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A STUDY TO FIND OUT THE PREVALENCE OF MUSCULOSKELETAL IMPAIRMENTS IN POST-OPERATIVE PATIENTS: A CROSS-SECTIONAL SURVEY

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ABSTRACT: MSK impairments are common in patients who undergo surgery and are of major concern overall. This study aims to find out the prevalence of musculoskeletal impairments and to find out whether post-op patients receive Physiotherapy treatment for musculoskeletal impairments or not.This cross sectional study is done with the help of a questionnaire. Data was collected from hospitals of Abbottabad and Islamabad (Pakistan) and analyzed using SPSS.Study incorporates 294 post-operative patients. According to the results; 5 (1.7%) patients reported no pain, 194 (66%) patients reported pain localized around incision and 95 (32.3%) reported radiating pain. 217 (73.8%) patients had movement limitation in the affected area. The reported frequency for affected ADL's was such as 7 (2.4%) patients reported limitation in transfers, 42 (14.3%) reported limitations in walking, 63 (21.4%) reported that their ADLs were not affected.Total 26 (8.8%) post-operative subjects felt improvement after physiotherapy treatment while 266 (90.5%) subjects got no PT treatment.It is concluded that movement limitation in the affected area was most common MSK impairment among post-operative patients. MSK impairments were most common in age group of 4-32 years. Pain was a common impairment in them. Muscle atrophy, post-surgical deformity and numbness in the affected area were less prevalent MSK impairments in post-op patients. Results also showed that prevalence of usage of either preventive or corrective PT treatment for MSK impairments was not high in post-op patients.

Key Words: MSK impairments, Post-op patients, Hospitalization, PT treatment, Pain, ADLs limitation

INTRODUCTION:

Degenerative diseases and inflammatory conditions of joints, ligaments, nerves and muscles supporting limbs and spine are termed as musculoskeletal impairments.Surgical repair, excision, transplantation, anastomosis and grafting are some of the many surgical procedures done to treat musculoskeletal injuries and organ diseases when other conservative treatments fail. Bed rest is often advised for speedy recovery of injured or diseased parts of the body after surgery. However, extensive bed rest and long periods of immobility can harm musculoskeletal system most obviously with the loss of muscle strength and endurance,atrophy, musculoskeletal pain, progressive loss in bone mass known as disuse osteoporosis and much other impairment.[1, 2]

Disuse atrophy involves loss of muscle stem cells (satellite cells) along with morphological changes including a decreased cross-sectional area of muscle fibers associated withreduced content of actin, myosin and other muscle proteins, reduced force production, increased fatigability, decreased sensitivity to insulin, decreased capillary density in muscle fibers, 12% decrease in muscle strength in a week and disruption of the 3-dimensional structure of skeletal muscles. Although number of muscle fibers remains intact.[5]

3-5 weeks of bed rest results in loss of half of muscle strength. Size of lower limb musclesespecially extensor muscles such as quadriceps femorisdecreases to a greater extent than flexor muscles such as hamstringsafter immobilization.Decrease of 30% and 24% occurs in muscle mass after 90 days of post-operative bed rest and after 42 days of best rest after surgery respectively. 90–120 days of post-operative bed rest may reduce quadriceps and calf muscle mass by about 30 %. Weight loss occurs due to loss of muscle mass and loss of fat.[2, 6]

About 20 days of bed rest results in increased tendon viscosity. 69% and 61% respective decrease occurs in stiffness and load-bearing ability of tendon. Less than one day of immobilization causes muscle fibers to become short and more densely packed. In 2–3 weeks a firmer contracture develops. Immobility results in adhesion formation, damage to cartilage, increased cross-linking of collagen fibers and deposition of type I collagen in peri-articular connective tissue.Just a few days of bed rest leads to loss of calcium from bones, increased calcium in blood abd urine, and calcium deposition in soft tissues. Disuse osteoporosis occurs such that 24%-40% ofheel bone mass is lost in 36 weeks of bed rest. This causes more pain with weight-bearing activities. [2, 6]

Muscle ischemia due to prolonged immobilization may result in'Dropped Shoulder Syndrome' in upper limb. Fibromyalgia is common in hospitalized patients after surgery.Flexion deformities and degenerative arthritis are some of theserious complications in post amputation patients. (7-9)

