

DETERMINANTS OF QUALITY OF LIFE RELATED TO ACL RECONSTRUCTION: MALES OF ONE REHABILITATION CENTER

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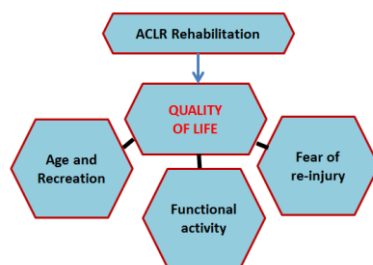
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Graphical abstract



Abstract

Anterior cruciate ligament injury is extremely common in athletics and recreational sport. The emphasis of physiotherapy rehabilitation in post-ACL reconstruction is to enhance quality of life. The purpose of the study was to identify determinants of quality of life after ACL reconstruction rehabilitation. Sixty male patients who undergone 12 to 16 weeks of rehabilitation completed the background data, ACL quality of life (ACL-QOL), Lysholm, International Knee Documentation Committee (IKDC), Knee Injury and Osteoarthritis Outcome Score (KOOS) and Tanpa Scale Kinesiophobia (TSK). Multiple linear regression showed that KOOS-pain and KOOS-sport/recreation explained 59.5% of the variation in quality of life. Thus, pain and recreation were the determinants of quality of life. This finding is useful in identifying potential factors that enhance quality of life in ACL reconstruction rehabilitation.

Keywords: Anterior cruciate ligament, quality of life, determinants

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1.0 INTRODUCTION

Anterior cruciate ligament (ACL) injuries occur frequently and this presents an epidemiological problem worldwide [1]. It is most common among individuals who engage in athletics and recreational activities [2]. The injuries require surgical reconstructions [3]. This is the standard management for ACL injury [4]. The reconstruction has generated interest and expectancy in restoring function [5]. The successful implementation of ACL reconstruction helps in repair of the ligament and provides a stable knee which allows the return to pre-injury activities [6].

The surgical procedures on ACL have been associated with successful long-term results in the majority of patients [7]. The reconstruction is followed by rehabilitation program to gain recovery with the ability to perform the functional activities within the

appropriate period of post-ACL reconstruction rehabilitation. Consequently, the ultimate goal of ACL reconstruction rehabilitation is to restore the quality of life [8]. The investigation on of quality of life is vital in the evaluation of surgical outcome. This specifies that the assessment of fear of re-injury [9], symptoms, performance limitations and activity restrictions are important to the patients [10]. With this reason, when evaluating health care outcomes, it is important to consider patients' quality of life. This is a challenging task because people with ACL reconstruction can be affected by different domains of quality of life. These include symptoms, their lifestyle, recreational activities, and participation in sports. The health-related quality of life supports disease-specific outcome of treatment and it is also a measure for cost-effectiveness [11]. For example, patients with ACL injury are still unsatisfied with functional outcome [12], despite having good strength,

knee stability and range of motion (9). Severe pain leads to a stronger effect of fear of movement on decreased muscle activity level (13). After injury, psychosocial factors emerged are potentially modifiable in the initial stage after ACL reconstruction (14). Currently, there is a rapid growing of literature on

quality of life in chronic diseases such as diabetes and asthma but studies on factors affecting quality of life of patients in post-ACL reconstruction are still limited. Consequently, it is crucial to conduct a research to identify determinants of quality of life after ACL reconstruction.

Table 1 Determinants of quality of life involving functional performance, fear of re-injury and patients' background

	Tolerance	VIF	B	SE B	β
Constant			20.953	33.787	
Lysholm	.567	1.763	.109	.186	.071
IKDC ^a	.340	2.938	-.030	.186	-.025
KOOS ^b -symptom	.747	1.338	-.069	.228	-.032
KOOS-pain	.203	4.934	.387	.211	.373*
KOOS-ADL	.266	3.753	.013	.248	.009
KOOS-sport/recreation	.428	2.338	.197	.113	.246*
KOOS-QOL ^c	.428	2.335	.141	.109	.181
TSK ^d	.642	1.559	-.092	.183	-.058
Age	.663	1.508	-.102	.545	-.021
Frequency of recreation:					
Seldom	.301	3.321	2.228	5.251	.071
Sometimes	.350	2.861	.691	4.424	.024

^aIKDC: International Knee Documentation Committee.

^bKOOS: Knee injury and Osteoarthritis Outcome Score.

^cQOL: Quality of Life.

^dTSK: Tanpa Scale Kinesiophobia.

