Prospective Study

The Effect of Social Isolation During the COVID-19 Pandemic on Patients with Chronic Low Back Pain Who Underwent a Spine Intervention

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Background: The COVID-19 infection poses a serious threat to global health for millions of people. In addition to therapeutic treatment methods, preventive measures are also important in controlling the pandemic. As a result, billions of people are quarantined in their homes to prevent the spread of coronavirus. However, social isolation may result in immobility, which can lead to musculoskeletal problems and an increased level of pain, depending on the weakness of the muscles.

Objectives: To examine the effect of social isolation during the recent COVID-19 pandemic on patients with chronic low back pain.

Study Design: A total of 145 patients who underwent a spine intervention within the past year were enrolled in this prospective and cross-sectional study.

Setting: The study was performed in the interventional pain unit of a tertiary rehabilitation center in Turkey.

Methods: Patient data were obtained by telephone interview and included information pertaining to demographics, pain history, an assessment of pain, analgesic use, activity levels, and an evaluation of stress and sleep habits. Additionally, the International Physical Activity Questionnaire (IPAQ) was used to evaluate patient activity levels.

Results: It was detected that social isolation has increased the intensity of low back pain experienced by patients during the COVID-19 pandemic. We also found that patients who benefited from spinal injections administered in the prepandemic period experience less severe low back pain ($P = 0.000$) and took fewer analgesics ($P = 0.000$) during the pandemic. The findings of our study revealed that there was a significant reverse correlation between IPAQ walking scores and the prepandemic Visual Analog Scale (VAS) scores ($P = 0.015$, $r = –0.201$) and the pandemic VAS scores ($P = 0.000$, $r = –0.313$).By contrast, the level of benefit from injections decreased ($P < 0.05$) and the duration of spinal intervention was shortened in patients with high IPAQ sitting scores ($P < 0.05$).

Limitations: The limitations of the study are the small number of patients and the fact that our results are based on patients' self-reported data.

Conclusions: Social isolation has had an increasing effect on low back pain during the COVID-19 pandemic. The results of our study showed a significant relationship between activity level and pain intensity. We also found that patients who have benefited from spinal injections administered in the prepandemic period experience less severe low back pain during the pandemic.

Key words: COVID-19, spine intervention, physical activity, low back pain, social isolation

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The COVID-19 infection poses a serious threat to global health for millions of people. In addition to therapeutic treatment methods, preventive measures are also important in controlling the pandemic. The use of masks, compliance with hygiene rules, and social distancing are considered the most important protective measures. As a result, billions of people have been quarantined in their homes to prevent the spread of coronavirus (1). However, social isolation may result in immobility, which can lead to musculoskeletal problems and an increased level of pain, depending on the weakness of the muscles. Low back pain is one of the most common and disabling musculoskeletal problems in patients (2,3). A reverse correlation between physical activity and the level of low back pain has been detected (4,5). Thus, home exercise programs are of great importance in preventing this health problem. A study by Anar et al (2) investigated the effectiveness of a home exercise program applied by patients with low back pain and demonstrated that a home exercise program provided a significant improvement in the pain level, disability severity, flexibility and endurance level of the patients. However, there is a lack of data in the literature regarding the impact of COVID-19 on the level of pain experienced by patients with established low back pain. Therefore, this study aimed to examine the effect of social isolation during the recent COVID-19 pandemic on patients with chronic low back pain who underwent a spine intervention within the past year. It is predicted that the results of this study will be useful in planning preventive and therapeutic measures for patients experiencing low back pain during the ongoing COVID-19 pandemic.

Methods

A total of 145 patients were enrolled in this prospective and cross-sectional study conducted at a tertiary rehabilitation center. All of the participants had low back pain for at least 3 months and underwent a spine intervention within the past year for chronic low back pain from August 2019 to August 2020. Inclusion criteria were being at least 18 years of age, having applied to the tertiary rehabilitation center regardless of gender and received a spinal injection for chronic low back pain in the interventional pain unit, and being willing to voluntarily participate in this study. Exclusion criteria were major general health problems (e.g., heart failure or chronic obstructive pulmonary disease) or refusal to participate in the study. We also excluded the patients who received peripheral joint injections and soft tissue injections in order to evaluate the patients who specifically underwent spine interventions. The study protocol was approved by a local ethics committee.