Postoperative rehabilitation program must be initiated with detailed musculosketal examinationspecifically designed for each patient. (5)

Medications such as nonsteroidal anti-inflammatory drugs (NSAIDs) are used to treat inflammation or pain, zolpidem (Ambien), eszopiclone (Lunesta), and ramelteon (Rozerem)are given to aid sleep in post-operative patients. (19)

Decompression surgery, release procedure, distraction surgery and heterotopic ossification excision are effective means of restoring function and mobility with low complication rates. Physical therapy is part of the conservative care for numerous musculoskeletal disorders in postoperative patients. It includes use of modalities such as TENS, ultrasound and CPM, range of motion exercise, soft tissue mobilization, stretching and strengthening exercisesand mobilization/manipulation. (10-13)

ROM within a protected range, muscle-setting exercises are indicated in maximum protection which ranges from a few days or a week to a month or 6 weeks depending on the type of surgery and type of tissue involved.Arthrokinematics, neuromuscular control and gradually increasing intensity of strengthening exercises are emphasized during intermediate protection phase of rehabilitation that spans from 4 to 6 to an additional 4 to 6 weeks. Full pain-free active ROM, functional strengthening exercises are main interventions during minimum protection or return to function phase. This phase startsfrom 6 to 12 weeks postoperatively and continues until 6 months postoperatively or beyond.(4)

LITERATURE REVIEW:

Bowering J. B., et.al (2015) conducted a research on the incidence and risk factors for impaired mobility in older cardiac surgery patients during the early postoperative period. A retrospective chart review was carried out on 396 patients receiving open heart coronary artery bypass grafts (CABG), valve replacements and combination CABG-valve replacements in a tertiary care hospital. The mean age was 66.4 ± 11.9 years. In a subset of patients aged 75 years and older, the mean age was 79.8 ± 3.7 years. Mobility issues affected 36.9% of individuals from the total

sample, and 47.6% of older patients. Increased age was a weak predictor in the total sample (OR 1.03) but was the only predictor in older adults (OR 1.1). [18]

Svendsen S., et.al (2012) conducted a study on the time trends in surgery for non-traumatic shoulder disorders and postoperative risk of permanent work disability. Nationwide cohort study found a fourfold increase in surgery rates and a substantial risk of postoperative permanent work disability that remained constant over time. The annual incidence increased from 3.5 to 14.8 per 10,000 and 9.8% of the patients became permanently work disabled. [14]

Papakostidou I., et.al (2012) conducted a study on factors affecting the quality of life after total knee arthroplasties in which 224 patients were included. Of the 224 eligible patients, 204 (162 females, mean age 69.2) were included in the analysis. Response rate at one year was 90%. At 6 weeks after surgery, despite improvement in pain and alleviation of the depressive mood, the physical function remained less satisfactory. Females presented lower scores in terms of quality of life, both preoperatively and 6 weeks after TKA. Significant improvement was already experienced at 3 months postoperatively. According to WOMAC, KSS, CES-D10 and pain VAS scores, the quality of life was significantly improved 12 months after TKA ($P < 0.001$). CES-D10 score was positively correlated with WOMAC and pain VAS scores at all the time points assessed ($P < 0.001$). Age, body mass index (BMI), place of residence, level of education and social support were not significant predictors of quality of life after TKA. [15]

Johansen A., et.al (2012) conducted a study on persistent postsurgical pain in a general population; prevalence and predictors. This study aimed to assess the prevalence of persistent postsurgical pain in a general population and to describe associated physical, social and psychological factors including symptoms of nerve injury and sensitization. A cross-sectional survey was performed in northern Norway with questionnaire items covering surgery, pain and sensory abnormalities in the area of surgery. Of the 12,982 participants, 24.0% (3111) had undergone one or more surgical procedures during the 3 years preceding the survey. Of these, 2043 had the surgery performed more than 3 months before the investigation. Persistent pain in the area of surgery was reported by 40.4% of the patients (826 of 2043), moderate or severe pain by 18.3% (373 of 2043). Hypoesthesia, hyperesthesia or both was reported by 24.5% (501 of 2043). There were strong associations between sensory abnormalities and persistent pain increasingly with higher pain intensities; odds ratios were 2.68 for hypoesthesia and 6.27 for

hyperesthesia. Of the 826 individuals reporting persistent pain in the anatomical area of surgery, 51.0% reported chronic pain when questioned without specific reference to the surgery. [17]

