



**የቅዱስ ጳውሎስ
ሆስፒታል ሚሊኒየም ሕክምና ኮሌጅ
St. Paul's Hospital Millennium Medical College**

**St. Paul's Hospital Millennium Medical College
Department of Orthopedics and Traumatology**

**Functional limitation and associated factors among adult patients
presenting with shoulder pain at AaBET hospital, Ethiopia**

By Dr. Yeabtsega Degu M.D (Orthopedics and Trauma Surgery Resident)

Addis Ababa, Ethiopia

January, 2025

St. Paul's Hospital Millennium Medical College
Department of Orthopedics and Traumatology

**Functional limitation and associated factors in patients presenting with
shoulder pain at AaBET hospital, Ethiopia**

By Dr.Yeabtsega Degu M.D. (Orthopedics and Trauma Surgery Resident)

**Clinical Advisor: Dr. Mamo Deksisia (Consultant orthopedics, sport and
arthroscope surgeon)**

**Public Health Advisor: Mr. Simegnew Handebo (MPH, Assistant
professor)**

**A research thesis to be submitted to department of orthopedics and
traumatology, Saint Paul's hospital millennium medical college for the
partial fulfilment of the requirements for specialty certificate in
orthopedics and traumatology**

January , 2025
Addis Ababa, Ethiopia

Investigator	Yeabtsega Degu (MD, Orthopedics and Traumatology Resident)
Full title of the research project	Functional limitation and associated factors in patients presenting with shoulder pain at AaBET hospital, Ethiopia
Duration of the project	August -January
Study Area	AaBET hospital, SPHMMC, Addis Ababa.
Total Cost of the project	25,420.00
Source(s) of Funding	SPHMMC
Address of investigator	tel:
	Cell phone: +251921334277
	Fax:
	P.O.Box:
	Email:yeabdg@gmail.com
Name of Advisor(s)	1. Dr. Mamo Deksisa (Consultant orthopedics, sport and arthroscopy surgeon) 2. Mr. Simegnew(MPH, Assistant professor)

Acknowledgments

Before anything else, I would like to extend my sincere appreciation and thanks to my clinical adviser, Dr. Mamo Deksis, for his valuable advice, experience, and continued help throughout this process.

Finally, my appreciation goes to my public health adviser, Mr. Simegnaw for his constructive criticism and assistance in preparing and writing this thesis.

I would like to express my deepest gratitude to the Department of Orthopedics and Traumatology at St. Paul's Hospital Millennium Medical College for their provision of the platform and resources needed to do this work.

List of abbreviations

- ACJ:** Acromioclavicular Joint
- AaBET:** Addis Ababa Burn, Emergency and Trauma Hospital
- CD:** Chronic Dislocation
- DASH:** Disabilities of the Arm, Shoulder, and Hand
- ERB:** Ethical Review Board
- IM:** Impingement Syndrome
- PI:** Principal Investigator
- QOL:** Quality of Life
- RCT:** Rotator Cuff Tear
- ROM:** Range of Motion
- SDQ:** Shoulder Disability Questionnaire
- SF-36:** 36-Item Short Form Survey
- SLAP:** Superior Labrum Anterior and Posterior
- SPADI:** Shoulder Pain and Disability Index
- SPHMMC:** St. Paul's Hospital Millennium Medical College
- VAS:** Visual Analog Scale
- VIF:** Variance Inflation Factor

Abstract

Background: Shoulder pain is a common condition which affects functional and quality of life. Even though this condition occurs so frequently, there is no localized data on functional limitation and associated factors among shoulder pain patients in Ethiopia. This study is conducted to fill the gap by improving information on functional limitations and identifying associated factors among adult patients with shoulder pain presenting to AaBET Hospital in Addis Ababa, Ethiopia.

Objective: The primary objective of this study was to determine the functional limitations and associated factors among adult patients with shoulder pain at AaBET Hospital's sports clinic.

Methods: This was a cross-sectional study conducted between August 2024 and January 2025 at the Orthopedics and Traumatology department in AaBET Hospital, which included 66 adult patients aged 18 years and above presenting with pain in the shoulder. Data were collected using standardized questionnaires, medical record reviews, and functional assessments using the Shoulder Pain and Disability Index (SPADI). Descriptive statistics, bivariable, and multivariable linear regression analyses were conducted to identify predictors of functional limitation. The level of statistical significance was set below 0.05.

Results: The study revealed that 62.1% of participants had severe functional limitations, with a mean SPADI score of 61.8 (± 15.7). Chronic dislocation was the most significant predictor of functional limitation, followed by rotator cuff tears and adhesive capsulitis. Female participants reported higher SPADI scores compared to males ($p = 0.002$). Shoulder flexion range of motion (ROM) showed a strong negative correlation with functional limitations (Spearman's $\rho = -0.660$, $p < 0.001$). Symptom duration and occupation were not significantly associated with functional limitations in the multivariable analysis.

Conclusion: Chronic dislocation, rotator cuff tears, and adhesive capsulitis were the most significant contributors to functional limitations in patients with shoulder pain. The study highlights the importance of early intervention and targeted rehabilitation to improve shoulder mobility and reduce disability. These findings provide valuable insights for clinicians and policymakers in managing shoulder pain in resource-constrained settings like Ethiopia.

Keywords: *Shoulder pain, functional limitation, SPADI, associated factors, Ethiopia, cross-sectional study, AaBET Hospital.*

List of tables

Table 1 Frequency distribution of independent variable.....	18
Table 2 Summary of Mean Comparison Tests for Total SPADI Scores	19
Table 3 Summary of Regression Coefficients for Total SPADI Scores	20
Table 4 Summary of Regression Coefficients for Predictors of Total SPADI.....	21

List of figures

Figure 1 Age	16
Figure 2 shoulder pathology	17
Figure 3 shoulder ROM and Total SPADI	18

Table of content

1	Introduction.....	1
1.1	Background	1
1.2	Statement of the problem	2
1.3	Significance of the study.....	4
2	Literature review	5
2.1	magnitude of functional limitation	5
2.2	Associated factors.....	6
3.	Objectives.....	10
3.1	general objective.....	10
3.2	Specific objectives	10
4	Methodology	11
4.1	Study area and period.....	11
4.2	Study design and period.....	11
4.3	population.....	11
4.4	Eligibility criteria.....	12
4.5	Sample size determination and sampling technique	12
4.6	Study variable	13
4.7	Operational definitions.....	13
4.8	Data collection procedure and instruments	14
4.10	Data quality control	14
4.11	Data processing and analysis.....	15
4.12	Ethical consideration.....	15
5	Results	16
5.1	Descriptive result of factors affecting functional limitation	16
5.2	Descriptive result functional limitation measured by SPADI score.....	18
5.3	Analytic Results.....	19
6	Discussion.....	21
7	Strengths and Limitations	23
8	Conclusion	23
9	Recommendation.....	24
10.	References.....	25
	Appendix I: consent form.....	29
	Appendix II Questionnaire	30

1 Introduction

1.1 Background

The shoulder complex consists of the clavicle, scapula, and humerus; the glenohumeral and acromioclavicular (AC) joints and the sternoclavicular (SC) joint. In addition, a scapulothoracic and a subacromial joint are often included in anatomical descriptions of the shoulder complex. Together, these articulations provide the shoulder with a range of motion that exceeds any other joint. The rotator cuff muscles, glenoid labrum, joint capsule, and ligaments are essential soft tissue structures that provide dynamic and static stability to the shoulder joint, enabling mobility and preventing injury. [1][4][27][28]

Shoulder pain can be defined as pain localized in the deltoid muscle region, including the upper arm. It may be categorized as local shoulder pain and referred pain. Local shoulder pain is pain originating from structures within the shoulder complex itself and which may be directly felt in the shoulder area, often associated with specific arm movements or positions. The converse, referred to pain, is felt in the shoulder from outside the shoulder complex. This can be due to cervical radiculopathy, which radiates from the neck down to the shoulder and upper arm. Referred pain may also originate from thoracoabdominal areas, such as the heart, lungs, diaphragm, or gallbladder. This is referred to pain, for example, in the right shoulder caused by gallbladder disease or in the left shoulder caused by a heart attack.[3][4]

One of the most common musculoskeletal complaints is shoulder pain, which sometimes cause significant functional impairment to affected individuals. Functional limitation refers to a person's reduced capability in executing daily activities, job-related tasks, and recreational pursuits concerning the shoulder joint and related structures in the setting of shoulder pain. Literature available on the SF-36 health survey documents that shoulder pain has profound effects on six of eight health domains: physical function, physical role, emotional role, bodily pain, vitality, and social role. This limitation manifests in several ways: it causes severe pain to the point that one can hardly sleep, resulting in being drowsy during the day and generally irritable. Patients have a loss in mobility and strength that diminishes elementary daily life activities, such as washing, dressing, driving, or even lifting. .[7] [8] [10] [21][22][23]

