The Effect of Implementing the Nursing Intervention Model for Patients with Upper Limb Burn on Their Clinical Health Status

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Abstract

Background: Upper limb burns represent a significant portion of burn injuries and are among the most functionally devastating due to their effect on essential motor activities and self-care abilities. **Aim of the study:**To evaluate the effect of implementing nursing intervention model for patients with upper limb burn on their clinical health status. **Design:**A quasi-experimental design is utilized. **Sample:** A purposive sampling of 80 adult patients from both genders who were randomly allocated and alternatively divided into two equal groups, study and control**. Setting:** The study was conducted in burn unit at general fayoum hospital.**Tools**: Four tools were used for data collection, (I) a Structured Interviewing Questionnaire, (II) Upper limb Joints flexibility assessment tool, (III) Muscle strength assessment tool, and (IV) Burn Specific Health Scale-Brief Instrument (BSHS-B). **Results:** two third of the studied patients in in study group were females (70%) and more than half of control group were females (55%), there was a statistically significance increase in mean of elbow flexion, Pronation, and supination angles (101.3, 65 and 64.5) after one week and significant more increase (143.8, 86.3 and 83.8) at discharge, 100% of patients developed Grade 5 (normal muscle strength) at discharge and three quarter of them reported good QOL, a shift supported by a highly significant Chi-square value ($X^2 = 52.6$, $p = 0.001$).**Conclusion**: there was a statistically significant improvement in upper limb joint function among patients in the study group implementation of the nursing intervention model.**Recommendation:**Applying continuous nursing rehabilitation intervention in large sample of burn patients and other setting for generalization.

Keywords:*Clinical health status, Upper limb burn, nursing intervention model.*

Introduction:

Vanet al., (2025) reported that burn injuries represent a global public health problem with profound clinical, functional, and psychosocial implications. They occur when the skin and underlying tissues are damaged by heat, chemicals, electricity, radiation, or friction. The skin, being the body's largest organ, serves as a barrier against infection, regulates temperature, and maintains fluid balance; thus, burn injury disrupts multiple physiological systems. ***Salingaroset al. (2025)*** specified that the upper limb, due to its frequent exposure and essential role in daily functions, is among the most commonly affected regions in burn injuries.

Malhotra et al., (2024) classifies burns into three levels: First-degree burns only affect the skin's outer layer. They cause discomfort, redness, and swelling. Second-degree burns affect both the top and bottom layers of skin. They cause inflammation, pain, redness, swelling, and blistering. Partial thickness. Third-degree burns affect the skin's deep layers. Full thickness. They result in white or blackened, burnt skin. The skin could be numb. Second-degree Burns are common and have a significant impact on the lives of those who are directly affected as well as those who are supporting them.

Zamanietal., (2025)demonstrated that burn injuries often result in complications, with contractures being a prevalent concern. Contractures represent a major source of morbidity for patients recovering from burn injury. Postburn

contractures often have a devastating impact on the quality of life and one's ability to perform activities of daily living. Although prevention remains the most rational approach, a significant percentage of burn survivors will develop functionally limiting. Contractures are defined as an inability to perform full range of motion (ROM) of a joint. Burns damage the skin and often the underlying soft tissue, muscle, and bone; therefore, burn-injured patients are at risk for developing joint contractures.

Khan et al,. (2025)added that upper extremity have a major effect than in lower extremity. Involvement of shoulder, elbow and hand has large impact on activity of daily living (ADL) such as bathing, dressing and toileting etc. Not only major joints but also involvement of small joints of hand and wrist may cause severe limitations to patients' functional independence. Hands are more vulnerable parts of human body due to close proximity to heat sources, and the fact that hands are usually used as a shield to protect the body.

Considerable clinical and research effort has gone into the prevention and treatment of scar contractures including positioning, splinting, exercise and surgical correction. Range of motion exercise is a key component of burn patient across all phases of care. Joint function may diminish as a result of bed rest, decrease protein, altered fluid and electrolyte levels and poor circulation until ultimately contracture occur **(Fanstone et al., 2025)**. Full range of motion joint exercise for all joints begins early in the wound management process and continues at regular daily interval. Active and passive exercises may be combined, depending on the patient's capabilities **(Slater et al., 2025)**.

Baldania&Baladaniya (2024)demonstrated thatexercises assists in maintaining and building muscle strength, maintaining joint function, preventing deformity, stimulating circulation, developing endurance, and promoting relaxation. Rehabilitation including nursing intervention model is a creative, dynamic process that requires a professionals nurses working together with patients and families. The health team members represent various disciplines, with each health professional making a unique contribution of the intervention process.

Miri et al. (2025) explain that intervention can comprise an active multidisciplinary program to improve the physical, mental, and social states of the patient and prepares him/her for return to society and routine life. During these programs, nurses have essential roles as coordinators between the patient, his family, and other members of the health team, as well as in the accurate assessment of the patient's condition from admission to discharge to minimize complications. Nursing intervention including education can provide active and informed participation of the patient to solve some of her problems. Since nurses have more interaction with patients than other members of the treatment team, they are more suited to communicate with, advise and educate patients. Patient education can also promote patient awareness.

Wardhan&Fahy, (2023) demonstrated that the nursing intervention model, which is based on the medical biology, psychology, and sociology model, systematically considers these factors and their complex interactions in understanding health and disease and medical service provision. Nurses play a crucial role in assisting patients who have suffered burns to adjust and deal with their new body image. They also educate patients on burn care and potential complications. Through rehabilitation instruction, psychological support, and discharge counseling, comprehensive rehabilitation nursing promotes the healing of burn patients.

Significance of the study:

Richards et al. (2025) reported that burn injuries remain a major global public health challenge, globally, 11 million people are affected by burn injuries every year, resulting in an estimated 180 000 deaths and substantial morbidity, with the vast majority occurring in low- and middle-income countries. In clinical practice, the most common type of burn is a

second-degree burn. initial data indicated that second-degree burns account for 85.4% of all burn cases, of which 56.3% are burns of less than 10% of the total body surface area (TBSA). Non-fatal burn injuries are also a leading cause of disability, contributing substantially to years lived with disability (YLDs).

Sagahet al. (2024) found that in Egypt, burn injuries remain a major public health concern due to a combination of factors including lack of safety awareness, limited access to specialized burn care, and insufficient follow-up rehabilitation services. Among these, second-degree (partial-thickness) burns of the upper extremities represent a critical focus due to their frequency and potential for preventable disability if not managed promptly and holistically. Based on information from the Central Agency for Public Mobilization and Statistics in Egypt's Statistical Records, estimated that up to 250,000 burn patients were being treated at Egyptian government hospitals. This number has increased between 2008 and 2011.

Zabihi et al. (2024) stated that while medical treatment focuses primarily on wound healing and infection control, nursing care plays a pivotal role in the patient's overall recovery. ***Ahmed et al. (2024)*** added that comprehensive nursing interventions such as patient education, pain management, early mobilization, psychological support, and scar care are essential in promoting functional independence and restoring overall health. However, few studies in Egypt have systematically examined the effectiveness of structured nursing intervention models on burn patients' clinical health status, particularly for upper-limb injuries.

