

Effect of Nursing Teaching Program on Knowledge and Practice of Patients with Anterior Cruciate Ligament Reconstruction Surgery

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Abstract

The anterior cruciate ligament (ACL) is important ligaments of the knee. **The Aim of the study** is to assess knowledge and practice of patients undergoing arthroscopy for anterior cruciate ligament injury, to evaluate the effect of applying nursing teaching program on knowledge and practice of patients undergoing arthroscopy for anterior cruciate ligament injury. Quasi experimental research design was utilized in this study. **First tool** interview questionnaire schedule consists of biosocial characteristics of patients, **second tool** to assess patients knowledge and practice. **Results** concluded that high statistical significant difference between the study and the control group regarding their knowledge and practice with P value (0.001). **Conclusion**: it can be concluded that, patients' knowledge and practice regarding ACL surgery for orthopaedic patient of Assiut University Hospitals are improved after teaching program. **Recommendation**: providing written guidelines for patients was much more effective than those patients in the control group who received resident's oral instructions.

Keywords: Anterior Cruciate Ligament, Teaching Program & Patient Outcomes.

Introduction

Anterior Cruciate Ligament (ACL) is one of the most important structures in the knee. It travels from the anterior (front) of the tibia to the posterior (back) of the femur and it prevents the tibia moving forward (Arnheim et al., 2011).

The anterior cruciate ligament (ACL) is one of the most commonly injured ligaments of the knee. An estimated 200,000 ACL-related injuries occur annually in the United States. The majority of this type of injury occurs in people aged 15 to 45 old. The incidence of ACL injury is higher in people who participate in high-risk sports such as basketball, football, skiing, and soccer. A higher prevalence of injury is observed in athletic females over males, at a rate 2.4-9.7 times greater for females (Pittman, 2013). In the last year (from 1/2012-1/2013), approximately 247 patient admitted to the orthopedic department of Assiut University Hospital (Assiut University Hospital Record, 2011-2012).

The ACL may tear when certain movements of the knee place a great strain on the ACL. These movements are extreme hyperextension of the knee. Sometimes, during athletic jumps and landings, the knee straightens out more than 10 degrees beyond its normal fully straightened position and extends beyond its normal range of motion, causing an ACL tear (Guy Slowik, 2011).

A sudden stop, twist, pivots or changes in direction at the knee joint another cause of ACL injury. Motor vehicle accidents and repeated trauma in which the

knee is forced under the dashboard may also cause rupture of the ACL (Honkamp et al., 2010).

Based on a study performed football, baseball, soccer, skiing, and basketball account for up to 78% of sports-related injuries. High-risk sports increase Incidence of ACL injury as in the college football players when compared to the general population (Langran, 2010).

Pain is very common with ACL injury. Pain is usually rated as moderate to severe, 5-9 on a 10 point scale. (Friedberg, 2012). One of the most common symptoms of a torn ACL is feeling or hearing a pop during the initial injury. Decreased range of motion most commonly occur. Patient will have trouble bending the knee, often unable to bend to 90 degrees. It may also be difficult to completely straighten it out. Patient may have episodes where knee feels like it gives out, or buckles (William et al., 2011).

ACL injury can be reduced anywhere from 20% to 80% by engaging in regular neuromuscular training that is designed to enhance balance, proper movement patterns and muscle strength. Training programs that have been shown to be effective in helping to reduce the risk of ACL injuries typically include strengthening and stability exercises, aerobic conditioning, polymetric exercises, jump training and risk-awareness training. Exercises that improve balance also can help when done in conjunction with other training exercises (Myer et al., 2013).

Management of patient with ACL injury includes medical and surgical management. Medical treatment includes physical therapy ,using a knee brace and medication. Medication for ACL injuries in the acute stage mainly consists of nonsteroidal anti-inflammatory drugs (NSAIDs) and opioid analgesics (Amy , 2011).

The most common method for repairing ACL injuries is arthroscopic surgery. The risks and possible complications include stiffness of the knee, persistent pain over the front of the knee, persistent swelling of the knee, deep venous thrombosis (DVT), infection of the knee and failure of the graft (American Orthopedic Society for Sports Medicine , 2010).

Aim of the study

The Aim of the study is to assess knowledge and practice of patients undergoing arthroscopy for anterior cruciate ligament injury , to evaluate the effect of applying nursing teaching program on knowledge and practice of patients undergoing arthroscopy arthroscopy for anterior cruciate ligament injury.

Subjects & Methods

Research design

Quasi experimental research design.

Research question : What is the Effect of Nursing Teaching Program on Knowledge And Practice of Patients With Anterior Cruciate Ligament Reconstruction Surgery ?

Research hypothesis

- The post mean knowledge scores of patients who will be attending the teaching program will be higher than mean knowledge scores of control group.
- The post mean practice scores of patients who will be attending the teaching program will be higher than mean practice scores of control group.

Setting

The study will be conducted in the unit of Arthroscopy and sport injuries in Assiut University Hospital.

Subjects

The study will include a convenience sample of 60 adult patients (male and female) by using Epi – Info equation , 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. and who are willing to participate in this study.

Note : sample size :from pilot study of 10 patient from study group and 10 patient from control group the mean knowledge of study group was 4.9 ± 2.1 mean knowledge of control group was 3.4 ± 1.6 , Difference of means=1.5 ,power of study = 80 % , alpha (significance level) = 0.05

Minimal required sample size of study group (25), control group (25) .

