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Impact Of Nursing Rehabilitation Program On Outcome Of Patients Undergoing Arthroscopy For Anterior Cruciate Ligament Injury

Shimaa H.Mohammed[1], Zienab A. El-Lateef Mohamed[2], Hesham A. El-Kady[3]
[1] *(Assistant Lecturer of Adult Nursing, Faculty of Nursing / Asyut University, Egypt)*
[2] *(professor of Adult Nursing, Faculty of Nursing , Asyut University, Egypt)*
[3] *(professor of Orthopaedic, Faculty of Medicine, Asyut University, Egypt)*

Abstract : *An estimated 200,000 ACL- related injuries occur annually in the United States .*
The aims of this study : *are three folds; to assess knowledge and practice of patients, to evaluate the effect of applying a rehabilitation program on patients knowledge and practice, to assess the effect of the rehabilitation program on reducing patients complications.*
Patient and Methods*: Quasi experimental research design was utilized in this study .This study was conducted in arthroscopy and sports injuries unit at Asyut University Hospital. A convenient sample of 60 patients was included in this study.* ***Tools*** *utilized for data collection were:****(I)*** *Patient's health needs assessment sheet.****(I I)****Modified Cincinnati Rating System Questionnaire.****(III)*** *Assessment of patient's knowledge, practices .****(V)*** *represents the rehabilitation program .*
Results: *high a statistical significant difference between the study and the control group regarding their knowledge and practice , Cincinnati Rating System , mid thigh circumference with P value (0.001)*
Conclusion: *providing written rehabilitation program was much more effective on patients outcome than those patients in the control group who received residents' oral instructions.*
Recommandation: *A specialized nurse rehabilitator is to be full time attending the outpatient arthroscopy clinic.*
Keywords: *Anterior Cruciate Ligament surgery, Rehabilitation program, Patient outcomes .*

I. Introduction

The anterior cruciate ligament (ACL) is an important ligament for proper movement. ACL injury more commonly causes knee instability than does injury of other knee ligaments (free encyclopedia ; 2013).

An estimated 200,000 ACL- related injuries occur annually in the United States (Brophy , et al ; 2009). In the last year (from 1/1/2012– 1/1/2013) , approximately 247 cases admitted to the orthopedic department of Assiut University Hospital (Assiut University Hospital Record ; 2011-2012). Injuries of the ACL range from mild such as small tears to severe when the ligament is completely torn (Langran ; 2010).

An ACL tear can be diagnosed by a popping sound heard after impact, swelling after a couple of hours , severe pain when bending the knee , and when the knee buckles or locks during movement or gives way while standing still with weight on the affected knee (Sports injury clinic ; 2011) .

The pivot-shift test , anterior drawer test and the Lachman test are used during the clinical examination of suspected ACL injury. The ACL can also be visualized using a magnetic resonance imaging scan (Guillodo , et al ; 2008).

Treatment for ACL rupture may be conservative or surgical. Conservative management often includes physical therapy and using a knee brace . For patients who frequently participate in such sports , surgery is often indicated (Miller ; 2007) . There are three different types of ACL surgery (patellar tendon graft , hamstring reconstruction , patella tendon-bone) . Auto graft is the most common and preferred and tend to produce the best results (Biau et al ; 2009).

After surgery, the knee joint loses flexibility, and the muscles around the knee and in the thigh tend to atrophy, so rehabilitation is required in order to strengthen the surrounding muscles and stabilize the joint. All treatment options require extensive physical therapy to regain muscle strength around the knee and restore range of motion (ROM) (free encyclopedia ; 2013).

Acl Reconstruction Surgery Is Generally Safe. Complications That May Arise From Surgery Or During Rehabilitation And Recovery Include, Infection In The Knee This Can Be Superficial Or Deep, Haemarthrosis (Bleeding Into The Knee), Blood Clots (Deep Venous Thrombosis) , Stiffness In The Knee (Arthrofibrosis) Is Very Uncommon With Acl Reconstruction Surgery, Neurovascular Injury (Damage To Nerves And Blood Vessels) , Rupture Or Stretching Of The reconstructed ligament, causing recurrent instability, fixation device problems are rare , fracture through the bone tunnels, frontal knee pain and tunnel widening (Peter ; 2009).

