Journal of Positive School Psychology
2022, Vol. 6, No. 3, 6614–6620

Prevalence Of Undiagnosed Parkinson Patients In Rural And Urban Communities In Chennai – A Cross-Sectional Study

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INTRODUCTION

According to the Global Burden of Disease research, neurological disorders are the main cause of disability worldwide, and Parkinson's disease is the fastest-growing of these disorders (in terms of age-standardized prevalence, disability, and fatalities). Globally, the number of people living with Parkinson's disease increased by 118 percent from 1990 to 2015, to 6.2 million [Neurological Disorders Collaborator Group study, 2017]. Studies on the occurrence of Parkinson's disease throughout time have produced mixed results. However, between 1990 and 2016, the age-standardized rates of Parkinson's disease grew in every region of the world, according to the current Global Burden of Disease research. Overall, global age-standardized prevalence rates climbed by about 22%. Converging evidence from global surveys, big institution medical records, national census bureaus, and death certificates suggests thaParkinson'son disease is becoming more common. Prospective cohort studies and thorough registries are needed to further understand these patterns. (Darweesh et al., 2016; Savica R. et al., 2017). Parkinsonism is characterized by four cardinal signs namely rigidity, tremor at resting, bradykinesia or paucity of movement, and most importantly the postural changes that occur very early in life. This is often studied theoretically but in actuality, these features develop in patients quite late in the disease progression. The first signs and symptoms that appear differ from individual to individual but most often these cardinal signs don't develop first. Non-motor symptoms (NMS) are noted with greater significance in the reported literature in recent years and they are capable of leaving a large impact on patients' quality of life and social participation. The NMS symptoms consist of mood fluctuation, a decline in cognitive function like memory, impulsive reaction, active conversation, and so on. Some patients report pain, sleep disturbance, and abnormal functioning of the autonomic nervous system. (Chaudhuri et al, 2009) Moreover, NMS is found to be associated with advancing age and disease severity. Although few symptoms like depression smell related issues, constipation, and sleep deprivation can occur initially in the course of the disease. This can be present even at a premotor stage. The increasing range of MS and NMS saw in PD has been reported as a quantitative measure of prevalence, highlighting the clinical breadth of the disease. (Chaudhuri et al, 2005). Thus from a physiotherapist's point of view, it is not always necessary to look into motor symptoms simply because they work with the motor disorder in Parkinson's patients predominantly. Moreover, physiotherapists are the ones who spend a lot of time with their patients observing them from close quarters, and can identify these ailments much better than the others. Hence it becomes imperative to identify patients in the initial symptoms to get them treated early so that their quality of life is maintained. The increasing range of motor symptoms and non-motor symptoms seen in Parkinsonism has been reported as a quantitative measure estimating the prevalence of the disease and highlighting the clinical breadth of Parkinson's patients. (Schrag et al, 2000; Martinez et al, 2007; O'Sullivan et al, 2008). Hence it was perceived that treating already diagnosed Parkinson's patients was insufficient but to identify undiagnosed Parkinson's patients from the community. In this study, an honest effort was taken to screen for Parkinsonism among the community-

dwelling people in both rural and urban places of Chennai.

METHODOLOGY

The research was approved by the institutional ethical committee at the Meenakshi Academy of higher education and research, Chennai from January 2018 to June 2019. The study was approved by the study review board in the college of physiotherapy. The study was performed as a cross-sectional study in the selected areas of Chennai as a part of regular community visits performed by the physiotherapist representing Meenakshi college of physiotherapy, Chennai.

The study was performed in three rural areas (villages) and seven urban communities in Chennai. The study was conducted from 2017 August to February 2018. This study was conducted on community-dwelling people above the age of 60 years of all the gender in both locations. The subjects were selected purely on the age basis for screening. The exclusion criteria included the subjects who were already diagnosed to have parkinsonism, cerebrovascular accidents, and significant disability from other neurological conditions like head injury, neuropathies, and cardiac diseases. We used a screening tool that combined two components motor and non-motor components. For the motor component screening a six-question scale that was standardized by Fereshtehnejad et al. in 2014 to valid and reliable tool for easily and quickly screening parkinsonism patients. The non-motor symptoms were screened using 6 questions selected from Past literature that reported common nonmotor symptoms in screening conducted on large scale. The screening tool is presented in table 1.

