

## Research Article

# Study on Causes of Emergency Department Admission for Patients with Parkinson's Disease (2009-2017)

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## Abstract

**Introduction:** Parkinson's Disease (PD) is one of the most common disorders among communities. PD is important due its several aspects like high burden of disorder, costs to health organizations and its progressive, and debilitating nature. In this study, we aimed to evaluate the reasons of admissions of patients with PD to ED in an 8-year range in Tabriz Imam Reza hospital.

**Materials and Methods:** In this cross-sectional study, 51 patients with Parkinson disease whom were admitted to Tabriz Imam Reza hospital from March 2009 to March 2016 were included. Age, sex, cause of admission, hospitalization duration and outcome of patients were recorded and, then analyzed by SPSS software version 16.0.

**Results:** The sexual distribution of hospitalized patients was almost equal (male = 47%, female=53%). The average age of patients was  $66.47 \pm 13.81$  years. The main reasons of patients' admission were sepsis, aspiration pneumonia and motor symptoms exacerbation. Mortality rate was 21.6%; the most common cause was sepsis (54.5%) with aspiration pneumonia (45.5%) being the leading cause of death. The average hospitalization duration of discharged patients was  $9.2 \pm 8.39$  days with a median of 7 days.

**Conclusion:** Higher mortality rate of our patients with infectious diseases reported as main cause of hospitalization and death signify importance of clinical investigation of concomitant diseases and better training of the medical staff in management of Parkinson disease.

**Keywords:** Emergency Department; Hospitalization; Parkinson Disease; Sepsis

## Introduction

Parkinson's Disease (PD) is one the most common pathologic conditions in western societies with the prevalence of 102-190 in 1000 people of general population [1]. Less available data in primary care of PD patients with progressive course of the dis-

ease, high prevalence and poor prognosis impose a large cost to the health care system [2]. Its progressive clinical course leads to disabilities and early death [3]. Patients diagnosed with PD do not usually need emergency primary cares in early stages, however in advanced stages they need more urgent cares [4]. High cost of anti-Parkinson drugs and many PD hospitalized patients cause a significant economic burden to health care facilities. Knowing the fact that the global population is aging and PD most often involves

people over 40 years old, it illuminates that we will face increasing rate of PD patients in near future [5-7]. In recent studies of PD, reasons of referral to ED and hospitalization has not been investigated completely. As patients with Parkinson's disease are under care of specialist and even subspecialist clinicians most of their outpatient periods, general physicians have less information about PD and its characteristics. It seems necessary to educate all general physicians in ED about PD, its signs and symptoms, and reasons of referral to hospital ED as they are the first doctors dealing with PD patients. In this cross-sectional study, we aimed to assess reasons of referring patients with diagnosis of PD to ED of Imam Reza Hospital in Tabriz University of Medical Sciences in recent 8 years.

## Materials and Methods

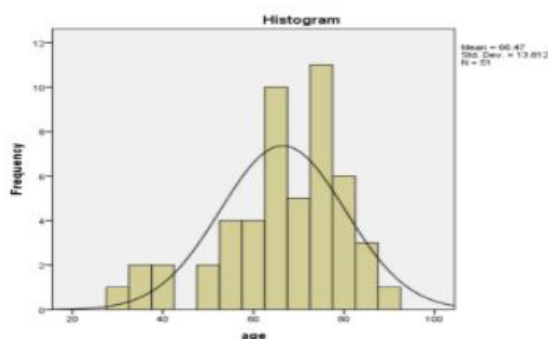
In this cross-sectional study, 51 patients diagnosed with Parkinson disease whom were referred to ED of Imam Reza Hospital of Tabriz University of Medical Sciences from March 2009 to March 2016 were included. Demographic and clinical data including age, sex, reason of referral to the hospital, admission diagnosis and duration of admission were collected using the archive of Imam Reza hospital and investigating patients' medical record.

a. **Ethical Considerations:** This study was confirmed by the regional board of ethics at Tabriz University of Medical Sciences. Personal information of patients was kept confidential.

b. **Statistical Analysis:** Statistical analysis was done by Statistical Package for the Social Sciences (SPSS) release (version 15.0.0) IBM®. Descriptive analysis was done.

