Review Article

JOURNAL OF APPLIED PHARMACEUTICAL RESEARCH | *JOAPR*

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QUALITY OF LIFE IN TOTAL KNEE REPLACEMENT (TKR) PATIENTS – A REVIEW

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ABSTRACT

Worldwide, severe pain and disability are caused to patients by Osteoarthritis, which is a common condition of the joints. A need for knee replacement had become a great option for patients when conventional treatment fails in granting appropriate relief in them, especially in elderly patients. Like all joint replacement surgeries, a total knee replacement procedure is also a quite painful and risky procedure that requires sufficient postoperative rehabilitation and therapies to prevent further complications. Post-surgical pain had a great influence on the patients' quality of life and a need to measure pain intensity had become a basic requirement. Measuring pain intensity can be done using traditional pain scales like a visual analogue scale (VAS), and a numerical rating scale (NRS). A risk assessment and predictor tool (RAPT) determines the discharge accuracy in patients. The WOMAC scale which is the abbreviated form of the questionnaire for checking the health status of the patients known as the Western Ontario and McMaster University Osteoarthritis Index. This questionnaire is used to assess the quality of life of the osteoarthritis patients after a surgery for the total knee replacement. The results of the assessment show that pain had become a significant factor in the reduction in quality of life. In conclusion, a well-designed multimodal analgesic regimen should be incorporated into the patient's rehabilitation care, which in turn will intensify the patient's quality of life, lessen the hospital stay, and minimize the socio-economic burden.

INTRODUCTION

Osteoarthritis (OA) is the most common joint condition in the world and occurs primarily in later life. It tends to be slowly progressive and can cause severe pain and disability [1]. Pain can be defined as an unpleasant experience which is both sensory and emotionally associated. This experience may bring about

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tissue damage really or possibly as described by the International Association for the Study of Pain, IASP [2]. Symptoms and radiographic changes are poorly correlated and therefore difficult to define for research purposes [1]. Significant health signs include chronic pain, joint dysfunction, stiffness, and radiographic narrowing of joint space [3].

Risk factors identified include obesity, local trauma, and occupation. These may explain some of the geographical variations that have been seen. There is contradictory data regarding the functions of diet, smoking, and sarcopenia. Interestingly, low BMD seems to be safe. The burden of OA is physical, psychological, and socio-economic. It may be associated with significant disability, such as reduced mobility and daily living activities. Various instances like self-worth devaluing, distress and loneliness that can affect the patient's psychological wellbeing are also experienced. The burden imposed on the economic status is highly considerable as the frequency of the prevalence of OA is also very high [1].

Knee replacement surgery becomes very much required for the geriatric population for which the commonest cause is their osteoarthritis of their knee that is very severe [4]. Study reports reflect that 22 out of 40 surgeries done for the joints were found to be having a high pain score as assessed by the numerical rating scale (NRS) [5]. When the patients are unable to get the changes in their functions as well as relief from pain with the routine therapies, then the standard choice gets into Total knee replacement surgery (TKR) [6]. It improves function and decreases pain in the majority of patients, so pain relief is likely to be the most significant long-term outcome [4].

TKR is considered a painful procedure and, given multimodal approaches to pain management, pain after discharge remains a continuing issue [7]. Surgery is a recognized risk factor for chronic pain, most commonly described as pain that has been present for atleast three months [2]. Studies have found that almost 20 % of patients are not satisfied one year after surgery [8]. The main reason appears to be persistent pain during daily life activities [9]. Research shows, however, that persistent TKR pain is a major problem affecting up to 34% of patients [10]. The importance of pain goes far beyond the social and ethical implications of ineffective management [11]. Pain needs care and failure to provide appropriate care will lead to medical-legal intervention [12].

Risks of severe postoperative pain include prolonged hospital stays, unnecessary medical referrals, and increased usage of opioids with related rises in postoperative nausea and vomiting, resulting in overall decreased patient satisfaction and possibly higher costs [11]. Besides, the extent of postoperative pain is directly related to arthrofibrosis, and the decreased range of motion [13]. The socio-economic burden of post-operative rehabilitation therapy for TKR is of widespread concern [14]. A pain control of the sub-optimal level was achieved in more than half of the patients who underwent the surgery in contrary to the immediate period after the surgery with severe pain [15].

This review aims to evaluate the literatures of pain score before and after TKR by assessing the effectiveness of the pain management using the analgesic protocols on pre and post-operative pain throughout the patient's stay in the hospital and also to investigate the quality of life in TKR patients.