This functional limitation due to shoulder pain may be lessened by treatment that includes conservative and surgical methods. Nonoperative interventions include physical therapy, oral analgesics, nonsteroidal anti-inflammatory drugs, and intra-articular injections of

corticosteroids or sodium hyaluronate; it also requires a multidisciplinary approach involving physiotherapy, occupational therapy, and psychology. [24][25][26] [26]

1.2 Statement of the problem

Globally, the prevalence of shoulder pain in community settings ranges from 0.67% to 55.2%, with a median of 16%, indicating a huge burden on healthcare systems worldwide [5][30]. In Ethiopia, while specific data on shoulder pain is limited, a study reported a 37.9% prevalence of occupational-related shoulder and neck pain among teachers, suggesting a considerable local impact. [9]

Shoulder pain uniquely impacts Quality of Life (QOL) in a way that is different from other joint-related issues. Unlike low back or knee pain, shoulder pain significantly affects both physical and mental QOL measures, as evidenced by the SF-36, a validated health-related QOL assessment tool. This comprehensive measure, which evaluates eight dimensions of health, shows reduced scores in both physical and mental health components for patients suffering from shoulder pain. The impact of shoulder disorders extends beyond these measurable metrics, often resulting in a high degree of functional disabilities that permeate various aspects of daily life.[4][7][29]

The functional limitations can be so profound that even simple daily activities, such as washing one's back or reaching behind, become challenging tasks. Patients frequently struggle with recreational activities, social engagements, and sports participation. Perhaps most concerning, individuals with shoulder pain experience a three-fold increase in the likelihood of high or very high psychological distress, highlighting the significant mental health implications of this condition.[29][30]

The impact in the workplace, however, is enormous—25% of those suffering from shoulder pain stop working due to their condition, while 22% are unable to do any unpaid work. Among affected employees who remain employed, productivity loss is significant, at about \$468 per week. Even it affects parenting responsibilities: 50% of participants in one study had children between the ages of 0 – 18 years, but have measurable impact for parenting disability because of shoulder pain, the median Parenting Disability Index score was low[4][29].

This goes down to personal levels, too, wherein the quality of sleeping is interfered with, especially cases of rotator cuff tears, wherein statistics from it show that 50% of patients suffer from moderate sleep disturbances and 30.6% from severe sleep disturbances. This

comprehensive effect highlights the profound effects shouldering pain has on the general quality of life.[4][7][23]

Besides, there are significant economic costs because of shoulder pain. An approximate cost of shoulder pain, as estimated by one Swedish study, is about €4139 per patient; over 80% of this cost is due to sick leave alone. These results highlight the multifaceted burden: it involves personal suffering and problems with daily functioning and involves large economic costs for society and mental health as well. [5,29]

Most factors that may cause functional limitation among patients with shoulder pain can be differentiated into underlying, intermediate, and distal factors. The key underlying factors are those explicit to pathology of the shoulder, including rotator cuff injuries, shoulder instability, acromioclavicular joint arthritis, biceps tendonitis, subacromial-subdeltoid bursitis, adhesive capsulitis, and acromioclavicular joint instability. These directly affect the anatomy and physiology of the shoulder to result in intermediate factors such as pain intensity, reduced range of movement, and muscle weakness. The distal variables relate indirectly to limitations in function and include demographic data like age and gender, occupational factors - especially working overhead, co-morbidity. [10][13] [15][16]. [10][13][15][16]

The main outcome measure in this study will be the Shoulder Pain and Disability Index. SPADI is widely recognized as one of the most reliable and valid tools with regard to assessing shoulder pain and functional limitations in research settings. Its use enhances the study's validity and allows for more accurate quantification of the problem's magnitude. The SPADI can also quantify pain and disability separately, as well as yield a total score; thus providing a complete assessment of shoulder function, which is highly essential in understanding the true impact of shoulder pain on the daily lives of patients. Moreover, it has been shown to exhibit excellent psychometric properties, with high internal consistency, test-retest reliability, and responsiveness to change for various shoulder conditions 12, 19, 20.

Recent studies in African countries have begun to explore shoulder pain aetiology, but significant gaps remain in understanding its functional impact. For example: The studies conducted in Nigeria and Ethiopia primarily aimed to identify the underlying pathologies causing shoulder pain in their respective populations. Both studies used ultrasound to investigate a broader range of shoulder pathologies.[6][11]

While these studies provide valuable insights into the aetiology of shoulder pain in African contexts, they do not address the functional limitations experienced by patients due to these conditions.

1.3 Significance of the study

There has been a severe knowledge gap, especially on the functional limitations directly related to shoulder pain at AaBET Hospital in Ethiopia, with enormous implications for health professionals, researchers, and critical organizations like the Ministry of Health and the Ethiopian Society of Orthopedics and Trauma Surgery. This information will enable health professionals to formulate more targeted, effective, patient-centered treatment strategies for the specific functional impairments and contributing factors. For researchers, this study will set up very critical baseline data within the Ethiopian context by filling a literature gap concerning shoulder disorders in Africa and probably modelling similar studies to follow in resource-limited settings. Literature contributions expected out of this study will include quantification of functional limitation using a validated tool such as SPADI in an Ethiopian population and outline unique patterns pertinent to the management of shoulder pain in this environment. It has practical implications for improving patient assessment and treatment planning at AaBET Hospital and similar institutions, guiding patient education programs, and leading workplace interventions on how to prevent or decrease functional limitations resulting from shoulder pain. These would provide the capacity to support the Ministry of Health in strengthening attention to musculoskeletal health within national policy documents, resource allocation decisions related to specialized orthopedic services, and developing policies and guidelines at the national level for care for shoulder pain. For this case, findings would help bolster advocacy of shoulder care training and resources by the Ethiopian Society of Orthopedics and Trauma Surgery. This will create immense contributions toward the global understanding of how to deal with functional limitations as far as managing patients who are distressed with shoulder pain is concerned.

2 Literature review

2.1 magnitude of functional limitation

Studies in North America have provided substantial evidence of the functional limitations caused by shoulder pain. In a study in the United States, patients with shoulder pathologies experienced moderate to severe functional limitations, with mean Shoulder Pain and Disability Index (SPADI) scores ranging from 21 to 43 out of 100. Another U.S. study, using the Patient-Specific Functional Scale (PSFS), found that patients reported functioning at only 40% of their normal capacity, with 88% of the 176 patients reporting at least one functional limitation.[13][31]

Studies in Europe have further illuminated the extent of functional limitations due to shoulder pain. A primary care-based study of shoulder disorders from the United Kingdom reported more general effects on daily functioning, where the most common limitations mentioned by patients were problems putting something on a high shelf, washing their backs, and carrying heavy things; 88% complained about sleep disturbance. The mean SPADI scores for the patients in this study are 45 for disability, 58 for pain, and 52 overall, indicating considerable functional impairment. Another UK study focused on specific functional limitations: difficulty turning in bed was rated as the most prevalent disability, affecting 86%, followed by sleeping well with 84%, and moving arm or hand difficulties affecting 85%. In another study in the Netherlands, a study using the results of the Shoulder Disability Questionnaire provided insights into functional disability across different stages of shoulder pain. The mean SDQ score for acute shoulder pain—symptoms less than six weeks—was 56.8, with an SD of 28.3. For subacute shoulder pain, defined as symptoms 6-12 weeks, it was 59.1, with an SD of 23.0. For chronic shoulder pain, defined as symptoms greater than three months, it was 62.9, with an SD of 22.7. Conventional rendezvous positions for higher values indicate more significant disability.[10][32][33]

A study in Japan also provides understanding into the impact of shoulder pain on quality of life and functional limitations. Among subjects with shoulder pain, the mean VAS score was 29.7 (SD: 20.2), comparable to other pain types such as lower back pain (27.5, SD: 22.0) and knee pain (28.9, SD: 24.8). However, shoulder pain uniquely demonstrated a greater impact on both physical and mental quality of life compared to other pain types of similar intensity.[8]

While studies from North America, Europe, and Asia have provided reasonable evidence for the functional limitations due to shoulder pain, surprisingly little research has focused on the African or Ethiopian context. The current literature from these regions focuses not on its functional impact but on disease patterns and prevalence aspects associated with shoulder pain. As an example, a study conducted at Tikur Anbessa Hospital in Ethiopia, which utilized ultrasound to evaluate the underlying pathologies for shoulder pain, found that rotator cuff pathologies were the most prevalent cause found in 37% of the cases, followed by acromioclavicular joint degeneration in 17% and biceps tendon pathologies in 14%.[6]

