*Assiut Scientific Nursing Journal*
http://asnj.journals.ekb.eg http://www.arabimpactfactor.com
DOI: 10.21608/asnj.2024.326354.1927 http://olddrji.lbp.world/indexedJournals.aspx
https://vlibrary.emro.who.int/journals/assiut-scientific-nursing-journal

# Assessment of Patients' Knowledge and Compliance regarding Post Burn Exercises

**Mervat Mamdouh Aziz[1], Aseem Hussein Kamel[2], Magda Ahmed Mohamed[3] & Ghada Hassan Ahmad[4]**
[1] Nursing Specialist at the Technical Institute of Nursing, Assiut University, Egypt.
[2] Professor of Plastic Surgery & burn, Assiut University Hospital Egypt.
[3] Professor of Medical-Surgical Nursing, Faculty of Nursing, Assiut University, Egypt.
[4] Assistant Professor of Medical-Surgical Nursing, Faculty of Nursing, Assiut University, Egypt.

## Abstract
**Background:** One of the most difficult injuries to treat is a burn because they usually need long time for lengthy stays in hospitals, several procedures, and extensive rehabilitation. Exercise is a key component of burn rehabilitation across all phases of burn care. **Aim:** The aim of this study is to assess patient knowledge and compliance regarding post burn exercises. **Research design:** A descriptive research design was used to conduct this study: **Setting**: The study was conducted in Burn unit at Main Assiut University Hospital and El eman General Hospital. **Sample:** Purposive sampling including 60 patients was admitted to the burns unit at Main Assiut University Hospital and El eman General Hospital during six months. **Tools for data collection: Tool (I):** Patient assessment sheet: **Tool (II):** Patients knowledge assessment questionnaire. **Tool (III):** Compliance assessment scale. **Results:** It was found that three quarters of them (71.7%) were male, while nearly to half (48.3%) of the studied sample, ages were ranged from 20-40 years old. more than one third of them (38.3%) were Illiterate. there was. **Conclusion:** level of the patient's knowledge post burn exercises were poor, while their compliance exercises post burn was good, there were statistically significant relations between level of knowledge and patients' compliance of exercises post burn exercises. **Recommendation:** Enhance the patients' knowledge about the importance of compliance with a rehabilitation exercises program in burned patient to preventing complications after burn.

***Keywords: Compliance, Knowledge & Post burn exercises.***

## Introduction
Burns present unique challenges in the field of trauma care due to their devastating nature. As a leading cause of morbidity and mortality worldwide, burns are a major global health concern and constitute the fourth most common type of trauma **(Murray, 2020).**
Burn injuries exert a profound impact on various aspects of human life, including physical and mental health, functional abilities, and social well-being. Changes in appearance and the potential for social isolation can lead to significant psychological distress. Prevention of burn is considered the best strategy to reduce the overall burden of burns **(Osborne et al., 2024).**
Burns are that can result in significant morbidity and mortality. 486,000 people with burn injuries received medical treatment and 40,000 individuals were hospitalized due to burn injuries in the United States. According to the WHO, nearly 11 million people worldwide were burned severely enough to require medical attention. Approximately 90% of burn injuries occur in low- and middle-income countries (LMICs). They are also among the leading causes of disability-adjusted life years in LMICs **(Atwell et al., 2020).**
Burns is one of the most common and life-threatening injuries throughout the world, especially in developing countries including Iran. Every year, only fire-related burns are accounted for over 300,000 deaths in the world. . Previous reports show that 5% of all injury deaths (mostly in children and young adults less than 44 years old) in 2000 was due to fire **(Khadem-Rezaiyan et al., 2020).**
The burn severity can determine by the burn's depth and extent and the cause, time, and circumstances surrounding the burn. To evaluate the severity of the burn, many factors must be considered: the depth of the burn, the percentage of the body surface area that was burned, and the anatomical site of the burn, age, medical history, concurrent injury, and inhalation harm were all taken into consideration **(Chipp, 2023 & Jeschke et al., 2020).**
The management of burn injuries necessitates a multidisciplinary approach, particularly for severe cases. While minor burns can often be treated in outpatient settings, patients with extensive or deep burns require specialized care within burn centers **(Zwierełło et al., 2023).** Compared to other types of injuries, burn trauma has a different set of difficulties. Improved outcomes for burn patients have resulted from the development of more effective treatment options made possible by advances in our understanding of burn pathophysiology **(Qtait & Alekel, 2023).**

