

Current Updates on Arthroplasty in Developing Countries

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Osteoarthritis (OA) is one of the most common joint diseases and the most common arthritis, worldwide. Its global prevalence has doubled from 247.51 million cases in 1990 to 527.81 million cases in the last thirty years. Osteoarthritis has a female predominance and the age group most affected is the elderly between the age of 60 and 70.¹ It is predicted that by 2050, 22% of the global population will be over the age of 60 hence, there will be a significant increase in the prevalence of OA in the upcoming years.² Osteoarthritis can be classified into two types; primary and secondary. Primary osteoarthritis, also known as idiopathic osteoarthritis, is characterized by the degeneration of the cartilage and joint without any trauma or disease. Risk factors include advanced age, obesity, female gender, and genetics. Secondary osteoarthritis occurs in the context of preexisting joint pathology. Common causes of secondary osteoarthritis include trauma, rheumatoid arthritis, avascular necrosis, and hemoglobinopathy.³

The Kellgren and Lawrence classification, which uses five grades from zero to four, can be used to classify the severity of osteoarthritis. Grade one and two can be treated conservatively; however, grade three and four require joint replacement.⁴ The demand for total hip replacement (THR) and total knee replacement (TKR) is constantly rising and is projected to increase by 276 percent and 208 percent, respectively, by the year 2030.⁵ Non-surgical treatment options for knee osteoarthritis include analgesics ranging from acetaminophen to opioids, serotonin-norepinephrine reuptake inhibitors, vitamin D supplements, glucosamine and chondroitin sulphate supplements, and intraarticular injections. Intraarticular injections include the use of steroids, platelet-rich plasma, and hyaluronic acid.⁶ These treatments and lifestyle changes are only useful in the early stages of osteoarthritis and are ineffective in advanced cases. Arthroplasty is safe and successful, but it requires state-

of-the-art operating rooms and the high cost associated with such surgeries is one of the major concerns for surgeons and patients in underdeveloped nations. Hip and knee replacements are among the most costly surgeries worldwide. The costs of these surgical procedures include implants, hospitalization, anaesthesia services, and operating room fees. Among these, the cost of implants accounts for the majority of expenses. Postoperative care, which includes physiotherapy and nursing care that must be continued after hospital discharge, adds to the treatment expense. In the United States, the cost of arthroplasty (THR/TKR) ranges from 30,000 to 120,000 United States Dollars (USD), and the cost of an implant ranges from 3,000 to 10,000 USD.⁷ In Australia, the cost of arthroplasty ranges between 19,000 to 30,000 Australian Dollars (AUD), and the cost of osteoarthritis therapy is expected to surpass 2.9 billion AUD over the next eight years.⁵ In Canada, the mean cost of total hip arthroplasty is 10,477 Canadian Dollars (CAD).⁸ Despite the cost, arthroplasty is more cost-efficient than non-surgical intervention in the management of severe osteoarthritis of the knee and hip joint.⁹

Pakistan is a third world country with per capita gross domestic product (GDP) of 1658.36 USD, which is ten times lower than the global GDP.¹⁰ Cost of THR/TKR ranges from 300,000 to 800,000 Pakistani Rupee (PKR) and the cost of the implant alone varies from 120,000 to 250,000 PKR. In a developing country, where tuberculosis is still endemic, this elective procedure imposes a substantial financial burden on patients. The major financial challenge in implementing arthroplasty is the cost of the implant, which can be overcome by indigenous implant production. Price capping, as utilized in India, can also be used to reduce the cost of imported implants. The profit margin on implants has been reported to exceed 300 percent. Price capping, despite its downsides, might significantly cut the cost of implants.¹¹ In 2020, the government of Pakistan launched health insurance, the Sehat Sahulat Program, similar to Medicare in the United States. Total joint replacement indicated for traumatic cases was one of the numerous expensive surgeries covered by it.¹²

The patients' demographics and surgical indications for arthroplasty in a third world country are significantly different from those in a developed one.

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The mean age of patients undergoing THR in the United States and the United Kingdom is 60.5 years and 69.4 years, respectively, which is greater than the range of 33 to 50 years for patients from developing countries. So, the disease burden is high in the developing countries.^{13,14}

Postoperative complications following arthroplasty include surgical site infection (SSI), bleeding, thromboembolic disease, neurovascular injury, dislocation, stiffness, malalignment, dislocation, and fracture. The risk of infection at the surgery site is considered the greatest concern among these various complications. In developed nations, the rate of SSI ranges from 0.50% to 1.50%, however, in developing nations such as ours, the percentage can be as high as 4.6%, which poses major risks and may require revision surgery.¹⁵ The revision surgery is substantially more expensive than the primary arthroplasty because of the longer operating time and hospital stay. In addition to being financially burdensome, revision operations are often associated with a poor prognosis. Surgical site infections can be prevented by using preoperative antibiotics, maintaining sterility in the operating room, and proper wound care.¹⁶

Registries have a significant capacity to offer information regarding medical devices, especially implants, which are crucial to arthroplasty. The first arthroplasty registry was established in Sweden, and currently, Finland, Norway, Denmark, Australia, New Zealand, Canada, Romania, England, and The Netherlands have active national registries on total knee and total hip replacement.¹⁷ Analysis of data from the registries offers an accurate assessment of implant reliability and early failure identification. Hence, allowing for earlier intervention, and lowering revision rates. Pakistan Arthroplasty Society established Pakistan National Joint Registry in 2014, and its primary objective is collecting and analyzing data on joint replacements.¹⁸ It has members both in private and governmental hospitals throughout Pakistan.

Joint Replacement operations are generally performed in metropolitan areas, and patient dropout is common due to the long distance patients must travel for follow-up care. Other issues identified during the follow-up evaluation in our setting included a lack of access to physiotherapy and inadequate wound care. One of the primary obstacles in assessing outcomes in developing nations is a patient dropout, with some studies reporting dropout of greater than 30%.⁹ In a resource-constrained area, this can be addressed by utilizing telecommunication for follow-up after a few hospital visits.

Total joint arthroplasty is a highly successful procedure, and its global demand is growing, but it places a significant financial strain on settings with limited resources. The challenges faced by the surgeon

include the unavailability of the modern operating theatre, the cost of the implant, late presentation, and lack of structure for patient referral. Despite these obstacles in a low-resource setting, arthroplasty is being successfully performed, and the demand for it is increasing; however, optimal circumstances are required for ideal results. Beginning with perioperative care and extending to follow-up, implementing an arthroplasty program is fraught with challenges. The issues at hand should be addressed on a national scale in order to overcome them.

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