

# Suicidal Risk in Patients with Parkinson's disease: A Disability-Based Analysis

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**Abstract:** The objective of this study was to investigate suicidal risk of patients with Parkinson's Disease (PD). Specifically, the study aimed at investigating whether patients with PD are in danger of committing suicide, as well as whether this suicidal risk is associated with factors like social support, level of patients' depression, as well as characteristics of PD, name the stage of the disease that patients are currently in and the number of years that patients have Parkinson. Quantitative research was held in the form of survey with questionnaires. 70 randomly-chosen patients with PD participated in a survey with questionnaires, which consisted of the GDS Scale, the Glo.Di.S Scale, and the RASS scale. Research findings indicated that female patients with PD reported higher danger, obviously because of their higher dissatisfaction for life. Next to the above, patients with PD that were of lower educational level, the intensity of the symptoms of whom were higher, as well as those were at a later stage of their chronic disease were those that revealed that they had higher danger of committing suicide. In contrast, patients subject to adequate family and social support did not report high danger of committing suicide. The theoretical and practical conclusions and implications of research findings are discussed and the limitations of the study are presented.

**Keywords:** Parkinson's Disease, Suicidal Ideation, Depression, Social Support.

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## 1. BACKGROUND

Parkinson's Disease (PD) is one of the most major neurological disorders concerning humans' Central Nervous System (CNS). Specifically, it is a chronic and progressive disease affecting humans' motor system, whose development is mainly attributed to the low dopamine levels produced by brain cells (Shulman *et al.*, 2011). The causes of PD have not been clearly defined. However, it is supported that PD is mainly identified in people exposed to pesticides –mainly those living in areas with high agricultural activity- and those having experienced severe head injuries (Van Maele-Fabry *et al.*, 2012). Smoking and tea consumption are considered as activities preventing the development of PD (Noyce *et al.*, 2012). Slowness of movement and tremor are the most common symptoms of PD, especially at earlier stages of the disease. As the disease progresses, patients experience difficulties in their daily functioning and performing their daily activities. In later stages, patients are unable to move and hold their balance, thereby being highly vulnerable to body injuries (Jankovic, 2008). PD also has mental and neurological symptoms, such as sleeping difficulties and seeing nightmares, memory problems and even illusions (Davie, 2008). Patients with severe PD may also experience dementia in later stages of their disease and life cycle (Camicioli and Fisher, 2005). As far as psychological symptoms are concerned, depression is the most common. There are no specific examinations to diagnose PD. Rather, through screening and other medical examinations, health professionals exclude other diseases from their diagnoses to reach the conclusion that a patient has PD (Ghoche, 2012). PD cannot be fully cured. Medication with emphasis on issuing dopamine forms the major clinical

intervention to deal with PD symptoms, while in some cases physiotherapies and even surgical interventions are proposed, in order to improve the motor ability of patients (Rodriguez-Oroz *et al.*, 2009). Due to the varying nature of PD symptoms, holistic care is mainly recommended to include interventions for dealing with the psychological symptoms of PD as well (Kalia & Lang, 2015). According to the Parkinson's Disease Foundation (2016), approximately 1% of the global population over 65 years old and 4% of the global population over 80 years old have some form of PD, while the disease is mainly identified in people over the age of 50. The Greek newspaper To Vima (2012) reports that patients with PD in Greece were about 20,000 in 2012.

PD is highly associated with depression. According to Cummings (1992) and the findings of his literature review, about 40% of patients with PD are highly likely to develop symptoms of depression sometime throughout their lifespan. The findings of the same research also indicated that female patients and those with more intense motor symptoms of PD are more likely to become depressive. In a similar context, Worku *et al.* (2014) conducted survey with questionnaires with a sample of 101 patients with PD from Ethiopia and found that 58% of them were depressive, while 1.8% of them received antidepressants, thereby indicating the need for health professionals to also pay attention to the psychological side of PD. According to Lynch and Duval (2010), as well as Takahashi (2001), depression is the psychological disorders that leads patients to commit suicide more than any other disease, thereby also providing the framework for linking PD with suicidal risk. The authors also note that 70%-90% of people with psychological disorders have suicidal intentions and many of them commit suicidal attempts, most of which lead to death.