Efforts were taken to avoid bias in the answers by the respondent due to fear of treatment or overconfidence of well-being or when the symptoms are so gradual and the patients might have not noted them or due to cognitive deterioration, they may fail to report it appropriately. Hence we decided to take responsibility for the 12 questions from both the patient and the caretaker who lives with the patient and watches them for the maximum a day for at least the past year. The study size was arrived at after screening a minimum of 4000 elderly people. There was no sample size estimated as this was time-bound research. The research was performed by the primary researcher and two more physiotherapists who graduated at least 5 years before with at least 2 years of clinical experience in handling parkinsonism patients and handling the screening tools in their full form.

Statistical analysis -

The data for the study were expressed with a central tendency of mean, median, and percentiles and central distribution. The confidence level was set to 95% and the significance level was fixed at 0.05. SPSS version 26 was used for the statistical analysis of the study. The Clopper-Pearson method was used to create a confidence interval.

RESULTS

A total number of 4144 subjects were screened for the study in 7 months. Totally 18 areas were identified in the rural community and 42 areas were identified in the urban areas. Three researchers were in charge of collecting data with 6 junior therapists deputed under them in assisting the screening. A total number of 18 physiotherapists were involved in the data collection process apart from the primary researcher and two associate researchers. The primary researcher was responsible for the data organization and interpretation. The demographic data of the samples screened is presented in table 2. We initially recorded the Age by category, Sex, Employment status, and if the patients were presenting with chief complaints of slowness in walking, lack of strength, difficulty in swallowing, and so on. The data clearly shows that the majority of the samples screened were male and most of them are retired or unemployed with an average age of 67.45 (4.8) years. We defined positive symptoms as people presenting with at least 4 motor and 2 nonmotor or 2 motor and 4 non-motor symptoms. We also had a weak positive category where subjects had at least 2 motor and 2 non-motor symptoms or 3 motor or non-motor symptoms. If the patients scored below this we considered them negative for the possibility of PD. There were 8 subjects already diagnosed with PD and were on medication. A total of 49 subjects were identified to have positive symptoms of Parkinsonism, 27 subjects with weak positive remaining all negative for PD. The characteristic of the subjects identified with positive and weak positive is presented in table 3 and 4 respectively. Figure 4 shows the flow chart of the study.

Table 1. Screening tool used for the study to screen PD

Q.No	Question	Yes	No	Do not know
1	Have you ever noticed stiffness in your legs?			
2	Have you ever had tremors in your head, arms, or legs that lasted more than 1 day?			
3	Do you have trouble buttoning buttons or dressing?			
4	Have you or others noted that you do not swing one arm when you walk?			
5	Do your feet seem to get stuck to the floor when walking or turning?			
6	Have you become slower in your usual daily activities?			
Screening tool for the Non-Motor component				
1	Do you have a problem with smell			
2	Do you have constipation or issues with urination?			
3	Do you have disturbed sleep			
4	Do you have Unexplained depression?			
5	Do you have difficulty swallowing food or drink or problems with choking			
6	Problems remembering things and lack of interest in what is happening around you.			

Table 2. The demographic data of the samples screened

Criteria	Numbers	
Total samples	4144	
Age by category	60-65 years	1955
	66-70 years	1277
	71-75 years	802
	76 years and above	110
Sex	Male	2943
	Female	1201
Employment	Retired	2285
	Unemployed	1004
	Employed	855
Area	Rural	1980
	Urban	2164
Presenting with chief complaints of slowness in walking, lack of strength, difficulty in swallowing, and so on	No	2248
	Occasionally	1475
	Often	421

Table 3. Demographic data of the samples positive for PD

Criteria	Sub classification	Numbers
Total positive – 49		
Age by category	60-65 years	28
	66-70 years	15
	71-75 years	6
	76 years and above	0
Sex	Male	32
	Female	17
Employment	Retired	30
	Unemployed	18
	Employed	1

	No	0
Presenting with chief complaints	Occasionally	7
	Often	42

Table 4 Demographic data of the samples weak positive for PD

Criteria	Numbers	
Total - 27		
Age by category	60-65 years	14
	66-70 years	10
	71-75 years	2
	76 years and above	1
Sex	Male	18
	female	9
Employment	Retired	12
	Unemployed	11
	Employed	4
Presenting with chief complaints	No	0
	Occasionally	8
	Often	21

