Global perceived improvement and health-related quality of life after physical therapy in Lebanese patients with chronic non-specific low back pain

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Global perceived improvement and health-related quality of life after physical therapy in Lebanese patients with chronic non-specific low back pain

Nour El Hoda Saleh[a,b,*], Yara Hamdan[b], Abdullah Shabaanieh[b], Nourhan Housseiny[b],
Ahmad Ramadan[a], Aly Haj Diab[a] and Zahra Sadek[b,c]
[a]*Department of Research, Health, Rehabilitation, Integration, and Research Center (HRIR), Beirut, Lebanon*
[b]*Physical Therapy Department, Faculty of Public Health, Islamic University of Lebanon, Beirut, Lebanon*
[c]*Physical Therapy Department, Faculty of Public Health, Lebanese University, Beirut, Lebanon*

Abstract.

BACKGROUND: The effectiveness of physical therapy (PT) in patients with chronic non-specific low back pain (CNSLBP) is mainly evaluated through pain, disability, and health-related quality of life (HRQOL). However, recent studies have recommended the consideration of improvement from patients' perspectives.

OBJECTIVE: This study aimed to investigate the relationship between the global perception of improvement in Lebanese patients with CNSLBP who have undergone PT, the HRQOL levels, as well as pain intensity.

METHODS: 132 patients with CNSLBP who have undergone PT completed a questionnaire consisting of sociodemographic and CNSLBP characteristics questions, pain intensity numeric scale (NRS), 12-Item Short-Form Health Survey (SF-12), and the Global Perceived Effect scale (GPE). Binary logistic regressions and Pearson correlation coefficient were used for analyses.

RESULTS: Global perceived improvement of PT varies according to HRQOL levels. A significant correlation was found between pain intensity after PT, perceived improvement from PT, and HRQOL. Educational level and pain irradiation have been shown to be predictive factors of perceived improvement after PT.

CONCLUSION: Pain and HRQOL are interrelated and contributed to elucidating the global perception of improvement after PT in patients with CNSLBP. The findings suggest that patients' global perception of improvement should be considered in evaluating the benefits of physical therapy in addition to pain and HRQOL.

Keywords: Low back pain, physical therapy specialty, quality of life

1. Introduction

Chronic non-specific low back pain (CNSLBP) is considered one of the greatest widespread health problems affecting adults worldwide [1]. Whereas no specific pathoanatomical known cause is attributed to this chronic condition, recent research interested in the effect of the biopsychosocial model has been developed to associate social and cultural factors [2]. CNSLBP has commonly been deemed a serious cause of disability, reducing functional activities, social participation, and quality of life [3].

Rehabilitation and physical therapy (PT) modalities have been recommended in the majority of clin-

*Corresponding author: Nour El Hoda Saleh, Department of Research, Health, Rehabilitation, Integration, and Research Center (HRIR), Beirut, Lebanon. E-mail: nourelhoda.saleh.1@ul.edu.lb.

ical practice guidelines and in the first-line of non-pharmacological management procedures for CNSLBP [4–7]. Evidence-based PT interventions have highlighted the use of advice to stay active, manual and exercise therapy, and patient education [8,9], they targeted optimizing function and preventing disability [10,11]. However, despite the unclear evidence concerning the superiority of one intervention over another, rehabilitation has shown to be effective with regards to numerous significant outcomes, such as functionality, pain, and health-related quality of life (HRQOL) [12,13].

Pain and disability were considered the most regularly used outcome measures in physiotherapy studies on chronic low back pain interventions [14]. Therefore, HRQOL is one of the most important perceived outcomes for patients [15]; it represents the functional result of a health condition and its consequent treatment as perceived by the individual undergoing therapy [16]. Previous studies have described a significant correlation between pain intensity, disability, and HRQOL [17]; they assumed that improvement in pain and disability following physical therapy interventions, such as manual therapy, had a favorable equivalent impact on HRQOL as well [18]. In addition, the consideration of patients' perceptions in terms of outcome measurements is highly recommended [13].

The importance of evaluating the patient's perspective of recovery has been demonstrated by its variance in pain and disability scores [19]. Accordingly, the introduction of measures of patients' global perception of improvement has been developed for its use in chronic pain research [20] and has represented a contribution to the field of assessing how changes in specific outcomes are significant to the patient [21].