Aim of the study:

This study aimed to; evaluate the effect of implementing the nursing intervention model for patients with upper limb burn on their clinical health status through the following objectives:

1. Assess clinical health status of patients with upper limb burn .
2. Design the nursing intervention model for patients with upper limb burn .
3. Implement the nursing intervention model for patients with upper limb burn .
4. Evaluate the effect of implementing the nursing intervention model on patients' clinical health status.

Research Questions:

1. What is the level of general health of the studied subject?
2. What is the level of physical status of the studied subject?
3. What is the level of mental status of the studied subject?
4. What is the level of social status of the studied subject?

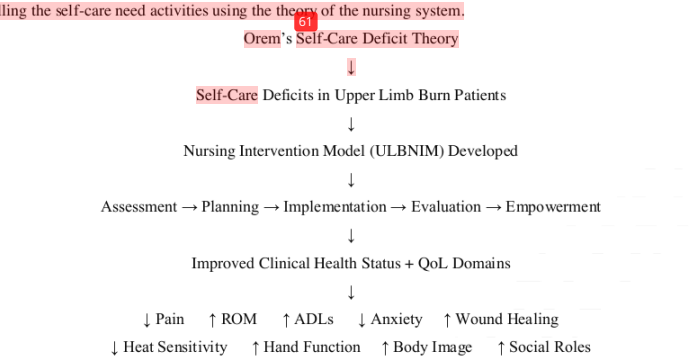
Research Hypothesis:

1. At the end of the study, studied subject who will receive the designated nursing intervention model will have a better general health.
2. At the end of the study, studied subject who will receive the designated nursing intervention model will have a better physical condition.
3. At the end of the study, studied subject who will receive the designated nursing intervention model will have a better mental condition.
4. At the end of the study, studied subject who will receive the designated nursing intervention model will have a better social condition.

Theoretical Framework

The present study employed Orem's Self-care Deficit Nursing Theory (SCDNT) as a theoretical framework of reference in implementing the self-care management program. **Esmaeilzadeh&Inuwa, (2024)** reported that SCDNT theory includes the theoretical constructs of Self-Care, Self-Care Deficits and Nursing Systems, all are interrelated, providing

support and foundations for nursing practice. According to the theory, **Kalkan&Karadağ, (2025)** added that nursing is required in situations of self-care deficits, which occurs when an individual is unable to fulfill self-care activities. It can encompass limitations in the ability to perform actions, or making decisions, knowledge and nurses play an essential role in fulfilling the self-care need activities using the theory of the nursing system.



Conceptual Flow of the present Study Framework, designed by the researcher

Subjects and Methods:

I. Technical Item:

Research design:

A quasi-experimental research design (study and control groups) was used.

Setting:

This study was carried out at the Burn Unit at General Fayoum Hospital, it is the only hospital receiving patients with burn in Fayoum, and it receives patients from all areas of EL-Fayoum governorate.

Type of Sample:

A purposive sample of 80 adult patients from both genders having second degree of recently dominant hand burn will be involved in this study

Inclusion criteria

1. Adult patients from both genders.
2. Second degree of recently burn patients.
3. Patients with dominant hand burn.
4. Patients who have burn involve wrist, elbow and fingers joints.

Exclusion criteria

1. Patients who have severe damage to their upper limb muscles,tendons, skeleton, and nerves.
2. Patients who have mental illness.
3. Patients with serious cardiac dysfunction and who are unconscious prior to the burn.
4. Those with serious complications involving the heart, brain, or lungs.

Sample size:

Based on sample size equation, (80) patient will be included in this study. The sample size was calculated by adjusting the power of the test to 80% and the confidence interval to 95% with margin of error accepted adjusted to 5% and a known total population of 80 patients using the following equation:

Tool for data collection:

Data was collected through using the following tools.

Tool I: Structured Interviewing Questionnaire (Appendix I)

This tool was developed and filled in by the researcher after reviewing of literatures to assess characteristics of patients with upper limb burn. It included the following two parts.

Part 1: Demographic data to cover the personal data and the characteristics of the studied patients such as (age, gender, educational level, occupation, marital status and residence). It included 6 items.

Part 2: Medical data (past & present medical history) included diabetes mellitus, hypertension, renal disease, duration of hospital stay, causes of burn, degree of burn, percent of burn, first aid, skin graft and joints affected). It included 13 items.

Tool II: Upper limb Joints flexibility assessment (pre /post): (Appendix II)

This tool was adopted from ***Norkin and White (2017),*** after reviewing related literature and applied by the researcher to assess flexibility of upper limb joints of dominant hand included (joints of elbow, wrist and fingers) by using a goniometer with a standardized technique for both (study and control) groups to measure the angles of joints in degrees (table 1) which scored by the patient with movement. This part was assessed three times (pre) when the patient admitted in the burn unit, (post one weak) from patient admission and at discharge.

Tool III: Muscle strength assessment tool (Appendix III)

This tool was adopted from ***Hermans et al.,(2012),*** by Medical Research Council (MRC), used to assess muscle strength of upper limb for both (study and control) groups by using manual muscle testing (MMT) scale which included a numerical scale of 0 to 5 to grade muscle strength, with 5 being normal and 0 indicating no muscle contraction. Grades 1-4 represent varying degrees of strength between these two extremes, reflecting the ability to move against gravity or resistance. It consisted of six points.

Tool IV: Assessment quality of life of upper limb burn patients through (Burn Specific Health Scale-Brief Instrument (BSHS-B)

This scale is adapted from ***Willebrand&Kildal (2008).*** It is a professional measurement tool for the assessment the quality of life (QoL) in terms of general, physical, mental, and social health aspects of the upper limb burn patients for both (study and control) groups on admissionand at discharge (before and after intervention). BSHS-B consists of 32 items covering seven well-defined domains including;(1) hand functioning activities such as writing, eating, tying shoelaces (5 items), (2) simple abilities as ability to bathe, dress, sit on chair (3 items), (3) affect emotions such as loneliness,sadness, inadequate social communication (7 items), (4) interpersonal relationships communications as problems with family, distance from family (4 items), (5) body image as impaired self-image from scars or unattractiveness from others (4 items), (6) heat sensitivity problems such as sun exposure, hot weather, skin sensitivity (4 items) and (7) treatment regimens as troubles with skin care, treatment procedures, time allocation (5 items).

Validity:

The content and face validity of the tools were done by a panel of five experts: two professors of medical surgical department from Faculty of nursing, Cairo University and 3 assistant professors of adult health nursing Faculty of Nursing, Helwan University who reviewed the content of the tools for comprehensiveness, accuracy, clarity, relevance, and applicability. Appropriate modifications were done.

Reliability:

Reliability of the tool was tested to determine the extent to which the questionnaire items are related to each other. The Cronbach's alpha test, the model of internal consistency, was used for the analysis. The researcher used a valid reliable standard tool. Statistical equation of Cronbach's alpha reliability coefficient normally ranges between 0 and 1; higher values (more than 0.7) denote acceptable reliability.