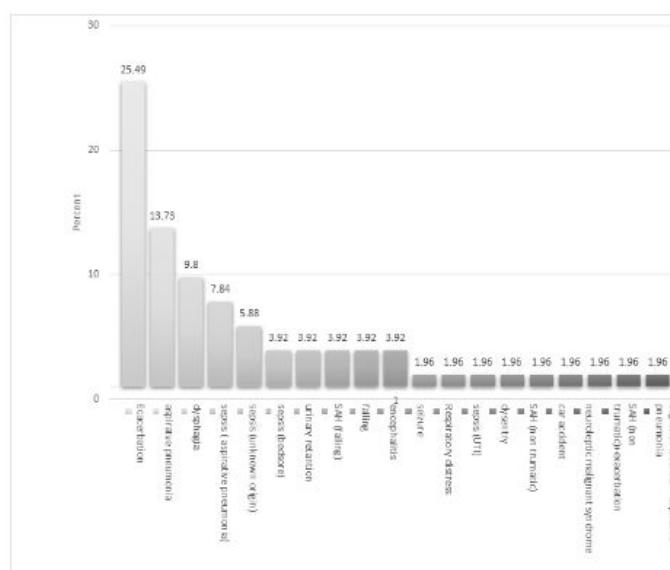
## Results

In our study 51 patients diagnosed with Parkinson disease whom were referred to emergency department of Imam Reza hospital and admitted from March 2009 to March 2016 were studied. 24 and 27 patients were male and female respectively. The average age was  $66.47 \pm 13.81$  years old (figure 1). Utilizing Kolmogorov Smirnov test age distribution was abnormal (p value = 0.01)



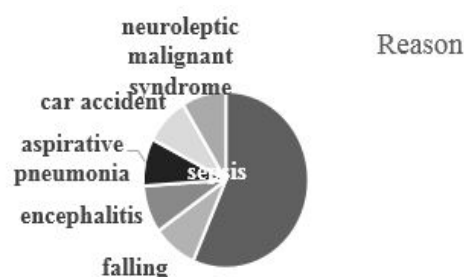
**Figure 1:** Abnormal Distribution of Population.

Although male average age ( $69.71 \pm 12.28$ ) was more than female ( $63.59 \pm 14.66$ ), but there was no significant difference based on Mann Whitney U test (p value=0.13). In assessment of causes that patients present to emergency department, 13 cases with exacerbation, 10 cases with sepsis (aspiration pneumonia in 4, bed sore in 2, UTI in 1, and 3 of them with unknown origin), non-septic aspiration pneumonia in 7 cases, dysphagia in 5 cases, falling in 4 cases (trauma in 2 and SAH in 2 cases), non-traumatic SAH in 2 cases, urinary retention in 2 cases, encephalitis in 2 cases, seizure in 1 case, respiratory distress in 1 case, dysentery in 1 case, accident in 1 case, neuroleptic malignant syndrome in 1 case and cognitive disorder with pneumonia in 1 case were reported Figure 2 and Figure 3.



**Figure 2:** Frequency of Disease in Parkinson Patients.

The most common cause of mortality rate was sepsis (54.5%) with aspiration pneumonia with frequency of 45.5% being reported as the most sepsis-related reason of death.



**Figure 3:** Mortality Cause in Parkinson Patients.

Using Man Whitney U test there was no significant relationship between age of the patients and reasons of their admission

(p value = 0.82). The average duration of hospitalization was  $9.2 \pm 8.39$  days with the longest (33 days) and shortest (1 day) seen respectively in patients with respiratory distress and SAH diagnosis.

## Discussion

In our study, male and female rates in patients who were admitted with Parkinson disease diagnosis was near-equal (M=47%, F=53%). In a 6-year study of Colin Klein et al from 1999 to 2004 in Telaviv, 61.5% of patients who were admitted were male [8]. In Henry Woodford et al study in England 45% were male [9]. Ozlem Guneyssel, et al. study about reasons of hospitalization of patients with Parkinson disease from 2004 to 2006, 63.2% of patients were male [10]. In Abhimanyu Mahajan, et al. study from 2002 to 2011, 53.2% were male [11]. In Shinsuke Fujika, et al. study about reasons of emergency Parkinson disease hospitalization from 2009 to 2015 in Japan among 38 patients, 15 were female [12]. In A. Araslinham, et al. study about reasons of admitting patients with Parkinson disease in England in 2011, 61% were male [13]. In Michal Lubomski et al study from 2008 to 2012 in Australia, 62.8% of patients with Parkinson disease diagnosis were male [14]. Although the results of recent studies show more than 60% of male patients, in our study frequency of female patients were more than male like Woodford's study [8].