Nurses play an important role in rehabilitation for patients who had ACL reconstruction surgery. Rehabilitation therapy will be needed , therapy will include the use of crutches and , possibly, a knee brace range-of-motion exercises to regain full knee motion , muscle-strengthening and stability exercises. The nurse gives instruction about weight bearing limit , exercise restrictions. Nurses' Initial aims are to reduce pain and swelling in knee , regain normal joint movement and strengthen the muscles around the knee and assess for signs of complications (Sharon , et al ; 2007).

The aims of the study:

- To assess knowledge and practice of patients undergoing arthroscopy for anterior cruciate ligament injury.
- To evaluate the effect of applying a rehabilitation program on knowledge and practice of patients undergoing arthroscopy for anterior cruciate ligament injury.
- To assess the effect of the rehabilitation program on reducing the complications of patients undergoing arthroscopy for anterior cruciate ligament injury.

Hypothesis:

- To fulfill the aim of the study the following research hypothesis were formulated:-
- The post mean knowledge and practice scores of patients who will be exposed to the rehabilitation program will be higher than their pre mean knowledge and practice scores.
- The arthroscopy anterior cruciate ligament complications will reduce after implementation of the rehabilitation program in the study group than those in the control group.

Significance of the Study:

The anterior cruciate ligament (ACL) is one of the most common ligaments to be injured. In the last year (from 1/1/2012– 1/1/2013), approximately 247 cases admitted to the orthopedic department of Assiut University Hospital (Assiut University Hospital Record, 2011-2012).Pre - and post-operative rehabilitation is a major factor in the success of ACL reconstruction as well as reducing the incidence of complication after surgery .

II. Patients And Methods

Research Design:

Quasi-experimental research design will be utilized in this study.

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Study Variables:

The independent variable in this study is Impact of nursing rehabilitation program while the dependent variables are: outcome of patients undergoing arthroscopy for anterior cruciate ligament injury

I. Technical Design:

Setting:

The study will be conducted at the orthopedic department of Assiut University Hospital.

Subjects:

The study will include a convenience sample of 60 adult patients (male and female) , Isolated ACL injurt undergoing arthroscopy anterior cruciate ligament from time of admission in the department (pre operatively), through a follow up period (five visits) through six months (two weeks, one month ,two months , four months, and six months post operatively). Their ages ranges from 18 to 50 years. This sample will be divided into two equal groups (30 patients for each).

The control group will receive the routine pre-discharge resident instructions and will be taken through a follow up period .

The study group with whom the rehabilitation program will be applied by the researcher and the effect will be evaluated, and they will receive the rehabilitation booklet before discharge.

Tools:

Tool (I): Patient's health needs assessment sheet: This tool consists of sociodemographic patient sheet which consisted of: patient's name, age, gender, level of education, occupation……etc.

Tool (II): Modified Cincinnati Rating System Questionnaire (Noyes FR, Barber SD, Mooar LA, 1989) to assess patient's physical status this scale includes 8 sections concerning knee assessment .

Tool (III): Assessment of patient's knowledge, practices This tool consist of three parts :

- Assessment of patient knowledge pre and post implementation of the rehabilitation program .

- Assessment of patient practice pre and post implementation of the rehabilitation program .
- Assessment of mid thigh circumferance pre and post implementation of the rehabilitation program .

Tool (V): Rehabilitation guidelines:

This tool will be based around the content of the best practice statement for arthroscopy anterior cruciate ligament (brief anatomical knee overview, post arthroscopy rehabilitation,…etc) for completion and application by the researcher.