Ethical consideration:

- Ethical approval obtained from the scientific research, Ethical committee of faculty of Nursing - Helwan University.
- The study facilitation letter to conduct the study was received from the department of postgraduate studies at faculty of Nursing –Helwan University and sent to the director of Fayoum University hospital.
- An official permission was obtained from the administrative authorities of the selected hospital for the current study.
- The researcher assured confidentiality of data for every selected Patient involved in the study sample by using codes to identify participants instead of names or any other personal identifiers.
- The researcher obtained an oral and written consent from the studied patient after explaining the purpose and objectives of the study.
- The participation is voluntary, that patients they have the right to withdraw from the study at any time without giving any reason.

II. Operational Item:

Pilot Study:

The pilot study aims at testing clarity and applicability of each tool. It was carried out on 10% (8) of the study subjects chosen for the study setting previously mentioned. According to this pilot study, the required modifications were made. Those patients who were involved in the pilot study were included in the study.

uld be used only for the purpose of research.

Field work:

In this study, the researcher implemented the nursing intervention model designed to assist patients with upper limb burn in preventing joint contractures and deformities, maintain joint mobility, maximize functional recovery, enhance healing and reduce complications such as edema and stiffness, empower patients through educational booklet to actively participate in their rehabilitation, home care guidance and finally so on, ensuring the best possible outcomes for independence and quality of life.

I: Assessment phase:

During this phase, the researcher visited the selected setting regularly, four days per week, selected patient according to inclusion criteria, then assigned them randomly to either a study or control group. Initial assessment was done by the researcher for all study subjects in study and control groups regarding to participants' age, gender, educational level, occupation, comorbidities, burn severity and health history. Identify whether the patient's self-care deficits were due to limited mobility secondary to burn injury by evaluating their ability to perform necessary actions for burn care & recovery. Data collection was held through structured interviews and medical record chart. During this phase each patient was interviewed individually and data collection was filled by the researcher on admission (during first 24 hours from admission) for **tool (I) , tool (II), tool (IV)** and during first 24-72 hours for **tool (III)** for study and control groups as follows:

II: Diagnosis phase:

According to Orem's theory diagnosis provides the basis for selection of nursing interventions to achieve outcomes for which the nurse is accountable, actual problems includes: Impaired physical mobility related to pain and burn injury of upper limb, self-care deficit related to limited ROM (range of motion) and hand function, disturbed body image related to visible burn on dominant hand and temporary disability. Potential problem: risk for joint contracture related to improper positioning, lack of splinting and limited ROM (range of motion) exercises.

III: Planning and design phase:

This phase included analysis of the pre-test findings; where goals and outcomes are formulated that directly impact patient care. The researcher plan intervention, design the nursing intervention according to the patient's needs. Detected needs, requirements and deficiencies were translated into the aim and objectives of the nursing intervention sections in the form of designated nursing intervention (splinting, positioning & ROM exercises) and educational program (booklet). The objectives of intervention and education are to promote healing, prevent complication, improve self-care practices regarding burn care and improving quality of life.

IV- Implementation phase:

Based on the results obtained from the interviewing and observational sheets, as well as literature review, the nursing intervention program was developed by the researcher. It was implemented immediately after the pre-test.No intervention was performed for the control group during the study.

This includes implementing the nursing intervention model for the study group (40) patient, in term of applying splinting, positioning & ROM exercises and educational sessions. The program was divided into 6 sessions (2 theoretical, and 4 practical sessions) **appendix (IX)** each session was implemented according to patient's need. The duration of each session varied, according to its contents as well as the clients' response.

Theoretical part divided into 2 sessions:

Session (1): it took about 30-45 minute, started during first twenty-four hours post admission for patientshemodynamic ally stable.

Session (2): it took about 45-60 minute, It emphasized on how to avoid burn complications.

Practical part divided into 4 sessions:

Session (1): Positioning & Passive ROM

Session (2): Splint Fitting & Active-Assisted ROM

Session (3): Functional Use & Strengthening

Session (4): Final session and included two parts:

Part 1: It focused on developing a positive body image.

Part 2: Independent Practice & Program Review

VI- Evaluation phase:

Evaluation was done by using the posttest questionnaire which was the same format of pre-test in order to compare the changes in patients' upper limb joints function, muscle strength and quality of life using assessment tools (II, III, IV) post one week of admission and at discharge.

By discharge, the patient demonstrated a restoration of self-care agency, the core objective of nursing within the SCDNT model. Nursing actions were gradually withdrawn as the patient demonstrated mastery over essential self-care skills, fulfilling Orem's definition of nursing as a temporary, supportive role that becomes unnecessary when the individual regains the ability to meet their own care demands (**Orem, 2001**).

Administrative item:

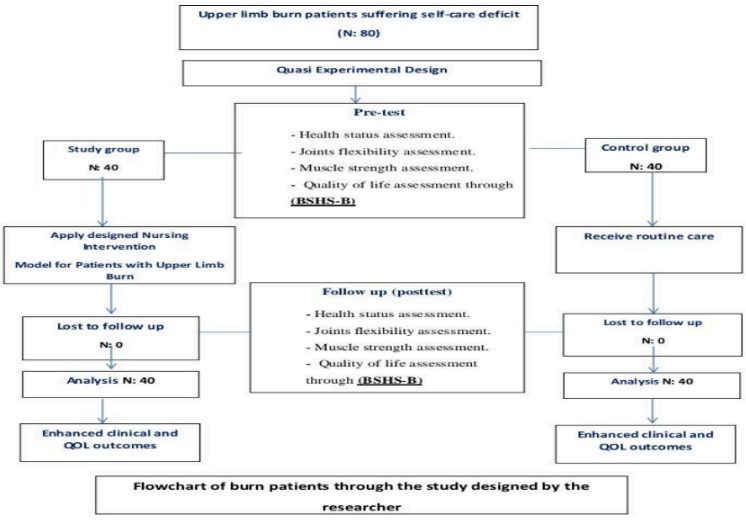
An official permission was obtained from the director of General Fayoum Hospital and Head burn unit where the study was conducted. A letter was issued to them from the Faculty of Nursing- Helwan University explaining the aim of the

study for obtaining the permission for data collection.

IV. Statistical analysis:

- Data collected and coded to facilitate data manipulation and double entered Microsoft Access and data analysis performed using the Statistical Package of Social Science **(SPSS)** software version 22 in windows 7 (SPSS Inc., Chicago, IL, USA).
- Simple descriptive analysis in the form of numbers and percentages of qualitative data, and arithmetic means as central tendency measurement, standard deviations as a measure of dispersion of quantitative parametric data.
- Quantitative data included in the study first tested for normality by One-Sample Kolmogorov-Smirnov test in each study group then inferential statistic tests selected.