Understanding individual situations, motivators, and barriers is crucial, as is filling in knowledge gaps regarding the significance of physical activity. When creating physical activity interventions, careful planning and the use of behavior change models suitable for the demographic and environment is necessary. **(Lee et al., 2023).** Compliance**:** it is of crucial relevance of properly evaluating adherence to recommended exercise. There is no gold standard for monitoring adherence, and the process is complicated. Adherence is often used interchangeably with terms such as compliance, participation and concordance **(Goldsmith et al., 2023).**

One treatment that has been shown to be successful in restoring lean body mass is rehabilitation exercise training, (RET)A long-term exercise prescription plan should be taken into consideration for all patients with severe burns, as RET is a safe and effective treatment that restores function and lowers post-burn morbidity.Exercises is a body activity that enhances or maintains physical fitness and overall health and wellness **(Palackic et al., 2021 & Marquez et al., 2020).**

## Significance of the study:

Worldwide, burns are a major cause of death and illness. Survivors with burns face numerous functional, psychological, and physical challenges. and it leads to many complications in the joints and movement, so burn patients need sufficient information and perform exercises that enables them to prevent complications from occurring and help them adhere to exercises overcome, which is present by this study **(Opriessnig et al., 2023).**

**Aim of the study**

The aim of this study is to assess patient knowledge and compliance regarding post burn exercise.

**Research question**

To fulfill this, aim the following research question were formulated

- What were the levels of patient knowledge about post burn exercise?
- What was the patient compliance regarding post burn exercise?

## Patients and Method

**Research design:**

Descriptive explorating research design was utilized to carry out this study.

**Setting:**

The study was conducted in Burn unit at Main Assiut University Hospital and El eman General Hospital.

**Sample:**

Purposive sampling including 60 patients was admitted to the burns unit at Main Assiut University Hospital and El eman General Hospital during six months. Patients with second- and third-degree burn. Age range between (20-65) from both sexes and are willing to participate in the study.

**Exclusion criteria:**

- Patients with psychogenic disorders.
- Pregnant women.
- Electrical burn.

**Tools:**

Three tools were utilized in this study**:**

**Tool (I): Patient assessment sheet**. To assess demographic and medical data

This tool developed by the researcher after reviewing of related literature **(Ahmed, et al 2019).** It consisted of two parts as following:

**Part 1: Demographic data assessment.** The purpose of this section was to assess the patient's demographic data, and consisted of (6) items (age, gender, level of education, residence, marital status and occupation).

**Part II: Clinical medical assessment data.** This part constructed by the researcher, aimed to assess the following: medical history, diagnosis, date of admission, vital signs (respiratory rate, heart rate, body temperature and blood pressure), body mass index (BMI), and body surface area (BSA) of burn patient.

**Tool (II): Patients' knowledge assessment questionnaire.** This questionnaire was designed and developed by the researcher based on the following literature review to assess patient's knowledge about burn and post burn exercises **(Mohamed et al 2020).**

Assess patient's general knowledge about burn which included (9) questions (from 1 to 9) (definition of burn, causes, degree, percent, types, complications, wound healing, and management, such as diet, exercises and wound care). Assess patient's knowledge about post burn exercises which included items (4) (Range of motion, Stretching, Strengthening and scar massage).

Based on the responses collected from the burnt patients ; the patients answers were checked and compared with the responses from the predesigned model. Their knowledge is classified as: complete correct answer that was given two scores, while incomplet correct answer was given one score and incorrect was given for zero **(Ibrahim et al., 2021).**

**Scoring system**

Patients' knowledge regarding post burn exercises total score:

- Poor knowledge <50%.
- Fair 50-70%.
- Good >-70%.

**Tool (III): Compliance assessment scale:**

This scale was adopted from(**Newman et al., 2016)**. It consisted of seventeen items: Assessment of patient exercise adherence,The items included ( I do

my exercises as often as recommended, I feel confident about doing my exercise, etc).