Scoring system :

Scoring system of the Modified Cincinnati Rating System Questionnaire: (Noyes FR, Barber SD, and Mooar LA;1989)

Section 1-Pain intensity: consisted of 6 items
No pain, normal knee, performs 100%. (20)
Occasional pain with strenuous sports. (16)
Occasional pain with light recreational sports. (12)
Pain usually brought on by sports, light recreational activities. (8)
Pain is a significant problem with simple activity such as walking. (4)
Pain present all the time. Not relieved by rest. (zero)

Section 2-Swelling: consisted of 6 items
No swelling. (10)
Occasional swelling with strenuous sports. (8)
Occasional swelling with light recreational sports. (6)
Swelling limits sports and moderate work. (4)
Swelling brought on by simple walking activities. (2)
Severe problem all the time, with simple walking activities. (zero)

Section 3 - Giving Way: consisted of 6 items
No giving way. (20)
Occasional giving way with strenuous sports or heavy work. (16)
Occasional giving way with light sports or moderate work. (12)
Giving way limits sports and moderate work. (8)
Giving way with simple walking activities and light work. (4)
Severe problem with simple walking activities. (zero)

Section 4 - Overall activity level: consisted of 6 items
No limitation, normal knee, able to do even strenuous sports. (20)
Perform sports but at lower performance level. (16)
Light recreational activities possible with rare symptoms. (12)
No sports or recreational activities possible. (8)
Walking, ADL cause moderate symptoms, frequent limitations. (4)
Walking, ADL cause severe problems, persistent symptoms. (zero)

Section 5 – Walking: consisted of 5 items
Walking unlimited. (10)
Slight/mild problem. (8)
Moderate problem: smooth surface possible up to approx 800m. (6)
Severe problem, only 2-3 blocks possible. (4)
Severe problem; requires stick or crutches. (2)

Section 6 – Stairs: consisted of 5 items
Normal, unlimited. (10)
Slight/mild problem. (8)
Moderate problems only 10-15 steps possible. (6)
Severe problem; requires bannister support. (4)
Severe problem on 1-5 steps possible. (2)
Section 7 - Running activity: consisted of 5 items
Normal, unlimited; fully competitive, strenuous. (5)

Slight mild problem; run half speed. (4)
Moderate problem 2-4 km. (3)
Severe problem only 1-2 blocks possible. (2)
Severe problem only a few steps. (1)

Section 8 - Jumping or Twisting: consisted of 5 items
Normal, unlimited, fully competitive, strenuous. (5)
Slight to mild problem; some guarding. (4)
Moderate problem; gave up strenuous sports. (3)
Severe problem; affects all sports. (2)
Severe problem; only light activity possible. (1)

For knowledge assessment : the total scores of questionnaire 10 grades, one grade was given for the correct answer and zero for the incorrect answer.

For practice assessment : the total scores of questionnaire 5 grades, one grade was given for the correct answer and zero for the incorrect answer.

III. Operational Design

This study was conducted through:

- Tools development.
- Content validity was done by expertise, (medical staff) & (nursing staff) from the medical-surgical nursing field. Modifications were made accordingly, and then the tools were designed in their final format and tested for reliability using internal consistency for all of the tools which was measured using Cronbach test. The tools proved to be reliable (0.73.0.71 and 0.81, respectively).
- An official permission was obtained from the head of the orthopeadic department at Assiut University Hospital to conduct the study.

Ethical Consideration

- An informed consent was obtained from patients to participate in the study and the nature and purpose of the study were explained to them.
- The researchers initially introduced themselves to all optional subjects and they were assured that the collected data would be absolutely confidential.
- They were informed that participation is voluntary and that they could withdraw at any time of the study.
- Confidentiality of the patient's data was ascertained. Confidentiality and anonymity were assured.
- Patient’s names were coded for data entry so that their names could not be identified. Then, through this patient's interview.

Pilot Study

- A pilot study was conducted on 10% of sample (6 patients) in a selected setting to evaluate the applicability & clarity of the tools. According to this pilot study, the required modifications were made. Those patients who were involved in the pilot study were included in the study.
- Baseline data was obtained from the study and control group patients to fill in Tools: I , II and III (pre-test) At initial interview the researcher introduce herself to initiate line of communication, explain the nature & purpose of the designed nutritional regimen and fill out the patient assessment sheet (tool I) which contains; Personal and Medical Data Sheet.

Tool II: Modified Cincinnati Rating System Questionnaire (Noyes FR, Barber SD, Mooar LA, 1989) to assess patient’s physical status this scale includes 8 sections concerning knee assessment .