2.2 Associated factors

2.2.1 Socio-demographic factors

Age

When taken together, no significant difference was found between the functional limitation of patients with shoulder pain and their age. This might easily make sense because the demand on the shoulder is relatively high in routine life. Some other literature related their poor self-reported shoulder and upper extremity function to their older age, especially in the case of chronic pain. One study demonstrated that worse function, represented by a higher DASH score, was independently associated with increasing age. The predictor variable age could account for 67% of the variance in DASH scores. Curiously, age appears to correlate with some diagnoses. They were frequent in the younger patients, those within the age of 20-35 years, which was associated more with instability, while in the older patients, they seemed to represent more degenerative conditions. These findings contradict each other and point to the need for further studies on the role of age in functional limitations of the shoulder in the various groups of patients. [30][31][32]

Gender

It is known that there are sex differences in the functional limitations of patients with shoulder pain. These studies point to an overwhelmingly conclusive finding: that women, when compared to men, report higher levels of disability and functional limitation. One major study concluded that despite similar bony and soft tissue pathology, women reported more disability than men, which showed in subjective and objective measures for this disparity. Scores for the Quick DASH, a broad measure of upper extremity function, were uniformly higher in women and thus represented more significant perceived disability in the general population of patients with both simple afferent and referred surgical subgroups. For chronic shoulder pain, women reported consistently higher SPADI scores than did men with similar

pathology and complaints, indicating worse self-reported function of the shoulder and upper extremities. Notably, in one study, a model including sex explained 67% of the variance in DASH scores. This strongly points to the consideration that needs to be taken with regard to gender in functional assessment measures for shoulder pain and related limitations.[32][33][34]

Occupation

Occupational risk factors are implicated in the development and severity of shoulder pain and functional limitations. Quantitative exposure-response relations were established between working with highly elevated arms and clinically verified shoulder disorders, including supraspinatus tendinitis and shoulder pain with or without disability. In one study including machinists, car mechanics, and house painters, it was found that for every 1% increase in daily working hours spent with the upper arm elevated above 90°, there was an increased odds ratio of 1.23 for supraspinatus tendinitis, 1.16 for shoulder pain with disability, and 1.08 for shoulder pain without disability. Specifically, significant complaints and disorders of dominant-sided shoulders were observed in twice as many house painters than in machinists and car mechanics, emphasizing that the distinctive occupational tasks influenced this result regarding the shoulder. These findings underline the importance of considering occupational factors in the assessment and management of the shoulder. Specifically, one study found that those whose jobs "sometimes" required heavy work while standing had, on average, considerably worse modified-DASH scores than persons whose jobs never required such work, with an odds ratio of 1.39 (95% CI = 1.03–1.89) for worse upper extremity disability. Although frequent lifting of objects heavier than 10 lbs was not statistically significantly associated with modified-DASH scores, a trend toward worse scores for those whose jobs "often" or "always" required such lifting can be seen.[4] [15][18]

2.2.2 Clinical factors

Shoulder pathology

Shoulder pathology has been shown to impact functional limitations, though studies have yielded mixed results. A U.S. study involving 275 patients with various shoulder conditions found a hierarchy of conditions associated with decreasing levels of functional limitation, ranging from SLAP tears and instability (with anterior instability showing worse outcomes) to rotator cuff tears, tendinopathy, acromioclavicular arthrosis, glenohumeral arthritis, and adhesive capsulitis [14][46][47][48]. However, contrasting findings have emerged from other studies. A UK-based study found no significant differences in Shoulder Pain and Disability

Index (SPADI) scores among patients with various diagnoses, including rotator cuff tendinopathy, acromioclavicular joint disorders, adhesive capsulitis, and referred pain, although the researchers noted that confounding effects of combined diagnoses made precise SPADI estimations challenging [10]. Similarly, another study examining 176 patients with shoulder pain found no significant differences in the frequencies or severity of functional limitations across four diagnostic categories: SLAP lesions, subacromial impingement pain, combined SLAP and SAI, and nonspecific shoulder pain [31]. These conflicting results suggest that while specific shoulder pathologies may influence functional limitations to some degree, other factors might play equally important roles in determining the extent of functional impairment experienced by patients with shoulder pain.

Duration of symptom

The relationship between the duration of symptoms and functional limitation in patients with shoulder pain has also been studied, with conflicting results. One study found that acute shoulder pain patients had the best outcomes, with lower disability scores at six months, while patients whose pain was sub acute or chronic had slower recovery and higher pain levels at six months. [32][33].

Of interest, one study investigating patients with chronic shoulder pain (defined as > 3 months) did not find a significant relationship between the duration of pain and the degree of associated disability measured by the DASH outcome measure.[36]

2.2.3Anatomic factors

Hand dominance

Hand dominance plays a significant role in functional limitations and DASH scores among patients with shoulder pain. studies indicates that upper extremity musculoskeletal disorders , including rotator cuff tendinitis, are more prevalent in the dominant arm, particularly among women [37]. This pattern is further supported by a study of house painters with unilateral supraspinatus tendinitis, which found a higher ratio of disorders in the dominant shoulder compared to the non-dominant shoulder [18]. studies demonstrated that dominant arm shoulder pain more significantly affects functional status as measured by DASH compared to non-dominant arm pain, with pain during active movement in the dominant shoulder being the most critical factor influencing daily living for those suffering from shoulder conditions.The impact of hand dominance on shoulder function is also evident in range of motion studies. studies found that dominant arms exhibit greater external rotation, while non-dominant arms show increased internal rotation and extension. This difference in range of

motion between dominant and non-dominant arms may contribute to the varying functional limitations observed.[16][38][39]

Range of Motion

Studies indicate a significant relationship between shoulder pain, range of motion (ROM), and disability in various populations. Reduced shoulder ROM, particularly in flexion, abduction, and rotation, is strongly associated with increased pain intensity and disability in patients with shoulder dysfunction. Regarding disability, measured by the Shoulder Pain and Disability Index (SPADI), abduction demonstrated a strong negative correlation, while flexion and rotation showed moderate negative correlations. Extension had a fair negative correlation with disability. Additionally, a moderate positive correlation was observed between pain intensity and disability. These findings suggest that limitations in shoulder flexion, abduction, and rotation are most strongly associated with increased pain severity and physical disability [39][40]

2.2.4 Previous treatment

Previous treatments, particularly physiotherapy and injections, play a significant role in the management of shoulder disabilities and can influence functional outcomes. The literature provides insights into the effectiveness of these interventions and their impact on shoulder function.

Physiotherapy has been widely studied as a treatment for various shoulder conditions. One study found that exercise therapy, a key component of physiotherapy, was effective in reducing pain and improving function in patients with rotator cuff disease. The review showed that exercise therapy was superior to placebo in terms of pain reduction and functional improvement in the short term, with benefits persisting in the long term.[43]

Other study also show Subacromial methylprednisolone injection and primary care physiotherapy showed similar effectiveness in improving shoulder disability at 6 weeks and 6 months. [42]

Literature on functional limitations due to shoulder disorders and related factors in the African context, particularly in Ethiopia, is very meager. While the complaints about pain in the shoulder joints and problems with daily functioning are reliably documented in Western and some Asian countries, research concerning African populations, including that of Ethiopia, is extremely scarce.

3. Objectives

3.1 general objective

- To assess the functional limitation among patients with shoulder pain presenting to AaBET hospital sport department

3.2 Specific objectives

- To assess the functional limitation among adult patients with shoulder pain presenting to AaBET hospital sport department
- To identify factors associated with functional limitation among adult patients with shoulder pain presenting to AaBET hospital sport department

4 Methodology

4.1 Study area and period

The study was conducted at Saint Paul Hospital Millennium Medical Collage which is located in Gulele sub city of Addis Ababa. It was founded by Emperor Haileselese in 1975 in collaboration with German angelical church. Currently it is among the few tertiary hospitals in Ethiopia. Addis Abeba burn trauma emergency and trauma hospital is affiliate of saint pauls millennium medical hospital.

Established in 2015, the first trauma hospital in Ethiopia is a 250-bed facility with 12 intensive care unit beds, serving as a crucial healthcare provider in the region. On average, the hospital's emergency department receives 20,000 to 30,000 patients annually. As a teaching and referral hospital, it caters to the residents of Addis Ababa and the entire Ethiopian population. Since its inception, the hospital has offered a wide range of services, including neurosurgery, orthopedics, trauma care, burn treatment, emergency, and critical care services. Equipped with four operating room (OR) tables and two recovery rooms, the hospital is dedicated to providing both emergency and elective surgical services to patients 24 hours a day.

The sport clinic is the only clinic dedicated to sport surgery service in government hospital in the country. Injuries around the knee, shoulder, elbow and wrist from all around the countries are seen in the clinic

4.2 Study design and period

This study was a hospital-based cross-sectional design to assess functional limitations and their associated factors among adult patients presenting with shoulder pain at AaBET Hospital sport clinic, Ethiopia. The study will be conducted from Aug 2024- Oct 2025

4.3 population

4.3.1 Source population

The source population were all patients with shoulder pain who visited AaBET Hospital's sport clinic in Ethiopia.