**Scoring system for Compliance scale:**

Each item was scored using a 5-point Likert scale (0 = completely agree to 4= completely disagree) with a possible summed score range from 0 to 70. The higher overall adherence score indicated better adherence to exercise.

This scale consisted of seventeen items such as : I do my exercises a often as recommended, Adjust the way I do my exercises to suit myself, I don't get around to doing my exercises, Other commitments prevent me from doing my exercises, I feel confident about doing my exercise , Don't have time to do my exercise , I, m not sure how to do my exercise, I do some ,but not all, of my exercise, I don't do my exercises when I am tired, I do less exercise than recommended by my healthcare professional, I fit my exercises into my regular routine, I do my exercises because I enjoy them, My family and friends encourage me to do my exercise, Stop doing my exercises when my pain is worse, I do my exercises to reduce my health problem and I continue doing my exercises when my pain is better. Each item take score of (completely agree (4), agree (3), Natural (2), Disagree (1) , completely disagree (0).

- Poor compliance ≤ 70
- Good compliance ≥ 70

**Procedure:**

**This study was carried out in three phases:**

**I: Preparatory phase:**

**Tools development:**

1. The responsible authorities at the hospital granted permission to perform the study. (Head of the burn unit)
2. Tool development following a survey of relevant literature.
   It involved evaluating previous and current national and worldwide related literature as well as theoretical understanding of different study components using books, periodicals, periodicals, magazines, and the internet in order to create data gathering instruments.
3. The tools were reviewed by 4 Juries. One medical staff member and three medical surgical nursing staff member's faculty of nursing, assuit university are included in the face and content validity.

**Face validity and reliability:**

**Face validity**

Face validity was done by three specialists who evaluated the resources for comprehension, thoroughness, relevance, and clarity, including four instructors from the Medical-Surgical Nursing team and one professor from the plastic surgery and burn department. Only minor changes were made, the necessary correction was done, and the tools were then designed in their final version and reliability tests were conducted.

**Tools reliability:**

The degree to which the instrument (the questionnaires) consistently measured the thing it was intended to measure (Assessment of Patient's Knowledge and Compliance regarding Post Burn Exercises) Reliability of tools were confirmed by Alpha Cronbach test (0.95 and 0.87).

**Pilot study:** The pilot study included 10% of the study sample (6 patients) they were used to determine the tools' applicability and clarity as well to calculate the amount of time required to complete the data gathering instruments. The data from the pilot study were analyzed; no changes were made to the tools utilized, so the samples selected for the pilot study were involved in the study.

**Ethical Considerations:**

The study's ethical committee at the Faculty of Nursing granted permission to conduct it, Assiut University on 29 May 2023 with ID approval (1120230630). An official letter was issued from the dean of the Faculty of Nursing to the head of Plastic Surgery department to collect the necessary data. Reviewing of the current available literature using books, articles and scientific journals to develop tools for data collection. Patients were meeting the criteria for possible inclusion approached by the researcher.

Surgeons and nursing personnel were informed of the study's purpose in order to win their cooperation. Additionally, after explaining the nature and goals of the study, patients or their families who were willing to participate verbally gave their consent. Privacy and confidentiality were guaranteed. Patients were free to discontinue participation in the trial at any moment and without explanation.

**II. Implementation phase:**

- Prior to beginning data collection, the dean of the nursing faculty and the managers issued an official letter of Main Assiut Hospital and El Eman General Hospital.
- Data was collected from plastic surgery department (burn unit) at Assiut University Hospital and El Eman General Hospital for 6 months during the period from **July 2023 end to December 2023.**
- During the first interview, the researcher introduced herself to start a conversation, explaining the study's nature and goal to the chosen patients, who agreed to take part, complete the questionnaire. The patient's demographic information, including (age, gender, and education level, place of residence, marital status, and occupation) was assessed by the researcher on patient admission by using tool I (part I). And clinical medical assessment data which included past medical history, diagnosis, date of admission, vital signs tool I (part II).