Tool (III): Assessment of patient's knowledge, practices This tool consist of three parts :
Assessment of patient knowledge pre and post implementation of the rehabilitation program .
Assessment of patient practice pre and post implementation of the rehabilitation program .
Assessment of mid thigh circumferance pre and post implementation of the rehabilitation program .

- Application of the Rehabilitation guidelines was explained by researchers for the patient (tool V) first prepared the training places, teaching aids and media (pictures, handouts and booklet). This was followed by arranging for the teaching schedule based on the contents of booklet, number of patients involved, time availability.

Teaching sessions:

- For the study group; after filling the patient's health needs assessment sheet , the researcher explains to the patient the rehabilitation program preoperatively in the following sequence:

The rehabilitation program were administered to the patient in five sessions, the duration of each session was about one hour, including 15 minutes for discussion and feedback .The researcher in the first session explain to the patient simple note on the anatomy of the knee, what are the ACL of the knee and there function, knee arthroscopy information , pre-surgery instructions , day surgery instructions and post surgery and follow up instructions. The second , third and fourth session was specified for the rehabilitation exercises which were demonstrated by the researcher to the patient . Each patient in the study group obtained a copy of the rehabilitation booklet.

Then the study subjects are met individually in the clinic for follow up of their knowledge and practice and for re-evaluating their condition.

- For the control group After the patient's discharge from the hospital , the researcher meets the patient for follow up in the arthroscopy outpatient clinic (during his/her first visit {2 weeks after the surgery}, one month , two months , four months and six months post knee arthroscopy) for re-evaluating the patient's condition .

Statistical Design:

Data entry was done using compatible personal computer by the researcher. All data was entered into statistical packages for the social sciences (SPSS) version 17.0 (Chicago, Illinois, USA) software for analysis and Excel for figures. The content of each tool was analysed, categorized and then coded by the researcher. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations for quantitative variables. Pearson's correlation analysis was used for assessment of the inter-relationships among quantitative variables. Using chi square to determine significance for non-paretic's variables. Statistical significance difference was considered when statistical significance was considered at p-value < 0.05.

Correlation Coefficient (r) analysis was used for assessment of the inter-relationships among quantitative variables. Using chi square to determine significance form non significance variables. Statistical significance difference was considered when statistical significance was considered at p-value < 0.05.

IV. Results

Table (1): Distribution of study sample as regards sociodemographic characteristics , medical diagnosis , involved knee , activity at injury , duration of injury , chronic diseases , and previous knee surgery .

	Study No = 30		**Control No = 30**	
	No.	**%**	**No.**	**%**
Age	27.7±8.1		28±7.4	
Gender				
Male	30	100.0	30	100.0
Female	-----	--------	------	----
Marital status				
Single	18	60.0	16	53.3
Married	12	40.0	14	46.7
Level of education				
High education	14	46.7	12	40.0
Secondary education	11	36.7	13	43.3
Read and write	3	10.0	1	3.3
Illiterate	2	6.7	4	13.3
Occupation				
Employee	11	36.7	13	43.3
Student	6	20.0	3	10.0
Farmer	------	-----	2	6.7
Office work	13	43.3	10	33.3
Machinery work	----	-----	1	3.3
Not work	------	----	1	3.3
Patient diagnosis				
Acl	18	60.0	19	63.3
Acl+meniscus	12	40.0	11	36.7
Involved Knee				
Right	20	66.7	17	56.7
Left	10	33.3	13	43.3
Activity at injury				
ADLs	3	10.0	4	13.3

Sports	20	66.7	22	73.3
Traffic	4	13.3	4	13.3
Work	3	10.0	----	-----
Duration of injury				
1-3 months	7	23.3	2	6.7
3-6 months	6	20.0	8	26.7
6-9 months	6	20.0	6	20.0
One year and more	11	36.7	14	46.7
Chronic diseases				
No	29	96.7	30	100.0
Hypertension	1	3.3	-----	-----
Kidney disease	----	-----	------	-----
Previous knee surgery				
Yes	2	6.7	3	10.0
No	28	93.3	27	90.0