4.3.2 Study population

They were all patients presenting with shoulder pain at AaBET Hospital sport clinic in the study period

4.4 Eligibility criteria

4.4.1 Inclusion Criteria

- Adults aged 18 and above
- Presenting with shoulder pain as the primary complaint

4.1.1 4.4.2 Exclusion criteria

- Patients with shoulder pain due to acute trauma
- Patients with cervical radiculopathy and referred pain
- Patients with diagnosed systemic diseases affecting multiple joints
- Patients with pain on the rest of the upper extremity other than shoulder

4.5 Sample size determination and sampling technique

4.5.1 Sample size determination

The sample size was determined by using single population proportion formula with the following statistical assumptions: $Z_{\alpha/2}$ (the value of the standard normal curve score corresponding to the given confidence interval = 1.96) corresponding to 95% confidence level, the proportion of patients with functional limitation = 50% (since there is no previous study) and d (the Margin of error = 5 %)

$$N = (Z^2 \alpha/2 * P(1-P)) / d^2$$

$$N = (1.96^2 * 0.5(1-0.5)) / 0.05^2$$

$$N = 384.16$$

Using finite proportion correction formula where N = 385 representing patients with shoulder pain at sport clinic for past 3 months which is obtained from HMIS

$$n' = n / (1 + (n-1)/N)$$

$$n' = 385 / (1 + (385-1)/385)$$

$$n' = 60$$

By considering 10% potential non-response rate the final sample size = 66

4.5.2 sampling technique

In this study convenience sampling technique was employed to recruit participants. Consecutive adult patients presenting at the clinic with shoulder pain were included.

4.6 Study variable

Dependent variable

- Functional limitation

Independent variable

- Age
- Gender
- Occupation
- Shoulder pathology
- Hand dominance
- Symptom duration
- Shoulder ROM
- Previous treatment

4.7 Operational definitions

Shoulder Pain: “Pain reported by the patient in the shoulder region excluding referred pain from the cervical area.”

Functional Limitation: “functional limitation in the shoulder region as measured by the Shoulder Pain and Disability Index (SPADI).

functional limitation will be categorized based on SPADI scores as follows:[17]

- 0-20: Mild pain and disability
- 21-40: Moderate pain and disability
- > 40: Severe pain and disability

Overhead Activity: "Work-related arm postures or movements where the hands are elevated above shoulder level. Categorized as follows:[18]

- High Overhead Activity: Work tasks requiring arm elevation $>90^\circ$ for more than 1 hour per day or $>10\%$ of daily working time.
- Low Overhead Activity: Work tasks requiring arm elevation $>90^\circ$ for 1 hour or less per day or $\leq 10\%$ of daily working time.

4.8 Data collection procedure and instruments

The data accrued for this current study was procured by directly interviewing patients at the sports clinic in AaBET Hospital with subjective complaints of shoulder pain and cross-checked against that patient's accumulated medical record. In contrast to interviews alone, complementary details were gleaned regarding clinical data and history from examination of the study participants' medical records.

The data collection instrument employed in this research was a structured questionnaire comprising demographic information, history, functional assessment, and factors associated with the condition. It has included demographic data such as age, sex, occupation, and vocation. Functional assessment was done using SPADI, a validated tool based on two subscales: pain and disability; it contains 13 items rated using a visual analog scale. Also, the questionnaire had questions related to associated factors, such as the duration of symptoms, hand dominance, and findings of physical examination for the range of motion.

The questionnaire was administered in Amharic, the main language spoken by most of the patients in AaBET Hospital. It was translated and back-translated to ensure accuracy and clarity.

Data collection occurred in the sports clinic in AaBET Hospital during regular hours of this clinic from September 2024 through November 2024. Consecutive patients coming to the clinic were approached. The principal investigator and the year 3 and 4 orthopedics and trauma surgery residents collected the data.

A pilot study among 5-10 patients will be carried out to confirm the feasibility of the data collection process and the tools to be used.

4.10 Data quality control

All the data collectors underwent rigorous training on how data collection would be carried out for uniformity in interviews. Training on theoretical and practical measures was done by the principal investigator through role-playing and conducting mock interviews. A pretest on a small number of patients coming to the clinic with complaints of shoulder pain, using a structured questionnaire, was done before actual data collection. The pre-test helped to find ambiguities and difficulties in the questionnaire, understand how clear the questions were and how relevant they were, and to check if the translation into Amharic was proper.

The principal investigator periodically went through the filled questionnaires for accuracy, completeness, and consistency. Issues and discrepancies identified were resolved promptly.

In addition, regular meetings were held with the data collectors to keep them updated and address any challenges they faced in the field.

4.11 Data processing and analysis

All the obtained data were tabulated into a database using SPSS version 26.0 for statistical analysis. All data were cleaned to detect any missing information, outliers, and errors made during data input. The mean and standard deviation were used as summary measures to describe the quantitative variables, while demographic and clinical variables were described in terms of frequency and percentage.

We applied linear regression to test the association of functional limitation and its associated factors. All variables with a p-value of < 0.25 from the bivariable analysis were fitted in the multivariable linear regression model. From this, the final model was built using a backward stepwise selection procedure, and variables with a p-value of < 0.05 were considered statistically significant. These included linearity, normality, and homoscedasticity of residuals-the usual assumptions underlying a linear regression. Associations are presented as adjusted beta coefficients and their 95% CIs. To check multicollinearity, the VIF was considered; significant multicollinearity was considered present if VIF exceeded 5. The R-square value gave a measure of goodness of fit.

4.12 Ethical consideration

This study has been approved from the Ethical Review Board, St. Paul's Hospital Millennium Medical College. A support letter was obtained from the Department of Orthopedics and Traumatology, St. Paul's Hospital Millennium Medical College. An informed consent was obtained in a written form that included what will be performed for the participant. The participants were further informed that they could withdraw from this study at any time without penalty, or loss of benefits to which they were otherwise entitled. Every effort was taken to ensure participant confidentiality. Personal identifiers were coded. There has been minimal risk for participants involved in this research because all testing was non-invasive; any discomfort of assessments would have been short-term and managed accordingly. Data collections would be provided in a very private setting and will maintain subject privacy.

5 Results

5.1 Descriptive result of factors affecting functional limitation

5.1.1 Sociodemographic result

A total of 66 individuals presenting with shoulder pain were evaluated at AaBET Hospital in Ethiopia. Of these, 54.5% (36 patients) were female, while the remaining 45.5% (30 patients) were male. The ages of the participants varied quite a bit, spanning from 19 to 67 years. The average age of the group was calculated to be 46.3 years, with a standard deviation of ± 15.6 years.

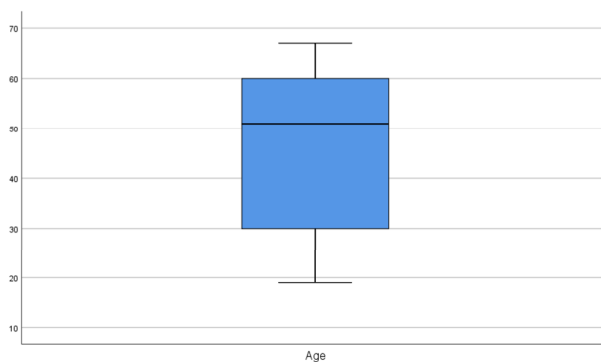


Figure 1 Age

5.1.2 Occupational and Clinical Presentation

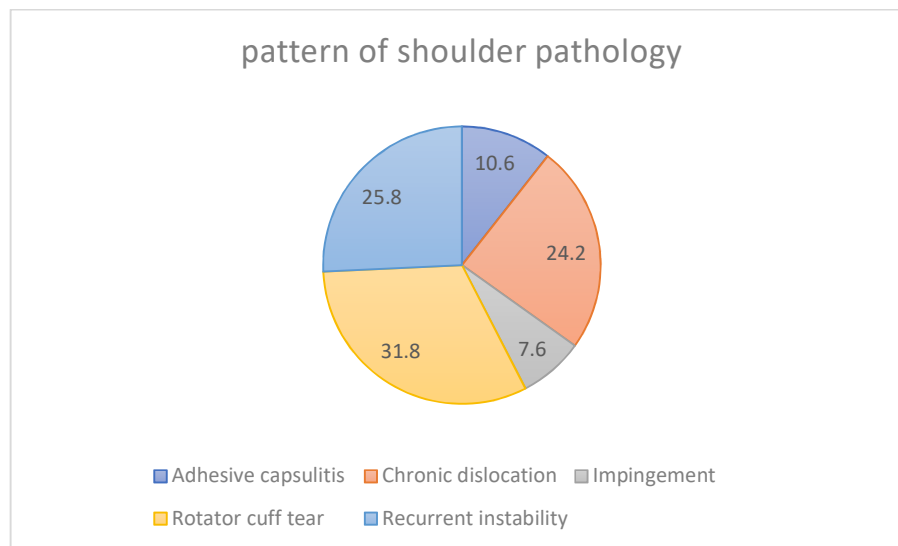
When looking at the occupations of the patients, most of them ($n=41$, 62.1%) were involved in jobs or activities that didn't require much overhead work. However, a significant portion ($n=25$, 37.9%) regularly performed tasks that involved lifting their arms above shoulder level. Regarding how long they had experienced shoulder pain, nearly two-thirds ($n=42$, 63.6%) reported dealing with symptoms that persisted for over three months. A smaller group ($n=22$, 33.3%) reported having pain lasting between one and three months, while only two patients (3.0%) presented with acute symptoms that had been ongoing for less than one month.