- **For quantitative parametric data:**
  - Independent samples **t test** was used to compare quantitative measures between two independent groups
  - **Paired t-test** used to compare two dependent quantitative data.
- **For quantitative non-parametric data**
  - **The Mann-Whitney test** used to compare two **independent** groups.
  - **Wilcoxon tests** used in comparing two groups of **dependent** data
  - The **P-value< 0.05** was considered as statistically significant



Flowchart of burn patients through the study designed by the researcher

Results:

Table (1): illustrates that, the mean age of the studied patients in both study and control groups were (32.5, 32.6) respectively. About two third of the studied patients in study group were females (70%) and more than half of control group were females (55%).as regards to educational level for patients in both study and control groups the more than one quarter and two fifth of them were preparatory (27.5%, 40%) respectively, as regards to occupation for patients in both study and control groups about half of them were manual work (50%, 55%). also Majority of the patients in both study

nd control groups were single (52.5%, 50%).

Table (2): clarifies that, the median length of stay was (14) for the study group and for control group was (28) days. Minority of the studied patients in both study and control groups have diabetes mellitus (7.5%, 12.5%) and equal percentage in hypertension for both groups (10%) respectively. Near two third and more than three quarter of the studied patients in both study and control groups were scald burn causes (57.5%), 77.5%) respectively, followed by scald burn (20%, 12.5%), more than three quarter and majority of the studied patients in both study and control groups were represented by second degree burn (77.5%, 87,5%) respectively. As regard to percent of burn; the median of burn of studied patients in both groups was (1).

Figure (1): illustrates a notable difference in the duration of hospital stay between the study and control groups. The study group had a significantly shorter average hospital stay of 14 days compared to 28 days in the control group. This reduction suggests that the intervention applied to the study group may have accelerated patient recovery or improved clinical outcomes, leading to earlier discharge.

Table (3): displays that, there was a statistically significance increase in mean of elbow flexion, Pronation, and supination angles (101, 65 and 64.5) after one week and significant more increase (143.8, 86.3 and 83.8) at discharge time of assessment with p-value <0.001. in addition to significant **decrease in** mean of elbow extension (17.5) after one week and more decrease (zero) at discharge time of assessment with p-value <0.001.

Table (4): represents that there was a statistically significance **higher** mean of wrist flexion after intervention with p-value 0.01. For example, wrist flexion increased from 31.9° to 63.2° in the study group, while controls improved only slightly from 28.3° to 31.6°; this highlights clinically meaningful functional gains.In addition, there was a significance **higher** mean of wrist extension, ulnar, and radial deviation angles among study in comparison to control groups after one week and at discharge time of assessment with p-value <0.001

Table (5): clarifies that there was no statistically significance difference between study and control groups as regards Metacarpophalangeal flexion and Proximal interphalangeal joint Flexion angles, before intervention with p-value >0.05.But after nursing intervention model, significantly improved finger joint mobility in burn patients. MCP flexion in the study group increased from 40.8° to 74.5°, compared to 32.1° in the control group ($p < 0.001$). PIP and DIP flexion also improved markedly, reaching 79.1° and 70.4°, respectively, versus 46.4° and 35.6° in controls ($p \leq 0.001$). Extension deficits were significantly reduced, with PIP extension improving from 18.1° to 4.3°, while controls remained at 19.04° ($p < 0.001$).

Table 6: reveals a remarkable improvement in muscle strength in the study group compared to the control group. While both groups started with 100% of patients at Grade 2 (poor) strength in elbow, wrist, and finger muscles, the study group rapidly progressed, with all patients reaching Grade 4 (good) elbow strength by one week and Grade 5 (normal) at discharge ($p = 0.02$). Similarly, wrist and finger muscle strength showed significant gains, with up to 88.9% and 87.5% of the study group achieving Grade 4 within one week and 59.3% and 50% reaching normal strength by discharge, respectively ($p < 0.001$).

Table (7): Reveals a significant improvement in total Quality of Life (QOL) for both the study and control groups after intervention. The study group showed a substantial shift from poor QOL (67.5%) pre-intervention to predominantly good QOL (75%) post-intervention ($X^2=52.6$, $p=0.001$). In contrast, the control group also improved, with poor QOL decreasing from 77.5% to 35%, but most participants moved into the

average category rather than good QOL (62.5%) (X^2=12.2, p=0.004). These results indicate the intervention had a more pronounced positive effect on the study group's overall quality of life.

Table (8): demonstrates a significant association between certain demographic factors and post-intervention Quality of Life (QOL) in the study group (n = 40). Participants aged <30 years showed the highest proportion of "Good" QOL (82.6%), with age significantly related to QOL outcomes (χ^2 = 8.50, p = 0.014). Education was highly significant (χ^2 = 15.20, p = 0.004), where 100% of participants with preparatory, secondary, or university education reported "Good" QOL.

Also, occupation was also significant (χ^2 = 6.30, p = 0.042), with 81.8% of officially employed individuals achieving good QOL. Urban residents had a higher percentage of "Good" QOL (88.9%) than rural (71%), with near-significance (χ^2 = 5.70, p = 0.058). Gender and marital status were not significantly associated (p = 0.405 and 0.142, respectively), though females (81.8%) and singles (81%) had slightly better outcomes.

Table (1): Distribution of the demographic characteristics for Study and Control Groups (N: 80):

DemographicData	Study group (n=40)		Control group (n=40)		Test	p-value
	No	%	No.	%	X^2 test	
Age group						
<30 years	23	57.5%	21	52.5%	0.21	0.90
31-50 years	16	40%	18	45%		
>50 years	1	2.5%	1	2.5%		
Gender						
Male	18	45%	12	30%	0.48	0.64
Female 22	22	55%	28	70%		
Marital status						
Single	21	52.5%	20	50%	1.3	0.74
Married	17	42.5%	16	40%		
Widow	2	5%	3	7.5%		
Divorced	0	0%	1	2.5%		
Residence						
Urban	9	22.5%	12	30%	0.58	0.61
Rural	31	77.5%	28	70%		
Educational level						
Can't read or write	6	15%	5	12.5%	2.6	0.76
Read write	6	15%	4	10%		
Primary	5	12.5%	10	25%		
Preparatory	9	22.5%	16	40%		
Secondary	11	27.5%	4	10%		
University / post	3	7.5%	1	2.5%		
Occupation						
Official	11	27.5%	4	10%	4.4	0.11
Manual	20	50%	22	55%		
No work	9	22.5%	14	35%		

Table (2): Comparison of the Medical History in Different Groups (N: 80):

