

# Effect of Safety Measures Precautions on Pain and Quality of Life among Orthopedic Patients with External Fixation

Nour Mansour Mohamady Mohamed<sup>1</sup>, Nadia Mohamed Taha<sup>2</sup>, Elham Hamad Mohamed<sup>3</sup>, Maha Desoky Saleh Saker<sup>4</sup>

(<sup>1</sup>) Assistant Lecturer of Medical Surgical Nursing, Faculty of Nursing, Zagazig University.

(<sup>2</sup>) Prof of Medical Surgical Nursing, Faculty of Nursing, Zagazig University.

(<sup>3</sup>) Assist Professor of Medical Surgical Nursing, Faculty of Nursing, Zagazig University.

(<sup>4</sup>) Lecturer of Medical Surgical Nursing, Faculty of Nursing, Zagazig University.

**Corresponding author: Nour Mansour Mohamady Mohamed**

Email: [nour.mansour.90@gmail.com](mailto:nour.mansour.90@gmail.com) Tel: 01010762495

## Abstract:

**Background:** External fixators are golden method in controlling fractures however, a key drawback to its use is high incidence of pin-tract infection, pain, disability and decrease quality of life.

**Aim of the study:** was to evaluate the effect of safety measures precautions on pain and quality of life among orthopedic patients with external fixation

**Subjects and Methods: Research Design:** A quasi experimental design was utilized in this study.

**Setting:** The study was conducted at orthopedic departments at Accidents hospital and Outpatient hospital at Zagazig University Hospitals.

**Subjects:** Purposive sample of 40 orthopedic patients with external fixation divided into two groups each group consisted of 40 patients.

**Tools of data collection:** Three tools were utilized for data collection patients' interviewing questionnaire, Safety measures precautions, quality of life questionnaire.

**Results:** revealed that more than half of patients aged below 30 years, more than three quarter were male, there was increase in patients' total knowledge, self-care practice, total safety measures, there was decrease in pain level, and improve quality of life post intervention and in follow up compared to pre intervention. There was a statistically highly significant difference in relation between high quality of life and academic qualification, there were negative correlations between pain with each of (knowledge, self-care practice, safety measures and total quality of life).

**Conclusion:** safety measures precautions significantly improved patients' knowledge, practice, pain, and quality of life, pain has a statistically highly significant effect on quality of life.

**Recommendations:** safety measures should be included in routine nursing care and patient education.

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## **Introduction:**

More than 500 million people are injured each year worldwide, with more than 25% sustaining an orthopedic injury. Many are hospitalized and require surgery. Orthopedic trauma surgery is associated with severe acute pain and infection rates, with high pain scores in 50% of patients. These factors are affecting the quality of life of orthopedic patients (Edgley, et al., 2019). Orthopedic trauma can have a profound socioeconomic impact on patients, particularly within a year of injury including: ongoing pain, significant disability and lose employment due to injury (Suroto, et al 2021).

External fixators are orthopedic devices that are used to stabilize fractured bones and correct their position and orientation with minimally invasive techniques. These devices are comprised of elements which pass through the bones such as pins or wires interconnected with a stabilizing structure outside the body, external fixation methods allow the realignment of the bone segments without surgically exposing them (Widanage, et al., 2023)

The biological benefits of frame fixation are well documented; however, a key drawback to the use of percutaneous fixation is the incidence of pin-site infection (PSI) which is a common side effect of external fixation with estimated rates between 9 and 100%. It is therefore our duty as care providers to take steps to minimize infection, appropriately diagnose and rapidly treat PSIs when they develop. a precise documentation of a controlled methods for pin insertion, providing education as safety measures to the setting/individuals performing the pin-site care, policies on showering, dealing with crusts and frequency of dressing changes will be necessitated. (Shields, et al., 2022)

## **Significance of the study**

With the increasing numbers of fractures worldwide and the associated rates of external fixation devices as a vital option in fracture management. Orthopedic patients with external fixation devices need specialized education regarding complication management including pin tract infection, disability, pain and decreased quality of life. The nursing care should be started at the preoperational period through providing advices on physical and mental preparation, pain management, complication monitoring, rehabilitation by promoting exercise. (Mandour, et al.2022)

Therefore, it was necessary to conduct this program to increase patient awareness regarding safety measures precautions to decrease pain and improve patients' quality of life and help returning him to normal or near normal functioning levels and decrease dependency on others.

