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# KNOWLEDGE, AWARENESS, AND PRACTICES OF PHYSICAL THERAPISTS, MEDICAL STUDENTS, AND ORTHOPEDICS PRACTITIONERS IN KSA REGARDING REHABILITATION IN ACL SURGERY

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**Abstract**

**Background:** This article discusses anterior cruciate ligament tears which are a common type of knee injury. The cruciate ligament is a structure made up of two large ligaments are known as the anterior cruciate ligament and posterior cruciate ligament. Preoperative rehabilitation has been recommended for preparing patients for operation and rehabilitation following surgery prior to ACLR. ACL tears can be the cause of up to 64% of sports-related knee injuries in athletes. The lack of knowledge on the efficacy of physical therapy before and after anterior cruciate ligament (ACL) surgery in Saudi Arabia makes this study crucial. While studies conducted in the West have demonstrated that preoperative physical therapy improves patient outcomes, their results are inconsistent and lack standard operating procedures, especially when considering the Saudi setting.

**Objective:** The purpose of this study was to assess Physical therapists, medical students, and orthopedics practitioners in Saudi Arabia's amount of knowledge and awareness regarding rehabilitation techniques for ACL surgery.

**Methods:** This is a cross-sectional study conducted between July-November 2024 in Saudi Arabia. The study took place in the Kingdom of Saudi Arabia between 2024 and 2025, with Physical therapists, medical students, and orthopedics practitioners living there. The study included Saudi Physical therapists, medical students, and orthopedics practitioners, both male and female, aged 20 to 60, who are familiar with pre and post ACL reconstruction rehabilitation. people working or studying in an unrelated medical industry were not permitted entrance. The minimal target sample size of 384 was determined using a procedure based on prevalence estimation, 95% confidence, and 5% acceptable error.

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**Results:** Regarding the knowledge, awareness, and practices of ACL surgery rehabilitation. There was a high overall awareness, with 75.5% out of 502 participants were familiar with current guidelines and 71.3% recognizing recommended pre-operative exercises. However, only 24.5% exhibited a high level of knowledge, and a concerning 41.4% were unaware of the guidelines. While 78.9% demonstrated a strong understanding of rehabilitation practices, 19.1% showed moderate awareness, indicating potential for improvement in education. Overall, 67.3% accurately identified the typical 4-6 month rehabilitation duration, and 87.8% supported open kinetic chain OKC quadriceps exercises, highlighting a generally well-informed perspective, but underlining the need for enhanced training and knowledge dissemination in ACL rehabilitation.

**Conclusion:** there was a high overall awareness with 75.5% of participants were familiar with current practices and 71.3% acknowledged essential pre-operative exercises. However, only 24.5% demonstrated a high level of knowledge, with 41.4% unaware of key guidelines. This indicates a critical need for enhanced education on ACL rehabilitation protocols to optimize patient outcomes.

**Keywords:** Knowledge, Awareness, ACL, Saudi Arabia, Physical therapy, Orthopedic.

**Introduction:**

Anterior cruciate ligament (ACL) tears are a common type of knee injury that needs precise medical care to prevent complications [1]. The cruciate ligament is a structure made up of two large ligaments that cross deeply within the knee joint. They go from the femur to the tibia and are known as the anterior cruciate ligament (ACL) and posterior cruciate ligament (PCL) [2]. Surgical reconstruction is the standard treatment for ACL ruptures [3]. Its goals are to optimize functional capacity and restore knee stability so that patients may resume their previous level of physical activity [4]. Preoperative rehabilitation, also known as prehabilitation, has been recommended as a means of both physically and mentally preparing patients for operation and rehabilitation following surgery prior to ACLR [5].

A frequent medical disease known as an anterior cruciate ligament tear involves a ligament sprain or stretch [6]. The anterior cruciate ligament (ACL), which assures knee rotational adjustment in the frontal and cross-over planes, is the main passive constraint to the anterior translation of the femur's tibia. ACL tears can be the cause of up to 64% of sports-related knee injuries in athletes who cut and pivot [7]. Worldwide, anterior cruciate ligament (ACL) injuries are highly common. An estimated 100,000 to 200,000 tears of the ACL occur on an annual basis in the United States [8].

A 2020 Saudi study revealed that the anterior cruciate ligament(ACL) was the most affected among 74 individuals with injured cruciate ligaments, with 55.1% receiving physical therapy [9]. Despite some evidence-based treatment approaches for ACL injuries, there is no definitive consensus on the most effective rehabilitation approach post-ACLR [10]. A survey of 114 physical therapists revealed that participants engaged in varying preoperative ACL rehabilitation programs with varying durations and interventions [11].