Items	Study group (n=40)		Control group (n=40)		Test	p-value
	Median	Range	Median	Range	U- test	
Duration of hospital stay/ days	14	3-28	28	3-30	411.5	**<0.001***
Percentage of burn (TBSA)	1	0.42-5	1	0.41-5	795	0.96
Comorbidities	**No.**	**%**	**No.**	**%**	**X^2 test**	
No	33	82.5%	31	77.5%	0.56	0.76
DM	3	7.5%	5	12.5%		
HTN	4	10%	4	10%		
Cause of burn						
Scald	23	57.5%	31	77.5%	0.46	0.79
Flame	16	40%	5	12.5%		
Electrical	1	2.5%	4	10%		
Degree of burn						
Superficial 2nd degree	0	0%	0	0%	5.2	0.07
Deep 2nd degree	31	77.5%	35	87.5%		
mixed	9	22.5%	5	12.5%		
Skin graft						
No	38	95%	34	85%	2.2	0.26
Yes	2	5%	6	15%		
First aid received at home						
No	28	70%	27	67.5%	0.06	0.99
Yes	12	30%	13	32.5%		
Side of Affected joint						
Right side	39	97.5%	38	95%	0.35	0.99
Left side	1	2.5%	2	5%		
Affected joint						
Elbow	4	10%	4	10%	0.0	1
Wrist	27	67.5%	25	62.5%	0.22	0.82
Fingers	24	60%	21	52.5%	0.46	0.65

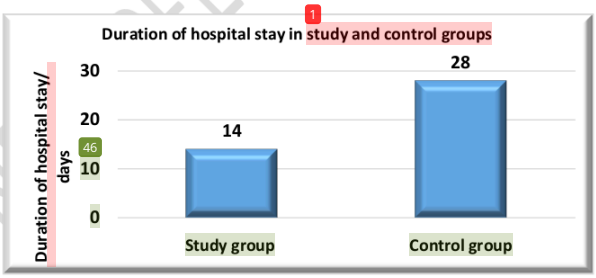


Figure (1): Duration of Hospital Stay in Study and Control Groups

Table (3): Mean and SD for Elbow Joint Motions Degrees among Study Group through Study Phases (N: 40):

Study group	Study group (n=4)		Test	p-value
	Mean	SD	Paired t-test	
Elbow flexion degree				
Pre	75°	4.1	-6.1a -8.8b	**0.009*a** **0.003*b**
After 1 week	101.3°	6.3		
At discharge	143.8°	4.8		
Elbow extension degree				
Pre	27.5°	2.9	12.1a	**0.001*a**
After 1 week	17.5°	2.9		
At discharge	0°	0°		
Elbow Pronation degree				
Pre	40.7°	2.9	-11.2a -17.b	**0.002*a** **<0.001*b**
After 1 week	65°	4.08		
At discharge	86.3°	4.8		
Elbow Supination degree				
Pre	43.8°	3.5	-27.7a -12.9b	**<0.001*a** **0.001*b**
After 1 week	64.5°	3.3		
At discharge	83.8°	4.8		

A: significance difference between pre and 1 w after intervention.

B: significance difference between 1 w after intervention and at discharge assessment

Table (4): Distribution for Comparison between Study and Control Groups Regarding the Degree of Wrist Joint Motion through Study Phases (N: 80):

Variables	Study group (n=25)		Control group (n=25)		Test	p-value
	Mean	SD	Mean	SD	t-test	
Wrist flexion degree						
Pre	31.9°	4.5	28.3°	5.3	2.6	**0.01***
After 1 week	46.8°	10.5	28.04°	12.5	5.8	**<0.001***
At discharge	63.2°	19.6	31.6°	19.1	5.9	**<0.001***
Wrist extension degree						
Pre	29.9°	6.6	29.2°	5.3	0.43	0.67
After 1 week	47.3°	11.2	29.8°	14.2	4.9	**<0.001***
At discharge	56.6°	16.7	33.3°	20.9	4.5	**<0.001***
Wrist Ulnar deviation degree						
Pre	13.9°	2.4	13.5°	2.2	0.69	0.49
After 1 week	23.2°	5.4	13.2°	6.1	6.3	**<0.001***
At discharge	31.2°	9.7	15.5°	9.9	5.8	**<0.001***
Wrist Radial deviation degree						
Pre	9.5°	1.6	9.2°	1.7	0.69	0.48
After 1 week	14.9°	3.7	9.4°	3.9	5.2	**<0.001***
At discharge	17.9°	4.4	9.7°	5.8	5.7	**<0.001***

Table (5): Distribution for Comparison between Study and Control Groups Regarding the Degree of Fingers Joints Motions through Study Phases (N: 80):

Degree of fingers joints motions	Study group (n=24)		Control group (n=21)		Test	p-value
	Mean	SD	Mean	SD	U -test	
Metacarpophalangeal flexion degree						
Pre	40.8°	7.5	37.1°	5.5	1.8	0.07
After 1 week	62.8°	20.1	29.6°	18.1	5.8	**<0.001***
At discharge	74.5°	25.7	32.1°	24.6	5.6	**<0.001***
Metacarpophalangeal extension degree						
Pre	21.5°	6.4	20.4°	6.7	0.55	0.58
After 1 week	14.7°	8.5	18.7°	5.1	-1.9	0.06
At discharge	8.2°	16.8	24.7°	15.9	-3.4	**0.002***
Proximal interphalangeal joint Flexion degree						
Pre	40.9°	3.7	45.4°	11.9	-1.7	0.09
After 1 week	66.8°	20.6	44.5°	28.6	3	**0.004***
At discharge	79.1°	27.4	46.4°	35.8	3.5	**0.001***
Proximal interphalangeal joint Extension degree						
Pre	18.1°	2.5	22.3°	4.04	-4.3	**<0.001***
After 1 week	12.7°	5.1	20.7°	7.1	-4.3	**<0.001***
At discharge	4.3°	6.4	19.04°	10.5	-5.7	**<0.001***
Distal interphalangeal joint Flexion degree						
Pre	34.4°	6.6	30.1°	6.2	2.2	**0.03***
After 1 week	53.04°	16.3	35°	14.5	3.9	**<0.001***
At discharge	70.4°	24.6	35.6°	19.7	5.2	**<0.001***
Distal interphalangeal joint Extension degree						
Pre	19.2°	3.8	25°	2.7	-5.8	**<0.001***
After 1 week	13.1°	6.9	23.6°	5.3	-5.6	**<0.001***
At discharge	5.8°	9.6	23.01°	10.1	-5.9	**<0.001***

Table (6): Comparison of the Muscle Strength Assessment Follow Up in Different Groups (N: 80):

Variables	Study group	Control group

	pre	1 week	at discharge	pre	1 week	at discharge
	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
Muscle elbow						
Grade 0 (no activity)	-	-	-	-	-	-
Grade 1 (Trace)	-	-	-	-	-	-
Grade 2 (poor)	4(100%)	-	-	4(100%)	-	-
Grade 3 (fair)	-	-	-	-	4(100%)	4(100%)
Grade 4 (Good)	-	4(100%)*	-	-	-	-
Grade 5 (normal)	-	-	4(100%)*	-	-	-
p-value		**0.02***	**0.02***			
Muscle wrist						
Grade 0 (no activity)	-	-	-	-	-	-
Grade 1 (Trace)	-	3(11.1%)	3(11.1%)	-	10(40%)	10(40%)
Grade 2 (poor)	27(100%)	-	-	25(100%)	1(4%)	1(4%)
Grade 3 (fair)	-	-	-	-	14(56%)	14(56%)
Grade 4 (Good)	-	24(88.9%)*	8(29.6%)*	-	-	-
Grade 5 (normal)	-	-	16(59.3%)*	-	-	-
p-value		**<0.001***	**<0.001***			
Muscle Fingers of hand						
Grade 0 (no activity)	-	-	-	-	-	-
Grade 1 (Trace)	-	3(12.5%)	3(12.5%)	-	10(47.6%)	10(47.6%)
Grade 2 (poor)	24(100%)	-	-	21(100%)	1(4.8%)	1(4.8%)
Grade 3 (fair)	-	-	-	-	10(47.6%)	10(47.6%)
Grade 4 (Good)	-	21(87.5%)*	9(37.5%)*	-	-	-
Grade 5 (normal)	-	-	12(50%)*	-	-	-
p-value		**<0.001***	**<0.001***			