## **Aim of the study:**

The current study aimed to evaluate the effect of safety measures precautions on pain and quality of life among orthopedic patients with external fixation.

### **Research Hypothesis:**

1. The level of knowledge and practice will be improved among orthopedic patients with external fixation after the implementation of safety measures precautions.
2. Pain will be improved among orthopedic patients with external fixation after the implementation of safety measures precautions
3. Quality of life will be improved among orthopedic patients with external fixation after the implementation of safety measures precautions

### **Subjects and methods:**

#### **Research Design:**

A quasi experimental design was utilized in this study.

#### **Study Setting:**

Orthopedic departments at Accidents hospital and Outpatient hospital at Zagazig University Hospitals

#### **Subjects:**

Purposive sample of 40 orthopedic patients with external fixation divided into two groups. Each group consisted of 40 patients: pre-safety measures precautions group and post-safety measures precautions group.

#### **Tools of data collection:**

Three tools were used to collect the necessary data

#### **Tool I - Patients' interviewing questionnaire:**

It involved the following three parts to cover the following data:

Part 1: this part concerned with the assessment of patients' demographic characteristics

Part 2: to assess patients' knowledge about self-care and external fixation

#### **The scoring system**

each correct answer =one (1) and incorrect answer and don't know=zero (0).

Unsatisfactory level of knowledge: for those who had score % < 60% of the maximum score.

Satisfactory level of knowledge: for those who had score %  $\geq$  60% of the maximum score.

**Part 3: Patient's self-care practice checklist:** questions to assess patients' self-care practice.

#### **Scoring System:**

Score 1 was given if the patient correctly did the practice and score 0 if not.

Unsatisfactory level of practice: for those who had score % < 60% of the maximum score.

Satisfactory level of practice: for those who had score %  $\geq$  60% of the maximum score.

**Tool II: safety measures precautions:** developed by researcher after review of literature

#### **The scoring system**

Score 1 was given if the patient answer was Yes and score 0 if answer was No.

Inadequate level: for those who had score % < 60% of the maximum score.

Adequate level: for those who had score %  $\geq$  60% of the maximum score.

### **Tool III: World Health Organization quality of life questionnaire**

#### **Scoring system:**

Each item was scored based on a 5-point Likert scale, ranging from (1) very dissatisfied to (5) very satisfied. Total scores range between 23 and 115, with higher scores indicating higher level of QOL. A total percent score of 60% or higher was considered as high while a score < 60% was considered as low.

**Numerical pain score:** number from 0 to 100, zero represents no pain, 10-30 for mild pain, 40-60 moderate pain and 70-100 severe pain.

#### **Administrative and Ethical Consideration:**

A permission was taken from the dean of faculty of Nursing, from the manager of Zagazig University Hospitals and from the head of orthopedic department, participants oral permission was taken after full explanation of the aim of the study. The researcher assured maintaining anonymity and confidentiality of the participants.

#### **Pilot study:**

A pilot study for tools of data collection was carried out on four patients within selected criteria in order to test for clarity, relevance, comprehensiveness, understandable, feasible, applicability and ease for implementation. The results of the data obtained from the pilot study helped in modification of the tools, items were then corrected or added as needed.