To the best of our knowledge, there is a lack of studies investigating the relationship between HRQOL levels and the patients' global perceptions of improvement after physical therapy treatment. This study aimed to investigate the relationship between the global perception of improvement in patients with CNSLBP who have undergone physiotherapy and the health-related quality of life levels as well as pain intensity changes.

2. Methods

2.1. Study design

A cross-sectional study was conducted between June and September 2022. The study was approved by the Institutional Review Board of the Health, Rehabilitation, Integration, and Research Center in Beirut, Lebanon (P020/031/06/2022; Date issued: April 20, 2022).

2.2. Participants

Patients with CNSLBP or mechanical low back pain were recruited from six physical therapy centers across Lebanon. Inclusion criteria were as follows: being a patient who has completed at least 5 sessions of PT since a duration of no more than 4 weeks including manual therapy, exercise therapy, electrotherapy modalities such as short waves, TENS, ultrasound, or patients' education for chronic low back pain complaints. Inclusion criteria have also included having CNSLBP presented as pain in the lumbosacral region (sometimes associated with radiating pain to the buttock or leg) [22] lasting for 12 weeks and more [4,23]; mechanical low back pain arising intrinsically from the spine, intervertebral disks, or surrounding soft tissues without red flags such as motor or sensory loss, or recent urinary retention or incontinence [24]; patients aged 18 years or older and could read and understand Arabic. Exclusion criteria included having a specific cause of LBP or a systemic or neurologic red flags determined by a medical doctor or medical imaging (e.g., osteoporotic fractures, severe or progressive neurologic deficit, spinal nerve compromise, malignancy, ankylosing spondylitis, canal stenosis, or severe spondylolisthesis), serious comorbidities (e.g., malignancy, stroke), and current pregnancy.

2.3. Study procedure

Investigators have informed the physical therapists at the six centers of the recruitment process. Physical therapists at the participating centers determined their patients' eligibility based on the inclusion criteria and designated eligible patients to participate in the study by providing their phone numbers. An individual phone interview was conducted with all patients with LBP who successfully met the inclusion criteria. The interview informed patients about the study objectives and procedures and provided them with a request for participation. Patients who were willing to participate have received the electronic survey with a web link through their emails. Data had been gathered over three months and was recorded on an Excel sheet from Google Forms.

2.4. Measurements

The questionnaire was prepared as an electronic survey developed using the "Google Forms" software. It is essential to note that collected data through the online platform was completely anonymous and without the responders' personal or contact information. The online survey started off with a cover letter; the letter

served as an introduction that pointed up the purpose of the study and its procedure(s), in addition to highlighting the importance of participants' feedback for the study findings. At the same time, a clear confirmation of voluntary participation was requested.

The questionnaire developed in Arabic Language was divided into 5 sections. The first section included socio demographic questions including age, gender, height, weight, professional status, marital status, and educational level. The second section gathered information on the previously experienced LBP with interrogation on chronicity and LBP localization, pain characteristics, and intensity. Specifically, a Numeric Rating Scale (NRS) was used to quantify pain intensity before physical therapy (PT) sessions [25]. The third section inquired about the last PT treatment experience, pain intensity after sessions, and the Global Perceived Effect Scale. The fourth section included the Arabic version of the 12-Item Short-Form Health Survey (SF-12).

2.4.1. Global Perceived Effect scale (GPE) [21,26,27]

The GPE scale is a single question that aims to identify the patient's state of improvement or recovery after undergoing certain incomplete or complete treatment from patient perspective. GPE is rated on a 7-point scale (1 completely recovered to 7 worse than ever). GPE recommended to be used in musculoskeletal conditions [21], it has been used as an external criterion for the evaluation of psychometric properties of other outcome measures such as pain and disability described as impacting the quality of life [28,29]. For analysis, the ratings of GPE were dichotomized into "perceived improvement" ("completely recovered" and "much improved") versus "not perceived improvement" ("slightly improved," "not changed," "slightly worsened," "much worsened," "worse than ever").

2.4.2. SF-12

To examine HRQOL, the SF-12 [30], a summarized version of the 36-item Short Form Health Survey (SF-36), was used. This version was selected to reduce patient burden and questionnaire filling time, also due to the high correlation of its results with those of the SF-36 [31]. It includes 12 items of physical component summary (PCS; general health, physical functioning, physical role, and bodily pain) and mental component summary (MCS; vitality, emotional role, social functioning, and mental health) [32]. SF-12 was used in population-based studies to evaluate the impact of musculoskeletal diseases on general health [33]. Its consistency with SF-36 was demonstrated as high

with high reliability and strong evidence of criterion-related validity in response to a wide range of treatments and programs for musculoskeletal disorders [34]. SF-12 has been translated and validated into different languages [35,36] including Arabic, which has been considered a valid and reliable tool to measure HRQOL in the Lebanese population [37].