OBJECTIVES OF THE STUDY:

The aims of this study are:

- To determine the Prevalence of Most Common Musculoskeletal Impairments in Post-Operative Patients
- To determine Whether Postoperative Patients with Musculoskeletal Impairments Receive Physiotherapy Treatment or Not

MATERIALS AND METHODS:

SOURCES OF DATA:

- Ayub Medical Complex, Abbottabad
- DHQ, Abbottabad
- Women & Children's Hospital, Abbottabad
- Gillani Hospital, Abbottabad
- Pakistan Institute Of Medical Sciences, Islamabad
- Poly Clinic, Islamabad

POPULATION: Post-operative patients

STUDY DESIGN: Cross-Sectional study

SETTING: Data was collected from Ayub Medical Complex, DHQ, Women & Children Hospital, Gillani Hospital Abbottabad and PIMS and Poly Clinic, Islamabad. Study was carried out at Women Institute of Rehabilitation Sciences; Abbottabad.

DURATION OF STUDY: Six months after approval of synopsis.

SAMPLE SIZE: 294 post-operative patients were recruited in this study.

SAMPLING TECHNIQUE: Convenient Sampling

SAPMLE SELECTION:

Inclusion Criteria:

- All the post-operative patients who were hospitalized for more than 3 days in the above mentioned hospitals during the above mentioned duration.

- Patients who had undergone general, orthopedic and neurosurgery
- Both Genders

Exclusion Criteria:

All the post-operative patients who were hospitalized for less than 3 days and did not visit the above mentioned hospitals in the above mentioned duration.

DATA COLLECTION PROCEDURE: Primary questionnaire was implicated to them. The questionnaire contained close-ended questions. Total 300 post-operative patients were included in this study.

ETHICAL CONSIDERATIONS: Written informed consent was taken from the subjects. Topic of study was approved by ETHICAL COMMITTEE OF WOMEN INSTITUTE OF REHABILITATION SCIENCES, ABBOTTABAD.

DATA ANALYSIS PROCEDURE: All data was entered and analyzed by using SPSS version 20. Frequencies were calculated to determine the prevalence of musculoskeletal impairments in post-operative patients.

STATISTICAL ANALYSIS:

TABLE NO 1:PATIENT AGE:

Age in Years	Frequency	Percent
4-32	167	56.8
33-61	105	35.7
62-90	22	7.5
Total	294	100.0

TABLE NO 2: GENDER:

Gender	Frequency	Percent
Male	117	39.8
Female	177	60.2

Total	294	100.0

TABLE NO 3: OCCUPATION:

Occupations	Frequency	Percent
House wife	148	50.3
Job	52	17.7
Student	94	32.0
Total	294	100.0

TABLE 4: TYPE OF SURGERY:

Type of Surgery	Frequency	Percent
General	230	78.2
Orthopedic	56	19.0
Neurosurgery	8	2.7
Total	294	100.0

TABLE NO 5: DURATION OF HOSPITALIZATION:

Duration of Hospitalization	Frequency	Percent
> 3 days to 1 week	215	73.1
> 1 week to 3 months	78	26.5
> 3 months	1	.3
Total	294	100.0

TABLE NO 6: NATURE OF PAIN:

Nature of Pain	Frequency	Percent

No pain	5	1.7
Localized around incision	194	66.0
Radiating	95	32.3
Total	294	100.0

TABLE NO 7: MUSCLE ATROPHY:

Muscle Atrophy	Frequency	Percent
Yes	11	3.7
No	283	96.3
Total	294	100.0

TABLE NO 8: MOVEMENT LIMITATION:

Movement Limitation	Frequency	Percent
Yes	217	73.8
No	77	26.2
Total	294	100.0

TABLE NO 9: ADLs LIMITATION:

ADLs Limitation	Frequency	Percent
Transfers(Bed mobility, sit to stand)	7	2.4
Walking	42	14.3
ADLs Not affected	63	21.4
All ADLs affected	182	61.9
Total	294	100.0

TABLE NO 10: NUMBNESS:

Numbness	Frequency	Percent
Yes	42	14.3
No	252	85.7
Total	294	100.0

TABLE NO 11: DEFORMITY OR ABNORMALITY:

