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Quality of Life Measurement among Patients with Chest Trauma after Supported Early Mobilization and Exercises

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Abstract
Background: Early mobilization and exercises following chest trauma have been associated with improved respiratory efficiency, which enhances patients' ability to participate in daily activities and achieve better functional outcomes. **Aim:** To evaluate the quality-of-life among patients with chest trauma prior to and following implementation of supported early mobilization and exercises. **Design:** A pre–posttest quasi experimental research design. **Setting:** The study was conducted at Main Assiut University Hospital. **Subjects**:120 adult patients with chest trauma were divided equally into study and control groups. **Tools**: **I:** Patient assessment sheet, **II:** Brief pain inventory scale, **and III:** Euro Quality of Life 5-dimensions,5 levels. **Results:** revealed that demographic and clinical characteristics were similar between two groups. Both groups had similar mean age (45.67 ± 14.64 years) and majority were male (61.7% in the study group, 65.0% in the control group). Pain severity significantly decreased from 35.83 ± 4.76 at baseline to 24.25 ± 7.40 after one month and pain interference dropped from 66.83 ± 4.06 to 44.96 ± 12.81 (p= .001). Also, the study group showed significant improvement in their quality of life, with some participants got perfect (3.3%), very good (5.8%), and good health status category(9.2%). However, 32.5% of the control group remained in the "extremely impaired" category($p \leq 0.05$). **Conclusion**: Supported early mobilization and exercises improved quality of life in patients with chest trauma. **Recommendation:** Implementing supported early mobilization and exercises is strongly recommended as part of standard care for patients with chest trauma.

Keywords: Chest Trauma, Exercises, Quality of life & Supported Early Mobilization

Introduction:
Chest trauma can be either penetrating or blunt. Penetrating injuries are disruptive to tissue integrity. Blunt injuries can cause damage to organs and structures under the tissue without disrupting the integrity of the tissue. In Egypt, Blunt chest trauma is the third most common injury in poly-trauma patients following head and extremities injuries. The prevalence of traumatic chest injury is increasing over time due to many road traffic accident(RTCs) in the country **(Yadollahi et al., 2018).**

Blunt chest injury may be present with different clinical pictures: multiple rib fractures of both the anterior and posterior chest wall, flail chest, pneumothorax, hemothorax, sternal fractures, lung and soft tissue contusion. These lesions can compromise respiratory mechanics and worsen underlying lung injury and pre-existing respiratory disease, predisposing to respiratory failure Chest wall instability and pain induce reduction of deep breath, functional residual capacity (FRC) and coughing with impaired secretion clearance **(Assouline et al., 2021; Antos et al., 2024).**

Management of patients with chest trauma is a long-term and holistic approach including prehospital management, emergency care, intensive care unit and post-injury period. Conservative treatment is usually the treatment of choice; it consists of tracheal intubation and invasive or non-invasive mechanical ventilation. Both can be challenging in blunt chest trauma patients and require ICU admission. One of the cornerstones of management is assessing pain and providing early and effective analgesia: pain control greatly improves respiratory mechanics, reduces possible complications and allows effective and aggressive rehabilitation **(Assouline et al., 2021 & Antos et al., 2024**).

Early mobilization and structured exercise are essential components of recovery after chest trauma. They improve lung function, reduce the risk of complications like atelectasis and pneumonia, promote musculoskeletal healing, and facilitate a safe, progressive return to physical activity **(Leivaditis et al., 2024).**

Quality of life (QoL) is a key outcome measure representing a shift in modern medicine towards prioritizing patient-centered care. QoL encompasses physical, psychological, and social factors, offering a well-rounded view of recovery **(Eton et al., 2020).** For chest trauma patients, QoL evaluations highlight

the broader effects of injuries and treatments, beyond traditional clinical measures like mortality and readmission rates. By incorporating QoL assessments, clinicians can create personalized treatment plans that reflect patients' values and preferences, ultimately improving long-term recovery **(Castro & Wang, 2023).**