- Data were collected from burns unit in the morning and afternoon shifts for all available patients in the burn unit.
- Following the patients' assessed with the structured interviewing questionnaire sheet Tool (11) that filled through the researcher and assessed general knowledge about burn and adherence of exercise that filled through the researcher.
- The Patient's knowledge regarding post burn exercises such as range of motion exercise and Patient's compliance to post burn exercises were assessed by using Tool III.
- The patient was evaluated on the extent of commitment to post burn exercises (strengthening, stretching and scar massage) by contacting him by phone to find out the date of this visit to the physiotherapy unit to do the exercises, and the researcher went to the physiotherapy unit to evaluate the patient's extent of commitment to the exercises. According to the duration of recovery (strengthening, stretching and scar massage) depend on the patient condition.
- The patient comes after two days from discharge of hospital.
- All data were documented in patient sheet to be analyzed.
- Following the completion of each patient's evaluation, the researcher addressed any misconceptions or incorrect information and miss compliance with post burn exercises.
- Data was collected from the plastic surgery department (burn unit) at Assuit University Hospital on Tuesdays and Wednesdays and El Eman General Hospital on Saturdays, Sundays and Monday. On average two to three patients were interview per week.

**Statistically analysis**

The SPSS version 23 statistical software applications was used to evaluate, code, analyze, and tabulate data. Frequencies and percentages were used as descriptive data. Qualitative data were reported as numbers and percentages (n, %). The mean and standard deviation (SD) of quantitative data were used. To analyze the association between two or more qualitative variables, P-value $\leq$ 0.05 was established as the significant level.

## Results

**Table (1): Demographic data for studied patients n= 60.**

| Variables | Number | % |
|---|---|---|
| **Age groups by years** | | |
| 20-<40 yrs | 29 | 48.3 |
| 40-<60 yrs | 26 | 43.3 |
| 60-<65 yrs | 5 | 8.3 |
| **Gender** | | |
| Male | 43 | 71.7 |
| Female | 17 | 28.3 |
| **Level of education** | | |
| Illiterate | 23 | 38.3 |
| Primary school | 8 | 13.4 |
| Secondary school | 22 | 36.7 |
| University education | 7 | 11.7 |
| **Residence** | | |
| Urban | 15 | 25.0 |
| Rural | 45 | 75.0 |
| **Marital status** | | |
| Single | 12 | 20.0 |
| Married &widow | 48 | 80 |
| **Occupation** | | |
| Not working | 28 | 46.7 |
| Working | 32 | 53.3 |

**Part (II): Clinical medical assessment data:**

**Table (2): Frequent distribution and percentage of medical history and** burn **surface area of studied patients**

| Variables | Number | % | |
|---|---|---|---|
| **Causes of burn** | | | |
| Thermal | 47 | 78.3 | |
| Scold | 11 | 18.3 | |
| Chemistry | 2 | 3.3 | |
| **Comorbidity disease** | | | |
| Diabetes | 5 | 8.3 | |
| Hypertension | 3 | 5.0 | |
| Heart disease | 1 | 1.7 | |
| **Variables** | **Minimum** | **Maximum** | **Mean± SD** |
| BMI | **20.00** | **98.44** | **28.23±10.30** |
| BSA | **15.00** | **70.00** | **32.08±11.23** |