#### **Field work:**

Implementation phase for data collection started as following: The selection of patients, the collection of data, and the implementation of the safety measures lasted over a period of 11 months. The questionnaire was designed by the researcher. Data used was collected three days per week in the morning and afternoon where the safety measures were implemented, from 10:00 am to 1:00 pm. patients were grouped; each group included 4-5 patient. Each interview took approximately 30 minutes in each theoretical session and 45 minutes in each practical session. The data was collected in a simplified Arabic language. The safety measures consisted of 18 sessions; one third of the sessions (6) were theoretical, and two thirds (12) were practical. The total time of safety measures duration took 11 months: 5months in the pre intervention guidelines phase, two months in the theoretical part and four months in the practical part.

#### **Assessment phase:**

The program was constructed on the assessment of patients' knowledge and practice before implementation of the program by interviewing each patient individually to assess their knowledge by using tools.

#### **Planning Phase:**

Based on the results obtained from the pilot study and assessment phase as well as reviewing the related literature, the safety measures were planned and designed by the researcher. Detected needs, requirements and deficiencies were translated into aim and objectives of the program and

set in the form of the booklet that was prepared by the researcher and its content was validated by scientific committee.

**Teaching methods** were selected to suit teaching in small groups in a form of lectures, and group discussion.

**Teaching materials** were prepared as booklet (handout), brochures, videos and colored posters that covered theoretical and practical information.

#### **Implementation phase:**

The program was implemented through eighteen sessions in which the patients were given the program in groups. The length of each session varied according to the content of the session and the patient's responses and it ranged from 30-45 minutes.

#### **Evaluation Phase:**

Evaluation was done immediately post safety measures implementation and 1 month follow up. The evaluation was done to assess patient's knowledge, practice, pain and quality of life through comparing the results of the pre, post, and follow up tests to assess the continuous effect of safety measures.

#### **Content validity & reliability:**

- **For validity assurance purposes**, Content validity was used for the modified tools and the designed booklet to determine whether the tools covered the aim or not. It developed by a jury of five experts from faculty of Nursing, Zagazig University.
- Reliability of tools was done by using Cronbach's Alpha test to measure the internal consistency for the components of tools.

#### **Statistical analysis:**

All data were collected, tabulated and statistically analyzed using SPSS 20.0 for windows. Mc nemar test or marginal homogeneity was used to compare between two dependent groups of categorical data. Wilcoxon signed ranks test was used to compare between two dependent groups of non- normally distributed variables. Percent of categorical variables were compared using Chi-square test or Fisher's exact test when appropriate. Spearman correlation coefficient was calculated to assess relationship between study variables, (+) sign indicate direct correlation & (-) sign indicate inverse correlation. Multiple linear regression (step-wise) was also used to predict factors which affect Quality of life and disability scores.

#### **Results:**

**Table (1)** showed that more than half of the patients (55%) aged below 30 years with mean  $\pm$  SD  $34.25 \pm 13.06$  years. Most of studied patients (85%) were male. As regards marital status half of the patients (50%) were married. More than half of the patients (62.5%) were educated. Furthermore, slightly more than half of studied patients were employed (52.5%). Additionally, most of the patients (90%) lived in rural area.

**Table (2).** Revealed that there was a highly statistically significant differences in total mean scores of quality of life and its four domains among orthopedic patients with external fixation in pre-intervention and post-intervention phase with p. value was 0.001. Also it showed a highly statistically significant differences in social health, environmental health and total quality of life in post-intervention and follow up phase with p. value was 0.001

**Table (3):** Revealed that there was increase in high quality of life score among orthopedic patients with external fixation in post intervention and follow up phase compared to pre intervention (70.0%, 62.5%, 5.0%) respectively, it also showed that there was a highly statistically significant differences in total quality of life score pre and post intervention with p. value was 0.001.