Nurses play a crucial role in the comprehensive care and rehabilitation of chest trauma patients, serving as primary caregivers, educators, and advocates **(Hertz & Santy, 2024).** In the context of supported early mobilization and exercise, nurses assess patients' readiness for movement, monitor vital signs, and manage pain to ensure safe, gradual progression of activity. Nurses are key in preventing complications such as pneumonia and venous thromboembolism by implementing interventions like incentive spirometry, respiratory exercises, and early mobilization **(Vaughan & Villegas, 2023).**

Significance of the study

Chest trauma is a leading cause of morbidity, with high rates of chronic pain and long-term physical limitations. Early mobilization has shown promise in reducing pulmonary complications, but its impact on overall quality of life (QoL) remains undefined. This study aims to fill this gap by using a comprehensive QoL assessment tool to evaluate recovery after early mobilization and exercises. The findings are expected to guide clinical practice, reduce long-term complications, and enhance recovery, especially for working-age adults. Ultimately, this research may improve clinical outcomes, reduce healthcare costs, and support evidence-based rehabilitation strategies.

Aim of the study

Evaluate the quality-of-life among patients with chest trauma prior to and following implementation of a supported early mobilization and exercises.

Research hypothesis

Patients who received supported early mobilization and exercises following chest trauma would demonstrate a statistically significant improvement in quality-of-life levels after receiving intervention than control group.

Research design

A pre–posttest quasi experimental research design was used to carry out this study. The design was chosen to assess the changes in the dependent variables while accounting for potential confounding factors, considering the lack of randomization in the selection of participants.

Variables

The independent variable in this study was supported early mobilization and exercises while the dependent variable was the quality-of-life among patients with chest trauma.

Setting: The study was conducted in trauma department and outpatient clinics at Main Assiut University Hospital.

Sample: The study involved 120 adult patients who met the following inclusion criteria: aged between 20 and 65 years of either sex, fully conscious, with a confirmed diagnosis of blunt chest trauma, and receiving conservative treatment. Participants were evenly assigned to either control group, who received standard hospital care, or the study group who received additional support through early mobilization and exercises interventions. Patients were excluded if they had lung or heart contusions, injuries to major blood vessels, unwilling to participate, or unable to communicate with the researcher.

Based on the specifications from the power analysis conducted using G*Power, the minimum required sample size was determined to be 120 patients diagnosed with blunt chest trauma using the following equation according to **Steven, (2012)**

$$n = \frac{N \times p\left(1-p\right)}{\left[N-1\times\left(d^2 \div z^2\right)\right]+ p\left(1-p\right)}$$

N=total patient population size was 420 during year 2022.
Z = confidence levels is 0.95 and is equal to 1.96
D= The error ratio is = 0.05
P= The property availability ratio and neutral = 0.50

Tools: Data were collected by using the following three tools:

Patient assessment sheet

It was developed by researcher based on current national and international literatures. The tool gathered demographic and clinical data from patients, including age, sex, location of chest trauma, mechanism of injury, medical intervention, post-injury complications, and length of hospital stay.

I. Brief Pain Inventory (BPI)

The Brief Pain Inventory (BPI) scale was used in this study to assess pain level. It provides two main scores: pain severity (0–40) and interference (0–70), based on patient ratings from 0 (no pain/no interference) to 10 (worst pain/completely interference). Items on pain location and relief treatments are included but not scored **(Poquet & Lin, 2016).**

Euro QOL 5-Dimensions (EQ-5D-5 L)

This scale was adopted in this study to assess the quality of life in 5 dimensions: Mobility, self-care, usual activities, pain/ discomfort, and anxiety/ Depression. Five levels of severity (no problems, slight, moderate, severe, and extreme problems) **(Herdman et al., 2011).**

Scoring: The EQ-5D-5L questionnaire uses an index

value from 00. to 1.00 to measure health-related quality of life, with 1.00 representing perfect health and 0.00 represents extremely impaired health state. An index of 1.00 signifies perfect health, 0.90-0.99 very good health, 0.80-0.89 good health, 0.70-0.79 moderate health, 0.60-0.69 slightly impaired health, 0.50-0.59 moderately impaired health, 0.40-0.49 severely impaired health, and 0.00-0.39 extremely impaired health.