Post surgical deformity	Frequency	Percent
Spinal deformity (Kyphosis, lordosis, sway back, round shoulders)	14	4.8
Others(limb deformity)	4	1.4
None	276	93.9
Total	294	100.0

TABLE NO 12: PHYSIOTHERAPY TREATMENT:

Subjective Report about PT Treatment	Frequency	Percent
Patient felt improvement	26	8.8
Patient did not feel improvement	2	.7
Got no treatment	266	90.5
Total	294	100.0

CROSS TAB 1: TYPE OF SURGERY * NATURE OF PAIN:

Type of surgery	Nature of pain			Total
	No pain	Localized around incision	Radiating	
General	4 (1.4%)	150 (51.0%)	76 (25.9%)	230 (78.2%)

Orthopedic	1 (0.3%)	38 (12.9%)	17 (5.8%)	56 (19.0%)
Neurosurgery	0 (0.0%)	6 (2.0%)	2 (0.7%)	8 (2.7%)
Total	5 (1.7%)	194 (66.0%)	95 (32.3%)	294 (100.0%)

DURATION OF HOSPITALIZATION * MUSCLE ATROPHY:

Duration of Hospitalization * Muscle Atrophy	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	31.220	2	.000

MOVEMENT LIMITATION IN THE AFFECTED AREA * SUBJECTIVE REPORT ABOUT PT TREATMENT:

Movement Limitation in the Affected Area * Subjective Report about PT Treatment	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.873	2	.238

RESULTS:

This study shows thatmusculoskeletal impairments are prevalent in post-operative patients. Usage of physiotherapy treatment is not highly prevalent among post-op patients. Musculoskeletal impairments can unfavorably affect patient's life. According to the results obtained;

There were three age groups; 167 (56.8%) patients of age 4-32 years, 105 (35.7%) patients of age group 33-61 years and in 22 (7.5%) patients of age group 62-90 years. Mean age of sample was 34.17 years.

Out of 294 subjects, there were 117 (39.8%)male and 177 (60.2%) female.

According to occupation, patients were divided into three groups. 148 (50.3%) were House wives, 52 (17.7%) were doing Job and 94 (32%) were students.

Out of total 294 subjects, 230 (78.2%) subjects underwent General surgery, 56 (19%) had orthopedic surgery and 8 (2.7%) were patients of Neurosurgery.

According to duration of hospitalization, patients were divided into three groups; 215 (73.1%) subjects belonged to Group A (>3 days to 1 week), 78 (26.5%) were in Group B (>1 week to 3 months) and 1 (0.3%) subject was included in Group C (>3 months).

Out of total 294 patients 5 (1.7%) subjects reported no pain, 194 (66%) reported pain localized around incision and 95 (32.3%) reported radiating pain.

Study shows that 11 (3.7%) patients had muscle atrophy in affected area and 283 (96.3%) subjects had no muscle atrophy.

Out of 294 patients 217 (73.8%) subjects had movement limitation in the affected area and 77 (26.2%) subjects had no movement limitation.

Out of 294 subjects 7 (2.4%) subjects reported limitation in transfers, 42 (14.3%) subjects reported limitations in walking, 63 (21.4%) subjects reported their ADLs were not affected, 182 (61.9%) subjects reported their all ADLs were affected.

Frequencies of subjective report of physiotherapy treatment shows that total 294 subjects were included. Among them 26 (8.8%) subjects felt improvement, 2 (0.7%) subjects didn't feel improvement and 266 (90.5%) subjects got no treatment.

Frequencies of sensory abnormality (numbness) in the affected area shows out of 294 subjects 42 (14.3%) subjects reported numbness in the affected area and 252 (85.3%) subjects reported absence of numbness in affected area.

14 (4.8%) patients had Spinal deformity, 4 (1.4%) had limb deformity and 276 (93.9%) had no deformity.

