

## Abstract

**INTRODUCTION:** A significant number of patients attend to the Emergency Department due to the occurrence of a seizure event<sup>3-5</sup>. Seizure events can constitute up to 1% of all emergency department (ED) visits, with a quarter of these first time seizures<sup>6</sup>. Neuroimaging is key in the evaluation of patients with first time seizures<sup>10</sup>, and due to wider availability and quick acquisition time, computed tomography (CT) is routinely utilised. The expense associated with radiological imaging is significant<sup>9</sup> and places a burden on constrained healthcare resources<sup>12</sup>. Moreover, there is high mortality associated with acute symptomatic seizures from CNS infections, stroke and traumatic brain injury<sup>2,7,13</sup>, necessitating determination of the prevalence of these diseases.

**AIM:** The aim of the study was determining the CT scan findings of patients presenting with first time seizures.

**METHOD:** The study was a retrospective analysis of CT brain scans done in patients with first time seizures at Helen Joseph Hospital in Johannesburg, from January 2015 – December 2015. Associated co-morbid disease was also documented and analysed.

**RESULTS:** About 313 CT brain scans were included in the study, with the average patient age being 44 years and 56% of the scans having abnormal findings. CNS infections (15% or 47 cases) were the most prevalent cause of radiological abnormality, followed by cerebrovascular accidents (CVA) (11% or 33 cases) and lastly Traumatic Brain Injury (TBI) (4% or 14 cases). The most prevalent co-morbid disease was retroviral disease (RVD), (27% of patients), hypertensive disease (16%) and acute head injury (10.5%). We also found a strong association between patient age and abnormal CT scan findings, with the average age of patients with abnormal scans being 49 years and those with normal scans 38 years (p-value: 0.001). Furthermore, we found that the older patients were likely to present with CVA or neoplastic brain disease, and that overall, the patients with CVA were on average 52 years old (p-value 0.001).

**CONCLUSIONS:** We established that CNS infections were the most common finding in first time seizure patients and that underlying HIV infection was the most common associated co-morbid disease, thus firmly establishing the leading role of infectious disease in seizure presentation. CVA's were the third most common radiological finding and co-morbid hypertension the second most common disease, reflecting the effect of non-communicable disease in the South African population. Lastly, despite the endemic prevalence of trauma in South Africa, traumatic brain injury did not feature as highly in the causes of first-time seizure presentation (6th overall). The 8% prevalence we found is within the 4-9% prevalence in most international studies<sup>3,6,29</sup>