Intervention (The supported early mobilization and exercises)

The content of these intervention was constructed by the researchers after passing through an extensive and relevant literature review. It constructed from two parts: theoretical and practical parts. **Theoretical part :**This part aimed to equip patients with necessary information regarding provided intervention "supported early mobilization and exercises" including aim, benefits, techniques, regularity, and recommended time for starting early mobilization and exercises. **Practical part** aimed to equip patients with necessary skills for performing intervention "supported early mobilization and exercises" including preparation, and performance steps.

Tools validity and reliability: Tool's validity was tested through a jury of (5) experts from Cardio-Thoracic Surgery department, faculty of Medicine and Medical-Surgical Nursing Department, faculty of Nursing, Assiut University; their opinions were formulated as regards to the tool format layout, consistency, knowledge accuracy, relevance and competence. Tool's reliability was confirmed by Cronbach Alpha test (0.95 and 0.87).

Pilot study: A pilot study was carried out and conducted on 10% of the sample (12 patients) to evaluate the applicability and clarity of tools. Based on the results of the pilot study, needed refinements and modifications were made.

Ethical Considerations: Research proposal was approved from Ethical Committee in the Faculty of Nursing, Assiut University(IRB:1120230625) to safeguard the rights and welfare of the participants throughout the research process. There was no risk for studying subjects during application of the research. The study followed common ethical principles in clinical research. Oral consent was obtained from patients who were willing to participate in the study, after explaining the nature and purpose of the study. All data collected was coded and securely stored, with personal identifiers excluded from the datasets. Participants' privacy and dignity were always respected.

Procedure: It was accomplished through three phases:

Phase (I): Preparatory phase

This phase focused on the administrative arrangements necessary to implement the study. It also involved the development and preparation of data collection tools and the design of supported early mobilization and exercises booklet, based on a thorough review of relevant literature, journals, and textbooks **((Herdman et al., 2011; Eton et al., 2020; Assouline et al., 2021, & Leivaditis et al., 2024).**

Phase (II): Implementation phase

Immediately after arriving to Emergency department, all patients referred to ICU where they received conservative treatment "invasive or noninvasive mechanical ventilation" up to hemodynamic stability "approximately two weeks since ICU admission"; then all patients transferred to trauma department where researchers started data collection; Data collection started from June 1, 2023, to December 31, 2023. At the initial interview, the researcher introduced self to establish rapport and facilitate communication with participants. Following an explanation of the study purpose and nature, voluntary informed consent was obtained from eligible patients. Those meeting the inclusion criteria were approached by the researcher. Baseline demographic and clinical data were collected using tool 1. Pain level was assessed using tool II, and quality of life was assessed using tool III. The control group received standard care while study group received intervention.

The researcher delivered the intervention content in person, either to each patient separately or, on occasion, to small groups of three to five patients, over the course of two sessions. The **first session** aimed to equip patients with necessary information regarding supported early mobilization and exercises **Time**: 20 minutes. **Contents:** Inform patients about the purpose of the intervention; rapport building. Educate patients on normal respiration process, effect of chest trauma on respiration process, role of patient during intervention. encourage patients to ask questions and confirm patients understand what they were told. **Teaching method/media:** Lecture and illustrated pictures. **By the end,** a summary was made and time allowed for questions and answers & plan for next session was made.

The **second session** aimed to equip patients with necessary knowledge and skills for performing supported early mobilization and exercises. **Time:** 40 minutes. **Content:** In addition to routine care "chest physiotherapy" study group received demonstration and redemonstration for provided intervention that had begun after two-weeks post-injury" including early mobilization, thoracic and shoulder exercises. Encourage patients to repeat intervention steps as tolerated and confirm patients understand what they were received. Written instructions and maintained diary were provided to record adherence. **Teaching method/media:** recorded video on mobile screen,

illustrated pictures, and procedure checklist. **By the end,** a summary was made and time allowed for questions and answers.

Phase (III): Evaluation phase:

After two weeks where, patients still admitted in the hospital. The researcher reassessed patients' pain level using tool II and quality of life using tool III. Some patients still admitted up to one month where follow up completed in the hospital. However, discharged others resumed follow up at outpatient clinics. In each follow up, pain level and quality of life were assessed by using the same previously mentioned tools.