This table shows that the mean age of study and control group was (27.7±8.1) and (28±7.4) respectively . All patient were male in both the study and the control groups, the highest group was single in both study and control group , as regard level of education; the most patients (46.7 %) in the study group were highly educated while most of patients were secondary educated in the control group (43.3 %). Looking at the occupation in study group the highest percentage were office work (43.3%) while in control group were employee(43.3 %). Highest percentage of patient diagnosis in both the study and control groups was anterior cruciate ligament injury representing (60 %) and (63,3 %) respectively . Regarding knee affected the majority of the studied sample were having right knee affection (66,7 %) while (56,7 %) in control group. As regards activity at injury; the highest percentage in both study group(66.7 %) and(73.3 %) in control group was related to sports. Look for duration of injury (36,7 %) in study group while (46,7 %) in control group having injury since one year and more . All of patient in control group not having any chronic disease . Finally (93.3 %) in study group while (90 %) in control group have not previous knee surgery .

Table(2) : Distribution of study sample on the modified Cincinnati knee rating scale pre, two weeks, one month , two months , four months and six months post arthroscopy for anterior cruciate ligament injury

1- Pain Intensity	**Study**	**Control**	**P. value**
Pre	10.8±1.9	10.2±1.7	0.197
Two weeks	8.3±2.7	4.8±3	<0.001**
One Month	12.5±4.4	7.3±4.3	<0.001**
Two Months	16.4±4.1	10.7±5.6	<0.001**
Four Months	18.6±2.4	16.1±3.4	0.002**
Six Months	19.1±2.2	18.4±2.3	0.208
2- Swelling	**Study**	**Control**	**P. value**
Pre	7.3±3.3	6.9±2.7	0.605
Two weeks	4.5±1.6	2.4±2.2	<0.001**
One Month	7.1±1.5	4.5±1.5	<0.001**
Two Months	8.1±3.2	5.7±3.9	0.011*
Four Months	9.3±2.5	7.9±1.5	0.012*
Six Months	10.3±1.9	9.5±1.9	0.105
3- Giving way	**Study**	**Control**	**P. value**
Pre	11.5±4.7	10.3±1.5	0.184
Two weeks	19.6±0.7	14.7±2.8	<0.001**
One Month	19.9±0.3	18.1±2.3	<0.001**
Two Months	19.9±0.3	18.5±1.4	<0.001**
Four Months	20±0	19.2±1.4	0.003**
Six Months	20±0	19.7±1	0.155
4- Overall activity level	**Study**	**Control**	**P. value**
Pre	6.9±4.1	7.4±1.8	0.568
Two weeks	5.7±2	3.3±2.4	<0.001**
One Month	8.3±2.6	5.5±2.9	<0.001**
Two Months	11.7±2.1	7.5±2.7	<0.001**
Four Months	17±2.3	14.3±3.6	0.001**
Six Months	19.7±1.8	19.1±1.5	0.227
5- Walking	**Study**	**Control**	**P. value**
Pre	5.6±1.4	5.2±1.3	0.219
Two weeks	3±1.1	2±0.7	<0.001**
One Month	3.5±1	2.4±1	<0.001**
Two Months	9.9±2.2	5.7±1.4	<0.001**
Four Months	10.3±1.8	9±1.9	0.008**
Six Months	10.3±1.8	9.9±2.6	0.452
6- Stairs	**Study**	**Control**	**P. value**

Pre	5.5±1.7	5.3±2.3	0.801
Two weeks	3.6±0.8	2.7±1	<0.001**
One Month	4.5±1	3.2±1.1	<0.001**
Two Months	9.9±0.5	5.9±1.9	<0.001**
Four Months	10±0	9.3±1.1	0.001**
Six Months	10±0	9.7±1.3	0.250
7- Running activity	**Study**	**Control**	**P. value**
Pre	3±0.8	2.6±0.9	0.109
Two weeks	1.9±0.3	1±0	<0.001**
One Month	2±0.2	1±0	<0.001**
Two Months	2.3±1.1	1.4±0.6	<0.001**
Four Months	3.3±1.3	2.6±1	0.016*
Six Months	5±0.2	4.8±0.5	0.146
8- Jumping or Twisting	**Study**	**Control**	**P. value**
Pre	3±0.7	2.7±1	0.182
Two weeks	2±0.2	1±0	<0.001**
One Month	2.2±0.8	1.4±0.8	<0.001**
Two Months	3.2±1.2	2.4±1	0.008**
Four Months	3.5±1.2	2.8±1.1	0.030*
Six Months	4.9±0.3	4.8±0.5	0.220