When considering which side of the body was affected, the majority of cases involved the right shoulder ($n=43$, 65.2%). Pain in the left shoulder was less common but still substantial ($n=21$, 31.8%). Bilateral pain, however, was quite rare, affecting only a small fraction of the study participants ($n=2$, 3.0%).

5.1.3 Shoulder pathology

The types of shoulder conditions diagnosed in this group varied. Rotator cuff tears stood out as the most frequent condition, affecting 31.8% of patients (n=21). Recurrent instability of the shoulder was observed in 25.8% of the cases (n=17), while chronic dislocation was slightly less common but still notable, affecting 24.2% of participants (n=16). Adhesive capsulitis was diagnosed in 10.6% (n=7), and subacromial impingement syndrome was the least frequent, affecting just 7.6% of the group (n=5).

Figure 2 shoulder pathology



5.1.4 Previous treatment

The treatments patients had received prior to evaluation varied widely. The most commonly reported approach was the use of pain-relieving medications, which was reported by 43.9% of patients (n=29). Physical therapy was the second most common intervention, reported by 30.3% (n=20). Only a small fraction (n=4, 6.1%) had received injections as part of their treatment. Interestingly, nearly one-fifth of the participants (n=13, 19.7%) indicated that they had not undergone any kind of treatment for their shoulder issues before presenting for evaluation.

5.1.5 Range of motion

When their range of motion was objectively assessed, significant restrictions were found. On average, shoulder flexion was limited to 70.8° (SD=39.1°), while shoulder abduction averaged 58.2° (SD=36.0°).

5.2 Descriptive result functional limitation measured by SPADI score

The SPADI questionnaire revealed considerable variation in functional impairment among the participants. The mean total SPADI score was 61.8 (± 15.7). Individual scores ranged from as low as 35.4 to as high as 83.1. The majority of the participants ($n=41$, 62.1%) were classified as having severe functional limitations, while the remaining 37.9% ($n=25$) were categorized as having moderate functional impairments.

Figure 3 shoulder ROM and Total SPADI

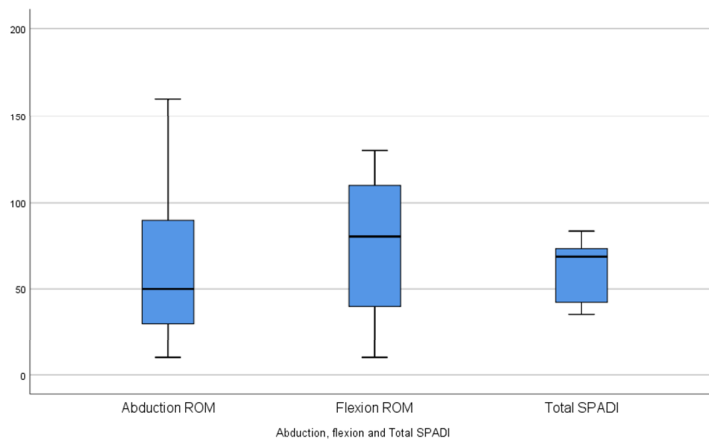


Table 1 Frequency distribution of independent variable

variables		Frequency	Percentage
sex	Male	30	45.5
	Female	36	54.5
Occupation	High overhead	25	37.9
	Low overhead	41	62.1
Side of shoulder pain	Right	43	65.2
	Left	21	31.8
	Bilateral	43	65.2
Hand dominance	Right	63	95.5
	Left	2	3
	Ambidextrous	1	1.5
Duration of symptom	< 1 month	2	3
	1-3 month	42	63.6
	>3 month	22	33.3
Shoulder pathologies	Rotator cuff tear	21	31.8
	Recurrent instability	17	25.8
	Chronic dislocation	16	24.2
	Adhesive capsulitis	7	10.6

	Subacromial impingement	5	7.6
Previous treatment	Analgesics	29	43.9
	Physiotherapy	20	30.3
	Injection	4	6.1
	No previous treatment	13	19.7

5.3 Analytic Results

5.3.3 Mean Results Among Independent Variables

The overall distribution of total SPADI scores did not conform to a normal pattern, necessitating the use of non-parametric methods for analysis. Both the Kolmogorov-Smirnov test ($p = 0.001$) and the Shapiro-Wilk test ($p = 0.001$) confirmed this deviation from normality.

When evaluating functional limitations using the SPADI, distinct variations were observed across independent variables. Female participants recorded higher SPADI scores (mean rank = 40.03) than males (mean rank = 25.67), indicating that women might experience greater levels of shoulder pain and associated disability (Mann-Whitney $U = 305.000$, $p = 0.002$). Additionally, individuals with chronic dislocation had significantly elevated SPADI scores compared to patients with conditions like rotator cuff tears or impingement syndrome (Kruskal-Wallis $H = 58.985$, $p < 0.001$). Symptom duration also showed a statistically relevant relationship with SPADI scores ($p = 0.022$), with extended durations associated with slightly reduced functional impairments. Conversely, factors such as prior treatments, the side of shoulder pain, or hand dominance did not display any statistically significant differences in SPADI scores ($p > 0.05$).

Table 2 Summary of Mean Comparison Tests for Total SPADI Scores

Variable	Groups/Categories	Test Used	p-value
Total SPADI	Sex (Male vs. Female)	Independent-Samples Mann-Whitney U	0.002
Total SPADI	Duration of Symptoms	Kruskal-Wallis Test	0.02
Total SPADI	Shoulder Pathology	Kruskal-Wallis Test	< 0.001
Total SPADI	Hand dominance	Kruskal-Wallis Test	0.46
Total SPADI	Side of shoulder pain	Kruskal-Wallis Test	0.49
Total SPADI	Hand dominance	Kruskal-Wallis Test	0.4

5.3.4 Correlation Analysis

Non-parametric correlation analyses demonstrated meaningful negative relationships between shoulder range of motion (ROM) and functional limitations as measured by SPADI scores. Specifically, shoulder flexion exhibited a strong negative correlation (Spearman's $\rho = -0.660$, $p < 0.001$), whereas shoulder abduction showed a moderate negative correlation (Spearman's $\rho = -0.459$, $p < 0.001$). Interestingly, no substantial correlation was detected between age and SPADI scores ($p = 0.690$), suggesting that age may not have a significant influence on functional limitations related to shoulder pain.

5.3.5 Regression Analysis of factors affecting functional limitation

Simple linear regression

The analysis of simple linear regression identified multiple factors that were significantly associated with SPADI scores. Among these, gender emerged as a critical variable, with males reporting SPADI scores that were on average 10.65 points lower than those of females ($B = -10.645$, $p = 0.005$), which supports findings that women experience more pronounced shoulder pain and disability. Symptom duration was another notable factor; longer symptom durations were linked to an average decrease of 8.33 points in SPADI scores ($B = -8.334$, $p = 0.023$), indicating reduced limitations as symptoms persisted. A decline in flexion ROM was associated with a 0.25-point increase in SPADI scores per degree lost ($B = -0.247$, $p < 0.001$), underscoring the critical role of shoulder mobility in mitigating disability. Abduction ROM showed a similar trend, with each degree decrease resulting in a 0.18-point increase in SPADI scores ($B = -0.180$, $p = 0.001$). Chronic dislocation exerted the greatest impact among pathologies ($\beta = 38.768$, $p < 0.001$), followed by rotator cuff tears ($\beta = 28.858$, $p < 0.001$), adhesive capsulitis ($\beta = 19.078$, $p < 0.001$), and impingement ($\beta = 5.898$, $p = 0.005$).