Statistical design:

The statistical package for (SPSS) version (23) was used to analyze data. Descriptive statistics was used for the quantitative data in all questions and the demographic data. Descriptive statistics included: means, standard division, frequencies, percentages, use Pearson Chi –Square (Cross tabulation) for relationship were done, independent-t test for mean scores and one way a nova test. The level of significance for this study was set at ($p \leq 0.05$) to detect any indication of differences found in the data available**.**

Results:

Table (1): Distribution of demographic and clinical data (n=120)

Variables	Study (n=60)		Control (n=60)		(P.value)
	N	%	N	%	
Age					
20 less than 40 years	24	40.00	24	40.00	1.000 ns
-40 less than 60 years	25	41.70	25	41.70	
-60and above	11	18.30	11	18.30	
Mean	45.67 45.67 ±14.64		45.67 45.67 ±14.64		1.000 ns
Sex					
Female	23	38.3	21	35.00	.850 ns
Male	37	61.7	39	65.00	
location of chest trauma					
Unilateral rib fracture	10	16.7	9	15.00	. 1.000
Bilateral rib fractures	27	45.0	29	48.3	.855
Radiological flail	15	25.0	13	21.7	.829
Extra-thoracic injuries	17	28.3	18	30.0	1.000
Mechanism of injury					
Fall from heigh	20	33.3	16	26.7	.550
Road traffic accident (RTA)	25	41.66	30	50.00	.912
Assault	9	15.0	9	15.0	1.00
Athletic activities	2	3.3	2	3.33	1.00
Cardiopulmonary resuscitation (CPR)	2	3.3	2	3.33	1.00
Metastatic rib lesions	2	3.3	1	1.66	1.00
Medical intervention					
Fixation	12	20.0	9	15.0	.632
Intercostal chest tube	41	68.3	39	65.0	.847
ICU length of stay	8.11± 8.34		8.100±9.133		.08
Hospital length of stay	28.91±3.431		32.81±12.538		.023*
Complications in hospital	27	45.0	38	63.33	.099
If yes;					
Chest infection	16	26.7	21	35.0	.765 ns
Emphysema	3	5.0	5	8.33	
ICT wound infection	6	10.0	11	18.33	
ICT dislodge	2	3.3	1	1.7	

Table (2): Mean scores of brief pain inventory among study and control groups (n=120)

Variables		Baseline	Two weeks	1 st month
Pain severity	Study	35.83±4.755	31.30±6.320	24.25±7.40
	Control	36.95±4.869	35.26±5.845	30.13±4.85
t-test (p.value)		1.271 (.206) ns	3.569 (.001) **	5.145) .000) **
Pain interference	Study	66.83±4.059	58.66±8.94	44.96±12.81
	Control	67.96±4.591	63.33±4.88	56.78±7.78
t– test (p.value)		1.432 (.155)	3.546 (.001) **	6.105 (0.000) **

Table (3): Comparison between study and control groups regarding Euro Qol 5-dimensions, 5-Levels (n=120)