The lack of knowledge on the efficacy of physical therapy before and after anterior cruciate ligament (ACL) surgery in Saudi Arabia makes this study crucial. While studies conducted in the West have demonstrated that preoperative physical therapy improves patient outcomes, their results are inconsistent and lack standard operating procedures, especially when considering the Saudi setting. Moreover, not enough studies have been done to find out how Saudi patients and medical professionals are aware of the advantages of physical therapy before surgery. Therefore, this research is required to evaluate the efficacy of preoperative physical therapy for Saudi patients.

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Objective**s:**
The purpose of this study was to assess Physical therapists, medical students, and orthopedics practitioners in Saudi Arabia's amount of knowledge and awareness regarding rehabilitation techniques for ACL surgery.
Materials and Methods:

**Study design:**
This was an observational cross-sectional study conducted between July 2024 and November 2024 in Saudi Arabia. Saudi Arabia is located in the extreme southwest of Asia.

**Inclusion and Exclusion Criteria:**
Participants in the study were Saudi Arabian Physical therapists, medical students, and orthopaedics practitioners, both male and female, between the ages of 20 and 60, who are familiar with pre and post ACL reconstruction rehabilitation. people working or studying in an unrelated medical industry were not permitted entrance.

**Sample size:**
Using the Qualtrics calculator and a 95% confidence level, the minimum sample size was calculated to be 384.
The sample size was estimated using the following formula:
n= P (1-P) * Zα 2 / d 2 with a confidence level of 95%.
n: Calculated sample size.
Z: The z-value for the selected level of confidence (1- a) = 1.96.
P: An estimated knowledge.
Q: (1 – 0.50) = 50%, i.e., 0.50.
D: The maximum acceptable error = 0.05.
So, the calculated minimum sample size was:
n = (1.96)2 X 0.50 X 0.50/ (0.05) 2 = 384.

**Method for data collection and instrument (*Data collection Technique and Tools)*:**
After completing an in-depth review of the literature regarding this topic of interest and conducting a thorough search of articles on both PubMed and Google Scholar, we adopted and modified a number of questions from two questionnaires in order to craft our very own questionnaire provided in the appendix [10,12]. The crafted online-administered questionnaire had six sections. The first section included demographic data questions. The second section included knowledge-based questions in order to check the professional level of information and knowledge the participants had. All questions had one correct answer based on the currently accepted literature in orthopedics, physiotherapy, and rehabilitation. Participants had to choose the correct answer. In the third section, the questions were made to reflect the preferences of Guidelines and Protocols. Awareness Answers were categorized as: (Yes or No). The second question is answered by (Frequently, Always, Always, Sometimes, Rarely, Never). In the fourth section, we need to know if there is a use of assessment tools during pre-postoperative rehabilitation time. We must determine the optimal preoperative approach for the patient by reassuring the participants in the fifth section. Open-ended questions regarding compliance for additional information and ACL patient rehabilitation were included in the last section.

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**Scoring system:**
The scoring system for the ACL surgery rehabilitation assessment was formulated to probe the knowledge and awareness of the candidate comprehensively. This assessment contained sections that, on accumulation, give the total score. Section 2: Knowledge Assessment, Part A addresses the issues of awareness related to ACL surgery rehabilitation guidelines and is graded from 1 to 5 points. Part B provides specific knowledge questions, with marks assigned to correct answers, which total 14 points. The overall total for knowledge thus ranged from 0 to 39 points. For awareness, the score was taken solely from Part A of Section 2, also having a maximum of 25 points. These scores were then categorized into three levels: low, moderate, or high, based on the total points achieved by the respondents.
Knowledge scores ranged from 0 to 39 points and were classified into three levels as follows: **low knowledge** was characterized as scoring 13 or less, **moderate knowledge** as scoring between 14 and 27, and **high knowledge** as scoring 28 or higher.
Awareness scores ranged from 0 to 25 points and were classified into three levels as follows:
**Low knowledge** was characterized as scoring 9 or less, **moderate knowledge** as scoring between 10 and 17, and **high knowledge** as scoring 18 or higher.
**Analyzes and entry method:**
Collected On a computer, data was input using the Windows version of Microsoft Excel (2016). After that time, data had been transferred to version 20 of the Statistical Package for Social Science Software (SPSS). to be analyzed statistically.

**Results:**

Table (1) displays various demographic parameters of the participants with a total number of (502). Notably, the age distribution reveals a significant proportion of younger individuals, with 43.2% under 24 years, highlighting the potential for fresh perspectives within the field. Conversely, 34.7% are aged 27 years or more, indicating a substantial representation of experienced professionals. Gender representation is relatively balanced, with females slightly outnumbering males at 51.8% to 48.2%. This demographic balance could foster diverse approaches to practice and enhance collaborative efforts in physical therapy. The years of experience data indicates that a majority (52.8%) have between 1 to 5 years of experience, suggesting a workforce that is relatively early in their careers but likely to be familiar with contemporary practices. The predominance of Physical Therapy Specialists (52.6%) underscores the significance of specialized knowledge in the current professional landscape. Geographically, participants are spread across various regions, with the Southern Region having the highest representation (32.3%). This regional diversity may influence practice styles and patient care approaches, enriching the overall professional discourse in physical therapy.