The average age of patients in our study was  $66.47 \pm 13.81$  years. In Colin Klein, et al. study about reasons of admitting Parkinson disease, the average age was  $69.5 \pm 6$  [8]. In Henry Woodford et al study about Parkinson disease, the average age was 76 [9]. The average age patients in Oliver H.H, et al. study was 69 [15]. In Massimiliano Braga, et al. study from 2000 to 2007 in Italy, the average age was 76.7 [16]. In Ozlem Guneyssel, et al. study from 2004 to 2006 in Istanbul, the average age was  $73.18 \pm 10.16$  [10]. Abhimanyu Mahajan, et al. epidemiologic study from 2002 to 2011 in 3 million American patients the average age was 78 [11]. In Shinsuke Fujika, et al. study from 2009 to 2015 in Japan the average age was 75 [12]. In A. Arasalingam, et al. study in England in 2011, the average age was  $77.1 \pm 8.5$  [13]. In Michal Lubomski, et al. study the average age was  $75 \pm 10.9$  [14]. According to these studies the average age of patients with Parkinson disease diagnosis is in the range of 69-78. In our study, the average age is 66 years, which represents lower age of patients when admitted.

Regarding the reason of referring to emergency department, exacerbation of motor symptoms (25.4%), sepsis (19.6%), aspiration pneumonia (13.7%), dysphagia (9.8%), falling (7.8%) were reported. In Colin Klein, et al. study from 1999 to 2004, Exacerbation (37%), psychosis (24%) and general problems (14%) were reported (8). The most common reason of hospitalization in J.A.Temlet, et al. study in Australia were falling and fracture (12.6%), pneumonia (12%), heart disease (11.6%) and GI disease

(11%) [17]. In a 4-year study by Henry Woodford, et al. in England infectious disease (21%), Pneumonia (11%), heart disease (20%), falling (13%), psychological problems (8%) were the main reasons (9). In Massimiliano Braga, et al. study in Italy, infectious disease especially respiratory disease was the most common reason of hospitalization in both male and female patients, whereas the main reason of admitting in male was trauma (16). In Ozlem Guneyssel, et al. study in Istanbul the most common reason of hospitalization was infectious disease (31.6%). The other reasons were respectively trauma (27.6%), cardiovascular disease (14.5%), cerebrovascular disease (11.8%), GI disease (7.9%) and electrolyte imbalance (6.6%). In an epidemiologic study by Abhimanyu Mahajan, et al. reasons of hospitalization were reported as pneumonia (6.3%), UTI (4.9%), sepsis (4.5%) and aspiration pneumonia (3.9%) [11]. In A. Arasalignam, et al. study in England in 2011, falling (32%), pneumonia (25%), UTI (12%), exacerbation (7%) and psychological problems (2%) were reported. Mortality rate of this study was 19% [13]. Vincent low, et al. study from 2009 to 2013 in England reported pneumonia (13.5%), exacerbation (9.4%), UTI (9.3%) and fracture (4.3%) as the main reasons [18]. According to many studies infectious disease especially aspiration pneumonia was the main reason of admission, which supports our study results and demonstrates importance of concomitant infectious disease in PD patients.

Mortality rate was 21.6% that the most common reason of mortality rate was sepsis (54.5%) and the most important reason of mortality was aspirative pneumonia (45.5%). Mortality rate of Massimiliano Brago, et al. study from 2000 to 2007 in Italy was 6% (16). Mortality rate of Abhimanyu Mahajan, et al. study in America was 3.9% [11].

Mortality rate in A. Arasalingam, et al. study in England in 2011 was approximately about 19% [13]. In Susan Pennington et al study from 1999 to 2006 the average age of mortality was 81.4 years with the most common reason of mortality being pneumonia (45%) [19]. Mortality rate on Vincent et al study from 2009 to 2013 in England was 2.46% [18]. Results of recent studies in comparison to our study, represents higher mortality rate of Parkinson disease in our study, whereas most of the studies have mortality rate of 4-6%. The most common reason of mortality in our study and Susan Pennington's was aspiration pneumonia [19]. The average duration of hospitalization in discharged patients was  $9.2 \pm 8.39$  days. In Colin Klein et al study the average period of hospitalization was  $11 \pm 6.3$  days [8]. The average duration of hospitalization in Ozlem Guneyssel, et al. study in Istanbul was  $12.24 \pm 7.19$  days [10]. Hospitalization period in our study was in the same range as other studies.

## Conclusion

Male and female sex rates in patients whom were admitted with Parkinson's disease diagnosis is equal. The average age of

patients who were studied was  $66.47 \pm 13.81$  years. In our study, exacerbation of motor symptoms, sepsis, aspiration pneumonia, dysphagia and falling were reported as the most common reasons of referral to the hospital ED. Mortality rate was 21.6%; sepsis was the most common reason of mortality (54.5%), with aspiration pneumonia reported as the most leading cause of death (45.5%). There was no significant relationship between sex and age with mortality rate. The average period of hospitalization in discharged patients was  $9.2 \pm 8.39$  days.

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