**Table (4)** Revealed that there was decrease in severe pain score among orthopedic patients with external fixation in post intervention compared to pre intervention (27.5%, 62.5%) respectively with mean  $\pm$  SD ( $72.35 \pm 18.46$ ,  $58.87 \pm 14.43$  and  $52.37 \pm 20.15$ ) respectively in pre, post and follow up phase, it also showed that there was a highly statistically significant differences in pain score pre and post intervention with p. value was 0.001

**Table (5)** Showed that there was a statistically significant difference in relation between high quality of life and academic qualification of patients with p value (0.030 and 0.042) in post-intervention and follow up phase respectively

**Table (6)** illustrated that only pain has a statistically highly significant effect on quality of life of orthopedic patients with external fixation with P .001. It also revealed that an inverse correlation was found between pain level and total quality of life (-0.507) with P value was 0.001

#### Discussion:

Regarding demographic characteristics, results of the present study revealed that more than half of the patients aged below 30 years old, this result may be regarded to the fact that this age group spent most of their time out of homes. Also, they characterized by high level of activity and therefore they are vulnerable to risky behaviors and accidents. The finding of the present study is supported by **Sayed et al., (2019)** in study about “Effect of Nursing Management on Pin Site Infection Among Incidence Patients with External Fixators” at traumatology department at Assiut University Hospital, they found that the greater part of patients’ age ranged between 18-30 years’ old

The finding of the present study disagrees with **Abbas & Awadelseid, (2020)** in study about “Outcome of Pin Tract Care in Sudanese Patients Treated with Ilizarov” conducted in north Khartoum hospital, they found that the greater part of patients’ age ranged between 32.5 years.

Our study findings were not in the same line with a study conducted by **Khorais et al (2018)** in his study titled “Self-Care Program: Quality of Life and Satisfaction among Patients with External Skeletal Fixation” conducted in the orthopedic departments and outpatient clinic at El-Demerdash hospital, Cairo which showed that the mean age of the patients was thirty years.

The result also disagrees with **Abouelala et al (2023)** in the study “Effect of Self-management protocol on Early Outcomes among Patients with Lower Limb External Fixator” carried out in the orthopedic departments Mansoura University hospital.

Regarding the patients' sex: Most of studied patients were male this finding agrees with **Morsy et al, (2021)** who found in the study “Effectiveness of Nursing Guidelines Regarding Self- Care Strategies for Patients with External Skeletal Fixation” that males were more prevalent than female this may be due to males more involved in outdoors activity and more vulnerable to accidents due to their nature of work.

On the other hand, this finding disagreed with **Xing et al. (2020)** who made a study about “Factors influencing self-care in outpatients with external fixation” in China, who reported that more than half of patients were females. This finding also disagrees with **Amarilla-Donoso et al (2020)** in the study “Quality of life in elderly people after a hip fracture: a prospective study” conducted in two university hospitals in the province of Cáceres who found that most of study patients were females.

Related to marital status, the present study revealed that half of the studied patients were married. this may be related to most of patients' age ranged from 20 -60 years and patients in this age are expected to be married but the elevated costs of marriage may delay it for some men. The result agrees with **El-Shishtawy & Mohamed (2022)** in their study “Effect of Self-Management Protocol on Dietary Adherence for Patients with Kidney Stones undergoing Shock Wave Lithotripsy Technique” performed at Urology Outpatient at Zagazig University Hospital.

Regarding educational level, the present study revealed that more than half of the patients were educated this result was incongruent with **Xing et al., (2020)** who found that more than half of patients' had an education level of junior high school or lower this may be due to the fact that education became of great concern in current days. In contrast with this finding **Khorais, et al., (2018)** showed that nearly a third of the studied patients were illiterate.

Concerning occupation, it was observed that the more than half of studied patients' were employed this agrees with **Badr et al, (2021)** in the study “Effect of safety measures educational program on the incidence of infection, satisfaction, and anxiety level among orthopedic patients with external fixation” who showed manual workers represented more than half of the studied patients this may be due to the nature of the work which lead them to be more liable to accidents and fractures. On the other hand, this finding disagreed with **Xing et al, (2020)** they found that more than half of participants engaged in light physical activity.

