

## Association Between Pain Intensity and Health Related Quality of Life Among Patient with Total Knee Arthroplasty

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### Abstract

**Background:** Total Knee Arthroplasty is a highly effective operation for reducing pain and impairment caused by advancing osteoarthritis of the knee. Total knee arthroplasty results are routinely measured using quality of life tools.

**Objective:** The objective of this study was to determine the association of intensity of patient quality of life in relation to pain and health with total knee arthroplasty.

**Material and Method:** A cross-sectional analysis was carried out. among 159 patients of total knee arthroplasty. Data was collected from patients of total knee arthroplasty in the physiotherapy department of PSRD, Mayo hospital and Ghurki Trust teaching center through a standardized Questionnaire (Pain by Visual Analogue Scale and QOL by Worldwide Organization for Health quality of life questionnaire). Data entered to SPSS for statistical Analysis. Chi Square test was performed to check the Association between Pain Intensity, Health Related Quality of Life among patients with total knee arthroplasty.

**Results:** Among 159 participants with total knee arthroplasty, 14(8.8%) were with no-pain, 41(25.8%) were with mild pain, 62(39.0%) were with moderate pain and 42(26.4%) were with worst pain. Quality of life was severely affected among 9(5.7%), effected among 96(60.4%) and normal among 54(34.0%). There was significant association between pain and overall quality of life, as well as physical, psychological, social, and environmental factors, As the P value was 0.045, 0.017, 0.032, 0.032 and 0.017 respectively, which was <0.05 which means that there was significant association between Pain and overall Quality of Life.

**Conclusion:** There was significant association between pain and quality of life including physical, psychological, social relations and environmental quality of life, as quality of life was affected among patients with moderate and worst pain.

**Keywords:** Pain, Quality of Life, Total Knee Arthroplasty.

## Introduction

TKA is a highly effective operation for reducing pain and impairment caused by osteoarthritis (OA) of the knee in its last stages. Total knee arthroplasty results are routinely measured using quality of life tools (TKA). However, evidence suggests that post-TKA symptom severity reductions may not be the primary predictors of post-TKA quality of life. The major goal of this study was to see if catastrophic thinking had any predictive value in quality of life in relation to health , evaluations in patients with severe OA after TKA. .(Gemayel and Varacallo, 2021)

Although TKA is a relatively frequent and normal treatment, it is important to pay close attention to every aspect to guarantee a well-balanced and functioning TKA is conducted to prevent the hazards of implanting components that would otherwise be vulnerable to increased wear and early failure..(Gemayel and Varacallo, 2021)

One of the most popular therapies for persons with severe knee osteoarthritis (OA) is total knee arthroplasty (TKA) . In clinical practice, the accuracy of outcome metrics and quantitative evaluations for perioperative TKA is a major concern. TUG tests have been proven to accurately assess fundamental mobility and balancing abilities.(Disantis et al., 2018)

(TKA) provides considerable medium- and long-term benefits to patients advantages in terms of quality of life, High patient satisfaction is the outcome of pain management and function. .(Canovas and Dagneaux, 2018, Konopka et al., 2018)

In patients with severe knee osteoarthritis, total knee arthroplasty (TKA) is performed to relieve pain and limits in everyday activities (OA). TKA is a highly successful therapy in general..(Leichtenberg et al., 2018)

According to the International Association for the Study of Pain (IASP), chronic pain is described as persistent pain , lasts three months or longer. 1 Chronic post-surgical pain is usually acknowledged to be pain of at least three to six months length that starts or rises in intensity following a surgical operation and adversely impacts health-related quality of life. (Wylde et al., 2018)

Despite the rising popularity of updated total knee arthroplasty (rTKA), there is a scarcity of data on patient-reported outcome measures (PROMs) following the treatment. As a result, the goal of this study was to investigate (1) PROM pain relief, function, and quality of life, and overall health, as well as (2) PROM predictors for patients following rTKA.(PiuZZi, 2020)

With the expanding number of elderly individuals throughout the world, more people are suffering from knee osteoarthritis (KOA), which causes physiologic knee joint dysfunction Not only do patients experience joint discomfort and swelling, but they also risk losing all function in their knees, thus interventional therapy should be performed as soon as possible to protect their life and health.(Zhang and Liu, 2021)

