

# Parkinson's Disease in the Gulf Countries: An Updated Review

Yassar Alamri<sup>a–c</sup> Michael MacAskill<sup>a, c</sup> Tim Anderson<sup>a, c, d</sup> Hani Benamer<sup>e, f</sup>

<sup>a</sup>New Zealand Brain Research Institute, <sup>b</sup>Canterbury District Health Board, <sup>c</sup>Department of Medicine, University of Otago, and <sup>d</sup>Department of Neurology, Christchurch Public Hospital, Christchurch, New Zealand; <sup>e</sup>Neurology Department, New Cross Hospital, Wolverhampton, and <sup>f</sup>Department of Neurology, Queen Elizabeth Neuroscience Centre, Birmingham, UK

## Key Words

Epidemiology · Parkinson's disease · *LRK2*

## Abstract

**Background:** The Arabian Gulf region is a rapidly developing part of the world. With the increase in average life-expectancy, idiopathic Parkinson's disease (PD), is also expected to increase in prevalence. Furthermore, the high rate of consanguinity among Arabs probably makes familial cases of PD more likely to be encountered than other areas in the world. This review provides an update on the published literature on sporadic and familial PD in Gulf Arabs. **Summary:** Although the Arab population of this region shares religious beliefs and demographic characteristics with other Arabs, their environmental exposures and genetic makeup may be different. This could account for the relatively low prevalence of PD reported in the Al-Thugba study (27 per 100,000) compared with prevalence rates by most other studies on Arab (mainly North African) populations (31.4–557.4 per 100,000). **Key Messages:** Gulf countries are considered rich countries, which makes conducting nation-wide or even international studies logistically easier than it is in many other countries. Such multinational research can be organized by the existing Gulf Cooperation Council, or through a collaboration of the Ministries of Health. This would, hopefully, culminate in the introduction of more research centers, as well as the implementation of better health care policies and practices for the ageing community. © 2015 S. Karger AG, Basel

## Introduction

The Arabian Gulf countries, or simply the Gulf countries, are 6 countries that make up most of the Arabian Peninsula: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates. Also known as countries of the Gulf Cooperation Council (GCC; [1]), they comprise a rapidly developing part of the world, with an estimated collective population of just under 49 million [2]. They share socioeconomic qualities, religious beliefs and demographic characteristics. With the help of globalization and oil discovery, there has been a relatively recent surge in these countries' incomes, making them some of the wealthiest countries in the world (average gross national income per capita of \$68,792 in 2012 [2]). For the most part, this has led to improvements in lifestyle overall, specifically in health care [3]. For example, the average life expectancy has increased from 71.2 years in 1990 to 76.2 years in 2012 [4]. Unlike the political unrest in some of the neighboring countries since the '2011 Arab Spring', the situation in the GCC countries remains largely stable.

Parkinson's disease (PD) is the second most common neurodegenerative disorder in the elderly, and the most commonly seen movement disorder in neurology clinics [5]. Likely due to methodological and sociodemographic differences and time since publication, reported prevalence rates of PD vary widely in the published literature. For example, PD prevalence was reported to be as low as 18 per 100,000 in a Chinese population [6] and as high as

**Table 1.** Published studies on PD in countries of the GCC

Study	Country	Year published	Study type	Study method	Number of PD cases		Mean age in years
					male	female	
Al Rajeh et al. [16]	Saudi Arabia	1993	Epidemiological	Door-to-door survey of various neurological illnesses in 1989	Not provided	Not provided	Not provided
Jones et al. [22]	Saudi Arabia	1998	Genetic	Gene sequencing study of members of a consanguineous Saudi family	2	1	Not provided
Chishti et al. [23]	Saudi Arabia	2006	Genetic	Gene sequencing study of members of 5 consanguineous Saudi families	4 individuals (sex was masked to protect confidentiality)		32 years
Al-Mubarak et al. [15]	Saudi Arabia	2015	Genetic	Screening of 98 PD patients for PD-causing pathogenic mutations	76	22	Various ages of onset
Al-Rajeh et al. [24]	Saudi Arabia	1993	Clinical	Retrospective analysis of outpatient records of patients from a single movement disorders hospital between 1985 and 1990	64		Not provided
Ogunniyi et al. [25]	Saudi Arabia	1998	Clinical	Prospective analysis of clinical records of dementia patients diagnosed in a single hospital between 1985 and 1996	5	1	72.6 years
Al-Bunyan [26]	Saudi Arabia	2000	Clinical	Clinical and nerve conduction evaluations of consecutive PD patients	41	13	60–89 years (no mean provided)
Hamad et al. [27]	Qatar	2004	Clinical	Retrospective analysis of clinical records of dementia patients diagnosed in a single hospital between 1997 and 2003	5	3	70 years