2.5. Data analysis

Data were extracted as an Excel spreadsheet and then exported to the statistical software SPSS version 26.0 for analysis. Regarding descriptive statistics, means and standard deviations (SD) were used to describe continuous variables, while frequency with percentages to state categorical variables. No missing values were resulted since all questions were mandatory in the Google Form. To assess the association between the different baseline characteristics (sociodemographic and clinical variables) of the participants and the perceived improvement after PT treatment, the sample was divided into two groups based on the perceived effect change into "perceived improvement" ("completely recovered" and "much improved") versus "not perceived improvement" ("slightly improved," "not changed," "slightly worsened," "much worsened," "worse than ever"). Baseline characteristics of participants in the two groups were compared to assess their relationships with perceived improvement; a Chi-square test was used to compare categorical variables and an independent sample t-test was used to compare the mean scores of pain intensity after PT, MCS, and PCS between the perceived improvement and non-perceived improvement group. To compare the pain intensity before and after completing 5 sessions or more of PT, paired sample t-test was used.

Binary logistic regression was launched to evaluate the factors predicting perceived improvement. The dichotomized GPE rating was used as the dependent variable. Independent variables were as follows: age, gender, marital status, occupational status, educational level, irradiation, and pain intensity after PT. Furthermore, Pearson's correlation was used to evaluate the relationship between the perceived improvement, pain intensity, and HRQOL. All statistical tests were two-sided, and a p-value less than 0.05 was considered statistically significant.

3. Results

3.1. Participants

A total of 310 patients who met the inclusion criteria received the link to the questionnaire survey. 132

Table 1
Baseline characteristics of participants

	Total ($n = 132$)	Perceived improvement group ($n = 56$)	Non-perceived improvement group ($n = 76$)	P-value
Age (years)				
18–35	51 (38.63%)	23 (45.10%)	28 (54.90%)	NS
$\geqslant 36$				
Gender				
Male	70 (53.04%)	29 (41.42%)	41 (58.58%)	NS
Female				
Educational level				
< college	76 (57.60%)	23 (30.27%)	53 (69.73%)	< 0.01*
$\geqslant$ college				
Marital status				
Married	95 (71.97%)	40 (42.11%)	55 (57.89%)	NS
Unmarried				
Employment status				
Employed	44 (33.33%)	16 (36.36%)	28 (63.64%)	NS
Unemployed				

There is no missing data; *p-value < 0.05 considered significant. NS: $p > 0.05$, non-significant p-value.

Table 2
Clinical variables of participants

PT related variables	Total ($n = 132$)	Perceived improvement group ($n = 56$)	Non-perceived improvement group ($n = 76$)	P-value	
Irradiation				< 0.01	
No	56 (42.43%)	32 (57.14%)	24 (42.86%)		
Number of sessions					
5–10	74 (56.06%)	37 (50.00%)	37 (50.00%)	0.05	
> 10					
PAIN NRS before PT	7.15 ± 2.02	6.64 ± 2.27	7.52 ± 1.73	NS	*p-value < 0.01
PAIN NRS after PT	3.03 ± 2.48	2.12 ± 2.31	3.69 ± 2.12	< 0.01	
PCS scores	38.69 ± 6.77	40.40 ± 7.15	37.42 ± 6.23	0.01	
MCS scores	45.81 ± 7.05	47.35 ± 6.81	44.68 ± 7.06	0.03	

There is no missing data; p-value < 0.05 considered significant. NS: $p > 0.05$, non-significant p-value. ***P-value of paired sample *t*-test** comparing pain intensity before and after completing 5 or more sessions of PT.

questionnaires were returned and data analysis was conducted on the 132 participants. 61.37% are aged more than 36 years, 57.60% of them are low-educated (< 12 years of education), 71.97% are married, 66.67% are unemployed, 57.57% have irradiation to lower extremities, 56.06% have performed 5 to 10 sessions of PT. Mean scores ± std.dev of pain intensity before PT of all participants was 7.15 ± 2.02 and 3.03 ± 2.48 after PT. The mean score ± std.dev of PCS is 38.69 ± 6.77, and the mean score ± std.dev of MCS is 45.81 ± 7.05.