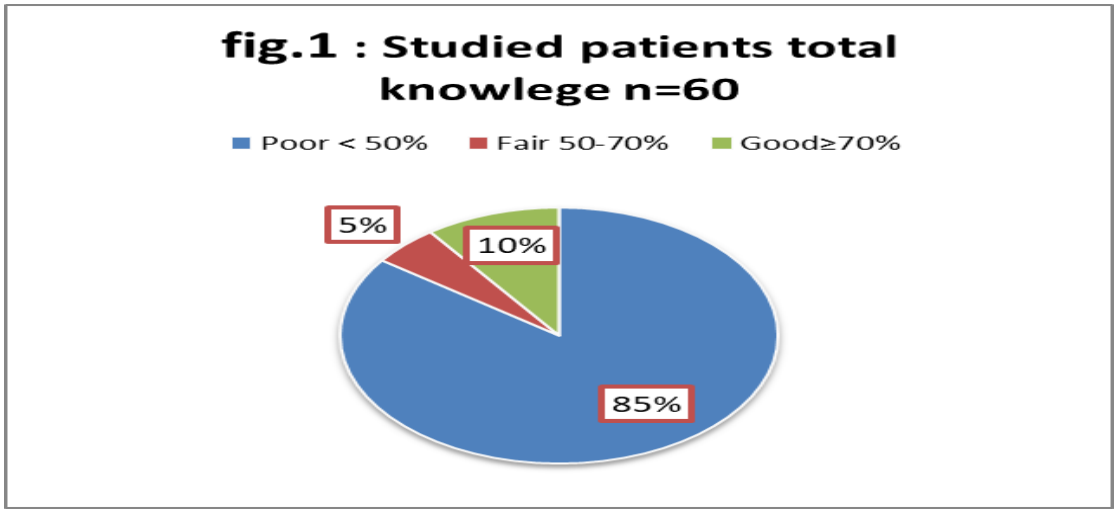


**Figure (1): Percentage distribution of studied patient's total knowledge regarding post burn exercises.**

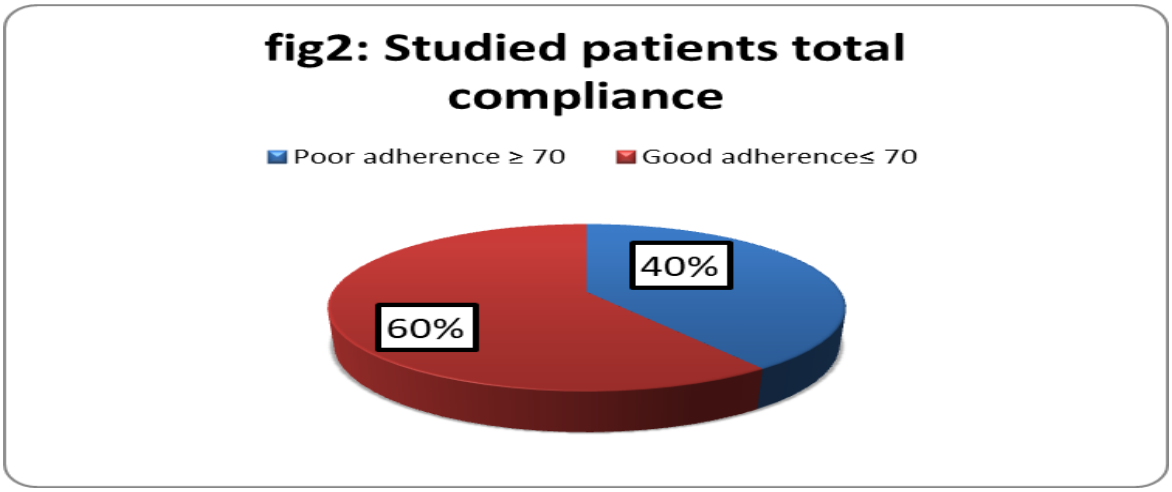


**Figure (2): percentage distribution of studied patients total Compliance scale regarding post burn exercises n=60.**

**Table (3): Relationship between studied patients level of compliance and level of knowledge regarding post burn exercise n=60.**

| Variables | Poor adherence (n %) | | Good adherence (n %) | | p.v |
|---|---|---|---|---|---|
| | N | % | N | % | |
| **Knowledge** | | | | | |
| Poor | 39 | 65.0% | 12 | 20.0% | .010 ** |
| Fair | 2 | 3.3 | 1 | 1.7 | |
| Good | 1 | 1.7 | 5 | 8.3 | |

*Chi square test* *(**) Highly Statistical significant difference *(P-value <0.01)*

**Table (1):** Clarified that, nearly to half (48.3%) of the studied sample, there ages were ranged from 20-40 years old. Regarding gender, it was found that three quarters of them (71.7%) were males. Regarding level of education; more than one third of them (38.3%) were Illiterate. In addition to their marital status, most of them (80%) were married. Regarding residence, it was found that three quarters (75.0%) were from -rural area. As regarding their occupation, approximately half of them (53.3%) were working.