Patient data were obtained by telephone interview during September 2020 and included information pertaining to demographics, pain history, an assessment of pain, analgesic use, activity levels, and an evaluation of stress and sleep habits. Demographic information included each patient's age, gender, height, weight, and body mass index .Additionally, patients' working status during the pandemic was obtained and categorized as "no working," "quit the work," "working at home office," "working in shift," or "working every day."

Patients were asked to report their diagnosis of low back pain, duration of low back pain, frequency of low back pain during the COVID-19 pandemic (0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = always), existence of comorbid diseases, and prepandemic and pandemic pain levels according to the Visual Analog Scale (VAS). The VAS consists of a 10-point line drawn on a horizontal or vertical axis, with scores ranging from "0 points" for "no pain" to "10 points" for "worst pain." Patients were asked to score or mark the level that corresponded to the severity of their pain (6,7). A 3-point Likert scale was used to evaluate each patient's status of consulting a doctor, wherein 0 = patient consulted a doctor, 1 = patient wanted to consult a doctor but could not, and 2 = patient did not require a consultation with a doctor.

Regarding analgesic use, patients were asked about the type of injection administered, the level of injection benefit, and the elapsed time after the injection (Fig. 1).

Patients rated their frequency of performing a home exercise program during the pandemic according to a 3-point Likert scale where 0 = never, 1 = irregularly, and 2 = regularly. Additionally, the International Physical Activity Questionnaire (IPAQ) short form was used to evaluate patient activity levels. The IPAQ is a scale consisting of assessment parameters that include leisure time activities, yard work, household chores, moving from place to place, and occupational physical activity. The items in the short IPAQ form were structured to provide separate scores on walking, moderate-intensity activity, and vigorous-intensity activity. Calculation of the total score for the short form requires a sum of the time (minutes) and frequency (days) of vigorous-intensity activities, moderate-intensity activities, and walking. Additionally, the IPAQ sitting score

was obtained as additional data and was not included in the total score of physical activity (5).

Study patients were also asked to report their frequency of stress and sleep disturbance experienced during the COVID-19 pandemic, categorized as 0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = always. Furthermore, the average hours of sleep per day before and during the pandemic were assessed.

Statistical analyses were performed using version 22.0 SPSS software (IBM Corp., Armonk, NY). The Kolmogorov-Smirnov test was used to determine whether the obtained parameters conformed to a normal distribution. Descriptive analyses are presented and the mean ± standard deviation were determined. The Wilcoxon test was used to compare the changes in the VAS score for low back pain, the amount of analgesics used per week, and the average hours of sleep per day between the prepandemic and pandemic periods. While investigating the associations between nonnormally distributed or ordinal variables, the correlation coefficients (r) and their significance (*P*) were calculated using the Spearman test. A probability value of $P < 0.05$ was considered statistically significant.

Results

Among the 145 patients included in this study, there were 96 women (66%) and 49 men (34%), with a mean age of 54.78 ± 1.08 years. The mean body mass index was 27.99 ± 0.40 kg/m^2. When patients' working status during the pandemic was examined, it was revealed that 54.5% of the patients were not working; 6.2% of the patients had quit their work because of the pandemic; 4.1% of the patients were working at a home office; 8.3% of the patients were shift workers; and 26.9% of the patients were working every day.