Referring to the association between PD and suicidal risk, Nazem *et al.* (2008) conducted survey with questionnaires with a convenience sample of 116 patients with PD and found that 30% of participants was subject to suicidal intentions while 4% had attempted to commit suicide in the past. Research findings also indicated that patients with more severe symptoms and at a later stage of PD were subject to higher suicidal risk. Dumitru (2016) also conducted personal interviews with questionnaires with 109 patients with PD and found that 30% were at high suicidal risk. Moreover, high suicidal risk was identified for patients at later stages of PD, with more intense symptoms and for those that were also depressive. Ozdilek and Gultekin (2014) collected clinical statistics for 120 patients with PD receiving treatment at a private clinic in Turkey and found that patients of lower educational level, as well as those at a later stage of their illness and those with very intense motor symptoms had increased suicidal risk. In contrast to the above, Chung (2015) had found that patients at earlier stages of PD are more likely to commit suicide, while for Juurlink *et al.* (2004) suicidal risk is high not only for patients with PD, but also for patients with other chronic diseases. Alphs *et al.* (2016) conducted excessive literature review and found social support as the most important factor for determining the level of suicidal risk of patients with PD.

Despite the above, there are also researchers having reached different conclusions. For example, Kummer *et al.* (2009) distributed questionnaires to 90 patients with PD and found that only a few of them had tried to commit suicide. These patients were younger than others and at earlier stages of their disease, while also not having experienced adequate social support. Myslobodsky *et al.* (2001) analyzed data for 144,364 patients with PD, which was collected from the National Health Statistics of the United States. According to their findings, suicidal risk of patients with PD was 10% lower than that of healthy population. Moreover, suicidal risk was not found to be correlated either with intensity of symptoms or level of patients' depression. Ghorbani *et al.* (2014) surveyed a random sample of 124 patients with PD and found no significant relationship between gender, social support and intensity of symptoms with suicidal risk of patients with PD.

Taking the above into consideration, this study hypothesized that patients with PD have adequate suicidal risk. Moreover, the study hypothesized that intensity of symptoms, stage of PD disease, depression and social support.

## 2. METHODS

The philosophical paradigm of positivism was occupied for this study. According to this paradigm, there is one and only truth, which is the truth that is observed in the environment, without taking into consideration social stings and human feelings (Schunk, 2008). The research that was conducted was quantitative, so that a large number of participants is researched and results that are representative of the wider population under investigation are produced (Silverman, 2011). For the same reasons, data was collected through survey with questionnaires, which were personally administered, so that high response rate is enhanced (Given, 2008).

The research questionnaire consisted of 4 sections (see Appendix). In the first, participants were asked to provide demographic information, as well as information regarding their smoking and alcohol-consumption habits and the extent to which they perceived the social support they received as adequate. In the second section, participants were asked to complete the translated-to-Greek short version of the Geriatric Depression Scale (GDS), as developed by Sheikh and Yesavage (1986). The scale is highly valid and reliable (Yesavage *et al.*, 1983). In the third section, participants were asked to complete the Greek version of Global Disability Scale (Glo.Di.S), as developed by Fountoulakis *et al.* (2012). The scale has also been found to be highly valid for assessing human disability, while the 25 items of the scale have been found to be subject to high internal consistency (Cronbach's Alpha=0.95) (Fountoulakis *et al.*, 2012). In the fourth and last section, participants were asked to complete the Greek version of the Risk Assessment Suicidality Scale (RASS), as developed by Fountoulakis *et al.* (2012). The scale consists of three sub-scales, namely the Life Scale (feelings for life), the Intention Scale (present and future intentions to commit suicide), and the History Scale (attempts to commit suicide in the past). The developers of the RASS scale found it to be high valid and reliable (Cronbach's Alpha= 0.69 for Life Scale, 0.85 for Intention Scale, and 0.52 for History Scale). Hoehn and Yahr Scale, as developed by Hoehn and Yahr (1967) was also used, in order to name the stage of PD that patients belonged to. The scale identifies 7 stages of PD (Stage 1, 1.5, 2, 2.5, 3, 4 and 5), and for every next stage intensity of PD and its symptoms is higher. Last but not least, Mini-Mental State Examination (MMSE) scale was used to assess the memory and mental ability of participants.

The sample of the research was random and consisted of 70 patients with PD, who were either treated at a Greek private clinic for patients with PD, or were attended by executives of the non-profit organization "Epikouros Kinisi", located at Athens, Greece, or received in-home treatment from health professionals of the Greek private healthcare company "In-Home Parkinson Care". Prior to completing their questionnaires, participants were asked to read an Informed Consent Form and return it back signed. Participants voluntarily participated in the research and the research was eponymous.