***Table (1): Sociodemographic characteristics of participants (n=502)***

| ***Parameter*** | | ***No.*** | ***Percent (%)*** |
|---|---|---|---|
| ***Age*** | 22 years or less | 138 | 27.5 |
| | 23 years old | 79 | 15.7 |
| | 24 to 26 | 111 | 22.1 |
| | 27 years or more | 174 | 34.7 |
| ***Gender*** | Female | 260 | 51.8 |
| | Male | 242 | 48.2 |

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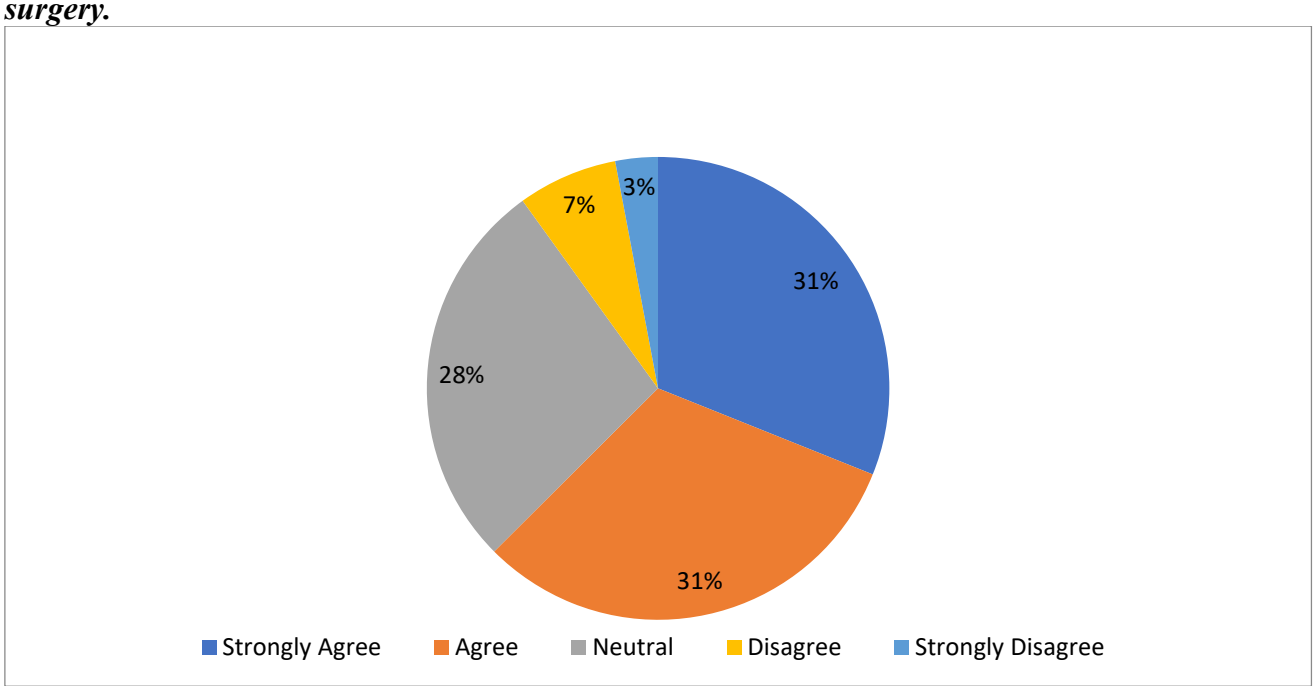
| | | | |
|---|---|---|---|
| ***Years of experience*** | less than 1 year | 157 | 31.3 |
| | 1 to 5 years | 265 | 52.8 |
| | 5 to 9 years | 43 | 8.6 |
| | 10 years or more | 37 | 7.4 |
| ***Current position*** | Doctor of Physical Therapy DPT | 68 | 13.5 |
| | Medical Student | 40 | 8.0 |
| | Orthopedic Resident | 12 | 2.4 |
| | Orthopedic Specialist | 28 | 5.6 |
| | Physical therapy consultant | 15 | 3.0 |
| | Physical therapy specialist | 264 | 52.6 |
| | Physical Therapy Student | 75 | 14.9 |
| ***Region*** | Northern Region | 86 | 17.1 |
| | Southern Region | 162 | 32.3 |
| | Central Region | 141 | 28.1 |
| | Eastern Region | 54 | 10.8 |
| | Western Region | 59 | 11.8 |

As shown in figure 1, The data regarding participants' confidence in identifying the phases of rehabilitation following ACL surgery illustrates a positive trend. A combined total of 314 respondents (62.4%) either strongly agree (156) or agree (158), indicating a solid understanding of rehabilitation phases. In contrast, only 50 participants (10%) expressed disagreement, with 35 disagreeing and 15 strongly disagreeing. Additionally, 138 individuals (27.6%) remained neutral, suggesting some uncertainty.