Table 3 Summary of Regression Coefficients for Total SPADI Scores

Predictor Variable	Unstandardized Coefficient (B)	Standardized Coefficient (Beta)	p-value (Sig.)
Age	0.248	0.247	0.045
Hand Dominance	9.633	0.183	0.142
Duration of Symptoms	-8.334	-0.279	0.023
Occupation (occup)	2.812	0.088	0.484
Sex (c_sex)	-10.645	-0.341	0.005
Flexion ROM	-0.247	-0.616	0.000
Abduction ROM	-0.180	-0.414	0.001
Shoulder pathology			
Rotator Cuff Tear (RCT)	28.858	0.864	< 0.001
Impingement Syndrome (IM)	5.898	0.100	0.035
Chronic Dislocation (CD)	38.768	1.000	< 0.001

Adhesive Capsulitis (AC) | 19.078 | 0.792 | < 0.001

Multiple Linear Regression

In multiple linear regression analysis, certain factors retained statistical significance. Chronic dislocation remained the most influential predictor, with an average SPADI score increase of 42.78 points ($B = 42.776$, $p < 0.001$). Rotator cuff tears and adhesive capsulitis contributed increases of 31.21 points ($B = 31.210$, $p < 0.001$) and 18.60 points ($B = 18.602$, $p < 0.001$), respectively. Impingement syndrome was linked to a 6.83-point rise ($B = 6.825$, $p = 0.001$). Reduced flexion ROM also continued to show significance, with each degree loss corresponding to a 0.06-point SPADI score increase ($B = 0.064$, $p = 0.001$). On the other hand, symptom duration ($B = -1.042$, $p = 0.280$) and abduction ROM ($B = -0.004$, $p = 0.786$) did not reach statistical significance. These findings emphasize the predominant role of specific shoulder pathologies and flexion ROM in influencing functional outcomes.

Table 4 Summary of multiple Regression Coefficients for Predictors of Total SPADI

Predictor variable	Unstandardized Coefficient (B)	p-value (Sig.)
Adhesive Capsulitis (AC)	15.744	< 0.001
Chronic Dislocation (CD)	41.971	< 0.001
Impingement Syndrome (IM)	4.222	0.139
Rotator Cuff Tear (RCT)	28.797	< 0.001
Gender (c_sex)	-0.283	0.779
Duration of Symptoms	-0.966	0.314
Abduction ROM	-0.006	0.691
Flexion ROM	- 0.060	0.002
Age	0.082	0.203

6 Discussion

This study explored factors associated with functional limitations in patients with shoulder pain at AaBET Hospital, Ethiopia. The mean total SPADI score in our study population was **61.8 (±15.7)**, indicating a significant level of pain and disability among the participants. This finding aligns with the range reported in the literature, where mean SPADI scores typically range between **45 and 76** across various populations and settings. [10][46]

The other findings showed significant links between specific shoulder pathologies, range of motion (ROM), and functional limitations, as assessed by the Shoulder Pain and Disability Index (SPADI). These results align with existing studies while also shedding light on unique characteristics of the patient population at AaBET Hospital.

Chronic dislocation was identified as the most significant predictor of functional limitations, with patients reporting a mean SPADI score of 79.47 ± 2.21 . This finding emphasizes the severe impact of chronic dislocation on shoulder function, most likely due to the structural instability and pain associated with this condition. Unfortunately, the prevalence of chronic dislocation in this study (24.2%) exceeds typical figures reported in Western populations where the prevalence is 0.10-0.18%. This disparity could indicate delayed care-seeking behavior or lack of treatment for initial injuries in this setting. In contrast, studies from developed countries show lower rates of chronic dislocation, as acute cases are often managed promptly to prevent chronicity. This finding emphasizes the need for early intervention strategies in resource-constrained settings like Ethiopia.[43][44][45]

Our study found that rotator cuff tears (RCTs) significantly contributed to functional impairments, with a mean SPADI score of 69.56 ± 2.00 . This is consistent with previous research, such as a primary care study that reported a median Total value of 76.0. Another study examining Wheeler extent of rotator cuff tear also shows a mean SPADI score of 79.1 for partial-thickness tears, 72.7 for <2 cm full-thickness tears, and 81.1 for ≥ 2 cm full-thickness tears. [10][46][47]

Adhesive capsulitis was another notable factor, with a mean SPADI score of 59.78 ± 2.87 . This is somewhat consistent with reports in the literature, which cite a mean SPADI score of 73.99 ± 9.1 at baseline for adhesive capsulitis [48]. The slightly lower scores here might suggest earlier presentation or differences in the severity based on duration of the disease. Nonetheless, the debilitating nature of adhesive capsulitis is well-documented.

This study had a lower prevalence of subacromial impingement syndrome (7.6%), but had an average SPADI score of 46.60 ± 12.99 . This is consistent with prior research, in which impingement was linked to a mean SPADI of 52 (95% CI 48-55) [10]. The marginally lower ratings in our study may be due to differences in the severity of the ailment or associated diagnoses. While impingement syndrome contributes to functional limitations, its impact seems less pronounced compared to chronic dislocation or RCTs.

A strong negative correlation was found between shoulder flexion ROM and functional limitations (Spearman's $\rho = -0.660$, $p < 0.001$). This supports findings in the literature ($\rho = -0.694$), which also report a moderate negative correlation between SPADI scores and shoulder ROM, particularly in flexion. This highlights the importance of shoulder mobility in minimizing disability. Clinicians should prioritize therapies to improve flexion range of

motion (ROM), since they have the potential to significantly improve patient functional outcomes.[30][40].

In this study, gender, ROM, and symptom duration were associated with functional limits in simple linear regression but were not significant in the multiple regression model. Female patients exhibited higher SPADI scores than males ($B = -10.645$, $p = 0.005$), which is consistent with previous research indicating that women endure more pain and impairment due to biological, social, or occupational causes[3][32][34]. Similarly, shoulder flexion ROM was substantially correlated with SPADI scores (Spearman's $\rho = -0.660$, $p < 0.001$), and symptom duration was inversely related to functional limits ($B = -8.334$, $p = 0.023$). However, in multiple regression, these variables lost significance, most likely due to the larger effects of shoulder diseases such as chronic dislocation, RCTs, and adhesive capsulitis. [30][40]

Overall, our findings illustrate the complexities of shoulder discomfort and disability, in which multiple factors interact. They underline the importance of conducting comprehensive assessments in clinical practice that take into account both structural and demographic characteristics.

7 Strengths and Limitations.

The study represents one of the first of its kind to be conducted on functional limitations in patients with shoulder pain in Ethiopia and thus provides vital baseline information for future research and clinical practice in this setting. The study further elucidates the unique characteristics of shoulder diseases and their consequences on functional outcomes in a resource-poor setting, which has been poorly represented in literature. One limitation of the present studies is that this single-center study may not properly represent the variability of shoulder pain patients across regions or healthcare settings. The cross-sectional design limits the ability to reveal causal links, and the use of self-reported SPADI scores may result in biased results. Moreover, comorbidities or psychological influences were not considered that could act as confounders in regard to functional outcome.

8 Conclusion

This study depicts the wide impacts of shoulder pathologies on functional limits in patients with painful shoulder disorders admitted to AaBET Hospital in Ethiopia. It has brought into focus early interventions and individualized therapy for improvement of shoulder range of

motion and reduction of impairment. The strong negative association between shoulder flexion range of motion and functional limits underlines the importance of mobility-oriented rehabilitation techniques. These findings add to the growing body of information on shoulder pain care in resource-constrained settings and offer useful insights for physicians working in similar situations.

9 **Recommendation**

The findings indicate that healthcare providers should emphasize early diagnosis and treatment of shoulder disorders, especially chronic dislocations and rotator cuff tears, to avoid long-standing functional limitations. The rehabilitation program should focus on the improvement of ROM, especially in shoulder flexion, as it was highly associated with a reduced level of impairment. Future public health programs should also aim to raise awareness among people about the need for early medical intervention in shoulder injuries to avoid chronic diseases. Future Research requires larger, multi-center designs with longitudinal study plans that would further elucidate the causal relationship of shoulder pathologies to functional outcomes, considering the comorbidities and psychosocial factors.