Patients' diagnoses associated with low back pain were lumbar disc herniation (75.9%), lumbar stenosis (12.4%), sacroiliac joint dysfunction (5.5%), lumbar spondylolisthesis (3.4%), and lumbar spondylosis (2.8%). The mean duration of low back pain symptoms was 7.20 ± 0.60 months (Table 1). The type of injections administered included transforaminal epidural steroid injection (105 patients, 72.4%), sacroiliac joint steroid injection (18 patients,12.4%), caudal epidural steroid injection (12 patients, 8.3%), facet joint steroid injection (9 patients, 6.2%), and medial branch nerve block (one patient, 0.7%). The mean elapsed time after the injection at the time of interview was 7.34 ± 0.24 months (Table 2). When the existence of low back pain during the COVID-19 pandemic was evaluated, it was detected

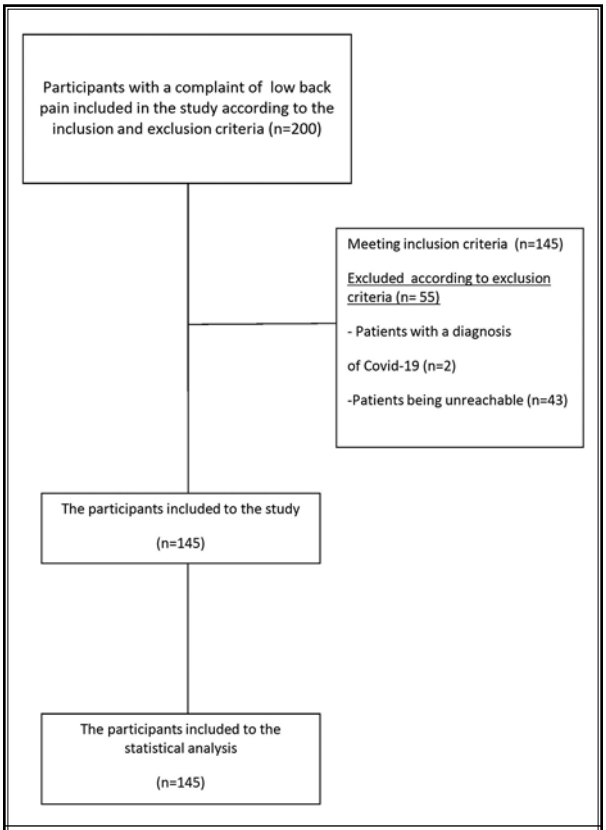

Fig 1. *Flow chart of the study.*

that 20 patients had not experienced low back pain, 10 had rarely experienced low back pain, 34 sometimes had low back pain, 26 often had low back pain, and 55 always had low back pain. In total, 57.9% of the patients stated that they wanted to consult a doctor, but could not because of the pandemic and 15.9% of the patients consulted a doctor because of their low back pain (Table 3). Patients who benefited from spinal injections that were administered in the prepandemic period had less severe low back pain (prepandemic: $P = 0.000$, $r = -0.589$ vs pandemic: $P = 0.000$, $r = -0.416$) and took fewer analgesics (prepandemic: $P = 0.000$, $r = -0.377$ vs pandemic: $P = 0.000$, $r = -0.367$) in both the prepandemic and pandemic periods ($P < 0.005$).

Additionally, 33.8% of the patients stated that they did not use analgesics during the pandemic period. The comparison of the prepandemic and pandemic periods revealed a significant enhancement in analgesic use during the COVID-19 pandemic ($P = 0.000$). The mean amount of analgesics used (number of drugs per week) in the prepandemic and pandemic periods were 2.96 ± 0.33 and 5.37 ± 0.48 respectively. There was a significant