*Significant between study and control

Table (7): Comparison of Total Quality of Life (QOL) for Study & Control Groups pre and post Intervention

Group	Time	Total QOL			X^2	p-value
		Poor	Average	Good		
study Group	Pre-intervention	27 (67.5%)	13 (32.5%)	0 (0%)	52.6	0.001*
	Post-intervention	3 (7.5%)	7 (17.5%)	30 (75%)	------	-----
Control Group	Pre-intervention	31 (77.5%)	9 (22.5%)	0 (0%)	12.2	0.004*
	Post-intervention	17 (35%)	25 (62.5%)	1 (2.5%)	-------	-----

Note: X^2 and p-values refer to the comparison between pre- and post-intervention within each group.

Table (8): Correlation Between Demographic Characteristics and QOL post Intervention for Study Group (n = 40)

DemographicData		QOL						Test Used	
		Poor		Average		Good			
		No	%	No.	%	No.	%	X^2 test	p-value
Age group									
<30 years	**(n 23)**	1	4.3%	3	13%	19	82.6	8.5	0.014

							%	0	*
31-50 years	**(n 16)**	2	12.5%	4	25%	10	62.5 %		
>50 years	**(n 1)**	0	0%	0	0%	1	100 %		
Gender									
Male	**(n 18)**	2	11.1%	4	22.2%	12	66.7%	1.80	0.405
Female	**(n 22)**	1	4.5%	3	13.6%	18	81.8%		
Marital status									
Single(**n21**)		1	4.8%	3	14.3%	17	81%		
Married	**(n 17)**	2	11.8%	4	23.55	11	64.7%	3.90	0.142
Widow	**(n 2)**	0	0%	0	0%	2	100%		
Divorced	**(n 0)**	0	0%	0	0%	0	0%		
Residence									
Urban	**(n 9)**	0	0%	1	11.1%	8	88.9%	5.70	0.058
Rural	**(n 31)**	3	9.7%	6	19.4%	22	71%		*
Educational level									
Can't read or write	**(n 6)**	2	33.3%	3	50%	1	16.7%		
Read write	**(n 6)**	1	16.7%	2	33.3%	3	50%		
Primary	**(n 5)**	0	0%	1	20%	4	8-%	15.	0.004
Preparatory	**(n 9)**	0	0%	0	0%	9	100%	20	**
Secondary	**(n 11)**	0	0%	1	9.1%	10	90%		
University / post	**(n 3)**	0	0%	0	0%	3	100%		
Occupation									
Official	**(n 11)**	0	0%	2	18.2%	9	81.8%	6.30	0.042
Manual	**(n 20)**	2	10%	3	15%	15	75%		
No work	**(n 9)**	1	11.1%	2	22.2%	6	66.7%		

*p< 0.05 = Significant, ** p < 0.01 = Highly significant,* X^2 *= Chi-square*

Discussion:

Burn injuries and their complications are considered the major health problems throughout the world as it has a negative effect on function of the burned part that result in psychological disturbance as depression, anxiety, irritability, body image dissatisfaction and post-traumatic stress disorder are common in burn patients that associated with adverse out comes including poor quality of life (QOL), low self-esteem, stigmatization and increase mortality. This study aimed to investigate the effect of self-care nursing intervention model on self-esteem and quality of life among burn patients **(Sierawska et al., 2022).**

Regarding the demographic characteristics of the study and the control groups, the current study results were stated that, the mean age of the studied patients in both study and control groups were (32.5, 32.6) respectively. About two third of the studied patients in in study group were females (70%) and more than half of control group were females (55%). The present study results were in the same line with the study by **Kouchek et al., (2024)**, who entitled "Demographic Assessment of Burn Injuries in Iranian Patients" conducted in Iran, which reported a mean age of approximately 35 years and a female predominance of 60.6%.

Concerning educational level for patients in both study and control groups the more than one quarter and two fifth of them were preparatory, concerning the occupation for patients in both study and control groups about half of them were manual work, In addition, the current study results were in harmony with the study by **Ain et al. (2024),** which conducted in Pakistan about Exploring the Demographic and Social Correlates of

Burn Injuries: A Comprehensive Study From a Regional Burn Center in Pakistan", which identified strong associations between low education, manual labor, and increased burn risk.

Additionally, the current study findings showed that, Majority of the patients in both study and control groups were single. The present study findings were in agreement with the study **Elshahidi et al., (2024)** who studied **"**Clinico-demographic Profile of Burns in the Middle-East and North-Africa (MENA) Region: A Systematic Review and Meta-Analysis", which reported a wide range of marital statuses across countries in the region, but frequently high proportions of non-married indivduals in burn injury populations and found a male predominance (~58.6%) and significant involvement of upper limbs (~51.7%), supporting our findings of 67.5% and 60% males in study/control groups, and similar age ranges

Moreover, the current study results were similar to the study by **Cohler et al., (2025),** which conducted inUSAand entitled**"**The individual-level and community-level social determinants of burn injuries: a single-institution study from the southwestern United States.", which reported many patients being manual workers and having lower educational levels, confirming that these demographic patterns are common in recent burn epidemiology across the region.

Regardingthe hospital stay duration among study in comparison to control groups, the current study results highlighted a significant difference in hospital stay duration between the study and control groups, with a median of 14 days in the study group compared to 28 days in the control group ($p < 0.001$). This significant reduction supports the effectiveness of the applied nursing intervention model involving early mobilization, pain management, wound care education, and psychosocial support.

These findings are in agreement with the study by **Chukamei et al., (2021**), about "The length of stay and cost of burn patients and the affecting factors", in Iran, who reported that comprehensive nursing care in burn units significantly shortened the average hospitalization period in a study conducted at a burn center in Pakistan. A reduction in hospital stay not only decreases the economic burden on healthcare systems but also reduces patients' exposure to nosocomial infections and promotes faster psychosocial reintegration.

Conversely, the present study findings revealed that, there was no statistically significant difference between the two groups in terms of baseline clinical characteristics, such as comorbidities and burn severity ($p > 0.05$).. These comorbidities are known to potentially delay wound healing and increase complication risk, as supported by **Kouchek et al., (2024**), who conduct the study in Iran, entitled **"**Demographic assessment of burn injuries in Iranian patients",found that, and found that, diabetic burn patients had longer recovery times and poorer outcomes.