Additionally, most of the patients lived in rural area this agrees with **Mohamed et al., (2020)** in the study "Nurses Performance Regarding Orthopedic Patients with External Fixation at Zagazig University Hospitals" they found that half of studied sample lived in rural area this may be due to decrease obligation of traffic laws in rural areas thus increasing incidence of accidents and fractures.

As regards to patients' pain the present study revealed that; there was decrease in severe pain score among orthopedic patients with external fixation in post intervention compared to pre intervention, on the other hand there was increase in patients' knowledge about pain in post intervention and follow up phase compared to pre intervention this agrees with (Said et al 2020) who revealed that concerning assessing pain level of the patients, it was noted that; it was done by less than half of the nurses and the rest were dealing with the pain as a pain medication giver when a patient asks this may be due to reduction in nurses knowledge about pain and work load leaving no time for proper pain assessment and management.

This finding was in agreement with Kodama et al. (2018) in the study "Joint distraction and early mobilization using a new dynamic external finger fixator for the treatment of fracture dislocations of the proximal interphalangeal joint" who confirmed that, at the final follow-up, pain averaged range: 0–2 on the numeric pain rating scale. In this context, (Hoogervorst-Schilp et al., 2016) in a study named "Postoperative pain assessment in hospitalized patients: National survey and secondary data analysis" they founded that; sever post-operative pain increases the incidence of postoperative complications, prolongs the length of stay, causes readmissions and significantly reduces patient's satisfaction and quality of life,

Stanghelle et al (2019) in the study "Associations between health-related quality of life, physical function and pain in older women with osteoporosis and vertebral fracture" ensured the importance of pain management and exercise in health care to increase health related quality of life (HRQoL). Also Gethin et al. (2020) in their study entitled "Evidence for person-centered care in chronic wound care: A systematic review and recommendations for practice" found that, significant improvements were reported in patient knowledge, pain and self-care behaviors.

In the same context (Yu et al 2022) mentioned in the study "Application and Effect Evaluation of Needle Tract Nursing after External Fixation with 2% Chlorhexanol Gluconate Gauze" that nursing measures can minimize pain and increase satisfaction of patients. it makes patients more comfortable in functional exercise and daily activities and improve patients' satisfaction after external fixator operation.

In addition, Awad & Hashem (2019) in the study "In- service Training Program Regarding Nurses' performance for Non- Pharmacological Pain Management Among Orthopedic Patients" conducted in orthopedic patients in El-Hadra hospital found that the majority of nurses perceived lack of knowledge regarding non pharmacological pain management methods as the main barrier to utilize the non-pharmacological pain management methods and they had lack of time, workload, patient unwilling, and patients refuse of non-pharmacological methods.

This study finding is supported by (Yaban., 2019) In the study "Usage of Non Pharmacologic Methods on Postoperative Pain Management by Nurses: Sample of Turkey" stated that; nurses have never used or have used little of non- pharmacological methods in pain management; they mostly try pharmacological pain management with analgesics. Moreover;

(Nwaneri, et al., 2018) in the study “Nurses’ Knowledge and Level of Utilizations of Non-Pharmacological Pain Control for Orthopedic” urged that massaging and change of patient position were most often used by orthopedic nurses to relive patient's pain.

Chapagain, 2018 in the study “Nursing challenges of chronic pain management in geriatric Care” reported that nurses should improve and maintain their knowledge and skills with ongoing education. So, it is crucial that nurse is aware of the pain-relieving methods, both pharmacological and non- pharmacological, which are available and how and when to use them safely.

Salim, et al (2019) in the study “Effect of a Nursing In-Service Education Program on Nurses’ Knowledge and Attitudes towards pain Management in a Governmental Hospital in the United Arab Emirates: Experimental Random Assignment Study” reported that nurses’ knowledge toward pain management increased after the in- service education program.