Quantitative variables are expressed as mean values (SD) or as median values (interquartile range). Qualitative variables are expressed as absolute and relative frequencies. Spearman correlations coefficients were used to explore the association of two continuous variables. Correlation coefficient between 0.1 and 0.3 were considered low, between 0.31 and 0.5 moderate and those over 0.5 were considered high. Linear regression analysis in a stepwise method (p for entry 0.05, p for removal 0.10) was used in order to find independent factors associated with RASS dimensions. Dependent variables were log transformed due to their skewed distribution. Adjusted regression coefficients ( $\beta$ ) with standard errors (SE) were computed from the results of the linear regression analyses. All reported p values are two-tailed. Statistical significance was set at  $p < 0.05$  and analyses were conducted using SPSS statistical software (version 19.0).

### 3. RESULTS

Sample consisted of 70 participants (36 men and 34 women) with mean age 70.1 years old (SD=8.9 years). Participants' characteristics are presented in table 1. 21.4% of the sample had diabetes, 38.6% hypertension and 15.7% CHD. 64.2% of the participants had more than two on Hoehn and Yahr scale. The mean MMSE was 26.9 (SD=2.8).

Mean and median scores on RASS, Glo.Di.S and GDS dimensions, are shown in table 2. Correlation analysis of RASS dimensions with Hoehn and Yahr scale, MMSE, Glo.Di.S and GDS are presented in table 3. All RASS dimensions except for History were significantly and positively correlated with stage according to Hoehn and Yahr scale. Also, All RASS dimensions except for History were significantly and positively correlated with Glo.Di.S subscales. MMSE revealed no significant association with RASS dimensions, while it was found a significant correlation of GDS with all RASS dimensions.

When multiple linear regression analyses in a stepwise method were conducted (table 3) it was found that Hoehn and Yahr scale, total Glo.Di.S score and GDS were independently associated with Intention scale. Furthermore regression analysis revealed that lower educational status, the presence of diabetes, increased scores on Hoehn and Yahr scale, total Glo.Di.S score and depression scale were associated with increased score on Life scale. On the contrast increased satisfaction by the support of relatives was associated with lower scores on Life scale. Depression was the only predictive factor for History scale. Concerning total suicide score it was found that lower educational status and increased scores on Hoehn and Yahr scale, total Glo.Di.S score and depression scale were independent predictors.

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**Table 1. Sample characteristics**

	N (%)
Sex	
Men	36 (51.4)
Women	34 (48.6)
Age, mean (SD)	70.1 (8.9)
Place of birth	
Athens	19 (27.1)
Other	51 (72.9)
Educational status	
At most primary school	20 (28.6)
Middle/High school	21 (30.0)
University/ Master	29 (41.4)
Married	51 (72.9)
Smoking	12 (17.1)
Alcohol consumption	9 (12.9)
Diabetes	15 (21.4)
Hypertension	27 (38.6)
Coronary heart disease	11 (15.7)
Duration of disease	
Less than 2 years	24 (34.3)
3-5 years	23 (32.9)
More than 5 years	23 (32.9)
Satisfied by the support of relatives	
Not at all	3 (4.3)
Some	11 (15.7)
Very	17 (24.3)
Very much	39 (55.7)
Satisfied by the support of friends and acquaintances	
Not at all	6 (8.6)
Some	18 (25.7)
Very	29 (41.4)
Very much	17 (24.3)
Satisfied by the support of medical staff	
Not at all	3 (4.3)
Some	15 (21.4)
Very	27 (38.6)
Very much	25 (35.7)
Hoehn and Yahr scale	
1.0	12 (17.1)
1.5	13 (18.6)
2.0	19 (27.1)
2.5	12 (17.1)
3.0	14 (20.0)

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Table 2. Descriptive statistics RASS, MMSE, Glo.Di.S and GDS dimensions

	Mean (SD)	Median (IQR)
<i>RASS</i>		
Intention scale	88.5 (145.9)	0 (0 - 95)
Life scale	202.5 (73.4)	195 (140 - 240)
History scale	27 (39.1)	0 (0 - 60)
Total suicide score	318 (213.7)	260 (180 - 360)
MMSE	26.9 (2.8)	28.0 (26.0 - 29.0)
Depression scale (GDS)	5.2 (3.7)	4.5 (2.0 - 8.0)
<i>Glo.Di.S</i>		
Everyday functioning	1.14 (0.86)	1.04 (0.33 - 1.67)
Social and interpersonal functioning	0.71 (0.73)	0.5 (0.17 - 1.17)
Severity	1.7 (0.78)	1.75 (1.13 - 2.38)
Mental disability	1 (0.83)	0.83 (0.33 - 1.5)
Total Glo.Di.S score	1.23 (0.76)	1.16 (0.64 - 1.72)