**Table (2):** Regarding to causes of burn the present study showed that (78.3%) of patients had thermal burn and (1.7) of them had heart disease. Also the present study showed that mean BMI were S.D 28.23±10.3 of studied patients and the mean BSA was 32.08±11.23**.**

**Fig. (1):** Represented percentage distribution of studied patient's total knowledge regarding post burn exercises. The majority of them (85.0%) had poor knowledge about exercises post burn, (5.0 %) of them had fair of knowledge and 10.0% of them had good level of knowledge.

**Fig. (2):** Showed that more than half of the studied (60.0%) had good Compliance post burn exercises.

**Table (3):** Represented statistically significant relation between level of knowledge and compliance of exercises of patients regarding post burn exercises (p., 010).

## Discussion

Based on the results of the present study; nearly half of the studied patients age were ranged from twenty-to forty years old**,** this finding is agreed with **(Madian et al., 2024).** Who reported that nearly to half of in the studied patients, the range of their ages was twenty to forty years old**.**

As regard gender**,** the result showed that three-quarters of the studied sample was males, this finding is incongruent with **(Seliman et al., 2022)**. Who found that two thirds of the studied patients were females. **From the researcher's point of view**, interpretation of the earlier results could be that males are more exposed to occupational hazards.

As regard to level of education and residency, it was found that, more than one -third of the studied patients were illiterate and three quarters of them lived in rural areas. This finding is in agreement with **(Elsayed Rady et al., 2020).** The researchers' opinion said that the most of the study subjects were from rural areas and had limited educational levels. **In the researcher's point of view**; regarding residence**,** patients lived in rural areas. This finding could be attributed to the Egyptian culture prevalent in rural areas, which relies on fire as a source of warmth, particularly during cold nights and during cooking. Therefore, they are exposed to accidental burn injuries.

As regard to marital status and occupation, the current study found that the majority of the patients in the study were married and concerning occupation, approximately half of them were working. This finding is similar with **(Farzan, et al., 2023).** Who found that most of the studied participants were married and more than half of studies patients had approximately half working.

Regarding to causes of burn**,** the present study showed that the majority had thermal burns of the studied sample. In this line with **(Anwar et al., 2023).** Who found that the majority of patients had thermal burns**.** In addition, this result was supported by **(Aly & Khlosy, 2020).** Who stated that it could be that flames were the most frequently encountered reason in the studied patients. **In the researchers point of the view** as a cause of the thermal burn injury; this might be due to careless handling of gas pipes without safety measures.

Regarding BMI the present study show that their mean of was $\bar{x}$ S.D 28.23±10.30. This finding is reinforced by **(Palackic et al., 2022)** who reported, their BMI mean was $\bar{x}$S.D 23.1 ± 5.4 kg*m-2.

Regarding BSA of burn, the current study showed that, the mean $\bar{x}$ S.D of the studied patients was 32.08±11.23. This finding is in agreement with **(Saadat et al., 2021). In researcher point of view**; because among the criteria that I took in the sample included a second-degree of burn.

Regarding level of knowledge for post burn exercises: Most of the patients under study lacked knowledge. This finding is in harmony with **(Mohammed et al., 2021).** Who found that less than three quarters of

them had inadequate level of knowledge. **In the researcher's point of view** the majority of the patients in the study lacked information and had illiteracy education.

Regarding of total compliance for post burn exercises study result revealed that more than half of the studied had good Compliance. This finding supported with **(Jonice et al., 2021). In the researcher point of view:** because the patients was seeing the physical therapist and following instruction doing the exercises.

Regarding Relation between studied patients compliance and level of knowledge regarding post burn exercise; the results of this investigation showed that statistically significant relation (p., 010). Study Likewise (**Schieffelers et al., 2024).** Who found that the positive relation between level of knowledge and compliance with post burn exercises.

## Conclusion:

**Based on the result of the current study, it can be concluded that:**

The study finding answered research questions, That's proved that level of the patient's knowledge with post burn exercises there was poor. While their compliance exercises post burn was good. statistically significant relation between level of knowledge and patient's compliance of exercises with post burn exercises.

## Recommendations:

**Based on the results of the present study, it can be recommended that**

**For patients:**

- Enhance the patient knowledge about the importance of compliance with a rehabilitation exercises program in burned patient to preventing complications after burn.
- Giving the patients a written rehabilitation booklet is a terrific way to remind them of the rehabilitation guidance.
- Encourage the patient and their family to follow the discharge guidelines, as this may increase the patient's compliance and commitment.