ANALGESIC PROTOCOL IN PATIENTS UNDERGOING TKR

Total knee replacement is one of the most commonly performed operations in the world. Addressing pain alone is not the goal of a surgery of the joint but also to restore the functional ability of the patients [16]. Opioids that are given parenterally after the knee arthroplasty play a vital role in the improvement of pain control [17-19]. Narcotic usage after operations may pose systemic adverse effects and thus, the use of locally acting anaesthetics are utilised for the benefit that they block the pain at the origin itself and avoid the conduct of pain. To reduce the incidence of side effects or complications, the analgesic protocol should preferably be multimodal and should block the pain at its origin. Peri articular injection of local anesthetics is a possible means of achieving this objective. The length of the hospital stay as well as the rehabilitation is well controlled by the use of atleast two analgesics with different mechanism of actions which is termed as multimodal analgesia [20].

Effective analgesia is a key component of fast-track surgery programs to allow patients early functional outcomes [21,22]. Much research has sought to refine procedures and drugs to enhance postoperative pain and patient satisfaction [23]. Nerve blockage in TKR is usually preferable to controlled analgesia in patients [24]. Providing greater comprehension and technological advancements in pain management, as Gan has

demonstrated in 2014, the quality of acute postoperative pain control is far from satisfactory [25].

PAIN MANAGEMENT IN OA

The Bone and Joint Decade (2001–2010) was marked by revolutionary advances in total hip and knee arthroplasty (THA and TKA), including minimally invasive methods, computer-assisted procedures, innovative recovery strategies, and enhanced perioperative pain control. The knee replacement surgeries has brought about many pain management improvements which are highly significant and advanced [26]. Being a sensation that is subjective in the health care, pain becomes the fifth important vital sign [27].

Measurement of patient pain intensity is an important component of effective postoperative pain management. Most pain tests are performed in the form of such scales, which are then clarified to the patient who selects the score. An assessment plan which is systematically done must be utilised for making the diagnosis in a perfect manner and to frame the proper therapeutic plan in case of patients with severe pain [28]. Pain intensity is thought to be one of the primary factors determining the impact of pain on a person's overall function and sense of well-being [29]. The use of pain scales helps to quantify pain intensity, guide treatment decisions, and monitor efficacy [30]. The use of peripheral nerve blocks for patients undergoing knee arthroplasty had shown reduced ache scores, and advanced early ambulation and reduced time to gain health center discharge. The study suggested that for knee arthroplasty postoperative pain control when not contraindicated, intraoperative neuraxial anesthesia blended with a non-stop adductor canal block and a multimodal medicine routine is the great analgesic protocol. The use of perioperative knee injections containing local anesthetics, opiates, and non-steroidal anti-inflammatory drugs has become increasingly common in the treatment of pain [31].

The analgesic complications and the other side effects may be avoided by the use of the multimodal analgesia thus ensuring the safety of the patient [32]. Administering periarticular injections of delayed-release local anesthetics may enhance pain management [33].

MEASUREMENT OF PAIN INTENSITY

Various scales are commonly used for measures of pain severity [34]. There is no single standardized pain assessment scale with a proper title or definition [35]. The most commonly used scoring scales include the NRS which is the frequently used Numerical Rating Scale ; the VAS i.e. Visual Analog Scales; the third position held with the Verbal Rating Scale or the VRS; and finally the Faces Pain Rating Scale (FPS) [36].

Among the above four, accurate rating is found with the NRS with more benefits [37]. But in some cases, even the other three have proven appropriate than the former [38]. The pain assessment shall be performed using a multidimensional approach, with the following determinations: onset: injury mechanism or pain etiology if identifiable, Location/distribution, Duration, Course or time pattern, Character, and quality of pain.

Visual Analog Scale:

In the VAS the pain is scored from zero to ten where the former denotes no pain and the later worst pain. This tool has been validated and reported for its reliability and thus used very widely by the clinical researchers [39-41].
The results of the VAS can be very well correlated and found to be significant with that of the other scales [42]. But it has its own disadvantages like time consuming, difficulty in understanding which may bring about poor responses specifically from the older ones [43].

Numeric Rating Scale:

The 0–10 NRS uses 11 numbers (0 through 10) to measure pain intensity. Patients are advised to pick the amount that best represents the pain level, with 0 equal to no pain and 10 the worst pain. This scale is more commonly used in clinical practice and is a reliable and valid measure of pain intensity [44,45]. Pain during cancer and chronic diseases have a very less correlation with the pain trials after surgery [46].Studies has revealed the Median discharge readiness and actual length of stay until discharge were both 2 days. They concluded that the fast-track THA and TKA with early discharge to home can be achieved in almost all patients [47].

The score revealed that about 473 patients had a mean pre-operative pain intensity score of 7/10 and it was decreased to 3/10 among 548 patients prior to discharge from the hospital. A difference in the pain intensity was noticed before the surgery and after the surgery in a more significant manner which involved the quality of life also [48].