Total knee replacement (TKR) nursing care seeks to decrease pain, enhance function, and improve post-surgical quality of life (QOL) in patients with osteoarthritis (OA), a chronic degenerative joint condition.(Sveinsdóttir et al., 2021)

The most efficient and reliable treatment for persistent knee discomfort and chronic osteoarthritis is total knee arthroplasty (TKA).(Javed and Batool, 2021)

In patients with osteoarthritis (OA) and rheumatoid arthritis, total knee arthroplasty (TKA) is one of the most popular surgical procedures (RA). Previous research revealed that TKA surgery resulted in a considerable improvement in health status(Rahimnia et al., 2021)

Pain catastrophizing captures patients' pain-related rumination, amplification, and feelings of helplessness. In studies on chronic pain, pain catastrophizing has been identified as a vulnerability factor on the path to physical functioning, whereas resilience mechanisms are thought to be coping mechanisms.(Nwankwo et al., 2021)

Total knee arthroplasty (TKA) is one of the most regularly done elective surgical procedures in

orthopedics, and it is effective in relieving the pain and impairment associated with knee OA [2]. TKA has been compared to coronary revascularization and kidney transplant operations in terms of improving patient health status.(Giesinger et al., 2021)

Total knee arthroplasty (TKA) has become more common in recent years across the world. According to certain research, the frequency of TKA operations and the associated revision load will likely rise in the future, emphasising the need of a successful revision TKA outcome.(von Hintze et al., 2021)

### Materials & Methods

It was a single blinded cross-sectional study .Data was collected from Ghurki Trust Teaching Hospital Lahore, PSRD and Mayo hospital. Duration of study was completed within 4 months. Non-Probability Purposive Sampling technique 159 patients of Total Knee Arthroplasty were registered in the study. With the help of the formula given below, the sample size of this study was calculated. The margin of error is equal to 05% and the level of significance is equal to 95%.

$$n = \frac{Z_{1-\frac{\alpha}{2}}^2 P(1-P)}{d^2}$$

(Sample Size determination in health studies version 2.0.21 WHO)

Z 1- $\alpha$ /2 is the anticipated level of significance = 95%

P<sub>0</sub> is expected proportion of Subjects = **50%**

d<sup>2</sup> is the expected margin of error = 5%

### Inclusion Criteria:

- Patients with Total Knee Arthroplasty.
- Aged between 40 and 60 years.
- Both male and female patients was included in the study

### Exclusion Criteria:

- People who refused to participate or was sensitive to being questioned was excluded from the study.
- Patients with history of trauma.
- Osteoarthritis of Hip and other joints (Other than Knee Joint).
- Rheumatoid arthritis.
- Septic Arthritis.