Regarding burn depth, second-degree burns were predominant, with more than three quarter and majority of the studied patients in both study and control groups were represented by second degree burn respectively. These findings aligned with the study by**Ji et al., (2024),** which conducted in China, entitled "Consensus on the treatment of second-degree burn wounds" and showed that second-degree burns are the most commonly

reported depth of injury in hospital-admitted patients and tended to be painful but have good healing potential, particularly when managed with evidence-based wound care and rehabilitation strategies.

From the researcher's point of view, the significant difference in hospital stay duration despite the comparable clinical characteristics strongly supports the value of early, targeted nursing interventions in burn care. The intervention appears to have enhanced patient outcomes even in cases with minor TBSA involvement, likely by preventing complications, encouraging mobility, and facilitating faster wound healing. These findings underscore the critical role nurses play not only in basic care delivery but also in influencing measurable clinical outcomes.

The current study findings presented that, there was a statistically significant improvement in upper limb joint function among patients in the study group implementation of the nursing intervention model. Specifically, there was a marked increase in the mean elbow flexion angle from baseline to 101.3° after one week, and a further increase to 143.8° at discharge ($p < 0.001$). Similarly, forearm pronation and supination showed substantial improvements, increasing to 65.0° and 64.5° after one week, and to 86D3° and 83.8°, respectively, by the time of discharge ($p < 0.001$). These improvements reflect restored range of motion (ROM) and joint mobility in key upper limb movements that are often severely restricted following burn injuries.

In contrast, elbow extension showed a significant decrease, from initial limited movement to 17.5° after one week, and complete recovery to 0° (full extension) by discharge ($p < 0.001$), which indicated resolution of flexion contractures—a common complication of upper limb burns. The present study findings were in the same line with the study by**Cartotto et al., (2023),** who studied "Clinical practice guideline: early mobilization and rehabilitation of critically ill burn patients", in USA , which demonstrated the effectiveness of early and structured physiotherapy combined with nursing rehabilitation in improving joint mobility and functional outcomes in burn patients.

The improvement in elbow and forearm ROM can be attributed to several elements of the nursing intervention, including early positioning, splinting, active and passive range of motion exercises, pain control, and patient education. This study findings were matched with the study **Ghasemi et al., (2024)**, who conducted the study in Iran and entitled "The Effect of an Exercise Program on the Quality of Life in Burn Patients" and emphasized that early mobilization and joint-specific physiotherapy starting within the first 72 hours post-injury significantly improved ROM and reduced contracture risk in upper limb burn patients.

From the researcher's opinion, these findings strongly support the critical role of nursing-led rehabilitation protocols in early post-burn period. The significant gains in flexion, pronation, and supination angles, coupled with the reduction in extension deficits, suggest that structured nursing care contributes directly to preserving functional independence and preventing long-term disability. Given the upper limb's vital role in performing activities of daily living and contribute to patients' psychological and social recovery.

Regarding the degree of wrist joint motion in Study and Control Groups through Study Phases, The present study findings were revealed that, there was no statistically significant difference in wrist joint movements—including extension, ulnar deviation, and radial deviation—between the two groups ($p > 0.05$), indicating proper matching and ensuring comparability prior to the intervention. As evidenced by, statistically significant and clinically meaningful improvements in all wrist movement parameters. Most notably, wrist flexion improved dramatically, increasing from 31.9° to 63.2°, compared to only a modest increase in the control group from 28.3° to 31.6° ($p = 0.01$).

These findings are consistent with the study by **Tehreem et al.**, **(2023)** studied in Egypt and entitled "Comparison of soft tissue mobilization versus static stretching in post-burn contractures at elbow and wrist, A pilot study", demonstrated that early, nurse-led rehabilitation led to significant improvements in wrist mobility, especially in flexion and extension. Similarly, the study conducted by**Cancio et al., (2024)** in USA, entitled "Acute surgical and rehabilitation management of complex hand burns in combat casualties", which emphasized that; early functional rehabilitation significantly enhances the recovery of fine motor control and joint movement.

From the researcher's point of view, the observed differences in wrist mobility underscore the importance of targeted, early nursing intervention in restoring joint function. The significant improvements in wrist flexion, extension, and deviation not only support the effectiveness of the intervention but also highlight its functional relevance, as wrist mobility is crucial for performing activities of daily living, particularly in burn patients who rely heavily on upper limb function during recovery.

In relation to finger joint mobility in burn patients (study and control groups), The current study findings illustrated that prior to intervention; there was no statistically significant difference between the study and control groups regarding Metacarpophalangeal (MCP) flexion and Proximal Interphalangeal (PIP) joint flexion angles ($p > 0.05$), indicating comparable baseline finger joint function in both groups.However, following the implementation of the nursing intervention model, the study group exhibited significantly greater improvements in finger joint mobility compared to controls. Specifically, MCP flexion in the study group increased markedly from 40.8° pre-intervention to 74.5° at discharge, whereas the control group reached only 32.1° ($p < 0.001$).

In addition, extension deficits, which are common post-burn complications due to scarring and contracture, were significantly reduced in the study group. The PIP extension angle improved from 18.1° pre-intervention to 4.3° at discharge, while the control group's extension remained impaired at 19.04° ($p < 0.001$). This reflects a marked reduction in flexion contractures, which if left untreated, can severely limit hand function.

The present study results were supported with the study by **O'Neil et al., (2023),** in USA, which entitled Early mobilization, early ambulation, and burn therapy in the acute hospital setting. Physical Medicine and Rehabilitation Clinics", and reported that early mobilization protocols significantly improve finger joint ROM and reduce contracture rates in burn patients. Similarly, the present study findings were in the same line with

the study by **El Metwally et al., (2023),** which conducted in Egypt about "Effect of rehabilitation program on knowledge and practice for patients with burn"**,** and demonstrated that nurse-led physical therapy interventions focusing on joint mobilization lead to improved functional outcomes in hand burns, including enhanced flexion and extension angles.

From the researcher's point of view, these results highlighted the critical role of timely, nurse-supervised rehabilitation programs in optimizing recovery trajectories for burn patients. The nurse's role in educating, motivating, and guiding patients through joint exercises can prevent the formation of disabling contractures, which often require surgical intervention if neglected.

Concerning Muscle Strength Assessment Follow Up in Different Groups, The current study results confirmed that, there was a significant improvement in muscle strength among patients in the study group following the implementation of a structured nursing intervention model. At baseline, both study and control groups exhibited Grade 2 (poor strength) across elbow, wrist, and finger muscles. However, by the end of the first week, all patients in the study group had progressed to Grade 4 (good strength) in elbow muscles, and by discharge, they achieved Grade 5 (normal strength) ($p = 0.02$). In contrast, the control group showed minimal improvement, with many participants maintaining low strength levels throughout.