Follow up time	Group	Baseline		Two weeks		1 st month	
QOL - 5 dimension		**N**	**%**	**N**	**%**	**N**	**%**
Mobility: No problems in walking	Study	0	0.0	0	00.	6	.05
	Control	0	0.0	0	0.0	0	0.0
Slight problems in walking	Study	0	0.0	1	0.8	18	15.0
	Control	0	0.0	0	0.0	7	5.8
Moderate problems in walking	Study	9	7.5	25	20.8	31	25.8
	Control	5	4.2	9	7.5	24	20.0
Severe problems in walking	Study	30	25.0	26	21.7	5	4.2
	Control	20	16.7	29	24.2	23	19.2
Unable to walk	Study	21	17.5	8	6.7	0	0.0
	Control	35	29.2	22	18.3	6	5.0
X2 (p. value)		**6.643 (0.036)**		**15.226 (0.002)**		**29.302 (0.000)**	
Self-care: No problems washing or dressing myself.	Study	0	0.0	0	0.0	1	0.8
	Control	0	0.0	0	0.0	0	0.0
Slight problems washing or dressing myself**.**	Study	0	0.0	1	0.8	23	19.2
	Control	0	0.0	0	0.0	2	1.7
Moderate problems washing or dressing myself.	Study	5	4.2	18	15.0	25	20.8
	Control	2	1.7	3	2.5	18	15.0
Severe problems washing or dressing myself.	Study	17	14.2	21	17.5	11	9.2
	Control	10	8.3	22	18.3	24	20.0
Unable to wash or dress myself	Study	38	31.7	20	16.7	0	0.0
	Control	48	40.0	35	29.2	16	13.3
X2 (p. value)		**4.263 (0.119)**		**15.828 (0.001)**		**40.608 (0.000)**	
Usual activities: No problems	Study	0	0.0	0	0.0	2	1.7
	Control	0	0.0	0	0.0	0	0.0
Slight problems in doing my usual activities.	Study	0	0.0	1	0.8	8	6.7
	Control	0	0.0	4	3.3	1	0.8
Moderate problems in doing my usual activities.	Study	1	0.8	13	10.8	31	25.8
	Control	0	0.0	4	3.3	11	9.2
Severe problems in doing my usual activities.	Study	16	13.3	20	16.7	12	10.0
	Control	5	4.2	17	14.2	14	11.7
Unable to do my usual activities	Study	43	35.8	26	21.7	7	5.8
	Control	55	45.8	35	29.2	34	28.3
X2 (p. value)		**8.231 (0.016)**		**8.136 (0.043)**		**34.903 (0.000)**	
Pain / discomfort: No pain or discomfort	Study	0	0.0	1	0.8	5	4.2
	Control	0	0.0	0	0.0	0	0.0
Slight pain or discomfort	Study	2	1.7	5	4.2	12	10.0
	Control	0	0.0	2	1.7	2	1.7
Moderate pain or discomfort	Study	4	3.3	14	11.7	29	24.2
	Control	1	0.8	6	5.0	15	12.5
Severe pain or discomfort	Study	27	22.5	30	25.0	13	10.8
	Control	10	8.3	24	20.0	28	23.3
Extreme pain or discomfort	Study	27	22.5	10	8.3	1	0.8
	Control	49	40.8	28	23.3	15	12.5
X2 (p. value)		**17.979 (.000)**		**14.679 (.005)**		**34.335 (.000)**	
Anxiety / depression : Not anxious or depressed	Study	0	0.0	0	0.0	3	2.5
	Control	0	0.0	0	0.0	0	0.0
Slightly anxious or depressed	Study	1	0.8	3	2.5	9	7.5
	Control	1	0.8	3	2.5	2	1.7
Moderately anxious or depressed	Study	0	0.0	14	11.7	31	25.8
	Control	3	2.5	4	3.3	6	5.0
Severely anxious or depressed	Study	12	10.0	19	15.8	13	10.8
	Control	5	4.2	8	6.7	11	9.2
Extremely anxious or depressed	Study	47	39.2	24	20.0	4	3.3
	Control	51	42.5	45	37.5	41	34.2
X2 (p. value)		**6.046(0.109)**		**16.428 (0.001)**		**54.935 (0 .000)**	

Table (4): Comparison between study and control groups regarding total Euro Qol 5-dimensions, 5-Levels (n=120)

Variables	Group	Baseline		Two weeks		st month1	
		N	%	N	%	N	%
Indicates perfect health	Study	0	0.0	0	0.0	4	3.3
	Control	0	0.0	0	0.0	0	0.0
Indicates a very good health status	Study	0	0.0	0	0.0	7	5.8
	Control	0	0.0	0	0.0	1	0.8
Indicates a good health status	Study	0	0.0	1	0.8	11	9.2
	Control	0	0.0	0	0.0	1	0.8
Indicates a moderate health status	Study	1	0.8	9	7.5	27	22.5
	Control	0	0.0	3	2.5	6	5.0
Indicates a slightly impaired health status	Study	6	5.0	18	15.0	7	5.8
	Control	4	3.3	4	3.3	11	9.2
Indicates a moderately impaired health status	Study	13	10.8	22	18.3	3	2.5
	Control	6	5.0	20	16.7	25	20.8
Indicates a severely impaired health status	Study	14	11.7	4	3.3	1	0.8
	Control	11	9.2	13	10.8	11	9.2
Indicates an extremely impaired health status	Study	26	21.7	6	5.0	0	0.0
	Control	39	32.5	20	16.7	5	4.2
X2 (p. value)		**6.939 (0.139)**		**25.307 (0.000)**		**61.705(0 .000)**	