This table shows high a statistical significant difference between the study and the control group regarding pain intensity , swelling ,giving way , overall activity level , walking ,stairs ,running actiuvity,jumping or twisting two weeks, one month , two months and four months post arthroscopy for anterior cruciate ligament injury , no a statistical significant difference between the study and the control group pre arthroscopy and six months post arthroscopy .

Table(3) : Distribution of study sample regarding their knowledge pre, two weeks, one month , two months , four months and six months post arthroscopy for anterior cruciate ligament injury

Knowledge	**Study**	**Control**	**P. value**
pre op.	5.9±2.1	2.6±1.6	<0.001**
after 2 weeks	8.5±1.2	5±1.1	<0.001**
after one month	8.5±1.2	5±1.1	<0.001**
after 2 months	8.6±1.1	5.1±1.1	<0.001**
after 4 months	8.5±1	5.1±1.1	<0.001**
after 6 months	8.5±1	5.1±1	<0.001**

This table shows high a statistical significant difference between the study and the control group regarding their knowledge pre, two weeks, one month , two months , four months and six months post arthroscopy for anterior cruciate ligament injury.

Table(4): Distribution of study sample regarding their practice pre, two weeks, one month , two months , four months and six months post arthroscopy for anterior cruciate ligament injury

Practice	**Study**	**Control**	**P. value**
pre op.	4.4±0.5	1.4±0.9	<0.001**
after 2 weeks	4.4±0.6	3.4±0.8	<0.001**
after one month	4.5±0.6	3.4±0.6	<0.001**
after 2 months	4.5±0.6	3.2±0.6	<0.001**
after 4 months	4.4±0.6	3.3±0.6	<0.001**
after 6 months	4.4±0.6	3.3±0.7	<0.001**

This table shows high a statistical significant difference between the study and the control group regarding their practice pre, two weeks, one month , two months , four months and six months post arthroscopy for anterior cruciate ligament injury.

Table (5): Distribution of study sample regarding their mid thigh circumference pre, two weeks, one month , two months , four months and six months post arthroscopy for anterior cruciate ligament injury

Mid thigh circumference	**Study**	**Control**	**P. value**
Right mid thigh circumference			
pre op.	46.7±4.4	54.2±5.8	<0.001**
after 2 weeks	46.5±4.1	53.7±5.6	<0.001**
after one month	46±4.2	52.8±5.7	<0.001**
after 2 months	45.7±4.3	52.1±5.5	<0.001**
after 4 months	45.6±4.4	52.2±5.3	<0.001**
after 6 months	45.6±4.4	52.2±5.5	<0.001**
left mid thigh circumference			

pre op.	45.7±4.5	53.6±6.7	<0.001**
after 2 weeks	45.6±4.4	53.7±5.9	<0.001**
after one month	45.1±4.6	52.6±6.3	<0.001**
after 2 months	44.9±4.7	51.3±5.7	<0.001**
after 4 months	44.9±4.7	51.9±5.9	<0.001**
after 6 months	44.8±4.7	51.8±5.8	<0.001**

This table shows high a statistical significant difference between the study and the control group regarding their mid thigh circumference pre, two weeks, one month , two months , four months and six months post arthroscopy for anterior cruciate ligament injury .

V. Discussion

The aims of the present study are three folds; to assess knowledge and practice of patients undergoing arthroscopy for anterior cruciate ligament injury, to evaluate the effect of applying rehabilitation program on knowledge and practice of patients undergoing arthroscopy for anterior cruciate ligament injury, to assess the effect of the rehabilitation program on reducing the complications of patients undergoing arthroscopy for anterior cruciate ligament injury.