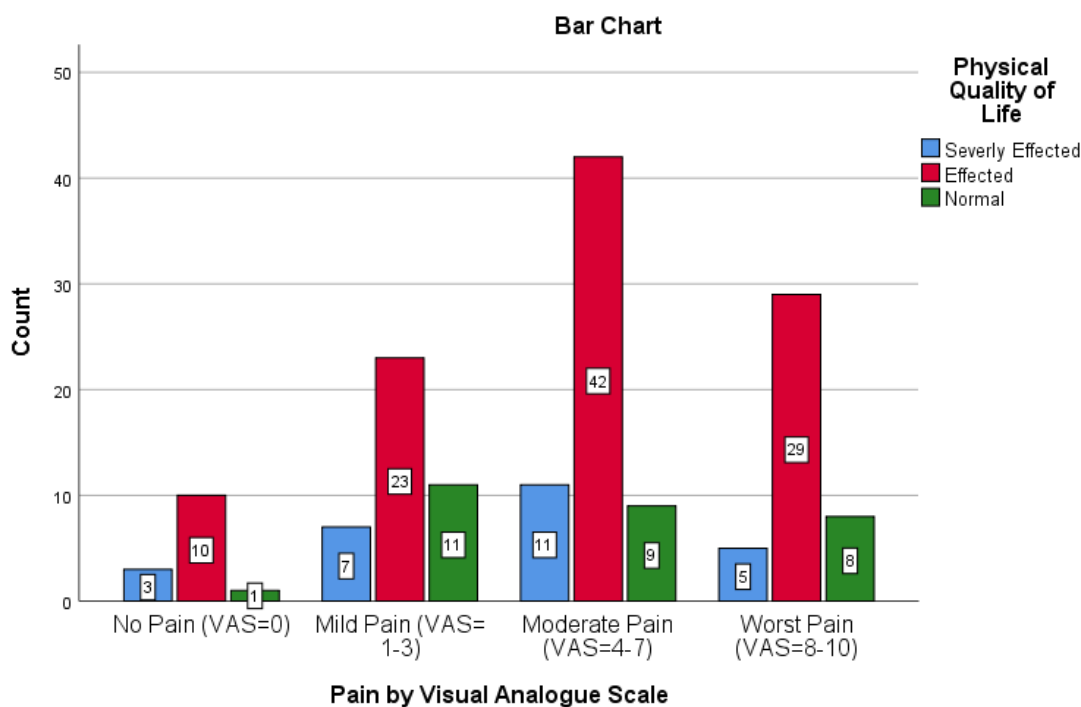
## Results

### Tables and Graphs

Among 159 participants, 27(17.0%) were in age group 40-45 years, 40(25.2%) were in age group 46-50 years, 40(25.2%) were in age group 51-55 years and 52(32.7%) were in age group 56-60 years. Among 159 participants, 43(27.0%) were male and 116(73.0%) were female patients. Among 159 participants, 31(19.5%) were underweight, 42(26.4%) were healthy , 43(27.0%) were overweight and 43(27.0%) were obese. relationship, 44(27.7%) satisfied with personal relationship, 44(27.7%) very satisfied with personal relationship.

*Table : Cross tabulation between Pain by Visual Analogue Scale and Physical Quality of Life*

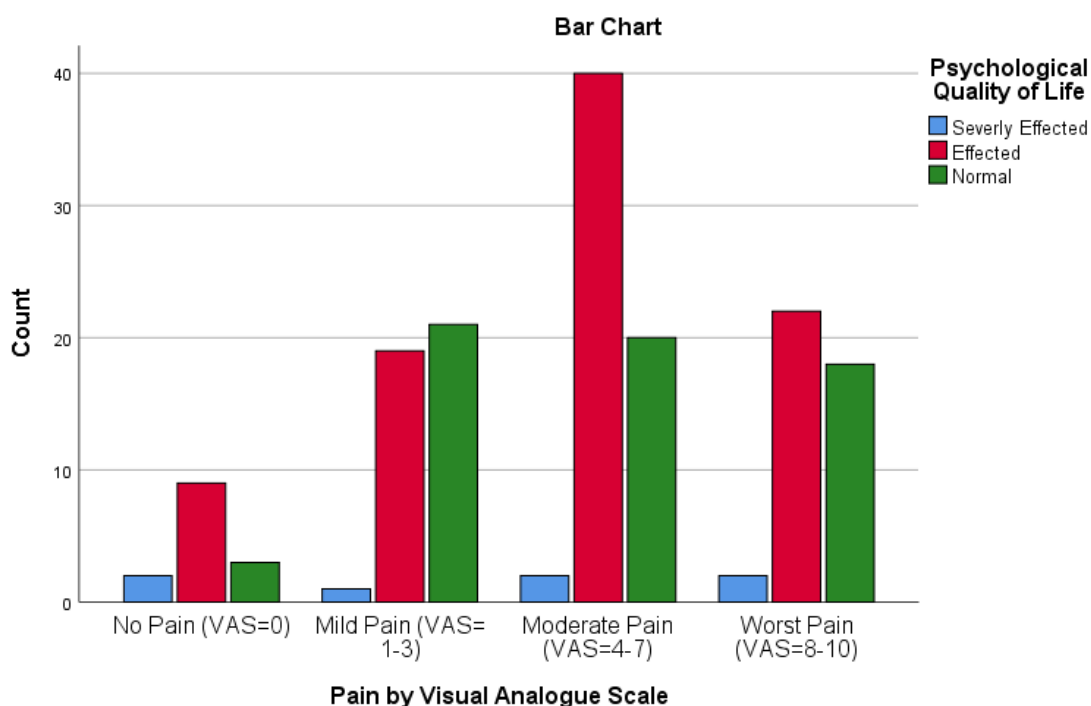
Pain by Visual Analogue Scale * Physical Quality of Life							
		Physical Quality of Life			Total	P Value	
		Severely Effected	Effected	Normal			
Pain by Visual Analogue Scale	No Pain (VAS=0)	3(21.40%)	10(71.40%)	1(7.10%)	14(100%)	0.045	
	Mild Pain (VAS= 1-3)	7(17.10%)	23(56.10%)	11(26.80%)	41(100%)		
	Moderate Pain (VAS=4-7)	11(17.70%)	42(67.70%)	9(14.50%)	62(100%)		
	Worst Pain (VAS=8-10)	5(11.90%)	29(69.00%)	8(19.00%)	42(100%)		
Total		26(16.40%)	104(65.40%)	29(18.20%)	159(100%)		