Figure 1 – Motor questionnaire - positive and weak positive subjects

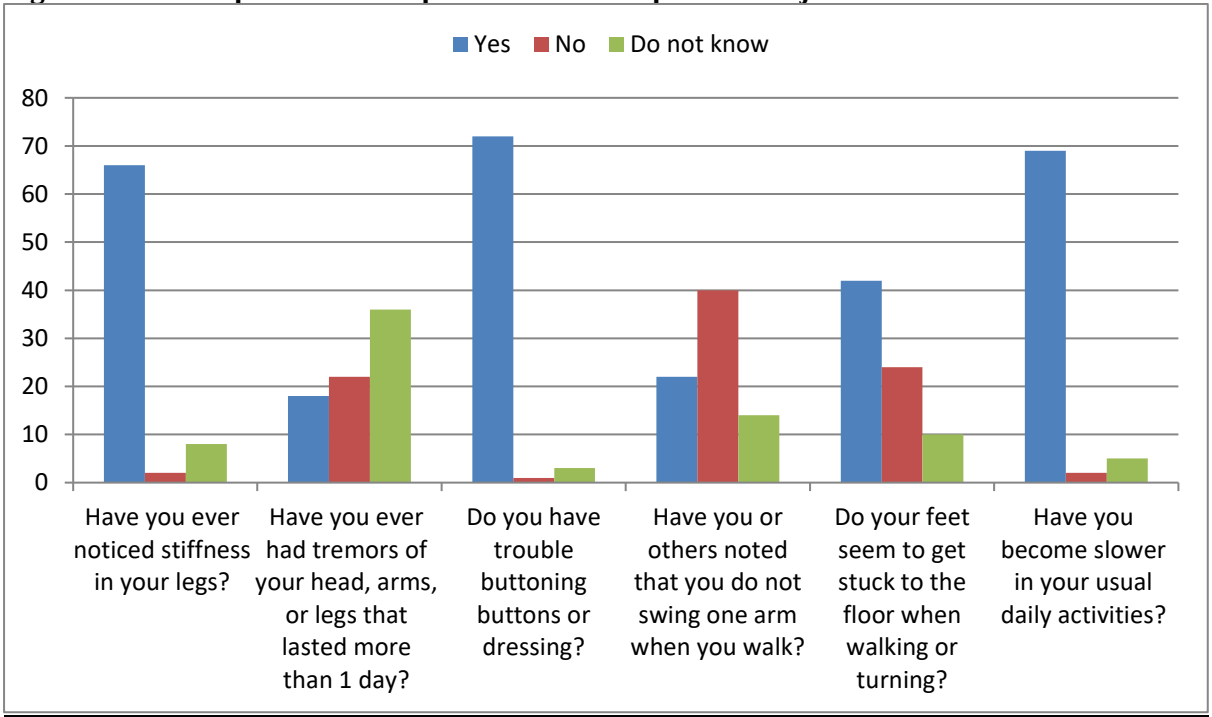


Figure 2 – Non-Motor questionnaire - positive and weak positive subjects