***Figure (1): Illustrates whether participants can identify phases of rehabilitation following ACL surgery.***



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As illustrated in table (2), The data in reveals significant awareness regarding ACL surgery rehabilitation among the 502 participants. A notable 75.5% either strongly agree or agree with being aware of current guidelines for rehabilitation, indicating a solid foundation of knowledge. Similarly, 62.6% can identify rehabilitation phases, while 71.3% are familiar with recommended pre-operative exercises, suggesting comprehensive understanding in this area. Furthermore, 57.8% strongly agree that they understand the importance of pre- and postoperative rehabilitation, emphasizing its critical role in recovery outcomes. This is reinforced by the 73.5% who recognize the potential complications of inadequate pre-operative rehabilitation. The relatively low percentages of disagreement across all parameters highlight a strong consensus on the importance of proper rehabilitation practices.

***Table (2): Parameters related to Awareness of ACL Surgery Rehabilitation (n=502).***

| ***Parameter*** | | ***No.*** | ***Percent (%)*** |
|---|---|---|---|
| ***I am aware of the current guidelines for ACL surgery rehabilitation*** | Strongly Agree | 177 | 35.3 |
| | Agree | 202 | 40.2 |
| | Neutral | 93 | 18.5 |
| | Disagree | 20 | 4.0 |
| | Strongly Disagree | 10 | 2.0 |
| ***I can identify the phases of rehabilitation following ACL surgery.*** | Strongly Agree | 156 | 31.1 |
| | Agree | 158 | 31.5 |
| | Neutral | 138 | 27.5 |
| | Disagree | 35 | 7.0 |
| | Strongly Disagree | 15 | 3.0 |
| ***I am familiar with the recommended exercises during the pre-operative phase of ACL surgery.*** | Strongly Agree | 189 | 37.6 |
| | Agree | 169 | 33.7 |
| | Neutral | 99 | 19.7 |
| | Disagree | 30 | 6.0 |
| | Strongly Disagree | 15 | 3.0 |
| ***I understand the importance of pre-postoperative rehabilitation in ACL surgery outcomes.*** | Strongly Agree | 290 | 57.8 |
| | Agree | 148 | 29.5 |
| | Neutral | 49 | 9.8 |
| | Disagree | 5 | 1.0 |
| | Strongly Disagree | 10 | 2.0 |
| ***I am knowledgeable about the potential complications associated with inadequate pre-operative rehabilitation.*** | Strongly Agree | 198 | 39.4 |
| | Agree | 171 | 34.1 |
| | Neutral | 112 | 22.3 |
| | Disagree | 11 | 2.2 |
| | Strongly Disagree | 10 | 2.0 |

As shown in figure (2), The data on recommended pre-operative exercises for ACL surgery rehabilitation clearly indicates that 328 participants (65.3%) identified high-impact activities as typically NOT recommended during this phase. This suggests a strong consensus on the necessity of avoiding such exercises to prevent further injury. In contrast, 93 respondents (18.5%) believe quadriceps strengthening exercises are inappropriate, while 54 (10.8%) think hamstring stretching exercises are not advised. Only 27 participants (5.4%) selected proprioception training as unsuitable.

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***Figure (2): Illustrates what exercise is not recommended preoperatively among participants undergoing ACL surgery rehabilitation.***