Risk Assessment and Predictor Tool:

The focus in recent years has been on postoperative care for patients, in particular on inpatient length of stay (LOS) after surgery, promoting early hospital discharge, and replacing home-based alternatives whenever necessary [49]. Over the last 20 years, postoperative management of total hip arthroplasty has changed completely in all industrial countries. In the light of cost-effective health care management, the length of stay in the surgical unit has now gone from 3 weeks in the 1970s to less than one week. Thus, there was an increase in the hospital stay due to the increase in the transfer numbers [50,51]. Proper measures must be taken to ensure that resources are properly allocated to the needs of the patient, avoiding disparities, and containing the costs borne by the health care system [52].

Identifying such preoperative target parameters that would help clinicians anticipate patient outcomes and needs before surgery became crucial, allowing more efficient postoperative care management and offering a first step in the development of a clinical predictive tool to identify patients at risk of delayed postoperative recovery [53].

Based on these criteria, a framework was first published in 2003 that could categorize the possibility of requiring prolonged inpatient rehabilitation after arthroplasty. The method explained in the Risk Assessment and Predictor Tool (RAPT) included nine variables at the initial stage. Two of them were omitted because they were not significant: preoperative medical comorbidities and home climate [54].

The "patient expectations" element was also omitted as it could differ based on the level of education of the patients and could be changed with preoperative therapy, although it was by far the most relevant. The final score system in this tool takes into account six variables: age, gender, preoperative functional capacity with or without technical assistance, social support at home, living alone, and patient preference. Once the score has been calculated, the decision to discharge the patients to the PM&R center is based on the RAPT score but also on the patient's preference. An overall accuracy of 75% was seen with the RAPT for discharge destination [54-56].

IMPACT OF PAIN IN QUALITY OF LIFE (QOL)
Post-operative chronic pain is widely accepted as having a period of at least three to six months that persists or rises in severity following surgery and greatly affects the health-related quality of life. The health-related quality of life is highly affected by the effect of pain after TKA that may be due to several factors like limitations in functioning, psychological disturbances, sleep disorders and opioid usage for a longer period [57].

Instruments related to the quality of life of health (HRQL) have been used to determine TKR outcomes and their appropriateness [58]. To quantify the health status of patients with knee osteoarthritis, a variety of patient-based subjective tools have been developed that the West Ontario and McMaster Universities (WOMAC) self-administered index is the most common clinical tool for the assessment of pain [59].

The most widely used tools for the surgical outcomes after TKR are the WOMAC scale and Short Form-36 (SF-36) [58]. The questionnaire covers 3 dimensions namely pain with five items; stiffness with two items and functioning with seventeen items, totally twenty four items [60, 61]. It is a highly reliable, patient-centered, self-reported health status questionnaire covering hip and knee osteoarthritis (OA) one of the most widely used self-reported quality of life (QoL) health surveys [62].

WOMAC has been thoroughly tested to adapt over time to its validity, reliability, viability, and responsiveness. Secondary objectives were to identify threshold values for preoperative WOMAC scores that were predictive of patient dissatisfaction with pain relief, workability, and recreation after TKA [63].

Persistent post-surgical pain is common with any joint replacement surgeries and further researches should be conducted to assess the severity of postoperative pain [10]. A prospective study conducted to interpret the pain within one month of knee arthroplasty and one year after surgery displayed significant progress in walking speed, a decline of stance phase duration, and enhanced passive knee extension. Knee-related quality of life and the biomechanics were improved a lot as reported [64].

A cohort study was conducted to assess the self-reported outcome, such as pain, physical function, and depression after TKA using well established tools like WOMAC, KSS, CES-D10, and VAS. In spite of the improvement in the pain and depression status, the patients were least satisfied with their physical functions even 6 weeks after the surgery. A

considerable improvement in the quality of life was developed in 3 and 12 months postoperatively [65]. After TKR, the patients were less satisfied with their ability to perform activities (79.3%) and more satisfied with their pain relief (90.3%) and the patient satisfaction after a TKA can be predicted through WOMAC [62].

CONCLUSION

After a TKR, the patients experience a major burden due to the post-operative pain which had made a greater impact on their quality of life. The incidence of postoperative pain has a viable influence on a patient's ability to perform physical activity and knee functions. Hence, the well-designed multimodal analgesic regimen should be investigated into their rehabilitation program, which in turn will enhance the patient's quality of life, reduce the hospital stay, and minimize the socio-economic burden.

FINANCIAL ASSISTANCE

Nil

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTION

Dr. M. RangaPriya conceived the work, corrected and made necessary revisions in the manuscript. Ms. M. Karthika and B. Kowsalya collected the contents and performed the literature survey. Ms. Lini Jacob and Meril Lucy Shibu contributed to drafting the manuscript. All the authors framed the final manuscript.

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