The result of the current study revealed that there was a highly statistically significant differences in quality of life among orthopedic patients with external fixation regarding physical , mental, social and environmental health in pre, post intervention this agrees with Mahdian et al (2020) in the study “External fixation greatly improves outcomes in the surgical treatment of osteoradionecrosis of the jaws without affecting quality of life: a five-year retrospective study” who reported that external fixator reduced the probability of pathological fractures and increased the rate of successful healing in patients without greatly interfering with patients’ quality of life.

Also Emara, et al (2023) in the study “Extremities Fractures and Fixation and their Effects on Patients, Quality of Life” conducted at the Orthopedic Departments in Tanta University Hospital found that Extremities fractures and their surgical management including internal and external fixation have a considerable effect on all dimensions of patients’ quality of life with lower extremity fracture had the poorest quality of life scores than upper extremity fracture this agrees with findings of the current study it could be a normal result of our dependence on lower extremities in self-care activities and moving.

In the same context Amarilla-Donoso (2020) found that, patients experience considerable deterioration in their HRQoL, especially in self- care, daily activities, and mobility. There is also a significant decline in functional capacity of activities of daily living one month after surgery.

Bakr (2018) in the study “Effect of Educational Program on Quality of Life for Patients Post Hip Joint Replacement Patients’ disability” conducted at orthopedic department and outpatient orthopedic clinic at the Ain Shams University Hospital. Found that there was highly statistically significant relation between knowledge, practice and patients’ quality of life and there was satisfactory level of total knowledge and quality of life in the study group post implementation of the educational program.

In the same context Briguglio (2021) in the study “The Burdens of Orthopedic Patients and the Value of the HEPAS Approach (Healthy Eating, Physical Activity, and Sleep Hygiene)”

emphasized that the cornerstones of health promotion, prevention and recovery of musculoskeletal disorders include food, nutrition education, the promotion of an active lifestyle all these factors decrease the risk of long-term disability promote nourishment, movement, rest and considered to be the primary needs for a person's quality of life.

Gadallah & El Miedany (2022) in the study "Operative secondary prevention of fragility fractures: national clinical standards for fracture liaison service in Egypt—an initiative by the Egyptian Academy of Bone Health" mentioned that fractures have a significant negative impact on the patients' functional abilities as well as health-related quality of life. Fractures are also associated with high rates of morbidity and mortality whilst fracture occurrence can be a life-changing experience at the individual's level, with significant negative impact on the persons' mobility causing social isolation and possibly depression.

#### Conclusion:

Based on the finding of the present study it can be concluded that the safety measures precautions significantly improved patients' knowledge, practice, pain and quality of life.

#### Recommendations:

In the light of the findings of the current study, the following are recommended:

- The educational intervention and safety measures should be included in routine nursing care and patient education as a protocol before and after external fixation surgery.
- Increase patients' awareness about the importance of pin site care and periodic check up to prevent developing any complications which can effect on their quality of life.

**Table 1: Frequency and Percentage Distribution of Demographic Characteristics of Orthopedic Patients with External Fixation (n=40).**

| Demographic Characteristics | No.               | %    |
|-----------------------------|-------------------|------|
| Age (years)                 |                   |      |
| 20-<30                      | 22                | 55.0 |
| 30-<40                      | 4                 | 10.0 |
| >40                         | 14                | 35.0 |
| Mean $\pm$ SD               | 34.25 $\pm$ 13.06 |      |
| Gender                      |                   |      |
| Male                        | 34                | 85.0 |
| Female                      | 6                 | 15.0 |
| Marital status              |                   |      |
| Married                     | 20                | 50.0 |
| Not married                 | 20                | 50.0 |
| Academic qualification      |                   |      |
| Educated                    | 25                | 62.5 |
| uneducated                  | 15                | 37.5 |
| Job                         |                   |      |

|               |    |      |
|---------------|----|------|
| Works         | 21 | 52.5 |
| does not work | 19 | 47.5 |
| Residence     |    |      |
| Urban         | 4  | 10.0 |
| Rural         | 36 | 90.0 |