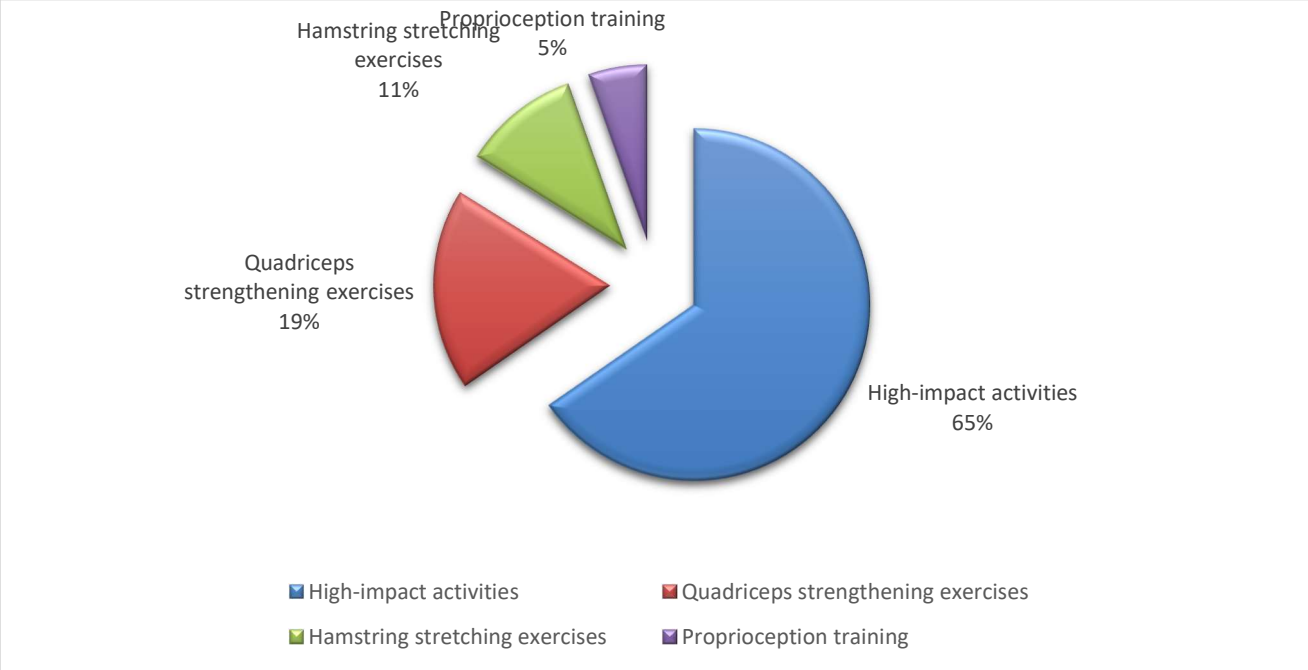


Table 3 provides a comprehensive overview of participants' knowledge regarding ACL surgery rehabilitation among 502 respondents. Notably, 67.3% recognize that rehabilitation typically lasts 4-6 months, reflecting a consensus on the duration necessary for effective recovery. A significant majority (87.8%) support the use of Open Kinetic Chain (OKC) quadriceps exercises, highlighting awareness of rehabilitation techniques. When it comes to guidelines, 58.6% affirm familiarity with current national or international protocols, although 41.4% report a lack of awareness. This gap emphasizes the need for ongoing education. Furthermore, a strong majority (70.7%) identifies multiple goals of pre-operative rehabilitation, reinforcing the comprehensive approach necessary for optimal outcomes. Participants exhibit confidence in their skills, with 55.6% feeling either very confident or confident. Importantly, 65.3% correctly identify high-impact activities as inappropriate during the pre-operative phase, indicating a solid understanding of safe practices. Overall, the data underscores a well-informed group, vital for enhancing ACL rehabilitation practices.

***Table (3): participants' knowledge of ACL Surgery Rehabilitation (n=502).***

| ***Parameter*** | | ***No.*** | ***Percent (%)*** |
|---|---|---|---|
| ***Duration of rehabilitation (in months):*** | One month | 36 | 7.2 |
| | Two months | 22 | 4.4 |
| | Three months | 106 | 21.1 |

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| | | | |
|---|---|---|---|
| | 4-6 months | 338 | 67.3 |
| ***Use of Open Kinetic Chain (OKC) quadriceps exercise during rehabilitation:*** | No | 61 | 12.2 |
| | Yes | 441 | 87.8 |
| ***Average number of post-operative weeks to begin with open kinematic chain OKC:*** | 1-2 weeks | 160 | 31.9 |
| | 3-4 weeks | 237 | 47.2 |
| | More than a month | 105 | 20.9 |
| ***Use of Patient-Reported Outcome Measures during rehabilitation:*** | No | 47 | 9.4 |
| | Yes | 455 | 90.6 |
| ***Patient-reported outcome Measures currently used during rehabilitation **** | ACL-RSI: Anterior Cruciate Ligament-Return to Sport after Injury. | 311 | 61.9 |
| | KOOS: Knee Injury and Osteoarthritis Outcome Score. | 183 | 36.5 |
| | IKDC: International Knee Documentation Committee. | 119 | 23.7 |
| | TSK or TSK-11: Tampa Scale for Kynophobia. | 107 | 21.3 |
| | K-SES: Knee Self-Efficacy Scale. | 148 | 29.5 |
| | Other | 109 | 21.7 |
| ***Goals of pre-operative rehabilitation in ACL surgery:*** | Reduce pain and inflammation of the knee joint. | 77 | 15.3 |
| | Establish a full range of movement of the knee joint. | 38 | 7.6 |
| | Regain strength of knee-supporting muscles such as quadriceps and hamstrings. | 32 | 6.4 |
| | All the Above. | 355 | 70.7 |
| ***Are you familiar with the current international or national guidelines for ACL surgery rehabilitation ?*** | No | 208 | 41.4 |
| | Yes | 294 | 58.6 |
| ***How often do you refer to guidelines when planning pre-operative rehabilitation for ACL surgery patients?*** | Always | 182 | 36.3 |
| | Often | 179 | 35.7 |
| | Sometimes | 109 | 21.7 |
| | Rarely | 27 | 5.4 |
| | Never | 5 | 1.0 |
| ***How confident are you in your knowledge and skills related to pre-operative rehabilitation in ACL surgery?*** | Very confident | 119 | 23.7 |
| | Confident | 160 | 31.9 |
| | Neutral | 159 | 31.7 |
| | Not very confident | 49 | 9.8 |
| | Not confident at all | 15 | 3.0 |
| ***Which exercise is typically NOT recommended during the pre-operative phase of ACL surgery rehabilitation?*** | High-impact activities | 328 | 65.3 |
| | Quadriceps strengthening exercises | 93 | 18.5 |