*Figure Cross tabulation between Pain by Visual Analogue Scale and Physical Quality of Life*  
 Among 159 participants with no pain (VAS=0), 3(21.40%) have severely affected, 10(71.40%) have effected and 1(7.10%) have normal physical quality of life. With Mild pain (VAS=1-3), 7(17.10%) have severely affected, 23(56.10%) have effected and 11(27.80%) have normal physical quality of life. with moderate pain (VAS=4-7), 11(17.70%) have severely affected, 42(67.70%) have effected and 9(14.50%) have normal physical quality of life. with Worst pain (VAS=8-10), 5(11.90%) have severely affected, 29(69.00%) have effected and 8(19.00%) have normal physical quality of life. As the P value was 0.045 which was  $<0.05$  which means that there was significant association between Pain and Physical Quality of Life.

*Table : Cross tabulation between Pain by Visual Analogue Scale and psychological Quality of Life*

Pain by Visual Analogue Scale * psychological Quality of Life						
		Psychological Quality of Life			Total	Total
		Severely Effected	Effected	Normal		
Pain by Visual Analogue Scale	No Pain (VAS=0)	2(14.30%)	9(64.30%)	3(21.40%)	14(100%)	0.017
	Mild Pain (VAS= 1-3)	1(2.40%)	19(46.30%)	21(51.20%)	41(100%)	
	Moderate Pain (VAS=4-7)	2(3.20%)	40(64.50%)	20(32.30%)	62(100%)	
	Worst Pain (VAS=8-10)	2(4.80%)	22(52.40%)	18(42.90%)	42(100%)	
Total		7(4.40%)	90(56.60%)	62(39.00%)	159(100%)	



*Figure : Cross tabulation between Pain by Visual Analogue Scale and psychological Quality of Life*

*Among 159 participants with no pain (VAS=0), 2(14.30%) have severely affected, 9(64.30%) have effected and 3(21.40%) have normal psychological quality of life. With Mild pain (VAS=1-3), 1(2.40%) have severely affected, 19(46.30%) have effected and 21(51.20%) have normal psychological quality of life. with moderate pain (VAS=4-7), 2(3.20%) have severely affected, 40(64.50%) have effected and 20(32.30%) have normal psychological quality of life. with Worst pain (VAS=8-10), 2(4.80%) have severely affected, 22(52.40%) have effected and 18(42.90%) have*

normal psychological quality of life. As the P value was 0.017 which was  $<0.05$  which means that there was significant association between Pain and psychological Quality of Life

Table : Cross tabulation between Pain by Visual Analogue Scale and social relation quality of life

		Pain by visual analogue scale* and Social Relations Quality of Life			Total	P Value
		Severely Effected	Effected	Normal		
Pain by Visual Analogue Scale	No Pain (VAS=0)	3(21.40%)	5(35.70%)	6(42.90%)	14(100%)	0.032
	Mild Pain (VAS= 1-3)	6(14.60%)	13(31.70%)	22(53.70%)	41(100%)	
	Moderate Pain (VAS=4-7)	13(21.00%)	24(38.70%)	25(40.30%)	62(100%)	
	Worst Pain (VAS=8-10)	10(23.80%)	15(35.70%)	17(40.50%)	42(100%)	
Total		32(20.10%)	57(35.80%)	70(44.00%)	159(100%)	