230 (78.2%) subjects underwent general surgery, among them 4 (1.4%) subjects reported no pain, 150 (51%) subjects reported pain localized around incision and 76 (25.9%) subjects reported radiating pain. 56 (19%) subjects underwent orthopedic surgery, among them 1 (0.3%)

subjects reported no pain, 38 (12.9%) subjects reported pain localized around incision and 17 (5.8%) subjects reported radiating pain. 8 (2.7%) subjects underwent neurosurgery, among them no subject reported no pain, 6 (2%) subjects reported pain localized around incision and 2 (0.7%) subjects reported radiating pain. Out of total 294 post-operative subjects, 5 (1.7%) reported no pain, 194 (66%) reported localized pain around incision and 95 (32.3%) subjects reported radiating pain.

Chi-square test was applied to check the relationship between duration of hospitalization and muscle atrophy. Pearson Chi-square value, p value =.000 which is less than .05. so it shows there was significant association between duration of hospitalization and muscle atrophy.

Chi-square test was applied to check the relationship between movement limitation in the affected area and subjective report about PT treatment. Pearson Chi-square value, p value =.238 which is less than .05. So it shows there was significant association between duration of hospitalization and muscle atrophy.

CONCLUSIONS:

- Movement limitation in the affected area was most common MSK impairment among post operative patients. Few patients reported limitation in transfers, some reported limitations in walking and most of patients reported that their all ADLs were affected.
- Pain was a common impairment in post operative patients. Pain localized around incision was more common than radiating pain and it was mostly seen in patients whose duration of hospitalization was less than 3 days to one week only.
- Muscle atrophy, post surgical deformity and numbness in the affected area were less prevalent MSK impairments in post-op patients.
- Prevalence of usage of either preventive or corrective PT treatment for MSK impairments was not very high in post-op patients. Only a small number of subjects received PT treatment and most of them felt improvement while a large number of subjects got no treatment.
- Large number of patients had limitation in movements but they did not receive PT treatment. Only small number of patients sought preventive PT treatment.

DISCUSSION: Musculoskeletal impairments are prevalent and their impact is pervasive. They are the most common cause of severe long term pain and physical disability. Musculoskeletal conditions are a major burden on individuals, health systems, and social care systems. (4) According to the results of this study, out of 294 patients 217 had movement limitation in the affected area and 77 had no movement limitation.So it can be concluded that movement limitation in the affected area is most common MSK impairment among post-operative patients. It was most common in age group of 4-32 years. A small number of patients reported limitation in transfers, some reported limitations in walking and most of patients reported that their all ADLs were affected.

A study conducted by Svendsen, S., et.al (2012) which shows a fourfold increase in surgery rates and a substantial risk of postoperative permanent work disability that remained constant over time. Their findings suggest that indications for surgery may need to be revisited and that attention should be given to supporting return to work, especially for blue-collar workers. The annual incidence increased from 3.5 to 14.8 per 10 000, and 9.8% of the patients became permanently work disabled. (14)

According to the results of this study out of total 294 patients 5 reported no pain, 194 reported pain localized around incision and 95 reported radiating pain. So it is concluded that pain was a common impairment in post-operative patients. Pain localized around incision was more common than radiating pain and mostly it was seen in patients whose duration of hospitalization was less than 3 days to one week only.

Literature supports that pain is a common impairment seen after any type of surgery Stubblefield, M. D. and N. Keole (2014) conducted a study on upper body pain and functional disorders in patients with breast cancer and found that upper body pain and dysfunction are common in survivors of breast cancer who had undergone surgery. Pain and disorders of the upper body can result directly from breast cancer or from the surgery, chemotherapy, radiotherapy, or hormonal therapies used in its treatment. Although considerable information is available regarding impairments such as pain and restricted shoulder range of motion associated with breast cancer and its treatment. (16)

Johansen A., et.al (2012) conducted a study which supports evidence from clinical studies of persistent postsurgical pain, indicating a high prevalence of persistent post-surgical pain. (17)

According to the results of this research out of 294 patients 11 patients had muscle atrophy in affected area and 283 subjects had no muscle atrophy. So it is concluded that muscle atrophy, post-surgical deformity and numbness in the affected area are less prevalent MSK impairments in post-operative patients.

A study conducted by Shamley DR, et.al (2007) concluded that three of the 4 muscles on the affected side demonstrated significantly less EMG activity, particularly when lowering the arm. Upper trapezius demonstrated the greatest loss in activity. Decreased activity in both upper trapezius and rhomboid were significantly associated with an increase in SPADI score and increased time since surgery. Pectoralis major and minor were significantly smaller on the affected side. (7)

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