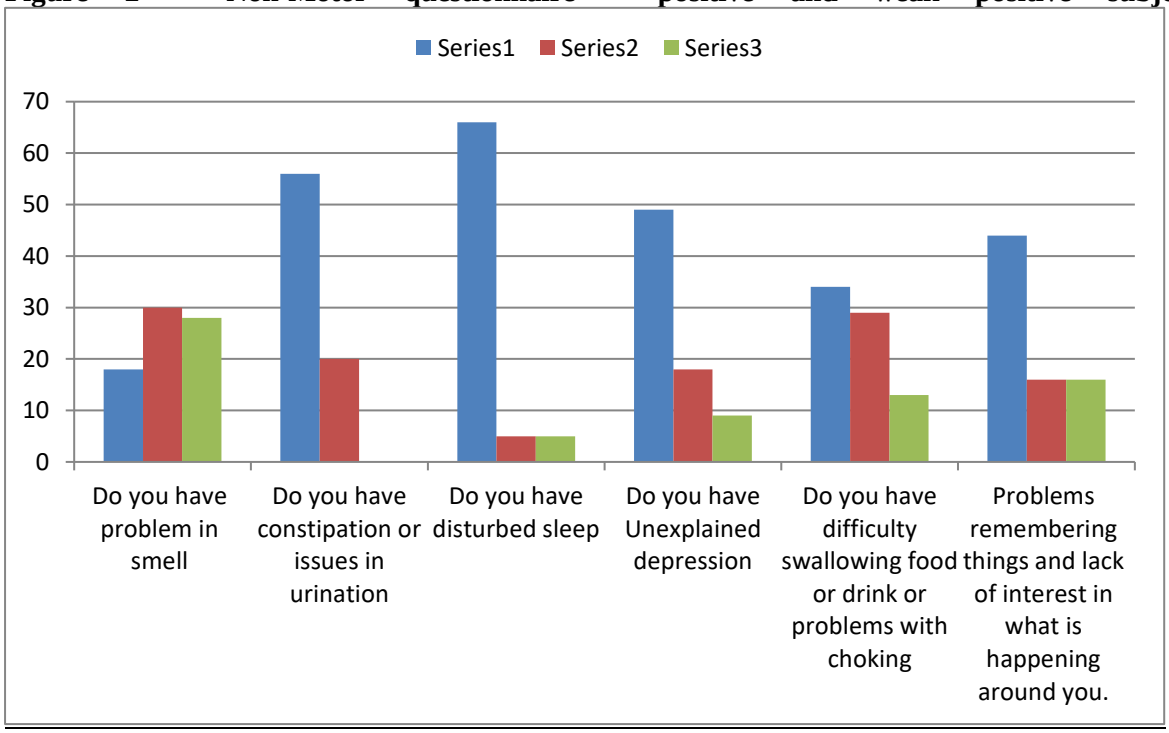


Figure 3 –Distribution of identified PD in rural and urban

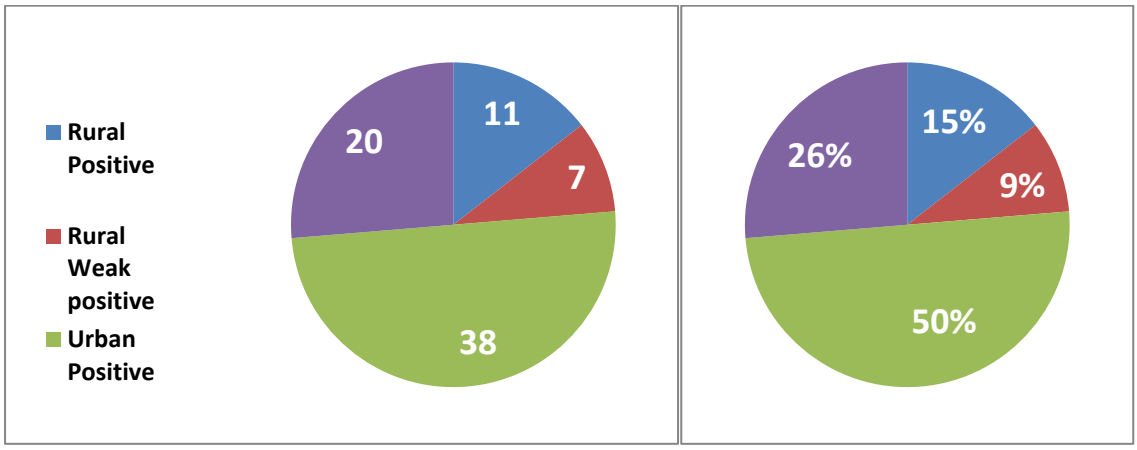
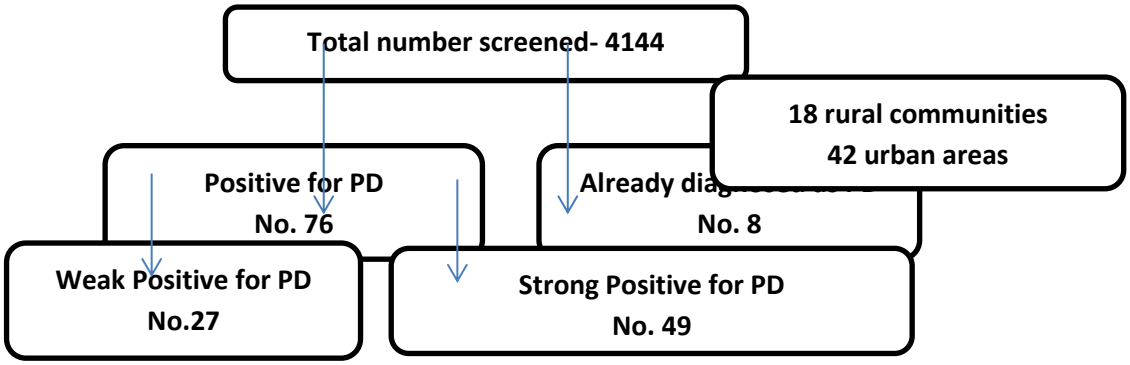