Table 1. *Patients' characteristics*

	Mean ± Standard Deviation (SD)
Age (years)	54.78 ± 1.08
Body mass index (kg/m^2)	27.99 ± 0.40
Duration of low back pain (years)	7.20 ± 0.60
IPAQ Scores	Mean ± SD
IPAQ-Walking MET (minutes/week)	434.10 ± 69.35
IPAQ-Moderate MET(minutes/week)	1932.82 ± 212.63
IPAQ-Vigorous MET (minutes/week)	424.66 ± 135.53
Total physical activity MET-minutes/week	2,794 ± 264.63
IPAQ- Sitting data minutes/week	3,434.27 ± 137.67
Gender	n (%)
Women	96 (66.2 %)
Men	49 (33.8 %)
Diagnosis	n (%)
Lumbar disc herniation	110 (75.9 %)
Lumbar stenosis	18 (12.4%)
Lumbar spondylolisthesis	5 (3.4 %)
Sacroiliac joint dysfunction	8 (5.5 %)
Lumbar spondylosis	4 (2.8%)
Patients' working status during the pandemic	n (%)
Not working	79 (54.5%)
Quit work	9 (6.2 %)
Working at a home office	6 (4.1 %)
Working in shift	12 (8.3%)
Working every day	39 (26.9%)
Total of patients	(n=145)

IPAQ: International Physical Activity Questionnaire
MET: Metabolic Equivalents

Table 2. *The parameters for injection*

The type of injection applied (n,%)	
Transforaminal epidural steroid injection	105 (72.4%)
Caudal epidural steroid injection	12 (8.3%)
Facet joint steroid injection	9 (6.2%)
Sacroiliac joint steroid injection	18 (12.4 %)
Medial branch nerve block	1 (0.7%)
Elapsed time after the injection (months)	7.34 ± 0.24

Table 3. *Clinical features of patients according to COVID-19.*

Existence of low back pain during the COVID-19 pandemic (%)	
Never	20 (13.8%)
Rarely	10 (6.9 %)
Sometimes	34 (23.4%)
Often	26 (17.9%)
Always	55 (37.9%)
Frequency of felt stress during the COVID-19 pandemic	n (%)
Never	34 (23.4%)
Rarely	7 (4.8%)
Sometimes	41 (28.3%)
Often	39(26.9 %)
Always	24 (16.6%)
Frequency of sleep disturbance during COVID-19 pandemic	n (%)
Never	45 (31.0%)
Rarely	9 (6.2%)
Sometimes	37 (25.5%)
Often	30 (20.7%)
Always	24 (16.6 %)
Performing of home exercise program during the COVID-19 pandemic	
Never	77 (53.1%)
Irregularly	41 (28.3%)
Regularly	27 (18.6%)
Status of consulting a doctor during the COVID-19 pandemic	
Patient consulted a doctor	23 (15.9%)
Patient wanted to consult a doctor, but he/she could not	84 (57.9 %)
Patient did not require a consultation with a doctor	38 (26.2 %)

correlation between age and the amount of analgesic used in both the prepandemic (P = 0.020, r = 0.193) and pandemic (P = 0.024, r = 0.188) periods. Nonsteroidal anti-inflammatory drugs were the most preferred analgesic drug (n = 71, 49%). The other analgesic drugs used were acetaminophen (n = 15, 10.3%), opioids (n = 3, 2.1%) and pregabalin (n = 6, 4.1%). There was a significant increase in the mean pain VAS score from the prepandemic period to the pandemic period (4.10 ± 0.15 to 6.39 ± 0.30, respectively, P = 0.000) (Table 4). A significant correlation was detected between the VAS scores and the amount of analgesic used in both the prepandemic (P = 0. 000, r = 0.564) and pandemic (P = 0.000, r = 0.643) periods.

Regarding the participation in a home exercise program, 15.9% had not participated, 28.3% had participated irregularly, and 18.6% had regularly performed home exercises (Table 3). The patients' IPAQ scores are shown in Table 1. Elderly patients spent less time walking; a significant reverse correlation was found between age and the IPAQ walking score (P =

