



Incidence and economic burden of prosthetic joint infections in a university hospital: A report from a middle-income country[☆]



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KEYWORDS

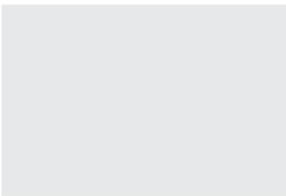
Arthroplasty;
Infection control;
Operating rooms;
Incidence;
Cost

Summary In this study, we aimed to evaluate the incidence and economic burden of prosthetic joint infections (PJIs) in a university hospital in a middle-income country. Surveillance data between April 2011 and April 2013 in the Orthopedic Surgery Department was evaluated. Patients (>16 years old) who had primary arthroplasty in Erciyes University were included in the study, and patients with preoperative infection were excluded. Patients were followed up during their stay in the hospital and during readmission to the hospital for PJI by a trained Infection Control Nurse. During the study period, 670 patients were followed up. There were 420 patients (62.7%) with total hip arthroplasty (THA), 241 (36.0%) with total knee arthroplasty (TKA) and 9 (1.3%) with shoulder arthroplasty (SA). The median age was 64, and 70.6% were female. The incidence of PJI was 1.2% (5/420) in THA, 4.6% (11/241) in TKA and 0% (0/9) in SA. PJI was significantly more prevalent in TKA ($p=0.029$). All of the PJIs showed early infection, and the median time for the development of PJI

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was 23.5 days (range 7–120 days). The median total length of the hospital stay was seven times higher in PJI patients than patients without PJI (49 vs. 7 days, $p=0.001$, retrospectively). All hospital costs were 2- to 24-fold higher in patients with PJI than in those without PJI ($p=0.001$). In conclusion, the incidence and economic burden of PJI was high. Implementing a national surveillance system and infection control protocols in hospitals is essential for the prevention of PJI and a cost-effective solution for the healthcare system in low-middle-income countries.

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Introduction

Prosthetic joint infection (PJI) is one of the most severe complications after arthroplasty that affects the quality of a patient's life [1,2]. The incidence of PJI is between 1% and 2% for primary hip and knee arthroplasties, respectively. The incidence of infection following a revision hip and arthroplasty has been reported approximately 2%–6% [3]. Furthermore, the dimension of the problem is huge in low-middle-income countries because of their own problems in their hospitals [4]. The management of PJI almost always requires surgical intervention and extended courses of antimicrobial therapy that places a significant economic burden on healthcare system. The economic burden of PJI is relatively well known in industrialized countries [1,2]. However, there is limited data about the extent of the problem and economic burden of PJIs on the healthcare system in developing countries.

The aim of this study was to evaluate the incidence and economic burden of PJIs in a university hospital in Turkey.

Patients and methods

Turkey is a middle-income country according to the World Bank classification of 2014 [5]. This study was conducted at Erciyes University, a referral-based tertiary hospital in the Central Anatolian region of Turkey with 1300 beds. There are 9 surgeons in the Orthopedic Surgery Department and over 600 arthroplasties are performed per year. The design of the operating theater is not optimal [6], and there is no ventilation system or traffic control in the orthopedic operating room. Prospective, active surveillance of prosthetic joint infection has been performed since 2007, and feedback is provided annually to orthopedics with infection control measures. All surveillance data were collected as

a quality and safety measure for the hospital, and institutional approval was given to report the data.

In this study, the surveillance data collected between April 2011 and April 2013 in the Orthopedic Surgery Department was evaluated. Patients (>16 years old) who had primary arthroplasty in Erciyes University were included in the study, and patients with preoperative infection were excluded. Patients were followed up during their stay in the hospital and during readmission to the hospital for PJI by a trained Infection Control Nurse for two years. PJI was defined according to the Center for Disease Control and Prevention (CDC) definitions that include laboratory and clinical criteria. At least one of the following criteria was required: (1) two positive periprosthetic (tissue or fluid) cultures with identical organisms; (2) a sinus tract communicating with the joint; and (3) having three of the following minor criteria: (a) elevated serum C-reactive protein (CRP; >100 mg/L) and erythrocyte sedimentation rate (ESR; >30 mm/h); (b) elevated synovial fluid white blood cell (WBC; >10,000 cells/ μ L) count; (c) elevated synovial fluid polymorphonuclear neutrophil percentage (PMN% >90%); (d) positive histological analysis of periprosthetic tissue (>5 neutrophils (PMNs) per high power field-400 \times); and (e) a single positive periprosthetic (tissue or fluid) culture [7]. The infections were described as early (within 3 months) and delayed (between 3 months and 2 years). Multi-drug resistance (MDR) was defined as diminished susceptibility to 2 or more antibiotic classes [8]. Demographic characteristics and adherences to basic, modifiable and strongly recommended infection control measures (preoperative blood sugar regulation, hair removal, hair removal time, chlorhexidine bathing, antimicrobial prophylaxis-AMP) were observed [9]. The billing records for each patient with PJI and without

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