

Prevalence of Parkinson's Disease, Diagnosis with its Life Expectancy

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Abstract

The disease of any kind causes bad effect on the health of human being. Ignoring the health problems leads to devastation of one's body. Parkinson's disease is one such disease. Millions of people suffered from this disease. The diagnosis of disease is very important before thinking of any further step. Parkinson's disease is neurodegenerative disorder. The diagnosis and cure is essential for overcoming the hurdles related to this neurological disorder. The diagnosis of the disease have been done. The data have analysed and the results are computed, tested and verified with the maximum survival of the patients using SPAR 2. It gives possible causes with the challenges and the solution using various computer based algorithm. Rigorous experimentation have been done by using different datasets of the disease and it gives promising results. Data is further tested and verified by SAS software and computation RMSE, General Mean and R Square is also obtained. The computation of ANOVA for Effects for each parameter of the patient is determined. The pair wise comparisons have also done for data sets and the statistical significance of the result is tested by computing the Critical Differences of characters at 5% and 1% levels of significance.

Keywords: Parkinson's disease; Tremor; Stiffness; Psychology; Memory; Analysis; Significance; Life Expectancy; Red tulips.

Introduction

The most devastating of nervous system affects the large population. The Red tulips represents the symbol of Parkinson's disease. It was on April 11, 2005 the red tulips was launched as the international symbol of Parkinson's disease during the 9th World Parkinson's Disease Day conference in Luxembourg. The red tulips which rises from

the bare earth to bloom gloriously each spring was chosen as the symbol of hope for Parkinson's sufferers.

There is actually a tulip named 'Doctor James Parkinson's. It is red triumph tulip with a white margin named for the English Doctor who first described the disease in 1817 and was launched by 1981 its hybridizer J.W.S. Vander Wereld himself suffering from Parkinson's disease.⁹

Parkinson's disease is degenerative, progressive disorder that affects nerve cells in deep parts of the brain called the basal ganglia and the substantia nigra. Nerve cells in the substantia nigra produce the neurotransmitter dopamine and are responsible for relaying messages that plan and control body movement.¹⁰

Parkinson's disease are caused by genetic mutations. Hereditary causes of this disease are rare. Only 15% of Parkinson's have a family history.

The month April is Parkinson's disease Awareness month. Parkinson's disease affects the

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eyes. It causes a lot of retinal cells in the eye that rely on dopamine to process and perceive color. Parkinson's may also impact the eyelids. People with Parkinson's disease blink less frequently, which can lead to dryness, irritation or burning of the eyes. Sometimes it causes blurred vision.

The disease symptoms gradually sometimes starting with a barely noticeable tremor in just one hand. Tremors are common, but the disorder also commonly cause stiffness or slowing of movement. In the early stages of Parkinson's disease, face may show little or no expression. The arms may not swing while walking in most of the cases. The most common symptoms such as bradykinesia, tremor, rigidity and postural instability also referred as Parkinsonism.

Many countries have done their trails and survey through questionnaire, awareness program, extension etc. Research and Implementation are still needed for complete satisfaction from devastating disease.

Materials and Methods

SPAR 2.0⁵ have been used for diagnosis, prognosis of disease and for finding out the possible causes. This software consists of many innovative modules based upon advanced statistical and computer methodologies with techniques. This software has been developed using Visual C++. This platform and technology¹⁻⁴ is suitable for software development. It utilizes various key features of object oriented technologies such as its ability to programme in an event driven operating system with great ease, write code for events automatically, optimize code capability for native platform, etc. The basic reason behind selection of this technology was its superior abilities for code reusability, inheritability, encapsulation, portability and modular development. The concept of various scripting languages have been used and this expert system is very easy to use and beneficial for everyone who is directly or indirectly related to this field.

Except this software, many other Software tools and engineering techniques have also been used which is mentioned in the next section.

Experimental Analysis

Extensive experimentation have been done for disease data sets⁸ by SPAR 2.0 The big data for diseases have also been generated to understand the pattern and also been analyzed with the same or different number of the parameters. It gives

the pattern identification of the type of disease or disorder, recurrence or non-occurrence of disease, survival or mortality percentage etc. Depending upon the level or type of disease, the procedures of corresponding treatment is implemented. It also gives the relationships among various parameters of the patients. It gives the diagnosis and prognosis of the disease. Comparisons have been made with the control, i.e. which has been expected for the various categories of disease. The prediction or the decision given by the algorithm is also statistically tested at different level of significance for all the data sets. The mean, standard deviation and coefficient of variation of each type of category is evaluated separately and statistically tested at different levels of significance. Further verification or analysis of the result is tested by SAS.⁶ The effect of each parameter on the survival percentage of the patient is also determined and it is statistical significance is obtained at different level of significance. Generally, except the medical science the statistical significance is acceptable at various levels but here the question arises for the life of a patient not for the item/commodity/resource, i.e. life of a human being and he/she is not to be recommended and acceptable even at low level. So through this algorithm and even through SAS, computed the statistical significance at 5% and 1% respectively to avoid the risk of the life of a patient. So, this way the health experts or the doctors can improve the quality of life by appropriate prediction, diagnosis and prognosis of the disease or disorder.