0.001, r = –0.264). Further, the body mass index was lower in patients with high IPAQ walking scores (P = 0.005, r = –0.229).There was a significant association between the body mass index and age (P = 0.000, r = 0.294).The benefit level from spinal injections applied during the prepandemic period was greater in patients with higher IPAQ walking scores (P < 0.05, r = 0.165) (Fig. 2). By contrast, the level of benefit from injections decreased (P < 0.05, r = –0.190) and the duration of spinal intervention was shortened in patients with high IPAQ sitting scores (P < 0.05, r = –0.190, r:–0.173). A significant reverse correlation was detected between IPAQ walking scores and the prepandemic VAS scores (P = 0.015, r = –0.201) and the pandemic VAS scores (P = 0.000, r = –0.313).However, there was a significant increase in prepandemic VAS scores (P = 0.039, r = 0.171) and pandemic VAS scores (P = 0.012, r = 0.207) in patients with higher IPAQ sitting scores. There was also a statistically significant, positive correlation between the pandemic VAS scores and the total IPAQ scores (P = 0.012, r = 0.208). There was a significant increase in both the VAS scores (P = 0.001, r = 0.270) and the amount of analgesic used (P = 0.035, r = 0.175) during the pandemic period in patients who had higher IPAQ vigorous activity scores and moderate activity scores.

There was a statistically significant negative correlation between the IPAQ walking scores and the amount of analgesic used in the pandemic period (P = 0.002, r = –0.258). By contrast, an increased amount of analgesics were used during the pandemic period in patients who had higher IPAQ sitting scores (P = 0.002, r = 0.261) and higher IPAQ total scores (P = 0.040, r = 0.171).

Regarding the frequency of stress felt during the COVID-19 pandemic, 23.4% of the patients stated that they had never felt stress, 28.3% had sometimes felt stress, 4.8% had rarely felt stress, 26.9% had often felt stress, and 16.6% had always felt stress during the pandemic. As to sleep disturbance during the pandemic, 24 patients always had sleep disturbance, 30 patients often had sleep disturbance, 37 patients sometimes had sleep disturbance, 9 patients rarely had sleep disturbance, and 45 patients had no sleep disturbance during the pandemic period. There was a significant reduction in the mean average hours of sleep per day, from 7.59 ± 0.12 in the prepandemic period to 6.49 ± 0.16 in the pandemic period (P = 0.000) (Table 4). During the pandemic, there was a significant reduction in the sleep time of patients who had experienced low back pain for a longer period (P = 0.047, r = –0.165). There was a significant negative correlation between pandemic VAS scores and the average hours of sleep per day during the pandemic (P = 0.000, r = –0.489). Similarly, the average hours of sleep per day was decreased in patients who suffered from more severe low back pain during the prepandemic period (P = 0.002, r = –0.256).

Table 4. *The comparison of prepandemic period and pandemic period.*

	Prepandemic Period	Pandemic Period
Visual Analog Scale (VAS) score for low back pain	4.10 ± 0.15	6.39 ± 0.30
The amount of analgesics used (number of drugs per week)	2.96 ± 0.33	5,37 ± 0.48
The average hours of sleep per day	7.59 ± 0.12	6.49 ± 0.16

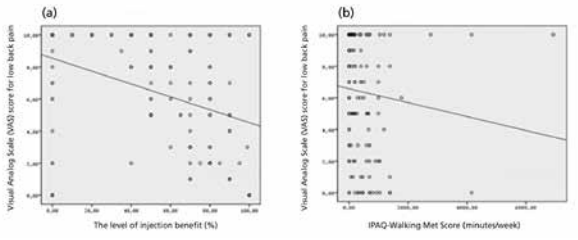

Fig 2. a) *The negative correlation between VAS score for low back pain during pandemic period and the level of injection benefit applied before the prepandemic period.* b) *the negative correlation between VAS score for low back pain during pandemic period and International Physical Activity Questionnaire-Short Form (IPAQ) Walking MET Score.*

Discussion

The findings of this study suggest that social isolation has increased the intensity of low back pain experienced by patients during the COVID-19 pandemic. We also demonstrated a relationship between the severity of patients' low back pain during the pandemic process and their activity level, just as in the prepandemic period. It was determined that the severity of low back pain increased in patients with longer sitting times during the pandemic period; in contrast, the VAS scores and the need for analgesics decreased in patients with longer walking times. Additionally, we also found that there was a statistically significant positive correlation between moderately vigorous activities (i.e., carrying light loads, bicycling at a regular pace, doubles tennis, heavy lifting, digging, aerobics, or fast bicycling) and

the parameters of low back pain level and the consumption of analgesics during the pandemic.