Study 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 (2): Assessment of patient's knowledge, practices :

- This tool consist of three parts :
- assessment of patient knowledge pre and post implementation of the teaching program .
 - assessment of patient practice pre and post implementation of the teaching program .
 - assessment of mid thigh circumference pre and post implementation of the teaching program .
 - 4-teaching program will be based around the content of the best practice statement for arthroscopy anterior cruciate ligament (brief anatomical knee overview, post arthroscopy instruction,...etc) for completion and application by the researcher.

Scoring system

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.

Methods

Technique for data collection

- Data were collected at the orthopaedic surgery department and the outpatient arthroscopy clinic at Assiut University hospital during the period from November 2014 to November 2015.
- The study tools and teaching program were formulated after review of literature.
- The content validity of tools and teaching program was done by 5 expertise in the medical surgical nursing field and orthopedic field.
- Reliability of tools by using croubach Alpha .
- An official permission was obtained from the head of orthopedic department, and the head of the arthroscopic knee surgery unit.
- Patient's agreement for voluntary participation was obtained after the purpose and nature of the study were explained.
- Data was assured confidentiality of data and anonymity of patients and were collected using the pre-mentioned study tools.

- A pilot study was conducted on 10% (6) of patients to examine the feasibility of the study and clarity of the tools.
- After diagnosing the patient as having ACL tear and he / she is admitted to the orthopaedic department.
- The researcher meet with each patient individually, the study and its aims are explained to the patient.
- After taking the patient oral agreement for voluntary participation in the study, the researcher then fills the patient's health needs assessment sheet.
- 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 knowledge and practice , this is for the control group subjects.
- For the study group; after filling the patient's health needs assessment sheet, the researcher explains to the patient the teaching program preoperatively in the following sequence:
 - The teaching 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 practice which were demonstrated by the researcher to the patient . Each patient in the study group obtained a copy of the teaching booklet.
 - The effect of implementing the teaching program on patient's knowledge and practice was evaluated.

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

Table (2): Effect of teaching program on mean knowledge score at pre, post arthroscopy for anterior cruciate ligament injury at different phases two weeks, one month , two months , four months and six months for both group .

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**

Table (3): Effect of teaching program on mean practice pre, post arthroscopy of ACL at different phases two weeks, one month , two months , four months and six months for both group .

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**

Table (4): Effect of teaching program on mid thigh circumference pre, post arthroscopy of ACL at two weeks, one month , two months , four months and six months for both group .

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**

Table(1): 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): 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 (3): 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 (4) 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 .

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 teaching program on knowledge and practice of patients undergoing arthroscopy for anterior cruciate ligament injury, to assess the effect of the teaching 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., 2014) .

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, employee, 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. The result of study agree with The **University of California, (2015)** 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., (2012)**. reveal that the highest percentage of patients were in the age group of 19 to 30 years old. **Hussien, (2013)**. found that the majority of patients

were in the age group of 25 to 30 years old. The result of study disagree with **Collins et al., (2013)** found that the a mean age of patients was 47 years . **Pizzari et al., (2005)** found that The age of participants ranged from 16 to 52 years . **Britton et al., (2000)** found that the participants had a mean age of 26.92 . **Janssen et al., (2010)** 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., 2012**) who found higher representation of male subjects than females. This result is in agreement with (**Wright et al., 2008**) 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., 2009**) 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., 2010**) in their survey study entitled that males had a higher incidence than females in all age groups. (**Pizzari et al., 2005**) found that participants included in the study were 68 patients (42 men, 26 women). **Britton et al., (2000)** 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., 2005**) who reported higher rates of injury among females athletes. (**Chappell et al., 2005**) 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 et al., 2005**) found that the most participants were not married . This result disagree with the study of (**Salem et al., 2012**) shows that, more than half of patients were married . **Hussien, (2013)** 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., 2012**) shows that more than half of patients were Read and write. **Hussien, (2013)** found that the majority of patients were secondary educated .

The present study show that the most patient were employee. in the same line **Hussien, (2013)** found that the majority of patients were employee . (**Pizzari et al., 2005**). found that Participants were about

equally likely to have a manual or sedentary occupation. This result disagree with the study of (Salem et al., 2012) 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, (2011) revealed that an ACL tear is most often a sports-related injury. Langran, (2010). also state that High-risk sports increase incidence of ACL injury as in the college football players when compared to the general population . Pizzari et al., (2005) found that Most participants were involved in competitive sport before injury, and had ACL injury while participating in sport . In the same line (Britton et al., 2000) shows that the majority of participants indicated that they sustained their ACL injury while participating in sport . (Sonnerly- Cottet, et al., 2011) 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., 2012) shows that the highest percentage of both study and control groups 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, (2011). emphasized that, ACL Injuries were highly frequent in the right knee than the left knee . (Salem et al., 2012). shows that the right knee was most affected in both study and control groups .

As regard duration of injury the majority of patients having injury since one year and more . Hussien , (2013). found that the majority of patients having injury since more than nine months . (Collins et al., 2013) 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 et al., 2005) found that the majority of patients having injury within 12 months . Risberg & Inger Holm , (2009) found that the mean time from injury to surgery was 46.4 weeks .

In present study the majority of patient diagnosed ACL injury. Arendt, (2009) 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., 2012) shows that highly prevalence of patients have no chronic disease . Hussein, (2013) found that the majority of patients have no chronic disease and no previous knee 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 , (2007) 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., (2001).

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., (2011). 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

Conclusion

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

Recommendations

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

- A specialized nurse is to be full time attending the outpatient arthroscopy clinic to remind the patients of the instructions needed is also recommended.
- Providing a written teaching booklet is of great value .

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