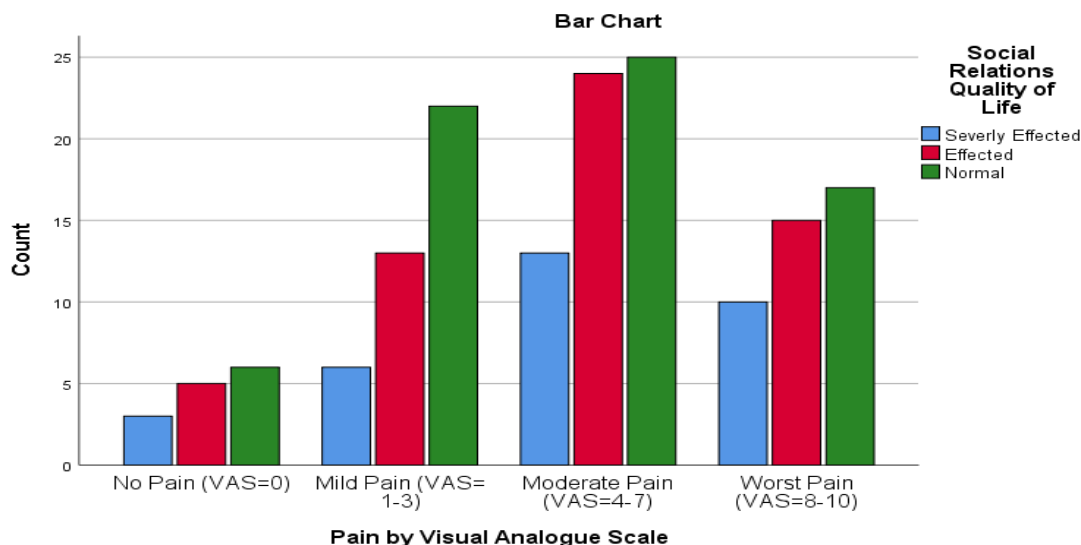


Figure : Cross tabulation between pain by visual analogue scale and social relation quality of life Among 159 participants with no pain (VAS=0),3(21.40%) have severely affected,5(35.70%) has effected and 6(42.90%)have social quality of life. With Mild pain (VAS=1-3),6(14.60%) has severely affected,13(31.70%) have effected and22(53.70%)have social quality of life. With moderate pain (VAS=4-7) 13(21.00%)have severely affected, 24(38.70%)have effected and 25(40.30%)have social quality of life. With Worst pain (VAS=8-10),10(23.80%)has severely affected,15(35.70%)have effected and have 17(40.50%)social quality of life. As the P value was 0.032 which was  $<0.05$  which means that there was significant association between Pain and social relations Quality of Life.

Table: Cross tabulation between Pain by Visual Analogue Scale and environmental quality of life

		Pain by visual analogue scale* and Environmental Quality of Life			Total	P Value
		Severely Effected	Effected	Normal		
Pain by Visual Analogue Scale	No Pain (VAS=0)	1(7.10%)	10(71.40%)	3(21.40%)	14(100%)	0.032
	Mild Pain (VAS= 1-3)	1(2.40%)	19(46.30%)	21(51.20%)	41(100%)	
	Moderate Pain (VAS=4-7)	3(4.80%)	34(54.80%)	25(40.30%)	62(100%)	
	Worst Pain (VAS=8-10)	0(0.00%)	20(47.60%)	22(52.40%)	42(100%)	
Total		5(3.10%)	83(52.20%)	71(44.70%)	159(100%)	