* $p < .05$

2.0 METHOD

Participants were all males who were active in recreational sports and they were recruited by convenient sampling. Based on an estimated sample of 42 participants could provide 80% power with a risk of type 1 error of 0.05, the minimum average sample size calculated was 45. However, to proceed with this study, 60 patients were taken. All had ACL reconstruction and rehabilitation done at a private hospital in Kuala Lumpur. An orthopedic surgeon performed ACL reconstructions by using hamstring grafts. Participants completed 12 to 16 weeks of physiotherapy rehabilitation program in the same hospital. In identifying the normality, Q-Q plots were inspected together with the values of skewness, kurtosis and their significance based on z-scores calculation (15). According to Field, at the 5%

significance level, an absolute value greater than 1.96 is significant, indicating a non-normal distribution. All z-scores for skewness and kurtosis were less than the threshold of 1.96, hence indicating that all variables came from normal distribution. Age, frequency of recreation, Lysholm, subjective IKDC, KOOS and TSK were studied and analysed by multiple linear regression using the enter method.

3.0 RESULTS AND DISCUSSION

3.1 Background Characteristics of Participants

The mean and standard deviation (\pm SD) of age was 29.33 ± 2.874 years. The youngest was 26 while the oldest was 40 years old. More than half of had graduated with diploma ($n = 33$) and quite a number

completed their degree ($n = 24$). Three were from high school. Forty-nine participants worked in private agencies, 10 were government employees and one was self-employed. The medical coverage was mostly done by personal insurance ($n = 56$). Thirty seven participants claimed that the frequency of recreational sport performance was sometimes and only 13 participants often participated in this sport.

3.2 Predictors of Quality of Life

All tolerance values were more than 10, which indicates multicollinearity assumption is not violated. This is also supported by the VIF values of less than 10. Based on the diagnostic checking, all regression assumptions have been satisfied (Table 1).

The results of regression analysis showed that the model was significant [$F(11, 48) = 27.5, p < .001$] with the predictors explaining 59.5% of the variation in quality of life. Table 1 shows that among 11 predictors entered into the model, only two predictors made statistically significant contributions. These were KOOS-pain and KOOS-sport/recreation. Both predictors had positive relationship with quality of life. In terms of importance, KOOS-pain made the largest unique contribution to quality of life.

A systematic review on health-related QOL after ACL reconstruction of patients with age range between 5 to 16 years reported that KOOS-QOL sub-scores correlated strongly with KOOS-sport/recreation and KOOS-pain sub-scores (16). The decision on return to the previous level of physical activity among young, active people with ACL injury is often to done early in the rehabilitation process. Consequently, they have good health-related quality of life after ACL reconstruction (17). Coping with ACL injury without undergoing ACL reconstruction is a treatment strategy that is more accepted in older than younger patients. Modifying the activity level, by avoiding sports and recreational activities with high demands on the knee is another treatment approach for more elderly patients (18).

Previous study was done to correlate SF-36 with IKDC and, there was a significant correlation between SF-36 physical function and role, and pain dimensions with the IKDC score (19). Significant knee pain is prevalent after ACL reconstruction; with those who undergo subsequent ipsilateral surgery at greatest risk (20). However, these findings were applicable at 2 to 6 years after reconstruction (19).

The evidence on knee function in relation to quality of life is useful for physiotherapists and other related health care professionals so that they can detect the appropriate elements that enable patients to return to their previous activity level after an ACL reconstruction (21). Psychologically, lower knee-related quality of life was correlated to high fear of re-injury. Patients who did not return to pre-injury activity levels had greater fear of re-injury (22, 23). However, the finding on predictors of quality of life in ACL reconstruction showed unexpected result where functional performance, fear of re-injury and background were

not predictors to anticipate the patient's subsequent quality of life.

4.0 CONCLUSION

The investigation on the identification of predictors of quality of life after ACL reconstruction rehabilitation involved 11 factors. From the linear multiple regressions, only KOOS-pain and KOOS-sport/recreation were statistically significant predictors. Both had positive relationship with quality of life. The KOOS-pain made the largest unique contribution. The predictors explained 59.5% of the variation in quality of life.

The information on the determinants of quality of life of patients attending ACL reconstruction rehabilitation is important to physiotherapists because these can be the indicators related to the improvement of patients' quality of life. With this notion, a screening tool needs to be developed based on the predictors in the study to identify the potential factors to enhance quality of life after ACL reconstruction. Hence, by developing such a tool, it can be used by physiotherapists as a physiotherapy document for identify important factors that enhance quality of life of the community involving patients treated for ACL reconstruction and rehabilitation. Therefore, despite the insignificant findings for the other nine predictors, it is critical not to exclude them as being unrelated to quality of life without examining these variables in further research by using bigger sample size.

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