10. References

1. McMahon PJ, Sallis RE. The painful shoulder. *Postgraduate Medicine*. 1999;106(7):36-49.
2. Veeger HEJ, van der Helm FCT. Shoulder function: The perfect compromise between mobility and stability. *Journal of Biomechanics*. 2007;40(10):2119-29.
3. van der Windt DA, Koes BW, de Jong BA, Bouter LM. Shoulder disorders in general practice: incidence, patient characteristics, and management. *Ann Rheum Dis*. 1995;54(12):959-64.
4. Linaker CH, Walker-Bone K. Shoulder disorders and occupation. *Best Practice & Research Clinical Rheumatology*. 2015;29(3):405-23.
5. Lucas J, van Doorn P, Hegedus E, Lewis J, van der Windt D. A systematic review of the global prevalence and incidence of shoulder pain. *BMC Musculoskeletal Disorders*. 2022;23(1):1073.
6. Gebregiorgis BT, Wegayehu MZ. Pattern of Radiographic and Sonographic Findings of Adult Patients Presented with Shoulder Pain at Tikur Anbessa Hospital, Addis Ababa, Ethiopia. *Ethiop J Health Sci*. 2023;33(6):987-94.
7. Zahra T, Altaf F, Akhtar H, Awan S, Sher U, Waris S. Sleep Quality and Nocturnal Pain in Patients of Rotator Cuff Syndrome. *Pakistan Journal of Medical and Health Sciences*. 2022;16.
8. Imagama S, Ando K, Kobayashi K, Seki T, Hamada T, Machino M, et al. Shoulder pain has most impact on poor quality of life among various types of musculoskeletal pain in middle-aged and elderly people: Yakumo study. *Modern Rheumatology*. 2020;30(3):568-72.
9. Dechasa Adare Mengistu, Yohannes Mulugeta Dammu. Occupational Related Shoulder and Neck Pain Among Working Population of Ethiopia: Systematic Review and Meta-Analysis, 07 September 2021.
10. Ostör AJ, Richards CA, Prevost AT, Speed CA, Hazleman BL. Diagnosis and relation to general health of shoulder disorders presenting to primary care. *Rheumatology (Oxford)*. 2005;44(6):800-5.
11. Odunlami J, Olaosebikan HB, Adelowo OO, Erhabor GE. Frequency and Pattern of Shoulder Pain Syndrome in a Nigerian Tertiary Hospital. *West Afr J Med*. 2023;40(5):476-80.
12. Angst F, Schwyzer H-K, Aeschlimann A, Simmen BR, Goldhahn J. Measures of adult shoulder function: Disabilities of the Arm, Shoulder, and Hand Questionnaire (DASH) and Its Short Version (QuickDASH), Shoulder Pain and Disability Index (SPADI), American Shoulder and Elbow Surgeons (ASES) Society Standardized Shoulder Assessment Form, Constant (Murley) Score (CS), Simple Shoulder Test (SST), Oxford Shoulder Score (OSS), Shoulder Disability Questionnaire (SDQ), and Western Ontario Shoulder Instability Index (WOSI). *Arthritis Care & Research*. 2011;63(S11):S174-S88.
13. Lentz TA, Barabas JA, Day T, Bishop MD, George SZ. The relationship of pain intensity, physical impairment, and pain-related fear to function in patients with shoulder pathology. *J Orthop Sports Phys Ther*. 2009;39(4):270-7.
14. Provencher MT, Frank RM, Macian D, Dewing CB, Ghodadra NS, Carney J, et al. An analysis of shoulder outcomes scores in 275 consecutive patients: disease-specific correlation across multiple shoulder conditions. *Mil Med*. 2012;177(8):975-82.

15. Yanik EL, Alvarez C, Cleveland RJ, Nelson AE, Golightly YM. Occupational tasks associated with shoulder pain and upper extremity disability: a cross-sectional study in the Johnston County Osteoarthritis Project. *BMC Musculoskeletal Disorders*. 2024;25(1):374.
16. Ozaras N, Cidem M, Demir S, Suyabatmaz O, Solak O, Esenyel M. Shoulder pain and functional consequences: does it differ when it is at dominant side or not? *J Back Musculoskelet Rehabil*. 2009;22(4):223-5.
17. Tveitå EK, Ekeberg OM, Juel NG, Bautz-Holter E. Responsiveness of the Shoulder Pain and Disability Index in patients with adhesive capsulitis. *BMC Musculoskeletal Disorders*. 2008;9(1):161.
18. Svendsen SW, Bonde JP, Mathiassen SE, Stengaard-Pedersen K, Frich LH. Work related shoulder disorders: quantitative exposure-response relations with reference to arm posture. *Occupational and Environmental Medicine*. 2004;61(10):844.
19. Gummesson C, Atroshi I, Ekdahl C. The disabilities of the arm, shoulder and hand (DASH) outcome questionnaire: longitudinal construct validity and measuring self-rated health change after surgery. *BMC Musculoskeletal Disorders*. 2003;4(1):11.
20. Roach KE, Budiman-Mak E, Songsiridej N, Lertratanakul Y. Development of a shoulder pain and disability index. *Arthritis Care Res*. 1991;4(4):143-9.
21. Largacha M, Parsons IMt, Campbell B, Titelman RM, Smith KL, Matsen F, 3rd. Deficits in shoulder function and general health associated with sixteen common shoulder diagnoses: a study of 2674 patients. *J Shoulder Elbow Surg*. 2006;15(1):30-9.
22. MacDermid JC, Ramos J, Drosdowech D, Faber K, Patterson S. The impact of rotator cuff pathology on isometric and isokinetic strength, function, and quality of life. *J Shoulder Elbow Surg*. 2004;13(6):593-8.
23. Minns Lowe CJ, Moser J, Barker K. Living with a symptomatic rotator cuff tear 'bad days, bad nights': a qualitative study. *BMC Musculoskelet Disord*. 2014;15:228.
24. Moskowitz RW, Blaine TA. An overview of treatment options for persistent shoulder pain. *Am J Orthop (Belle Mead NJ)*. 2005;34(12 Suppl):10-5.
25. Crookes T, Wall C, Byrnes J, Johnson T, Gill D. Chronic shoulder pain. *Aust J Gen Pract*. 2023;52(11):753-8.
26. Codsí MJ. The painful shoulder: when to inject and when to refer. *Cleve Clin J Med*. 2007;74(7):473-4, 7-8, 80-2 passim.
27. Sizer Jr PS, Phelps V, Gilbert K. Diagnosis and Management of the Painful Shoulder. Part 1: Clinical Anatomy and Pathomechanics. *Pain Practice*. 2003;3(1):39-57.
28. Dean BJ, Gwilym SE, Carr AJ. Why does my shoulder hurt? A review of the neuroanatomical and biochemical basis of shoulder pain. *Br J Sports Med*. 2013;47(17):1095-104.
29. Ackerman IN, Fotis K, Pearson L, Schoch P, Broughton N, Brennan-Olsen SL, et al. Impaired health-related quality of life, psychological distress, and productivity loss in younger people with persistent shoulder pain: a cross-sectional analysis. *Disability and Rehabilitation*. 2022;44(15):3785-94.
30. Burner T, Abbott D, Huber K, Stout M, Fleming R, Wessel B, et al. Shoulder symptoms and function in geriatric patients. *J Geriatr Phys Ther*. 2014;37(4):154-8.

31. Smith-Forbes EV, Moore-Reed SD, Westgate PM, Kibler WB, Uhl TL. Descriptive analysis of common functional limitations identified by patients with shoulder pain. *J Sport Rehabil.* 2015;24(2):179-88.
32. Croft P, Pope D, Silman A. The clinical course of shoulder pain: prospective cohort study in primary care. *Primary Care Rheumatology Society Shoulder Study Group. Bmj.* 1996;313(7057):601-2.
33. Reilingh ML, Kuijpers T, Tanja-Harfterkamp AM, van der Windt DA. Course and prognosis of shoulder symptoms in general practice. *Rheumatology (Oxford).* 2008;47(5):724-30.
34. Razmjou H, Davis AM, Jaglal SB, Holtby R, Richards RR. Disability and satisfaction after rotator cuff decompression or repair: a sex and gender analysis. *BMC Musculoskelet Disord.* 2011;12:66.
35. Razmjou H, Lincoln S, Macritchie I, Richards RR, Medeiros D, Elmaraghy A. Sex and gender disparity in pathology, disability, referral pattern, and wait time for surgery in workers with shoulder injury. *BMC Musculoskelet Disord.* 2016;17(1):401.
36. Soberg HL, Engebretsen KB, Juel NG, Roe Y, Brox JI. Associations between shoulder pain and functioning on the ICF checklist and the disabilities of the arm, shoulder, and hand scale - a cross-sectional study. *Disabil Rehabil.* 2020;42(21):3084-91.
37. Shiri R, Varonen H, Heliövaara MM, Viikari-Juntura E. Hand dominance in upper extremity musculoskeletal disorders. *The Journal of rheumatology.* 2007;34 5:1076-82.
38. Kachooei AR, Moradi A, Janssen SJ, Ring D. The influence of dominant limb involvement on DASH and QuickDASH. *HAND.* 2015;10:512-5.
39. Barnes CJ, Barnes CJ, Steyn SJV, Steyn SJV, Fischer RA, Fischer RA. The effects of age, sex, and shoulder dominance on range of motion of the shoulder. *Journal of shoulder and elbow surgery.* 2001;10 3:242-6.
40. Anwer S, Alghadir AH, Al-Eisa ES, Iqbal ZA. The relationships between shoulder pain, range of motion, and disability in patients with shoulder dysfunction. *Journal of back and musculoskeletal rehabilitation.* 2018;31 1:163-7.
41. Hay E, Thomas E, Paterson SM, Dziedzic KS, Croft P. A pragmatic randomised controlled trial of local corticosteroid injection and physiotherapy for the treatment of new episodes of unilateral shoulder pain in primary care. *Annals of the Rheumatic Diseases.* 2003;62:394 - 9.
42. Dacre JE, Beeney N, Scott DL. Injections and physiotherapy for the painful stiff shoulder. *Annals of the Rheumatic Diseases.* 1989;48:322 - 5.
43. Chaudhary D, Joshi D, Jain VK, Mohindra M, Mehta N. A six months old neglected anterior shoulder dislocation managed by closed reduction and Latarjet procedure. *Chinese Journal of Traumatology.* 2016;19:295 - 7.
44. Sahu D, Rathod V, Phadnis AS, Shyam A. Results and complications of head preserving techniques in chronic neglected shoulder dislocation: a systematic review. *Journal of shoulder and elbow surgery.* 2020.
45. Bark D, Lewis KL. Rare Case of Chronic Unreduced Shoulder Dislocation: A Case Report and Literature Review. *Journal of Orthopaedic Case Reports.* 2023;13:60 - 4.