The various symptoms Trembling, Depression, Fatigue, Insomnia, difficulty in voice, difficulty in walking, Dyskinesia, Constipation, Rigidity are represented by 1, 2, 3, 4, 5, 6, 7, 8 and 9 respectively. It is clearly shown in Fig. 1 that the percentage of trembling, walking, fatigue and rigidity is too much as compared to other parameters.

The Life expectancy also have been measured and analyzed through statistical methods by using SPAR 2.⁵ In (Fig. 2) 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 are represented as Age 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90 years respectively along y-axis. This is age of onset of disease. Life Expectancy of the patients having Parkinson's disease are represented by blue color bars as compared to persons who are not having Parkinson's disease. The results clearly shows that the life expectancy is almost same for people suffered with and without Parkinson's. It actually depends upon the onset of the disease. The people who suffered in young age with Parkinson's die earlier as compared to people who suffered from Parkinson's in late age. We found very rare

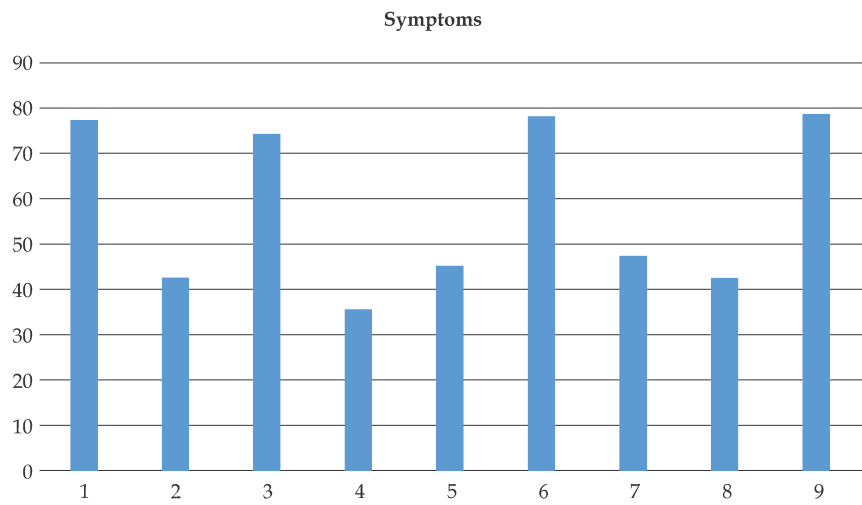


Fig. 1: Parkinson's disease symptoms.

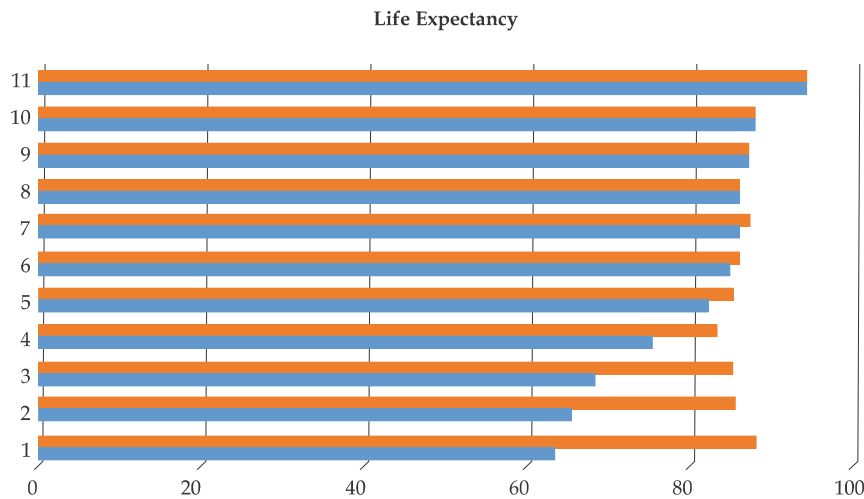


Fig. 2: Life expectancy.

cases of Parkinson's in very young age. So, the life expectancy of Parkinson's is almost somehow very near to normal persons. Rest it also depends upon the severity of other complications with the person.