Figure 4 – flow chart of the study



4. Discussion

There is no evidential lab or imaging test that is suggested or definitive for diagnosing PD. However, in 2011, the United States Food and Drug Administration acknowledged an imaging scan based on a single-photon emission computed tomography (SPECT) scanner, which was much similar to magnetic resonance imaging. But this technology is highly inaccessible and costly to the general public to afford. Specialists are turning out to be more mindful of symptoms of Parkinson's that go before actual indications. Pieces of information to the patients that occasionally appear before motor symptoms — and before a provisional diagnosis— are called "prodromal symptoms." These incorporate the deficiency of feeling of smell, sleep disturbances, REM issues, continuous clogging that is not in any case clarified, and mindset problems, like depression and anxiety. An examination into these and other early symptoms holds a guarantee for significantly more advanced testing and analysis. For instance, biomarker research is attempting to respond to the subject of who gets Parkinson's disease. Researchers trust that once specialists can anticipate that an individual with early symptoms will ultimately get PD, those patients can be effectively treated. At any rate, these advances could significantly postpone disease progression. Hence examination for screening of Parkinson's disease at the earliest has become imperative, particularly in a society like India, where affordability becomes a major issue for Diagnostic procedures. Moreover, the changes that happen in Parkinson's disease happen very in insidiously which results in patients getting have been created to the changes that are happening to them over some time. Because of this fact is that happening goes unnoticed even with the cap takers and the close relatives. As Parkinsonism is a gradually deteriorating disease, so the symptoms will not appear all of a sudden. If the early symptoms are diagnosed by the researcher, it would be fruitful.

The results of the current study state that there was a prevalence of 1.182% PD among the rural and urban population of Chennai who was not diagnosed yet with PD. There were 0.65% of the population with weak positive cases for PD. Thus put together there were 1.8% of possible PD patients prevalent in the Chennai district. The majority of the patients selected for the study were in the age category of 60 to 65 followed by the age category of 66 to 70. Patients who are elderly in this age group presented very scantily because of two main reasons, lack of interest in screening and lack of caretakers to bring them to the screening location. Predominantly, males participated in the study most of them were retired from their job. Most of them have worked with government or private organizations for a long period which can also be the reason for such high levels of prevalence of PD. Most of the patients presented with no chief complaints which were taken as signs of neural or motor function deterioration for the current study. 10.15% of the subjects reported having the symptoms continuously, 35% of the subjects had occasional symptoms out of 4144. Out of the diagnosed people with the positive symptoms of Parkinsonism, 57% of the patients were +in the age group of 60 to 65, this was expected because this population was more screened than the other age group. 65% of the patients diagnosed with Parkinson's disease were Male and only 35% of them were female. 85% of the people who said they had often suffered from chief complaints mentioned in the study predictive of Parkinson's disease. Similar results were already presented in the literature (Postuma, et al, 2009 Savica, et al, 2013)

The most common systemic disease that was prevalent among this age group was Diabetes mellitus with a percentage of 11.7% followed by hypertension at 10.3%. There were also subjects presenting with bronchitis, cancer, and other endocrinological disorders.

Out of the diagnosed people with the weak positive symptoms of Parkinsonism, 51.8% of the patients were in the age group of 60 to 65, this was expected because this population was more screened than the other age group. 66.6% of the patients diagnosed with Parkinson's disease were Male and only 33.4% of them were female. 77.7% of the people who said they had often suffered from chief complaints mentioned in the study predictive of Parkinson's disease. Three predominant motor symptoms were present in these patients stiffness of the legs trouble buttoning the dress and slowness of movement. It was observed from the analysis that patients observe their functional activities much better than other symptoms like tremors, and swinging of upper limbs. As far as the

non-motor questions are concerning sleep disturbance unexpected depression, and constipation were highly prevalent. In the overall distribution of Parkinson's disease among rural and urban areas, it is evident that in urban areas the positivity was high than in rural areas 2.68% that the rural which was only 0.90 %.

5. Conclusion

This study which tried to find the prevalence of PD among the Chennai population concluded that 1.18 % of patients were found positive to have PD and 0.65% of people can be suspected to develop PD in the future. The study identified that lack of awareness and the insidious nature of PD might be the reasons for unidentified PD and delayed diagnosis. This study would recommend finding the effect of physiotherapy among these patients who have not been diagnosed with PD and have not started on any medication yet. We also frequent screening for community and people from various sectors that comprise people above 50 years of age, to identify PD at the earliest for better rehabilitation and quality of life.

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