Table 3. Correlation coefficients of RASS dimensions with Hoehn and Yahr scale, MMSE, Glo.Di.S and GDS

		Intention scale	Life scale	History scale	Total suicide score
Hoehn and Yahr scale	r	0.43	0.37	0.09	0.46
	P	<0.001	0.001	0.465	<0.001
MMSE	r	-0.15	-0.07	-0.19	-0.15
	P	0.212	0.575	0.123	0.202
Everyday functioning	r	0.50	0.60	0.18	0.62
	P	<0.001	<0.001	0.132	<0.001
Social and interpersonal functioning	r	0.36	0.65	0.21	0.55
	P	0.002	<0.001	0.085	<0.001
Severity	r	0.46	0.65	0.20	0.64
	P	<0.001	<0.001	0.093	<0.001
Mental disability	r	0.40	0.57	0.19	0.54
	P	0.001	<0.001	0.124	<0.001
Total Glo.Di.S score	r	0.53	0.69	0.23	0.68
	P	<0.001	<0.001	0.060	<0.001
Geriatric Depression Scale (GDS)	r	0.56	0.70	0.41	0.74
	P	<0.001	<0.001	<0.001	<0.001

Table 4. Results from multiple linear regression analysis with dependent variables the RASS dimensions

	$\beta^*$	SE**	P
<i>Intention scale</i>			
Hoehn and Yahr scale	0.57	0.16	0.001
Depression scale (GDS)	0.14	0.03	<0.001
Total Glo.Di.S score	0.42	0.19	0.027
<i>Life scale</i>			
Educational status			
University/ Master	0.00+		
At most primary school	0.08	0.03	0.007
Middle/High school	0.07	0.03	0.017
Diabetes			
No	0.00		

Yes	0.10	0.03	0.001
Satisfied by the support of relatives	-0.03	0.01	0.027
Hoehn and Yahr scale	0.06	0.02	0.002
Depression scale (GDS)	0.02	0.00	<0.001
Total Glo.Di.S score	0.09	0.02	<0.001
<i>History scale</i>			
Depression scale (GDS)	0.10	0.03	0.001
<i>Total suicide score</i>			
Educational status			
University/ Master	0.00+		
At most primary school	0.05	0.05	0.292
Middle/High school	0.12	0.04	0.007
Hoehn and Yahr scale	0.12	0.03	<0.001
Depression scale (GDS)	0.05	0.01	<0.001
Total Glo.Di.S score	0.17	0.04	<0.001

#### 4. DISCUSSION

Taking suicidal risk in general first into consideration, although participants' dissatisfaction for life was considerable, their suicidal risk was on average found not to be so high, while participants were on average also found not to have committed suicidal attempts during their past history. The above findings do not contradict those of researchers like Nazem *et al.* (2008) and Dumitru (2016), who have found that patients with PD are in generally high risk of committing suicide. As it happens with other social groups, it was expected that some patients with PD would be subject to high suicidal risk and some others would not.

As far as demographics are concerned, it was expected that the majority of participants would be over 65 years old, since, according to Parkinson's Disease Foundation (2016), PD is mainly identified at ages over 60. Regarding gender, although Kalia and Lang (2015) suggest that men are more likely to die from PD than women, it was female participants that were found to be more dissatisfied with their lives. This findings can be explained by the research findings of Cummings (1992), according to which females are more likely to be depressed, thereby being also more likely to report suicidal intentions. In consistency with the findings of Ozdilek and Gultekin (2014), research participants with lower educational level were those that reported higher suicidal risk. This implies that patients with PD shall be more adequately supported and informed about the various dimensions of their disease, so that even lower-educated patients have the capacity to deal with their symptoms with greater patience. Referring to smoking, although Noyce *et al.* (2012) report it as factor preventing the development of PD, it was found that patients with PD that were smoking had higher suicidal risk, indicating that there must be other more important factors determining such risk. It was also surprising that alcohol consumption was not found to be correlated with suicidal risk, as this is supported by Barlow and Durand (2005) and Dumais *et al.* (2005). It seems that the abovementioned correlation does not exist in this research sample, which can also be explained by the age of participants, which is preventive for consuming alcohol to large amounts.