46. Curry EJ, Matzkin EE, Dong Y, Higgins LD, Katz JN, Jain NB. Structural Characteristics Are Not Associated With Pain and Function in Rotator Cuff Tears: The ROW Cohort Study. *Orthop J Sports Med.* 2015;3(5):2325967115584596.
47. Vrouva SD, Sopidou VK, Chanopoulos KP, Bakalidou DF, Papatsimpas VC, Sorras N, et al. Is Shoulder Pain and Disability Index a Prognostic Factor for Neuropathic Shoulder Pain? *Cureus.* 2021;13(10):e19173.
48. Qadri HAQ. EFFECTS OF END-RANGE MOBILIZATION TECHNIQUE ON PAIN AND DISABILITY IN PATIENTS WITH ADHESIVE CAPSULITIS-A QUASI-EXPERIMENTAL STUDY. *Pakistan Journal of Rehabilitation.* 2021.

Appendix I: consent form

የስምምነት ቅጽ

የጥናት ርዕስ:- በአቤት ሆስፒታል ውስጥ የትከሻ ሕመም ያለባቸው የአዋቂዎች ሕመምተኞች ተግባራዊ ገደቦች እና ተያያዥ ምክንያቶች

የጥናቱ ዓላማ:-

የዚህ ጥናት አላማ የትከሻ ሕመም በሚያጋጥማቸው የጎልማሳ ሕመምተኞች ላይ ተግባራዊ ውስንነቶችን እና ተያያዥ ምክንያቶችን መረዳት ነው። የዚህ ጥናት ግኝቶች የሕክምና እንክብካቤን ለማሻሻል እና የትከሻ ሕመም ባለባቸው ታካሚዎች መካከል የእንቅስቃሴ ገደቦችን ለመቆጣጠር አስተዋፅኦ እንደሚያደርጉ ይጠበቃል።

የተሳታፊ ተሳትፎ:-

በዚህ ጥናት ውስጥ መሳተፍ ከትከሻ ሕመም, በዕለት ተዕለት እንቅስቃሴ ላይ ያለው ተጽእኖ እና ከህክምና ታሪክዎ ጋር የተያያዙ ተከታታይ ጥያቄዎችን መመለስን ያካትታል። መጠይቁ ለማጠናቀቅ ከ10-15 ደቂቃዎች ያህል ይወስዳል።

በዚህ ጥናት ውስጥ ያለዎት ተሳትፎ ሙሉ በሙሉ በፈቃደኝነት ነው። ያለ ምንም አሉታዊ ውጤት በማንኛውም ጊዜ ከጥናቱ የመውጣት መብት አልዎት። ለመሳተፍ ወይም ላለመሳተፍ ውሳኔዎ በሆስፒታሉ ውስጥ በሚያገኙት እንክብካቤ ላይ ተጽእኖ አይኖረውም።

የቀረቡት ሁሉም መረጃዎች በሚስጥር ይያዛሉ እና ለዚህ ጥናት ዓላማዎች ብቻ ጥቅም ላይ ይውላሉ። የእርስዎ ምላሾች ስማቸው እንዳይገለጽ ይደረጋል፤ እና በዚህ ጥናት በተገኙ ሪፖርቶች ወይም ህትመቶች ውስጥ ምንም መለያ መረጃ አይገለጽም።

በመሳተፍ በቀጥታ ተጠቃሚ ባይሆኑም፤ የተሰበሰበው መረጃ ለወደፊቱ የትከሻ ሕመም ግንዛቤን እና ህክምናን ለማሻሻል ይረዳል።

የመገኛ አድራሻ፡

ስለ ጥናቱ ወይም ስለ እርስዎ ተሳትፎ ማንኛቸውም ጥያቄዎች ካሉዎት፤ እባክዎን ዋና መርማሪውን ዶክተር በ [የእርስዎ አድራሻ መረጃ] ያግኙ።

ፈቃድ:-

ከዚህ በታች በመፈረም ከዚህ በላይ የቀረበውን መረጃ እንዳነበቡ እና እንደተረዱት አምነዋል እናም በዚህ ጥናት ውስጥ ለመሳተፍ ተስማምተዋል ።

የተሳታፊው ስም:- _____

የተሳታፊ ፊርማ:- _____

ቀን:- _____

Appendix II Questionnaire

Questionnaire on Functional Limitation and Associated Factors in Patients with Shoulder Pain

Part I: Demographic Information

1. Age: _____
2. Gender:
 1. Male
 2. Female
3. Occupation: _____
4. Marital Status:
 1. Single
 2. Married
 3. Divorced
 4. Widowed
5. Level of Education:
 1. No formal education
 2. Primary education
 3. Secondary education
 4. Higher education

Part II: Medical History

1. Duration of shoulder pain:
 1. Less than 1 month
 2. 1-3 months
 3. More than 3 months
2. Hand dominance:
 1. Right-handed
 2. Left-handed
 3. Ambidextrous
3. Previous shoulder injuries or surgeries:
 1. Yes
 2. No If yes, please specify: _____
4. Previous treatments for shoulder pain (check all that apply):

1. Physiotherapy
 2. Injections
 3. Oral pain medications
 4. Surgery
 5. Home remedies
 6. Other (please specify): _____
5. Presence of other chronic conditions (e.g., diabetes, hypertension):
1. Yes
 2. No If yes, please specify: _____
6. Shoulder pathology identified: _____

Part III physical examination ROM

1. Shoulder range of motion (ROM) measurements:
- a) Flexion: _____ degrees
 - b) Extension: _____ degrees
 - c) Abduction: _____ degrees
 - d) Adduction: _____ degrees
 - e) Internal Rotation: _____ degrees
 - f) External Rotation: _____ degrees
2. Any pain experienced during ROM assessment?
- a) Yes
 - b) No
 - c) If yes, specify the movement(s) causing pain: _____
3. Any limitations observed during ROM assessment?
- a) Yes
 - b) No
 - c) If yes, specify the movement(s) with limitations: _____

Shoulder Pain and Disability Index (SPADI)

Please place a mark on the line that best represents your experience during the last week attributable to your shoulder problem.

Pain scale

How severe is your pain?

Circle the number that best describes your pain where: 0 = no pain and 10 = the worst pain imaginable.

At its worst?	0	1	2	3	4	5	6	7	8	9	10
When lying on the involved side?	0	1	2	3	4	5	6	7	8	9	10
Reaching for something on a high shelf?	0	1	2	3	4	5	6	7	8	9	10
Touching the back of your neck?	0	1	2	3	4	5	6	7	8	9	10
Pushing with the involved arm?	0	1	2	3	4	5	6	7	8	9	10

Disability scale

How much difficulty do you have?

Circle the number that best describes your experience where: 0 = no difficulty and 10 = so difficult it requires help.

Washing your hair?	0	1	2	3	4	5	6	7	8	9	10
Washing your back?	0	1	2	3	4	5	6	7	8	9	10
Putting on an undershirt or jumper?	0	1	2	3	4	5	6	7	8	9	10
Putting on a shirt that buttons down the front?	0	1	2	3	4	5	6	7	8	9	10
Putting on your pants?	0	1	2	3	4	5	6	7	8	9	10
Placing an object on a high shelf?	0	1	2	3	4	5	6	7	8	9	10
Carrying a heavy object of 10 pounds (4.5 kilograms)	0	1	2	3	4	5	6	7	8	9	10
Removing something from your back pocket?	0	1	2	3	4	5	6	7	8	9	10