**Table (2): Total Mean Scores of Quality of Life and Its Domains Throughout Study Phases (n=40).**

| Quality of life      | Pre         | Post       | Follow up  | wP1     | wP2     |
|----------------------|-------------|------------|------------|---------|---------|
|                      | Mean ± SD   |            |            |         |         |
| Physical health      | 11.35±3.58  | 17.42±2.56 | 16.45±2.67 | 0.001** | 0 .089  |
| Mental health        | 11.00±3.41  | 17.27±6.27 | 15.92±2.26 | 0.001** | 0 .304  |
| Social health        | 5.20±1.28   | 8.12±1.52  | 6.77±1.74  | 0.001** | 0.001** |
| Environmental health | 11.30±2.66  | 19.87±2.73 | 11.30±2.66 | 0.001** | 0.001** |
| Total                | 41.07±11.05 | 61.05±8.59 | 51.95±7.34 | 0.001** | 0.001** |

W: Wilcoxon Signed Ranks Test, non-significant ( $p>0.05$ ), \*\*: statistically highly significant ( $p<0.001$ ),  $p^1$ : for comparison between pre-intervention and post-intervention,  $p^2$ : for comparison between post-intervention and follow up phase.

**Table (3): Frequency and Percentage Distribution of Orthopedic Patients with External Fixation Regarding Total Quality of Life Score Throughout Study Phases (n=40).**

| Quality of life score | Pre |      | Post |      | Follow up |      | MC p1   | MC p2 |
|-----------------------|-----|------|------|------|-----------|------|---------|-------|
|                       | No  | %    | No   | %    | No        | %    |         |       |
| Low                   | 38  | 95.0 | 12   | 30.0 | 15        | 37.5 | 0.001** | 0.453 |
| High                  | 2   | 5.0  | 28   | 70.0 | 25        | 62.5 |         |       |

MC: Mcnemar test, non-significant ( $p>0.05$ ), \*\*: statistically highly significant ( $p<0.001$ ),  $p^1$ : for comparison between pre-intervention and post-intervention,  $p^2$ : for comparison between post-intervention and follow up phase.

**Table (4): Frequency and Percentage Distribution of Orthopedic Patients with External Fixation Regarding Pain Score Throughout Study Phases (n=40).**

| Pain score | Pre         |      | Post        |      | Follow up   |      | MH p1   | MH p2 |
|------------|-------------|------|-------------|------|-------------|------|---------|-------|
|            | No          | %    | No          | %    | No          | %    |         |       |
| No Pain    | 1           | 2.5  | 1           | 2.5  | 0           | 0.0  | 0.001** | 0.369 |
| Mild       | 0           | 0.0  | 2           | 5.0  | 9           | 22.5 |         |       |
| Moderate   | 14          | 35.0 | 26          | 65.0 | 20          | 50.0 |         |       |
| Severe     | 25          | 62.5 | 11          | 27.5 | 11          | 27.5 |         |       |
| Mean ± SD  | 72.35±18.46 |      | 58.87±14.43 |      | 52.37±20.15 |      |         |       |

MH: Marginal Homogeneity Test, non-significant ( $p>0.05$ ), \*\*: statistically highly significant ( $p<0.001$ ),  $p^1$ : for comparison between pre-intervention and post-intervention,  $p^2$ : for comparison between post-intervention and follow up phase.