Reconstructions of the anterior cruciate ligament (ACL) are the most frequently performed procedures in knee surgery nowadays. Anterior cruciate ligament injury is a common injury in active people, and one of the most common knee injuries in sports. It is estimated that the annual incidence of ACL injury is about 1 in 3,000 amongst the general population in the USA. That means more than 150,000 new ACL ruptures annually **Nikolaos et al , (11**) .

The present study included 60 patients, their mean age was (28.2) years. All patients were male, the majority of the patients were highly educated (86%), employee (80 %) , the main diagnosis of patients were ACL , had right knee injury , injury related to sports , the majority of patients having injury since one year and more, the majority of patients have no chronic disease and no previous knee surgery .

As regard age in present study mean age was (28.2) years. The result of study agree with The **University of California , (12)** which found that ACL injury is most prevalent in patients 15- 45 years of age. It is more common in this age group because of their more active lifestyle as well as higher participation in sports. Also **Salem et al , (13)** reveal that the highest percentage of patients (60%) were in the age group of 19 to 30 years old with a mean of (30.20) . **Hussien , (14)** found that the majority of patients (80 %) were in the age group of 25 to 30 years old with a mean of (28.20) . The result of study disagree with Collins , et al (2013) found that the a mean age of patients was 47 years . **Pizzari etal , (15)** found that The age of participants ranged from 16 to 52 years, with a mean of (28.8 ± 8.3) years . Britton etal found that the participants had a mean age of 26.92 . **Janssen et al , (16)** in their survey study entitled as "High incidence and costs for anterior cruciate ligament reconstructions performed in Australia" at University of Sydney done on 50 187 patients for ACL reconstruction, reported that The ACL reconstruction incidence rose rapidly through early adulthood and then gradually declined. Males had a higher incidence than females in all age groups.

As regard sex in present study all patients were male . This result agree with the study of **Salem et al , (13)** ; who found higher representation of male subjects than females. This result is in agreement with **Wright et al , (17)** , emphasized that men are five times more likely to sustain an anterior cruciate ligament injury than women. A possible explanation that might account for this finding is the fact that ACL injury is thought to be due to their high level of activity in men than woman. In the same line **Richard et al , (18)** found that men were more likely to sustain A CL injury in their study. The present study is in agree with the finding of study by **Janssen et al , (16)** in their survey study entitled that males had a higher incidence than females in all age groups. **Pizzari etal , (15)** found that participants included in the study were 68 patients (42 men, 26 women). **Britton etal** , (**22)** found that the participants (28 female patients and 67 male patients) had a mean age of 26.92.

This study is in disagree with **Agel et al , (19)** who reported higher rates of injury among females athletes. **Chappell et al , (200** claimed simply that female athletes have a higher risk of ACL injuries than male athletes.

In present study the majority of patients were single . this result agree with **Pizzari etal , (15)** found that the most participants were not married . This result disagree with the study of **Salem et al , (13)** shows that, more than half of patients were married . **Hussien , (14)** found that the majority of patients were married .

As regard level of education the majority of the patients were highly educated (86%) . This result disagree with the study of **Salem et al , (13)** shows that more than half of patients were Read and write. **Hussien , (14)** found that the majority of patients were secondary educated .

The present study show that the most patient were employee (80 %) . in the same line **Hussien , (14)** found that the majority of patients were employee . **Pizzari etal , (15)** found that Participants were about

equally likely to have a manual (53%) or sedentary occupation (47%) . This result disagree with the study of **Salem et al , (13)** shows that, the majority of patients were Farmer/Manual Work.