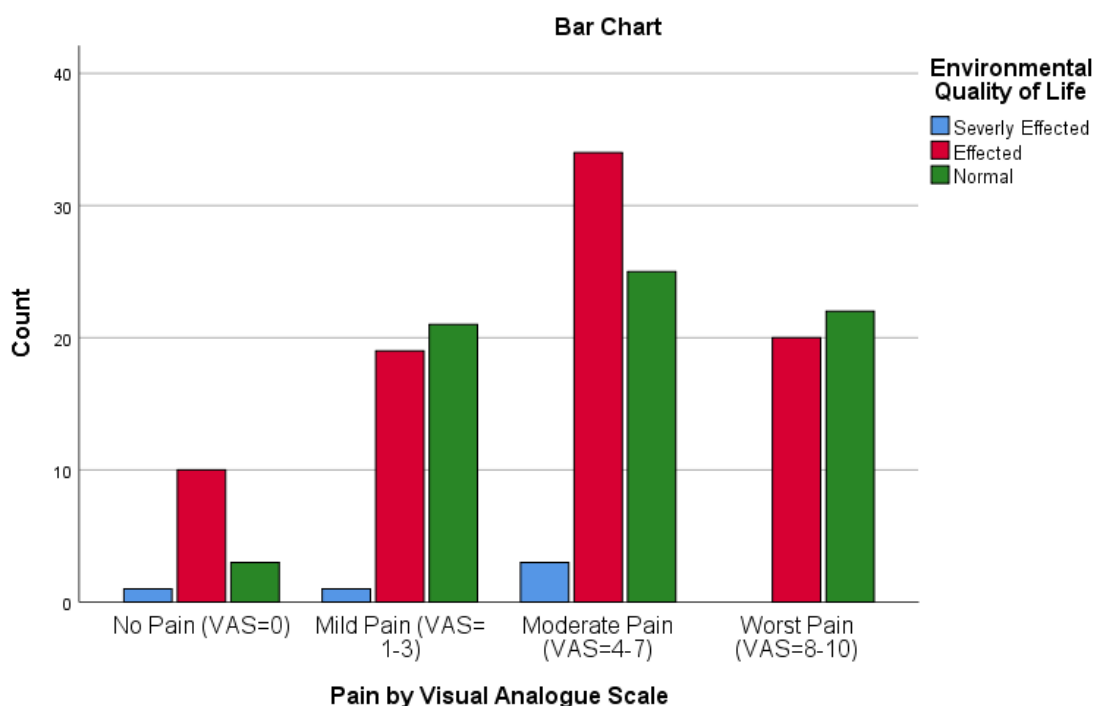


Figure : Cross tabulation between Pain by Visual Analogue Scale and environmental quality of life

Among 159 participants with no pain (VAS=0), 1(7.10%) have severely affected, 10(71.40%) have effected and 3(21.40%) have environmental quality of life. With Mild pain (VAS=1-3), 1(2.40%) have severely affected, 19(46.30%) have effected and 21(51.20%) have environmental quality of life. With moderate pain (VAS=4-7), 3(4.80%) have severely affected, 34(54.80%) have effected and 25(40.30%) have normal environmental quality of life. With Worst pain (VAS=8-

10),0(0.00%)have severely affected,20(47.60%) have effected and 22(52.40%) have environmental quality of life. As the P value was 0.032 which was <0.05 which means that there was significant association between Pain and environmental relations Quality of Life

**Table : Cross tabulation between Pain by Visual Analogue Scale and overall quality of life**

Crosstab		Pain by visual analogue scale* and Quality of Life (Overall)			Total	P Value
		Severely Effected	Effected	Normal		
Pain by Visual Analogue Scale	No Pain (VAS=0)	3(21.40%)	8(57.10%)	3(21.40%)	14(100%)	0.017
	Mild Pain (VAS= 1-3)	1(2.40%)	24(58.50%)	16(39.00%)	41(100%)	
	Moderate Pain (VAS=4-7)	4(6.50%)	38(61.30%)	20(32.30%)	62(100%)	
	Worst Pain (VAS=8-10)	1(2.40%)	26(61.90%)	15(35.70%)	42(100%)	
Total		9(5.70%)	96(60.40%)	54(34.00%)	159(100%)	