Taking now stage of PD and intensity of symptoms into consideration, the majority of participants were at stage 2 or 3 of the disease, i.e. did not experience sever motor symptoms. This helped participants in being able to correspond to the requirements of the research. However, the fact that the sample did not involve patients from all stages of PD makes the generalization of research findings to the wider population of patients with PD questionable. In any case, patients' disability was found to be significantly correlated with suicidal risk, and the same was also found for duration of patients suffering from the disease, as this is also supported by researchers like Dumitru (2016) and Ozdilek and Gultekin (2014). Regarding previous researches that did not confirm the above correlation (e.g. Kostić *et al.*, 2010), it is normal that some patients with intense symptoms may not develop suicidal intentions. However, this does not alter the fact that such patients are those that are more likely to be subject to high suicidal risk. In the same content, the fact that reseachers like Myslobodsky *et al.* (2001) have found that the suicidal risk of patients with PD is not higher than the risk of healthy population does not mean that patients with PD are not subject to high suicidal risk. It must be noted here, though, that suicidal risk was found to be correlated with clinical history of patients regarding PD and not other diseases they may have also faced.

Referring to research findings regarding the GDS scale, participants were at a marginal level of developing symptoms of depression. This verifies the findings of Shulman *et al.* (2011) and Blazer (2005), according to whom depression is the most common psychological symptom of PD. Taking into consideration the correlation between results in the GDS scale and those in the RASS scale, it becomes evident that depression is a major determinant of the suicidal risk that patients with PD are subject to. This finding is highly consistent with the findings of associated previous studies, such as those of Nazem *et al.* (2008), Hurwitz and Calne (2001), Dumitru (2016) and Ozdilek and Gultekin (2014). It is also consistent with findings of Richards and O'Hara (2014), Lynch and Duval (2010) and Takahashi (2001), according to whom depression leads to suicidal attempts, no matter whether it is identified in patients with chronic diseases or not.

Last but not least, research findings verified the significant correlation between suicidal risk and social support of patients with PD, as this is also supported by Kalia and Lang (2015), Kummer *et al.* (2009) and Nazem *et al.* (2008). It also became evident from research findings that participants reported their satisfaction only with the support they received from their family and not their wider social environment. This implies that the Greek social and healthcare system has not been structured in a way that vulnerable social groups with chronic diseases like PD are adequately supported.

## 5. CONCLUSION

Research findings have important theoretical and practical implications. Taking theoretical implications first into consideration, it became evident from the findings of this study that when suicidal risk of patients with PD is examined, many facets of the disease need to be taken into consideration, which are highly likely to determine how patients react to their new daily reality. This is something that is true not only for PD, but also other chronic diseases, which are also multidimensional. It also became evident from the study findings that how patients with PD behave always needs to be studied with respect to their level of depression as well. Indeed, depression makes people feel dissatisfied with their lives, and this is very likely to lead them to attempt to commit suicide. In consistency with the findings of Dumais *et al.* (2005), the importance of depression for increasing suicidal risk is something that researchers studying the behaviour of patients with other chronic diseases also need to take into account. Furthermore, researchers studying the behaviour of patients with PD – as well as other chronic diseases- need to also consider the level of social support that patients are subject to.

As far as practical implications are concerned, research findings highlight the very important role of holistic care that health professionals need to offer to their patients with PD (as well as other chronic diseases). Indeed, it is highly evident from research findings that PD is not only about motor and other pathological symptoms, but also about psychological ones. Therefore, and since medical science has developed to such an extent that patients with PD can live with their symptoms, it is highly important that such people are psychologically assisted in dealing with their symptoms and not get dissatisfied with their lives. In this context, it is also important for the Greek state, as well as other states all over the world, to provide adequate social support to patients with PD and other chronic diseases, so as to feel equal members of the wider populations and overcome –at least up to a point- the difficulties they face in their daily lives. To this end, this study recommends that state healthcare institutions specialized in treating patients with PD need to increase in number and be equipped with psychologists expertized in helping patients in overcoming the negative feelings associated with their chronic disease. At the same time, state authorities need to improve their informational campaigns about PD, its symptoms and the ways to deal with them, so that even patients with low education are able to organize their life likewise and are motivated to positively anticipate the changes that their chronic disease brings to their lives.

Last but not least, this study was subject to certain limitations. First of all, the sample of 70 patients was adequate in producing reliable results, but an even bigger sample would produce results that would be even more generalizable to the wider population under investigation. Ideally, patients with PD being treated in various other clinics could also participate in future researches, so that the role of health professionals in determining patients' suicidal risk is also identified. In a similar context, future researchers could conduct the same research in patients of different nationalities, so as to identify the role –if any- that nationality plays in determining suicidal risk of patients with chronic disease. Last but not least, the research that was held was quantitative. If qualitative research had been held, participants would express their opinions and experiences in more detail and depth, thereby leading to reaching deeper conclusions and producing new findings regarding the factors that determine suicidal risk of patients with PD.

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