3.2. Factors associated with perceived improvement

Participants were divided into two groups according to the perceived improvement defined by the dichotomized scale of the GPE. 57.60% of participants had no perceived improvement after PT treatment, while 42.40% had perceived improvement. The results of the

Chi-square analysis and independent samples T-test showed that perceived improvement after PT is associated with educational level ($p < 0.01$), absence of irradiation to lower extremity ($p < 0.01$), the number of PT sessions ($p = 0.05$), and pain NRS after PT ($p < 0.01$). Furthermore, a statistically significant difference was found between the improvement and non-improvement groups of the mean scores of the NRS ($p < 0.01$), PCS ($p = 0.01$), and MCS ($p = 0.03$). Additionally, the difference between NRS before and after PT sessions is statistically significant ($p < 0.01$). Tables 1 and 2 represent detailed baseline characteristics and clinical variables with a comparison of all participants according to the perception of improvement.

3.3. Factors predicting perceived improvement

As shown in Table 3, the binary logistic regression results demonstrated that perceived improvement after

Table 3
Factors predicting perceived improvement

	Binary logistic regression		
	Wald Chi-Square	P-value	OR (95% CI)
Educational level			
⩾ College	4.94	0.02*	2.59 (1.12–6.00)
< College	Reference		
Irradiation			
No	8.09	< 0.01*	4.43 (1.58–12.35)
Yes	Reference		

*p-value < 0.05 considered significant.

PT treatment was predicted by educational level and the absence of irradiation. Educated participants are more likely to perceive improvement from PT treatment 2.59 times than uneducated ones (p value = 0.02, OR = 2.59 (95% CI = 1.12–6.00)). Participants with localized LBP have also higher levels of perceived improvement from PT sessions (p-value = 0 < 0.01, OR = 4.43 (95% CI = 1.58–12.35)) 4.43 times than those who have LBP with irradiation to lower extremities.

3.4. Correlation between GPE, HRQOL, and Pain intensity

Table 4 represents the relationship between the HRQOL levels, perceived improvement, and pain intensity after PT. Pearson correlation results demonstrated a weak positive statistically significant correlation between the perceived improvement and PCS 12 scores (p-value = 0.01, r = 0. 264), MCS 12 scores (p =< 0.01, r = 0. 21), and a moderate negative correlation with pain intensity after PT (r = −0.40, p < 0.01). Pain intensity demonstrated a moderate negative statistically significant correlation (p < 0.01) with MCS12 scores (r = −0.40), PCS12 scores (r = −0.52), and perceived improvement (r = −0.41).

4. Discussion

The present study aimed to investigate the relationship between the global perception of improvement, HRQOL levels, and pain intensity in patients with chronic NSLBP who have undergone physical therapy treatment. The main findings showed that the perceived improvement is associated with educational level and localized low back pain, as the mean scores of the NRS after PT, PCS, and MCS have differed between individuals who perceived improvement and those who did not. A statistically significant correlation between perceived improvement, pain intensity, PCS, and MCS has also been demonstrated.

Our findings identified that uneducated participants are more likely to not perceive improvement from PT treatment than educated ones. This association has been demonstrated in an earlier study confirming that a patient's educational level is an influencing factor in the patient's perception of improvement [38]; a higher level of education is linked to a better-perceived improvement [38]. This may be explained by the fact that people with low education have maladjusted coping mechanisms and strategies that may help them to deal with their physical health [38]. It is worthy to pinpoint for future research the hypothesis of analyzing the correlation between people with low levels of education and the nature of their physically demanding type of jobs. These people are way more prone to suffer from pressure and intense low back pain; at some point, it could be the reason behind poor treatment efficiency and improvement [39]. In our study, the presence of irradiation was associated with perceived improvement after PT treatment. Participants who had irradiation to one or two lower extremities presented lower levels of perceived improvement (p-value = 0.005) than those with localized LBP. These findings may be explained by the fact that radiculopathy corresponds to higher pain experience at baseline, therefore, it has more impact on the patient's quality of life as demonstrated in several studies [40,41]. Thus, higher pain scores at baseline may need greater changes to be perceived as an improvement by patients [38,42,43].

