. Future studies are needed to assess this association in more chronic phases of recovery. Another limitation of this study is that the sample was from three orthopedic clinics in one city and may not be a true representation of the entire population of people with non-catastrophic injuries as there may be patients that refer to other healthcare settings for this type of injury such as hospitals. However, it should be noted that within the sample, a variety of participants in different age groups with various levels of social circumstances and injuries affecting different body parts caused by various mechanisms were included. This variety lowers the risk of the sample not being an accurate representation of the population. Another limitation of this study is that the cross-sectional design precludes us from deriving conclusions regarding the causality of the investigated factors. In addition, it is possible that social desirability bias influenced participants' responses, leading them to provide answers they believed were expected or desirable rather than their true feelings. However, to minimize this bias, the researchers provided ample information about the purpose of the study prior to data collection. The small sample size of female participants (18%) raises the possibility of a beta error, potentially masking significant associations. However, it is important to note that this proportion reflects the natural distribution of patients presenting with musculoskeletal trauma in the sampled population, where males are more frequently affected due to the higher likelihood of engaging in high-risk activities or occupations. The sampling approach was methodologically robust, ensuring inclusion of every eligible patient during the study period and reducing selection bias. The mean age of 32 years represents a younger population, which may limit the generalizability of these findings to older individuals. However, this age distribution reflects the demographic profile of patients presenting with non-catastrophic musculoskeletal injuries in the sampled population. This alignment with the natural characteristics of the study population enhances the relevance of the findings within this specific context. Future research targeting older populations could help to further generalize these results. The study did not capture whether injuries were work-related, which is a known factor associated with poorer outcomes and satisfaction (32). However, the primary aim of this research was to investigate demographic and baseline characteristics as predictors of satisfaction with recovery, irrespective of the injury's context. The main strength of this study is that the sample size was large enough (n = 100 with no missing data) to include all the intended demographic predictors of health-related dissatisfaction with enough power. This ensures our confidence in our estimation and results. We enrolled patients with a variety of injuries affecting different parts of the body and caused by different mechanisms. This factor is essential in order to generalize the results to general orthopedic injuries.

Conclusion

In this study, we aimed to identify demographic predictors of health-related satisfaction using the SRI scores in people with non-catastrophic musculoskeletal trauma. Our findings suggest that the demographic variables that we studied, are not associated with the SRI scores and cannot predict satisfaction with recovery from non-catastrophic musculoskeletal trauma. This pivotal finding shifts the focus to other potential contributors, such as psychological ones, in understanding patient recovery experiences. By recognizing that factors like age, sex, education, and type of injury

do not play a significant role in patient satisfaction, healthcare providers are encouraged to delve deeper into the psychological and social dimensions that might influence patients' satisfaction with recovery. This shift could lead to more personalized and effective patient care strategies, where mental health, coping strategies, the quality of social support systems, and familial factors are given greater attention. Ultimately, focusing on these psychological and social factors can pave the way for developing tailored interventions that enhance patients' satisfaction with their recovery.

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author contributions
Study concept and design: M.M and S.M; analysis and interpretation of data M.M and S.M; analysis: S.M and M.M, drafting of the manuscript: M.M; critical revision of the manuscript for important intellectual content: S.M, statistical analysis: S.M.

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Availability of data and materials
Authors have made the materials, data, and associated protocols promptly available to readers without undue qualifications.

Declarations

Ethics approval and consent to participate
The study received ethical approval from the University of Social Welfare and Rehabilitation Sciences, Tehran, Iran (Approval number: IR.USWR.REC.1399.226) and was conducted in accordance with the Declaration of Helsinki.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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