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| | | | |
|---|---|---|---|
| | Hamstring stretching exercises | 54 | 10.8 |
| | Proprioception training | 27 | 5.4 |
| ***Primary objectives of pre-operative rehabilitation in ACL injury*** | Strengthen quadriceps | 240 | 47.8 |
| | Improve range of motion | 141 | 28.1 |
| | Decrease swelling | 65 | 12.9 |
| | Facilitate wound healing | 28 | 5.6 |
| | Re-educate proprioception | 28 | 5.6 |

***Results may overlap***

Table 4 illustrates the levels of awareness regarding rehabilitation in ACL surgery among the 502 participants. A significant majority, 78.9%, exhibit a high level of awareness, indicating a strong understanding of rehabilitation practices essential for optimal recovery. Additionally, 19.1% of participants demonstrate moderate awareness, suggesting room for improvement in knowledge dissemination. Remarkably, only 2.0% possess low awareness, highlighting the effectiveness of current educational initiatives.

***Table (4): Shows awareness about rehabilitation in ACL surgery score results.***

| | **Frequency** | **Percent** |
|---|---|---|
| High level of awareness | 396 | 78.9 |
| Moderate awareness | 96 | 19.1 |
| Low awareness | 10 | 2.0 |
| Total | 502 | 100.0 |

Table 5 reveals the knowledge levels regarding rehabilitation in ACL surgery among the 502 participants. Notably, only 24.5% exhibit a high level of knowledge, suggesting a need for enhanced education and training within this area. In contrast, a combined 75.4% fall into the moderate (37.6%) or low (37.8%) knowledge categories, indicating significant gaps in understanding rehabilitation protocols.

***Table (5): Shows knowledge about rehabilitation in ACL surgery score results.***

| | **Frequency** | **Percent** |
|---|---|---|
| High level of knowledge | 123 | 24.5 |
| Moderate knowledge | 189 | 37.6 |
| Low level of knowledge | 190 | 37.8 |
| Total | 502 | 100.0 |

Table (6) shows that awareness level of rehabilitation after ACL injury has statistically significant relation to gender (P value =0.0001), age (P value=0.0001), and region (P value=0.001).

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***Table (6): Relation between awareness level of rehabilitation after ACL injury and sociodemographic characteristics.***

| ***Parameters*** | | ***Awareness level*** | | ***Total (N=502)*** | ***P value**** |
|---|---|---|---|---|---|
| | | **High level of awareness** | **Moderate or low** | | |
| ***Gender*** | Female | 184 | 76 | 260 | 0.0001 |
| | | 46.5% | 71.7% | 51.8% | |
| | Male | 212 | 30 | 242 | |
| | | 53.5% | 28.3% | 48.2% | |
| ***Age*** | 22 years or less | 92 | 46 | 138 | 0.0001 |
| | | 23.2% | 43.4% | 27.5% | |
| | 23 years old | 57 | 22 | 79 | |
| | | 14.4% | 20.8% | 15.7% | |
| | 24 to 26 | 90 | 21 | 111 | |
| | | 22.7% | 19.8% | 22.1% | |
| | 27 years or more | 157 | 17 | 174 | |
| | | 39.6% | 16.0% | 34.7% | |
| ***Years of experience*** | less than 1 year | 90 | 67 | 157 | N/A |
| | | 22.7% | 63.2% | 31.3% | |
| | 1 to 5 years | 226 | 39 | 265 | |
| | | 57.1% | 36.8% | 52.8% | |
| | 5 to 9 years | 43 | 0 | 43 | |
| | | 10.9% | 0.0% | 8.6% | |
| | 10 years or more | 37 | 0 | 37 | |
| | | 9.3% | 0.0% | 7.4% | |
| ***Current Position*** | Doctor of Physical Therapy DPT | 46 | 22 | 68 | N/A |
| | | 11.6% | 20.8% | 13.5% | |
| | Medical Student | 5 | 35 | 40 | |
| | | 1.3% | 33.0% | 8.0% | |
| | Orthopedic Resident | 6 | 6 | 12 | |
| | | 1.5% | 5.7% | 2.4% | |
| | Orthopedic Specialist | 28 | 0 | 28 | |
| | | 7.1% | 0.0% | 5.6% | |
| | Physical therapy consultant | 15 | 0 | 15 | |
| | | 3.8% | 0.0% | 3.0% | |
| | Physical therapy specialist | 246 | 18 | 264 | |
| | | 62.1% | 17.0% | 52.6% | |
| | Physical Therapy Student | 50 | 25 | 75 | |
| | | 12.6% | 23.6% | 14.9% | |
| ***Region*** | Northern Region | 68 | 18 | 86 | 0.001 |
| | | 17.2% | 17.0% | 17.1% | |
| | Southern Region | 126 | 36 | 162 | |
| | | 31.8% | 34.0% | 32.3% | |
| | Central Region | 116 | 25 | 141 | |