**For nurses:**

- Simple illustrated post burn exercise rehabilitation booklet should be available for nurse in the burn unit.
- Specialized nurse rehabilitator is to be full time attending the evening shift to remind the patients of the rehabilitation instructions needed is also recommended.

**For research:**

- The study should be replicated on large sample and different hospitals setting in order to generalized the results.

## References:


- **Ahmed, A., Hassan, Y., Azer, S., & Abd EL-All, H. (2019):** Effect of range of motion exercise program on improving upper-arm region joints function for burned patients. Assiut Scientific Nursing Journal, 7(19), 61-69.
- **Atwell, K., Bartley, C., Cairns, B., & Charles, A. (2020):** The epidemiologic characteristics and outcomes following intentional burn injury at a regional burn center. Burns, Vol. (46), No. (2), Pp.441-446.
- **Aly Y, & Khlosy, H. (2020):** Range of Motion Exercises Effect during and after Hydrotherapy on Patients Burned Hand Function and Pain Intensity: A Comparative Study. Egyptian Journal of Health Care, Vol. (11), No. (3), Pp. 670-687.
- **Anwar, M., Shah, B., Muhammad, D., Sultan, A., Tariq, M., Akhtar, N., & Hussain, S. (2023).** Nurses, Knowledge of first Aid Management of Burn Patients at the Peshawar Burn and plastic Surgery Center: Nurses Management of Burn Patients. Pakistan Journal of Health Sciences, Vol. (4), No. (1), Pp. 141-145.
- **Chipp, E. (2023):** Outpatient and Minor Burn Treatment. Surgical Clinics, Vol. (103), No. (3), Pp.377-387.
- **Elsayed, S., Gomah, S., Ramadan, S., & Samir, M. (2020):** Effect of Muscle Stretching and Range of Motion Exercises on Sleep Quality and Anxiety among Hemodialysis Patients. Egyptian Journal of Health Care, Vol. (11), No. (4), Pp.582-601.
- **Farzan, R., Ghorbani Vajargah, P., Mollaei, A., Karkhah, S., Samidoust, P., Takasi, P., & Haddadi, S. (2023):** A systematic review of social support and related factors among burns patients. International wound journal, Vol. (20), No. (8), Pp. 3349-3361.
- **Goldsmith, G., Bollen, J., Salmon, V., Freeman, J., & Dean, S. (2023):** Adherence to physical rehabilitation delivered via tele-rehabilitation for people with multiple sclerosis: a scoping review protocol. BMJ open, Vol. (13), no. (3), Pp.062548.
- **-Ibrahim, R, Sayedabusaad, E., & Solimanebrahem, G. (2021):** Assessment of Nurses Knowledge and Practice about an Upper Limb Exercise for Burned Children. Vol.(8), No.(2), Pp. 131–141.
- **Jeschke, M., van Baar, M., Choudhry, M., Chung, K., Gibran, N., & Logsetty, S. (2020):** Burn injury. Nature reviews Disease primers, Vol. (6), No. (1), Pp.11.
- **Jonice L H, Kerry H.C, & Kristen O (2021):** Management of patients With Burn injury. Brunner and Suddarth's Textbook of Medical-Surgical Nursing,15th ed , L,W.1745.