65–125 per 100,000 among the Europeans [7]. A study from England in 1992 revealed a prevalence of 121 per 100,000 [8]. It is expected that PD incidence will further increase in the future, as there are far more people surviving beyond 65 years of age than in the past [9]. With the improved life expectancy in countries of the GCC, PD in the area is likely to mirror the increase observed elsewhere. This article aims to review data about PD in GCC countries (see table 1 for a summary).

### Genetic Studies

Arab families generally tend to be large units with a high rate of consanguineous marriages (up to 30% of all marriages in some populations [10]), thereby increasing

the risk of genetic and familial disorders. Familial PD accounts for less than 10% of all cases of PD [11]. More than 13 loci and nine genes have been implicated in causing familial PD. With such a high rate of inter-marriages and several candidate genetic defects causing PD, one would expect a much higher rate of familial PD in these populations. However, only 2 reports (parkin and *PINK1* defects) have been published from GCC countries, suggesting that more research on potential genetic causes of PD in the region should be undertaken.

Only a handful of studies have specifically investigated the prevalence of PD in Arabs who mostly have their origin in North African Arab countries. A genetic study of familial PD in Tunisia [12] identified autosomal dominant with incomplete penetrance and autosomal recessive modes of inheritance. It is striking that

causes of familial PD, such as *LRRK2* G2019S, which are very prevalent in North African Arabs, have not been reported from GCC Arabs [13, 14]. This could be attributed to the ancestral differences between GCC Arabs and North African Arabs, the latter community being much more closely associated with Berber ancestry [13]. The absence of *LRRK2* G2019S mutations in the Saudi population studied by Al-Mubarak et al. [15] further demonstrates the genetic distinction between GCC Arabs and North African Arabs. These findings, however, do not prove the specificity of *LRRK2* G2019S mutations to North African Arabs, and are a reminder of the need for further exploration of the role of the genetics of PD in the GCC.

### Epidemiological and Clinical Studies

It is surprising that a solitary epidemiological study on neurological disorders in such a populated region has been published [16]. Of the few clinical studies, a number of knowledge deficiencies still exist. For example, not one study has stratified PD patients according to their cognitive state upon presentation/screening. The association of PD and cognitive decline may be of particular relevance to Arab patients, given that North African carriers of *LRRK2* G2019S mutations were found to have higher rates of depression, hallucination and sleep disorders [17].

While crude prevalence rates of idiopathic PD in Arab countries are reported to be similar to the value of 27 per 100,000 in Saudi Arabia [16] in some studies, others have reported considerably different rates. One study conducted in 3 tertiary referral centers in Irbid, Jordan, reported prevalence of 37.4 per 100,000 [18]; a second 1986 population Libyan study reported a prevalence rate of

31.4 per 100,000 [19]; and a third Tunisian study reported a crude prevalence of 43 per 100,000 [20]. In contradistinction, Khedr et al. [21] found a PD prevalence of 557.4 per 100,000 in a recent cross-sectional survey of the Egyptian district of Assiut, a rate much higher than the rate previously observed in the Arab world. The authors of that study highlighted that their study population was rural, possibly explaining this difference, with the majority of other studies comprising urban populations [18, 19, 21].

### Conclusion

Future interventions should focus on uniting efforts in the region, and conducting well-designed incidence and prevalence studies, as well as genetic analyses (e.g. identifying *LRRK2* G2019S mutation in GCC Arabs). The GCC countries are considered among the richer countries, which should make conducting nation-wide or even international studies logistically easier than it is in many other countries within the region. Such multinational research can be organized by the existing GCC, or through a collaboration of the Ministries of Health. This would, hopefully, culminate in the training of Arab movement disorders researchers and the introduction of more specialized research centers, as well as the implementation of better health care policies and practices for the aging community.

### Disclosure Statement

The authors report no financial disclosures or conflicts of interest.

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