As regard cause of injury the present study showed that sports was the main cause of injury . **Jonathan Cluett , (21)** revealed that an ACL tear is most often a sports-related injury. **Langran , (4)** also state that High-risk sports increase incidence of ACL injury as in the college football players when compared to the general population . **Pizzari etal , (15)** found that Most participants were involved in competitive sport before injury (63%) , and had ACL injury while participating in sport (97%).in the same line **Britton et al , (22)** shows that the majority of participants indicated that they sustained their ACL injury while participating in sport . **Sonnery- Cottet, et al , (23)** ; was disagree with the present study and concluded that non-sport related injuries and Motor vehicle accidents are the most common cause of ACL tear. This result disagree with the study of **Salem et al , (13)** shows that the highest percentage of both study and control groups (50%, 46.7% respectively) were non sporting . Regarding the affected knee the study results denoted that, the right knee was most affected in both study and control groups. In this respect, **Gillie , (24)** emphasized that, ACL Injuries were highly frequent in the right knee than the left knee . **Salem et al , (13)** shows that the right knee was most affected in both study and control groups (66.7%, 60% respectively) .As regard duration of injury the majority of patients having injury since one year and more . **Hussien , (14)** found that the majority of patients having injury since more than nine months . **Collins et al , (25)** reveal that Eighty-six percent of patients undergoing reconstruction did so within 6 months of injury diagnosis, while 94% underwent reconstruction within 1 year. **Pizzari etal , (15)** found that the majority of patients having injury within 12 months . **Risberg and Inger , (26)** found that the mean time from injury to surgery was 46.4 weeks .

In present study the majority of patient diagnosed ACL injury . **Arendt , (27)** shows that approximately 50 percent of ACL injuries occur in combination with damage to the meniscus, articular cartilage, or other ligaments. This study shows that the most of patients have no chronic disease and no previous knee surgery . **Salem et al , (13)** shows that highly prevalence of patients have no chronic disease . **Hussein , (14)** found that the majority of patients have no chronic disease and no previous knee surgery . The results of the present study revealed that there was a high statistical significant difference between the study and control group regarding total scores of the Cincinnati knee rating scale collectively in the follow up periods.

In the same line **Pizzari et al , (15)** suggest that the introduction of an accelerated approach to ACL rehabilitation promoting earlier weight bearing and movement and faster progression through rehabilitation . **Cooper et al , (28)** found that patient used strengthening program in the early phases of rehabilitation after anterior cruciate ligament improved in scores of the Cincinnati knee rating system for swelling , walking . **Risberg and Inger , (26)** found that there were significantly improved knee function and reduced pain during activity for the patient perform neuromuscular exercise program . **Risberg etal , (29)** found that Cincinnati Knee Scores were improved in patient share in neuromuscular training program at the 6-month follow up after ACL reconstruction surgery .

The result of the present study reveal that there was asignificant statistical difference between the control and study group regarding their knowledge pre ,two week ,one month ,two months , four months and six months . **Louis , (30)** mentioned that patient teaching is important because the patient has the right to know and to be informed about diagnosis, prognosis of illness, treatment options, risks associated with treatments.

And assigned patient teaching to the professional nurse and rationalized the advantages of a well-designed comprehensive teaching plan that fit patients' unique learning needs that it reduces health care costs and improve the quality of care. As patient teaching help patients make informed decisions about their health care and to become healthier and more independent. Quadriceps weakness and impaired neuromuscular control of the lower extremity are the main functional impairments in those who have undergone anterior cruciate ligament (ACL) reconstruction **Williams et al , (31)**

The result of present shows that significance difference between study and control group regarding mid thigh circumference pre ,two week ,one month ,two months , four months and six months . In regards Quadriceps weakness, **Rittweger et al , (32).** in their study which entitled" Persisting side-to-side differences in muscle strength and tendon stiffness after anterior cruciate ligament reconstruction. ", done on 100 patients at Institute for Biomedical Research into Human Movement and Health, Manchester Metropolitan University, Manchester, UK. emphasized that there were a significant side-to-side differences in quadriceps muscle strength between the study and control group .

VI. Conclusion And Recommendations

Conclusion:

Based on the results of the present study, it can be concluded that; providing written guidelines for patients was much more effective on the outcome of patients who have undergone arthroscopy for anterior cruciate ligament injury than those patients in the control group who received resident's oral instructions.

Recommendation:

From the results of the present study it can be recommended that:

- Permanent attendance of a rehabilitator nurse in the orthopedic department is of great importance to instruct and apply the rehabilitation of the patients.
- A specialized nurse rehabilitator is to be full time attending the outpatient arthroscopy clinic to remind the patients of the rehabilitation instructions needed is also recommended.
- Providing a written rehabilitation booklet is of great value in reminding patients of the rehabilitation guidelines

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