- **Khadem-Rezaiyan, M., Aghajani, H., Ahmadabadi, A., Zanganeh, M., Tavousi, S., Sedaghat, A., & Hasanabadi, S. (2020):** Epidemiology of severe burns in North-East of Iran: How is the burn size different in a developing country from developed ones? Burns Open,Vol.(4), No.(1), Pp. 4-9.
- **Lee, L., Hitzig, S., Mayo, A., Devlin, M., Dilkas, S., & MacKay, C. (2023):** Factors influencing physical activity among individuals with lower limb amputations: a qualitative study. Disability and Rehabilitation, Vol. (45), No. (9), Pp.1461-1470.
- **Marquez, D., Aguiñaga, S., Vásquez, P., Conroy, D., Erickson, K., Hillman, C., & Powell, K. (2020):** A systematic review of physical activity and quality of life and well-being. Translational behavioral medicine, Vol. (10), No. (5), Pp.1098-1109.
- **Murray, H. (2020):** Intensive care unit nurses' performance regarding caring patients with head injury: an educational intervention. International Journal of Studies in Nursing,Vol. (3), No.(3), Pp.141.
- **Mohamed, Z., Abo-ElNoor, E., & Abd-Elall, H. A. (2020):** Effect of Nursing Education on Knowledge and Self Care for Patient's with Systemic Lupus Erythematosus. Assiut Scientific Nursing Journal, 8(23), 113-121.
- **Mohammed R, Hassan M, & Mohammed I (2021):** Effect of an Educational Nursing Program on Nurses' Performance Regarding Burn Injury Management, International Journal of Novel Research in Healthcare and Nursing Vol. (8), No. (2), Pp. (50-63).
- **Madian, I., Sherif, W., Othman, W., & El Fahar, M. (2024):** Effect of Range of Motion Exercise Program on Pain Level among Patients with Second Degree Burn at Mansoura University Hospital. Mansoura Nursing Journal, Vol. (11), No. (1), Pp.461-468.
- **Newman-Beinart, N., Norton, S., Dowling, D., Gavriloff, D., Vari, C., Weinman, J., & Godfrey, E. (2016):** The development and initial psychometric evaluation of a measure assessing adherence to prescribed exercise: the Exercise Adherence Rating Scale (EARS). Physiotherapy, Vol. (103), No. (2), Pp.180-185.
- **Opriessnig, E., Luze, H., Smolle, C., Draschl, A., Zrim, R., Giretzlehner, M., & Nischwitz, S. (2023):** Epidemiology of burn injury and the ideal dressing in global burn care–Regional differences explored. Burns, Vol. (49), No. (1), Pp.1-14.
- **Osborne, M., Rowe, D., Edgar, A., Fear, A., Wood, W., Fairchild, A., & Kenworthy, P. (2024):** DOES EXERCISE INFLUENCE CHRONIC INFLAMMATION IN BURNS> 1 YEAR AFTER INJURY? Journal of Clinical Exercise Physiology, Vol. (13), No. (2), Pp.484-484.
- **Palackic, A., Suman, O., Porter, C., Murton, A. J., Crandall, C., & Rivas, E. (2021):** Rehabilitative exercise training for burn injury. Sports Medicine, Vol. (51), No. (12), Pp.2469-2482.
- **Palackic, A., Rontoyanni, V., Branski, L., Duggan, R., Schneider, J., Ryan, C., & Herndon, D. (2022):** 68 The Association Between Body Mass Index and Physical Function in Adult Burn Survivors. Journal of Burn Care & Vol. (43), No. (1), Pp.46-S47.
- **Qtait, M., & Alekel, K. (2023):** Impact of Education on Health Team Knowledge of Essential Burn Care Post Course Training: An Intervention Study. HIV Nursing, Vol. (23), No. (3), Pp.237-242.
- **Saadat, G., Toor, R., Mazhar, F., Bajani, F., Tatebe, L., Schlanser, V., & Bokhari, F. (2021):** Severe burn injury: Body Mass Index and the Baux score. Burns, Vol. (47), No. (1), PP. 72-77.
- **Seliman Zakeria, H., Fouad Abdalla, K., & Mohamed Maarouf, D. (2022).** Biosychosocial and Educational Needs of Patients with Burn Injuries. Egyptian Journal of Health Care, Vol. (13), No. (2), Pp.1135-1147.
- **Schieffelers, D., Ru, T., Dai, H., Ye, Z., van Breda, E., Van Daele, U., & Wu, J. (2024):** Effects of early exercise training following severe burn injury: a randomized controlled trial. Burns & Trauma, Vol. (12), No. (4), Pp.1- 5.
- **Zwierełło, W., Piorun, K., Skórka-Majewicz, M., Maruszewska, A., Antoniewski, J., & Gutowska, I. (2023):** Burns: classification, pathophysiology, and treatment: a review. International journal of molecular sciences, Vol. (24), No. (4), Pp. 3749.