The above results are further tested and verified by SAS software and computation⁶⁻⁸ of Root Mean Square Error (RMSE), General Mean and R Square

is also obtained. The computation of ANOVA (Analysis of Variance) for Effects for each character (parameter) of the patient and for each data set is determined. The pair wise comparisons were also done for data sets and the statistical significance of the result is tested by computing the Critical Differences of characters at 5% and 1% levels of significance.

Table 1: ANOVA and other measures

		ANOVA			
Source	DF	SS	MS	FCAL	Prob>F
Treatment	9	346793.5	38532.61	927.7096	0.00001
Error	2370	98438.43	41.5352		
Total	2379	445231.9	187.1509		
R-Square		RMSE	General	Mean	
	0.778905	6.444781	6.068546	106.1998	

Table 2: Treatment Mean and S.D. measures

Treatment means and their standard errors		
Treatment	Mean	SD
1	1.672269	0.470375
2	38.55462	16.0009
3	0.007761	0.003932
4	0.078441	0.064815
5	0.025941	0.013182
6	0.133135	0.088013
7	0.722332	0.271715
8	18.28854	12.5929
9	0.158227	0.097964
10	1.044189	0.65224

Table 3: Pair wise comparisons

All possible paired comparison of treatments Prob>F										
S. No	1	2	3	4	5	6	7	8	9	10
1	.	0.00001	0.00488	0.00703	0.00537	0.00924	0.10798	0.00001	0.01044	0.28782
2	0.00001	.	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
3	0.00488	0.00001	.	0.90478	0.97545	0.83195	0.22657	0.00001	0.79898	0.0795
4	0.00703	0.00001	0.90478	.	0.9292	0.92624	0.27586	0.00001	0.89258	0.10224
5	0.00537	0.00001	0.97545	0.9292	.	0.85603	0.2386	0.00001	0.82284	0.08491
6	0.00924	0.00001	0.83195	0.92624	0.85603	.	0.3187	0.00001	0.96612	0.12317
7	0.10798	0.00001	0.22657	0.27586	0.2386	0.3187	.	0.00001	0.33974	0.58594
8	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	.	0.00001	0.00001
9	0.01044	0.00001	0.79898	0.89258	0.82284	0.96612	0.33974	0.00001	.	0.13383

Table 4: Treatment Critical Differences

Treatment Critical Difference	
C.D. for Treatments (1%)	1.521880
C.D. for Treatments (5%)	1.157953

Most common cause of death in those with Parkinson's disease is pneumonia because the patient's ability to swallow, putting them at risk for inhaling or aspirating foods or liquids into their lungs leading to aspiration pneumonia.

The best treatment for Parkinson's is Levodopa and carbidopa (Sinemet). Levodopa is most commonly prescribed medicine for Parkinson's. It's also the best for controlling the condition particularly slow movement and stiff, rigid body parts. Levodopa works when your brain cells change it into dopamine.

Surgery is an important option for some people suffered with Parkinson's to help treat the symptoms. Deep brain stimulation is the most common surgery for the Parkinson's. It has fewer risks and

disrupting electrical signals in the brain, rather than destroying tissue. It improves the communication between brain cells. It reduces symptoms such as tremor, slowness and stiffness

Nutrition is very important for overcoming the hurdles. Vitamins are good for Parkinson's disease such as Antioxidant Vitamin C, E, B12, B6 are very important to include in some way. By varying the food of different types, increasing the fiber intake and inclusion of whole grain food, brown rice, whole wheat bread etc. Green tea, aerobic exercise, eat fresh fruits and vegetables. The Ginger and turmeric will also be beneficial for health. The massage with sesame oil is very effective and gives muscular relaxation, improves walking abilities, increase performance and relief up to large extent.

Pain is common in Parkinson's but perhaps unexpected. The personality changes because of

Parkinson's. Stressful life events may increase the risk of Parkinson's disease. The stress damages the dopamine cells resulting in severity of disease.

Family members, friends and care givers may notice changes in personality brought on by neurological changes in the brain. The changes can be varied. People with earlier Parkinson's can safely drive but as the stage increases very fatal symptoms of Parkinson's Disease give up driving is best.

Conclusion

The impact of Parkinson's disease goes beyond the physical effect on movement or control of movement. The progression and the extent of the disease affects not only an individual's ability to take an active role in everyday life but also his or her desire to do this. The diagnosis of the Parkinson's disease and the analysis have been done by using advanced statistical methodologies, software and algorithms. Rigorous experimentation have been done and analyze the data with promising results. More awareness program should be started so that the apprehension of this disease will be overcome. The day is not very far when people patiently

understand the symptoms of the disease and getting the solutions from the scientist, doctors and experts worldwide.

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"Awake each morning. Each new day renews our life, our contract to keep living. Strive to live forward and always remember that we are still in the driver's seat of our world. Live decisively even as we accept the problems from Parkinson's."

— Frank C. Chruch