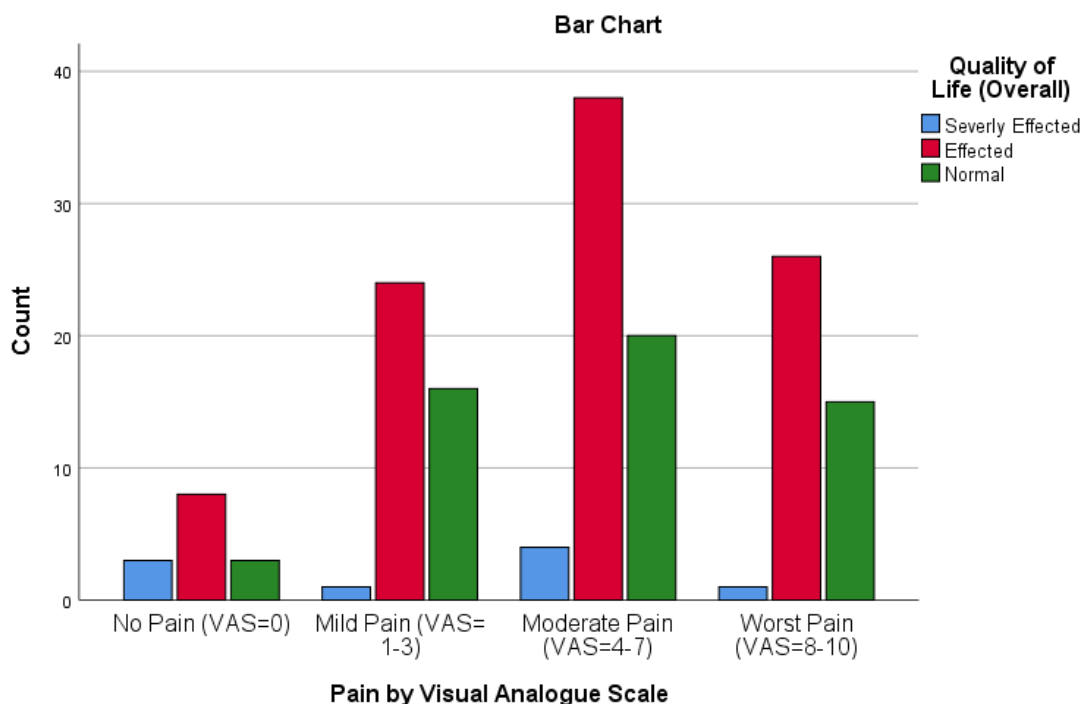


Table: Cross tabulation between Pain by Visual Analogue Scale and overall quality of life

Among 159 participants with no pain (VAS=0),3(21.40%) have severely affected, 8(57.10%) have effected and 3(21.40%) have normal physical quality of life. With Mild pain (VAS=1-3), 1(2.40%)

have severely affected, 24(58.50%) have effected and 16(39.00%) have normal physical quality of life. With moderate pain (VAS=4-7), 4(6.50%) have severely affected, 38(61.30%) have effected and 20(32.30%) have normal physical quality of life. With Worst pain (VAS=8-10), 1(2.40%) have severely affected, 26(61.90%) have effected and 15(35.70%) have normal physical quality of life. As the P value was 0.017 which was  $<0.05$  which means that there was significant association between Pain and overall Quality of Life

### Discussion

A study conducted by Neuprez in 2020. The goal of this study was to look into and pinpoint the variables that affect how a prosthetic replacement procedure affects pain, function, and quality of life in patients with lower limb osteoarthritis (OA) after five years of survival. Following knee arthroplasty, the increase in quality of life that was evident in the first year persisted for up to five years. More than 75% of the participants in our research achieved successful results (79.91 percent in KA group). Preoperative characteristics such as radiological severity, co-morbidities, disability, and degree of education, as well as preoperative elements such as hospital stay duration and discharge location, all predict a favourable outcome and a change in WOMAC over the course of five years. And according to our study, among 159 participants with no pain (VAS=0), 3(21.40%) have severely affected, 10(71.40%) have effected and 1(7.10%) have normal physical quality of life. With Mild pain (VAS=1-3), 7(17.10%) have severely affected, 23(56.10%) have effected and 11(27.80%) have normal physical quality of life. with moderate pain (VAS=4-7), 11(17.70%) have severely affected, 42(67.70%) have effected and 9(14.50%) have normal physical quality of life. with Worst pain (VAS=8-10), 5(11.90%) have severely affected, 29(69.00%) have effected and 8(19.00%) have normal physical quality of life. (51)