Table (5): relation between Demographic Characteristics of Orthopedic Patients with External Fixation and Their High Quality of Life Score throughout study phases (n=40).

| Demographic Characteristics | High quality of life |       |             |      |               |      | $\chi^2$<br>( <sup>1</sup> p-value) | $\chi^2$<br>(2p-value) | $\chi^2$<br>( <sup>3</sup> p-value) |
|-----------------------------|----------------------|-------|-------------|------|---------------|------|-------------------------------------|------------------------|-------------------------------------|
|                             | Pre (n=2)            |       | Post (n=28) |      | Follow (n=25) |      |                                     |                        |                                     |
|                             | No                   | %     | No          | %    | No            | %    |                                     |                        |                                     |
| Age (years)                 |                      |       |             |      |               |      |                                     |                        |                                     |
| 20-<30                      | 1                    | 50.0  | 14          | 50.0 | 14            | 56.0 | 0.355<br>(0.837)                    | 2.152<br>(0.341)       | 0.450<br>(0.798)                    |
| 30-<40                      | 0                    | 0.0   | 4           | 14.3 | 3             | 12.0 |                                     |                        |                                     |
| >40                         | 1                    | 50.0  | 10          | 35.7 | 8             | 32.0 |                                     |                        |                                     |
| Gender                      |                      |       |             |      |               |      |                                     |                        |                                     |
| Male                        | 1                    | 50.0  | 24          | 85.7 | 21            | 84.0 | FET<br>(0.281)                      | FET<br>(0.99)          | FET<br>(0.99)                       |
| female                      | 1                    | 50.0  | 4           | 14.3 | 4             | 16.0 |                                     |                        |                                     |
| Marital status              |                      |       |             |      |               |      |                                     |                        |                                     |
| Married                     | 2                    | 100.0 | 15          | 53.6 | 11            | 44.0 | FET<br>(0.487)                      | FET<br>(0.731)         | FET<br>(0.514)                      |
| Not married                 | 0                    | 0.0   | 13          | 46.4 | 14            | 56.0 |                                     |                        |                                     |
| Academic qualification      |                      |       |             |      |               |      |                                     |                        |                                     |
| educated                    | 1                    | 50.0  | 21          | 75.0 | 19            | 76.0 | FET<br>(0.99)                       | FET<br>(0.030*)        | FET<br>(0.042*)                     |
| uneducated                  | 1                    | 50.0  | 7           | 25.0 | 6             | 24.0 |                                     |                        |                                     |
| job                         |                      |       |             |      |               |      |                                     |                        |                                     |
| works                       | 1                    | 50.0  | 13          | 46.4 | 12            | 48.0 | FET<br>(0.99)                       | FET<br>(0.311)         | FET<br>(0.527)                      |
| does not work               | 1                    | 50.0  | 15          | 53.6 | 13            | 52.0 |                                     |                        |                                     |
| Residence                   |                      |       |             |      |               |      |                                     |                        |                                     |
| Urban                       | 1                    | 50.0  | 3           | 10.7 | 3             | 12.0 | FET<br>(0.192)                      | FET<br>(0.99)          | FET (0.99)                          |
| Rural                       | 1                    | 50.0  | 25          | 89.3 | 22            | 88.0 |                                     |                        |                                     |

$\chi^2$ : Chi square test FET: Fisher exact test non-significant ( $p>0.05$ ), \*: statistically significant ( $p<0.05$ ),  $p^1$ : for pre-intervention,  $p^2$ : for post-intervention,  $p^3$  for follow up phase

Table (6) Step Wise Multiple Linear Regression for Predicting Factors Which Affect Quality of Life Score of Orthopedic Patients with External Fixation.

| Model      | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig.  | 95.0% Confidence Interval for B |             |
|------------|-----------------------------|------------|---------------------------|--------|-------|---------------------------------|-------------|
|            | B                           | Std. Error | Beta                      |        |       | Lower Bound                     | Upper Bound |
| (Constant) | 65.614                      | 4.019      |                           | 16.328 | .000  | 57.479                          | 73.750      |
| Pain       | -.233-                      | .064       | -.507-                    | -3.624 | .001* | -.363-                          | -.103-      |

\*\*: statistically highly significant ( $p < 0.001$ ).

R-square=0 .257, ANOVA: F= 13.135,  $P < 0.001$

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