The present study findings were in the same line with the study by**Dewanti et al., (2022),** who studied"). Physical Therapy Rehabilitation Management on Burn Injury ", in Indonesia, and found that resistance-based rehabilitation protocols significantly improved muscle performance and functional outcomes in burn survivors. This analysis concluded that early strength training leads to improved upper limb functionality and reduced disability in both acute and long-term phases of recovery.

In addition, the current study results were in harmony with the study by **Kondo et al., (2024),** which conducted **in Jaban,** entitled "Effects of rehabilitation treatments jointly considered by physiatrists and rehabilitation therapists in patients with severe burn injury", showed that a supervised resistance program led to considerable improvements in muscle strength, lean body mass, and power output compared to patients receiving only standard physiotherapy. Although conducted in pediatric populations, the implications for structured rehabilitation are directly applicable to adults, as the underlying mechanisms of muscle disuse and recovery are comparable.

Regarding total Quality of Life (QOL) for both the study and control groups, the current study results revealed that, there was a notably greater positive shift in the study group. Before the intervention, less than two third of patients in the study group reported poor QOL. This value dropped dramatically after the nursing intervention, with three quarter of them reporting good QOL, a shift supported by a highly significant Chi-square value ($X^2 = 52.6$, $p = 0.001$).In contrast, the control group also showed improvement, with the percentage of patients with poor QOL decreasing from more than three quarter to only one third, This comparative outcomes clearly indicated that the structured nursing intervention model had a more substantial impact on improving overall quality of life than routine care alone.

The present findings were strongly supported by **Magbool et al., (2021),** in Egypt**,** who studied" Effect of Self Care Education on Quality of Life and Body Image among Burned Patients", and demonstrated the effectiveness of comprehensive nursing interventions in enhancing the QOL of burn patients and found that, burned patients who received a self-care-focused nursing intervention showed significant improvements in self-esteem and overall QOL compared to those receiving conventional care.

Additionally, the current study findings were in similar alignment with the study conducted by **Ata Abd El Salihen et al., (2024)**, in Egypt, entitled "*Post-Burn Training Program to Enhance Patients' Quality of Life and Reduce Post-Traumatic Stress Symptoms*", emphasized the psychological and educational aspects of burn rehabilitation and Conducted at a specialized outpatient burn clinic, this quasi-experimental study showed that a structured post-burn training program significantly reduced stress and improved QOL in patients.

From the researcher's point of view, the results are not only statistically significant but also clinically meaningful, reflecting a global trend in burn care research. Structured nursing interventions especially those that are holistic, educational, and rehabilitative, those interventions beyond routine wound care, including patient education and psychosocial support can achieve better long-term quality of life.

As regard to statistically significant correlations between socio-demographic characteristics and post-intervention Quality of Life (QOL) among the study group. The most prominent outcome was observed among participants younger than 30 years, where the vast majority attained a “Good” QOL status following the nursing intervention. The association between age and QOL was statistically significant ($\chi^2 = 8.50$, $p = 0.014$), Education level emerged as a highly significant factor influencing QOL outcomes ($\chi^2 = 15.20$, $p = 0.004$). In particular, all participants with at least a preparatory education—ranging from secondary to university levels—achieved a “Good” QOL post-intervention.

Occupational status was another factor with a significant association ($\chi^2 = 6.30$, $p = 0.042$). Among the participants with official employment, over three-quarters achieved “Good” QOL. Residency status showed a near-significant association with QOL outcomes ($\chi^2 = 5.70$, $p = 0.058$). Among urban residents, nearly nine out of ten reported “Good” QOL, compared to approximately three-quarters of rural participants. In contrast, gender and marital status did not show significant statistical associations with QOL outcomes ($p = 0.405$ and 0.142, respectively). However, trends in the data suggest that approximately four out of five females and unmarried individuals experienced good post-intervention QOL. Although these findings lack statistical significance

The current findings were aligned with the study by **Romanowski&Sen, (2022)** in USA, who studied "Wound healing in older adults with severe burns: Clinical treatment considerations and challenge", and found that younger burn patients had superior recovery rates and were more engaged in rehabilitation programs compared to older adults. In addition to, these results wre in the same track with the study by **Shabana et al., (2021)**, which conducted in Egypt, entitled " Effect of Multimedia Self-Care Strategy on outcomes among

patients with burn", and demonstrated that, educational attainment was directly associated with enhanced self-care and improved psychological outcomes in burn patients.

The Present research findings were consistent with the study by **Shokre et al., (2024)**, in Egypt, who titled "The effectiveness of the psychosocial empowerment program in early adjustment among adult burn survivors", and emphasized that gainfully employed burn patients demonstrated higher compliance with rehabilitation routines and experienced quicker psychosocial reintegration. Additionally, the current findings were in a similar line with **Wu et al., (2025),** who studied "Coping Experiences of Patients With Moderate to Severe Burns: A Descriptive Qualitative Study", in China, and concluded that, rural burn patients in China were more likely to encounter barriers to accessing psychological and rehabilitative services.

From the researcher's perspectives, these findings underscore the fact that socio-demographic factors can significantly influence clinical outcomes, particularly in response to structured nursing interventions. Patients who are younger, more educated, officially employed, or living in urban areas appear to gain the greatest benefit from the intervention. This suggests that these groups may have intrinsic or environmental advantages—such as higher health literacy, access to care, or stronger social support systems—that enhance their capacity to recover and adapt after injury.

Conclusion

Based on the results of the present study and research hypothesis, the current study concluded that, there was a statistically significant improvement in upper limb joint function among patients in the study group implementation of the nursing intervention model. Specifically, there was a marked increase in the mean elbow flexion angle from baseline to 101.3° after one week, and a further increase to 143.8° at discharge ($p < 0.001$). In contrast, elbow extension showed a significant decrease, from initial limited movement to 17.5° after one week, and complete recovery to 0° (full extension) by discharge ($p < 0.001$), which indicated resolution of flexion contractures

Additionally, there was a significant improvement in muscle strength among patients in the study group following the implementation of a structured nursing intervention model. The study group exhibited Grade 2 (poor strength) across elbow, wrist, and finger muscles. However, by the end of the first week, all patients in the study group had progressed to Grade 4 (good strength) in elbow muscles and by discharge, they achieved Grade 5 (normal strength) ($p = 0.02$). Also, there was a notably greater positive shift in the study group. Before the intervention, less than two third of patients in the study group reported poor QOL. This value dropped dramatically after the nursing intervention, with three quarter of them reported good QOL, a shift supported by a highly significant Chi-square value ($X^2 = 52.6$, $p = 0.001$).

Recommendations:

Based on the findings of this study the following recommendations are derived and suggested:

1- Applying continuous nursing rehabilitation intervention in large sample of burn patients and other setting for generalization.

2- The present study should be taken as evidence based practice for improving burn patient health outcomes.

3- Integration of early, nurse-led rehabilitation models into burn care standards to optimize functional recovery and improve long-term quality of life for burn survivors.

4- Future studies should investigate long-term outcomes, cost-effectiveness, and scalability across different healthcare systems.

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