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| | | | | | |
|---|---|---|---|---|---|
| | | 29.3% | 23.6% | 28.1% | |
| | Eastern Region | 32 | 22 | 54 | |
| | | 8.1% | 20.8% | 10.8% | |
| | Western Region | 54 | 5 | 59 | |
| | | 13.6% | 4.7% | 11.8% | |

***P value was considered significant if ≤ 0.05.***

Table (7) shows that knowledge level of rehabilitation after ACL injury has statistically significant relation to gender (P value =0.001), age (P value=0.020), years of experience (P value=0.001), current position (P value=0.0001), and region (P value=0.001).

***Table (7): Relation between knowledge level of rehabilitation after ACL injury and sociodemographic characteristics.***

| ***Parameters*** | | ***Knowledge level*** | | ***Total (N=502)*** | ***P value**** |
|---|---|---|---|---|---|
| | | **High level of awareness** | **Moderate or low** | | |
| ***Gender*** | Female | 143 | 117 | 260 | 0.001 |
| | | 45.8% | 61.6% | 51.8% | |
| | Male | 169 | 73 | 242 | |
| | | 54.2% | 38.4% | 48.2% | |
| ***Age*** | 22 years or less | 74 | 64 | 138 | 0.020 |
| | | 23.7% | 33.7% | 27.5% | |
| | 23 years old | 45 | 34 | 79 | |
| | | 14.4% | 17.9% | 15.7% | |
| | 24 to 26 | 79 | 32 | 111 | |
| | | 25.3% | 16.8% | 22.1% | |
| | 27 years or more | 114 | 60 | 174 | |
| | | 36.5% | 31.6% | 34.7% | |
| ***Years of experience*** | less than 1 year | 79 | 78 | 157 | 0.001 |
| | | 25.3% | 41.1% | 31.3% | |
| | 1 to 5 years | 174 | 91 | 265 | |
| | | 55.8% | 47.9% | 52.8% | |
| | 5 to 9 years | 33 | 10 | 43 | |
| | | 10.6% | 5.3% | 8.6% | |
| | 10 years or more | 26 | 11 | 37 | |
| | | 8.3% | 5.8% | 7.4% | |
| ***Current Position*** | Doctor of Physical Therapy DPT | 45 | 23 | 68 | 0.0001 |
| | | 14.4% | 12.1% | 13.5% | |
| | Medical Student | 10 | 30 | 40 | |
| | | 3.2% | 15.8% | 8.0% | |
| | Orthopedic Resident | 0 | 12 | 12 | |
| | | 0.0% | 6.3% | 2.4% | |
| | Orthopedic Specialist | 22 | 6 | 28 | |
| | | 7.1% | 3.2% | 5.6% | |

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| | | | | | |
|---|---|---|---|---|---|
| | Physical therapy consultant | 10 | 5 | 15 | |
| | | 3.2% | 2.6% | 3.0% | |
| | Physical therapy specialist | 180 | 84 | 264 | |
| | | 57.7% | 44.2% | 52.6% | |
| | Physical Therapy Student | 45 | 30 | 75 | |
| | | 14.4% | 15.8% | 14.9% | |
| ***Region*** | Northern Region | 40 | 46 | 86 | 0.001 |
| | | 12.8% | 24.2% | 17.1% | |
| | Southern Region | 102 | 60 | 162 | |
| | | 32.7% | 31.6% | 32.3% | |
| | Central Region | 104 | 37 | 141 | |
| | | 33.3% | 19.5% | 28.1% | |
| | Eastern Region | 32 | 22 | 54 | |
| | | 10.3% | 11.6% | 10.8% | |
| | Western Region | 34 | 25 | 59 | |
| | | 10.9% | 13.2% | 11.8% | |