As for the demonstrated association between HRQOL and perceived improvement, participants who have perceived improvement from PT sessions have higher levels of PCS and MCS. These findings can be justified by the findings of previous studies suggesting that global perception of improvement may integrate a diversity of other domains such as self-efficacy, self-esteem, and "sensation of positive emotions" [44]. Accordingly, our results can be exploratory of the relationship between the mental component of HRQOL and the patient's adjustment to the health condition [45].

In addition, our study results are also reinforced by the significant correlation between perceived improvement, pain intensity after PT treatment, and HRQOL levels. These findings replicate reports stating that higher pain intensity had an inverse correlation with HRQOL [46–48]. They also confirm the role of physical therapy in reducing pain level in patients with LBP and subsequently improving the HRQOL. This role relied on previous study results indicating that pain changes after PT treatment may act as a facilitator for the quality of life that is more easily perceived as important by patients after interventions [45]. While no previous study

Table 4
Correlation between GPE, HRQOL, and Pain intensity after PT

	Perceived improvement	Pain intensity after PT
PCS12	$r = 0.26, p = 0.01^*$	$r = -0.52, p < 0.01^*$
MCS12	$r = 0.21, p = 0.01^*$	$r = -0.40, p < 0.01^*$
Pain Intensity after PT	$r = -0.40, p < 0.01^*$	

r: Pearson's correlation coefficient; $^*p$-value < 0.05 considered significant.

has been reported on the association between levels of HRQOL and perceived improvement, this can be understood by taking into consideration the complexity of pain experience and the limited misleading information collected by pain NRS as a single and unidimensional measure. In contrast, the SF-12 includes a variety of functional activities more easily understood by patients and representatives of their daily restrictions due to pain. This may also help to explain why HRQOL may be better related to the global perception of improvement.

In this study, HRQOL scores represent more relevance than pain for the GPE scores suggesting that physiotherapy modalities may have a particular impact on reducing disability perceived by patients by improving functional activities and enhancing the factors associated with better quality of life.

In the present study, a significant decrease in the mean pain intensity after PT sessions in comparison with the mean pain intensity before the sessions has been demonstrated. These results are similar to various studies supporting that physical therapy treatment plays a critical role in pain reduction in patients with CNLPB [10,14,49] and that pain is an essential benchmark predictor of the intervention's success [50,51].

To the best of our knowledge, this is the first study that investigates the perception of improvement after physical therapy sessions and the role of HRQOL levels as a determinant of improvement in Lebanese patients with CNSLBP. Furthermore, this study is the primary study to emphasize the link between HRQOL and perceived improvement after PT interventions. Accordingly, this study could serve as a preliminary work to justify the importance of evaluating outcomes of physical therapy interventions that could contribute to global perceived improvement, such as HRQOL.

There are limitations to this work that should be considered. The lack of prior research on the factors associated with the GPE from physical therapy interventions in patients with CNSLBP has influenced the interpretation of the findings. The use of the cross-sectional study design restricted the ability to evaluate the HRQOL levels before and after treatment. Participants were recruited randomly from the center without having any information about their HRQOL levels before the PT sessions. Although the selection of patients was based on those who have completed sessions since no more than 4 weeks; thus, recalling the pain intensity before PT may be affected by emotional consequences called memory bias. It is worthy to note that it was essential to integrate medication intake in the outcome from PT sessions. In addition, the use of an online self-report questionnaire incorporated the probability that individual responses might have been affected by personal aspects. On the whole, further investigations and studies with a larger number of participants and baseline assessments before PT sessions should be conducted to assure the accuracy of our and similar findings.

5. Conclusion

This study provides a preliminary result on the role of pain and HRQOL levels in CNSLBP patients' perception of improvement after PT sessions. Lower Pain intensity and higher HRQOL levels after PT sessions are demonstrated as associated with higher perceived improvement. Future studies should be conducted for a better understanding of the relationship between CNSLBP outcome domains and perception of improvement after physical therapy treatment.

Ethical approval

The study was approved by the Institutional Review Board of Health, Rehabilitation, Integration and Research (P020/031/06/2022; Date issued: April 20, 2022).

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No funds were granted for this project.

Informed consent

An electronic informed consent was received from all participants before accessing the questionnaire web link.

Conflict of interest

The authors declare no conflict of interest.

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Author contributions

Study conception and design: NS; Questionnaire development and data collection: YH, AS, NH; Analysis and interpretation of results: NS, AR; Draft manuscript preparation: YH, NH, AS, AR, AD; Manuscript critical review: NS, ZS. All authors have contributed, reviewed the results, and approved the final version of the manuscript.

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