There are various conclusions regarding the effect of activity on low back pain in the literature. A study by Maugeri et al (8) revealed that a regular exercise routine is a key strategy for physical health during the COVID-19 pandemic. Contrariwise, another study by Alyousef et al (9) showed that the severity of low back pain and physical activity level were not related, but they disclosed that high levels of low back disability were associated with reduced physical activity, including less total, moderate, vigorous, and discretionary types of activity. Amorim et al (10) reported that occupational physical activity, such as carrying a heavy weight while inclined and awkward postures (e.g., bending, twisting, squatting, and kneeling) are associated with a higher prevalence of recurrent low back pain. They also mentioned that they did not observe any significant correlation between occupational physical activities, such as sitting or standing, and low back pain.

We also determined that the level of benefit from spinal injections applied in the prepandemic period was higher in patients with higher IPAQ walking scores. On the other hand, the results of a study by Mhaskar et al (11) showed that an epidural steroid injection was effective in both sedentary (sitting, a certain amount of walking, standing) and nonsedentary (higher levels of activity) patients over a 6-month period, and that the difference in the injection effect between the 2 groups was not statistically significant. In our study, patients, who benefited from spinal injections administered before the pandemic experienced less severe back pain and received a smaller amount of analgesic during the COVID-19 period. According to our knowledge, this is the first study to compare the effect of spinal interventions with the intensity of low back pain experienced by patients during the COVID-19 pandemic.

This study revealed a higher body mass index and a lower IPAQ walking score in elderly patients during the COVID-19 pandemic. Additionally, greater amounts of analgesics were consumed in this age group during this same period. This high analgesic consumption was thought to be due to an increase in low back pain resulting from high body mass index, which affected the lumbar region and weakness of the lumbar muscles because of insufficient walking exercises. These findings are compatible with the results of the study by Wong et al (12). They reported that activity level is a risk factor for low back pain in elderly patients (12). Another study by Chen et al (13) determined that an unhealthy body weight correlated with increased chronic pain in older adults. There are few studies in the literature associating the severity of low back pain with stress level; in our study, we found no statistically significant relationship between stress level and VAS scores. However, Svensson et al (14) observed an association between low back pain and dissatisfaction with the work environment and a higher degree of worry. Furthermore, Vinstrup et al (15) demonstrated that psychological stress increases the probability of low back pain among healthcare workers.

The findings of our study revealed that there was a significant relationship between the level of low back pain and the level of sleep. Our results revealed that patients who suffered from low back pain for a longer time, and who had more severe low back pain, had significantly fewer daily sleep hours during the pandemic period. Similarly, Franca et al (16) reported a high prevalence of sleep disorders among patients with chronic low back pain. Furthermore, Atkinson et al (17) observed that sleep complaints appear to be common in patients with low back pain, which may reflect diverse sleep anomalies.

The limitation of the study is that our results are based on patients' self-reported data. Our study is largely based on recall of the patients and their respective attitudes regarding the pandemic . Therefore, responses might be subject to recall and response biases. Another limitation of our study is that there was a small number of patients, since only patients with chronic low back pain who underwent a spine intervention were evaluated, and patients who received peripheral joint injections and soft tissue injections were not included in the study.

Conclusion

In conclusion, the findings of this study suggest that social isolation has increased the intensity of low back pain experienced by patients during the COVID-19 pandemic. The level of pain and the use of analgesics are primarily related to activity level. The findings of our study reveal that there is a significant reverse correlation between IPAQ walking scores and VAS scores. We also found that patients who have benefited from spinal injections administered in the prepandemic period experienced less severe low back pain during the pandemic. Further comprehensive and more advanced studies are needed to confirm the present findings.

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