Table (1): Shows that; there are no statistically significant differences between the study and control groups in terms of demographic and clinical characteristics. The mean age in both groups is 45.67 ± 14.64 years. Male comprises more than half of patients in both groups (61.7% in the study group and 65.0% in the control group). Approximately half of patients have bilateral rib fractures (45.0% and 48.0%, respectively).

Regarding the mechanism of injury, the most common cause was road traffic accidents, accounting for 41.66% in the study group and 50.00% in the control group. Many patients in both groups required intercostal chest tube insertion (68.3% in the study group vs. 65.0% in the control group). The study group experienced a shorter hospital stay, with a mean duration of 28.91 ± 3.43 days, compared to 32.81 ± 12.54 days in the control group. Although chest infection was the most frequent complication in both groups, it was less common in the study group, though the difference was not statistically significant.(P=0.765) **Table [1].**

Table (2): Demonstrates a marked decrease in pain severity score among the study group, with scores dropped from 35.83 ± 4.76 at baseline to 24.25 ± 7.40 after one month ($p < 0.001$). Similarly, the total pain interference score in the study group went down significantly from 66.83 ± 4.06 at baseline to 44.96 ± 12.81 after one month, showing a notable improvement compared to the control group ($p = .000$).

Table (3): Reflects that there are statistically significant differences between study and control groups regarding five dimensions of Euro Qol 5-Levels (EQ5D-5L) scale especially at 1 month ($p < .001$).

Table (4): At baseline, most patients in both groups had moderate to extreme impairment, with none reporting perfect or very good health. After two weeks, the study group showed marked improvement, reducing the "extremely impaired" category from 21.7% to 5.0%, while the control group improved less. By one month, the study group achieved further gains, with some reaching perfect, very good, or good health, and no participants remaining in the "extremely impaired" category. In contrast, 32.5% of the control group remained extremely impaired with minimal improvement in higher health levels.

Discussion:

Early mobilization and exercise are essential for recovery from chest trauma, helping to minimize complications such as pneumonia and muscle wasting. These interventions enhance lung function, relieve pain, boost psychological health, and speed up functional recovery, ultimately leading to a better quality of life. Regarding the demographic data: the present study illustrated that there was no statistically significant difference between the study and control groups prior to the application of early mobilization and exercises, suggesting that both groups were comparable in terms of demographics.

The mean age in both groups was 45.67 ± 14.64 years, suggesting that chest trauma commonly affected individuals in middle adulthood. This age distribution may reflect increased exposure to risk factors such as road traffic accidents, occupational hazards, or physical activity during this stage of life.

Additionally, male comprised more than half of the participants in both groups, which is consistent with existing literature **(Simon & Wickham, 2019; St-Laurent et al., 2022)** indicating a higher incidence of trauma among male. This gender disparity may be attributed to greater involvement in high-risk behaviors or occupations typically dominated by men. Also, the present study found no statistically significant difference between both groups before application of the supported early mobilization and exercises regarding their medical data. The lack of statistically significant differences between the groups ensures that both groups were well-matched in terms of their medical data. This strengthens the validity of study results by confirming that any differences in recovery outcomes are likely due to the intervention, rather than differences in health conditions or medication use. since both groups started with similar health conditions and were receiving the same medical interventions, any differences observed after the application of early mobilization and exercises can more confidently be attributed to the intervention itself, rather than pre-existing differences in health status or medical treatment.

The present study found the majority of patients in both groups experienced trauma due to road traffic accidents with no significant difference. The researcher suggested that both groups are subjected to comparable injury patterns, potentially leading to similar recovery challenges. In this context, **Caragounis et al., (2021)** found that many of trauma patients experienced injuries due to road traffic accidents and found that the distribution of RTAs was consistent across different study groups. on the other hand, **Prins et al., (2020)** reported that a significant difference in the incidence of RTAs between different patient groups, with younger male patients being more likely to experience trauma from high-energy events like RTAs, while older patients, particularly women, experienced trauma more commonly due to falls.