A study conducted by Zhang in 2021. The study's goal was to determine the goal of this study was to look at the safety of total knee arthroplasty (TKA) in the treatment of knee osteoarthritis (KOA) and how it affected postoperative pain and quality of life in patients. The postoperative HSS score was considerably greater than the preoperative value, and the postoperative pain score rose with time as the pain lessened. The postoperative WOMAC score was considerably lower than the preoperative score, and the 6 month postoperative score was significantly lower than the 3 month postoperative level. There were no serious problems such severe prosthesis fractures, subsequent infections, or patellar tendon rupture, and the overall complication rate was 11.7 percent. At 6 months following surgery, the successful rate of therapy was 98.3 percent, which was much greater than at 3 months. According to our study among 159 participants with no pain (VAS=0), 2(14.30%) has severely affected, 9(64.30%) have effected and 3(21.40%) have normal psychological quality of life. With Mild pain (VAS=1-3), 1(2.40%) have severely affected, 19(46.30%) have effected and 21(51.20%) have psychological quality of life. with moderate pain (VAS=4-7), 2(3.20%) have severely affected, 40(64.50%) have effected and 20(32.30%) have psychological quality of life. with Worst pain (VAS=8-10), 2(4.80%) have severely affected, 22(52.40%) have effected and 18(42.90%) have normal psychological quality of life. (52)

A study conducted by Nwankwo in 2021 .The objective of the study was to determine the pre-operative resilience predicts 3-month postoperative outcomes. There were 117 individuals in the trial, with a median age of 67.0. Women made up 53% of the patients, while white people made up 70.1 percent. Higher baseline resilience was positively associated with better postoperative knee function and better general physical health but not with better general mental health in unadjusted analyses, and In multivariable linear regression analyses, higher baseline resilience was positively associated with better postoperative knee function and better overall physical health but not with better general mental health; the relationship persisted for physical function after adjusting for PCS and other covariates. According to our study, among 159 participants with no pain

(VAS=0), 1(7.10%) have severely affected, 10(71.40%) have effected and 3(21.40%) have normal social quality of life. With Mild pain (VAS=1-3), 1(2.40%) have severely affected, 19(46.30%) have effected and 21(51.20%) have normal social quality of life. With moderate pain (VAS=4-7), 3(4.80%) have severely affected, 34(54.80%) have effected and 25(40.30%) have normal social quality of life. With Worst pain (VAS=8-10), 0(0.00%) have severely affected, 20(47.60%) have effected and 22(52.40%) have normal social quality of life. (53)

A study conducted by Mizoguchi, in 2021 year, The objective of study was to determine what variables prevent patients with rheumatoid arthritis from improving their quality-of-life following complete knee arthroplasty. Physical function increased similarly in both groups from 4 weeks to 5 months after surgery in terms of muscular strength and walking ability. Despite being younger, individuals with rheumatoid arthritis had worse self-health assessment scores and measures of life-space mobility by the Japanese Knee Osteoarthritis Measure and Life-Space Assessment. According to our study, among 159 participants with no pain (VAS=0), 1(7.10%) have severely affected, 10(71.40%) have effected and 3(21.40%) have environmental quality of life. With Mild pain (VAS=1-3), 1(2.40%) have severely affected, 19(46.30%) have effected and 21(51.20%) have environmental quality of life. With moderate pain (VAS=4-7), 3(4.80%) have severely affected, 34(54.80%) have effected and 25(40.30%) have normal environmental quality of life. With Worst pain (VAS=8-10), 0(0.00%) have severely affected, 20(47.60%) have effected and 22(52.40%) have environmental quality of life. (54)

A study conducted by Tobinaga in 2021, the goal of the study is to compare the relative impact of Physical Activity SE on health-related quality of life to other factors, such as pain and physical function, which are well-treated by current treatments. TUG, OLS, WOMAC Pain and Function, and the 8 subscales of the SF-36v2 all showed significant improvement over pre-operative levels at 3 and 6 months. Knee pain, knee function, and SE for physical activity were found to have a substantial influence on SF-36v2 subscale scores six months after surgery. According to our study, 159 participants with no pain (VAS=0), 3(21.40%) have severely affected, 8(57.10%) have effected and 3(21.40%) have normal physical quality of life. With Mild pain (VAS=1-3), 1(2.40%) have severely affected, 24(58.50%) have effected and 16(39.00%) have normal physical quality of life. With moderate pain (VAS=4-7), 4(6.50%) have severely affected, 38(61.30%) have effected and 20(32.30%) have normal physical quality of life. With Worst pain (VAS=8-10), 1(2.40%) have severely affected, 26(61.90%) have effected and 15(35.70%) have normal overall quality of life. (55)

### **Conclusion:**

There was significant association between pain and quality of life including physical, psychological, social relations and environmental quality of life, as quality of life was affected among patients with moderate and worst pain.

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