***P value was considered significant if ≤ 0.05.***

**Discussion:**

The anterior cruciate ligament (ACL) injury is among the most prevalent and severe knee injuries, particularly for athletes engaged in sports that require abrupt stops, directional changes, and pivoting movements [13]. This type of injury can lead to symptoms such as pain, swelling, instability, and challenges with walking or bearing weight on the affected limb [14]. ACL injuries can arise from various mechanisms, encompassing both high-energy and low-energy events. Low-energy injuries may involve contact mechanisms; however, non-contact injuries are more common, accounting for about 70% of ACL tears. The approach to treating ACL injuries is influenced by the patient's age and athletic activity level, which may lead to decisions for either non-operative or surgical interventions [15]. For young, active individuals, surgical reconstruction of the ACL (ACLR) is typically the recommended course of action to restore knee stability, especially for those intending to resume participation in pivoting sports. The incidence of ACL injuries in Saudi Arabia differs based on the population examined, with some studies reporting rates as high as 26.2% [16]. Recent findings indicate that the average wait time for ACLR in Saudi Arabia is approximately 6 months for 45.9% of patients (n = 39), while over 6 months is observed in 32.9% (n = 28) of cases [17]. Despite this data, the ideal timing for ACLR remains controversial, with no widespread agreement on the most appropriate timing for surgical intervention. Thus, we aimed in this study to assess physical therapists, medical students, and orthopedics practitioners in Saudi Arabia's amount of knowledge and awareness regarding rehabilitation techniques for ACL surgery.

In assessing the knowledge, awareness, and practices of physical therapists, medical students, and orthopedic practitioners in Saudi Arabia (KSA) regarding rehabilitation in anterior cruciate ligament (ACL) surgery, we have found that 75.5% of 502 participants were aware of current rehabilitation guidelines, and 71.3% acknowledged recommended pre-operative exercises. These numbers contrast sharply with the findings from a study conducted among Australian orthopedic surgeons, where only 11% regarded preoperative rehabilitation as critical for postoperative outcomes. This suggests a divergence in attitudes towards preoperative practices between the two populations, emphasizing the necessity for further investigation into the beliefs of orthopedic surgeons across various regions

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regarding the importance of preoperative rehabilitation [18]. Moreover, our results revealed a reasonably high understanding of rehabilitation practices, with 78.9% of participants demonstrating strong comprehension. However, despite the overall awareness, only 24.5% showed a high level of knowledge, and a noteworthy 41.4% remained unaware of established guidelines. In comparison, a survey targeting licensed physical therapists in Saudi Arabia [19] indicated that most therapists had been treating patients awaiting ACLR for more than two years and engaged in various preoperative interventions, including education and both closed and open kinetic chain exercises. Many recommended that patients undertake rehabilitation exercises 2 to 4 times weekly for up to 8 weeks pre-surgery. This report aligns with a systematic review on presurgery training protocols, reinforcing the practice among physical therapists of utilizing evidence-based approaches to optimize outcomes [20]. Additionally, our results revealed that factors influencing the length of preoperative rehabilitation included muscular strength, pain levels, range of motion, and swelling, which mirrors findings from other studies highlighting the importance of quadriceps strength in the early stages post-ACL injury. Particularly, it has been identified that early, effective preoperative rehabilitation can mitigate strength deficits [21]. Moreover, systematic reviews underscore that engaging in preoperative exercise regimens over 4 to 16 weeks can lead to significant improvements in quadriceps strength before ACLR, enhancing rehabilitation outcomes [22, 23]. These findings emphasize that while the awareness of rehabilitation practices is strong among our surveyed participants, further education and streamlined practice standards could enhance postoperative outcomes further, paralleling calls for stronger consensus on preoperative rehabilitation strategies in the broader body of literature on ACL injuries.

**Conclusion:**

In conclusion, there was a high overall awareness, with 75.5% were familiar with current guidelines and 71.3% recognizing recommended pre-operative exercises. While a majority demonstrated awareness of current guidelines and recommended exercises, only a small percentage attained a high level of knowledge, indicating a need for improved education and training in this field. Despite the recognition of preoperative rehabilitation's importance, discrepancies in practices and beliefs suggest that efforts must be made to standardize rehabilitation protocols and enhance practitioner education. By addressing these gaps, there is potential to improve patient outcomes significantly, reduce postoperative complications, and ultimately ensure that Saudi patients receive comprehensive care in their journey from ACL injury to recovery.

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**Ethical approval:**

An informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for research purposes only.

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**Conflict of interests:**

The authors declare no conflict of interest.

**Data and materials availability:**

All data associated with this study are present in the paper.

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