The current study revealed that the study group had a shorter hospital stay compared to the control group. While chest infection remained the most common complication in both groups however, it occurred less frequently in the study group, although the difference was not statistically significant. Similarly, research by **Coles et al. (2020) & Monsees et al. (2023)** demonstrated that early mobilization significantly decreases respiratory complications and shortens hospital stays, suggesting wider recovery advantages from early interventions.

The study revealed a significant reduction in both pain severity and pain interference scores in the intervention group after one month, indicating meaningful improvements in patients' pain perception and daily functioning. These findings highlight the clinical effectiveness of the intervention and are consistent with prior research. Similar trends were reported by **Alaparthi et al. (2020) & Escalon et al. (2020),** who found that early mobilization and physical exercises significantly reduced pain over time in post-surgical and post-trauma patients, respectively.

The present study found a statistically significant improvement in EQ-5D-5L scores among chest trauma patients in the study group from baseline to two weeks and one month after early mobilization and exercise, indicating both short-term and sustained benefits in physical and mental health. These results support early rehabilitation to enhance overall quality of life (QoL).Supporting evidence from previous studies **(Smith et al., 2022; Jones et al., 2021; Liu et al., 2020; Nguyen et al., 2020)** shows early mobilization improves respiratory function, reduces complications, and promotes physical and emotional recovery.However, some studies **(Brown et al., 2021; Miller et al., 2020; Zhao et al., 2021; Peters et al., 2020; Baker et al., 2021; Huang et al., 2024)** report no significant QoL differences or even negative effects, attributing this to severe pain, psychological distress, or injury severity. These conflicting results may be due to variations in patient populations, recovery timelines, or intervention timing.

Also, the results of the present study demonstrated a statistically significant improvement in EuroQol 5-Dimensions 5-Levels (EQ-5D-5L) scores for mobility, self-care, and usual activities over time (baseline, two weeks, and one month) in the study group compared to the control group following the application of early mobilization and exercises. These significant improvement highlights the critical role of the supported early mobilization and exercise. In this line, study by **Henry et al., (2024)** reported that early mobilization programs in trauma patients significantly reduced dependency in self-care activities within the first month post-injury. In contrast, **Berk et al., (2023)** reported that early mobilization may not yield immediate benefits in self-care or usual activities, particularly in patients with severe trauma or comorbidities. **Lau et al., (2024)** added that pain and psychological distress could delay observable functional improvements despite physical activity.

Furthermore, the results of the present study indicated a statistically significant improvement in the dimensions of pain/discomfort and anxiety/depression over time (baseline, two weeks, and one month) in the study group compared to the control group following early mobilization and exercise. This suggests that these interventions positively impact not only

physical recovery but also psychological well-being among patients with chest trauma. The researcher's opinion that the significant reduction in pain and discomfort in the study group highlights the efficacy of early mobilization and exercise in managing trauma-related pain. Mobilization likely reduces stiffness, enhances circulation, and prevents secondary complications such as joint immobility, which are common contributors to persistent pain.

Burback et al., (2024) highlighted the interplay between physical activity and psychological outcomes, emphasizing that movement-based therapies can reduce inflammation and promote neurochemical balance. Similarly, **Antos et al., (2024)** found that mobilization reduced anxiety in hospitalized patients, suggesting that activity may buffer against trauma-induced stress and depression.

Muñoz et al., (2023) implied that some individuals may require adjunct interventions, such as psychological counseling or pharmacological pain management, to achieve comparable benefits.

Conclusion:

The current study concluded that both groups had similar demographic and clinical profiles, mostly male aged 20–40 with bilateral rib fractures from road traffic accidents. The study group had a significantly shorter hospital stay and showed notable improvements in all areas of the Euro Qol 5-Dimensions 5-Levels after receiving supported early mobilization and exercise.

Recommendations:

- Implementing supported early mobilization and exercises is strongly recommended as part of standard care for patients with chest trauma.
- Conducting additional studies with longer follow-up periods and larger sample sizes is suggested to verify the sustainability and generalizability of these effects.

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