Parkinson’s disease can lead to disability and reduce the quality of life of its patients. The purpose of this study is to evaluate the quality of life of a group of people with Parkinson’s disease. The clinical and progressive characteristics of the disease, its motor and neuropsychological impact were evaluated in each Parkinsonian subject included in the study. A quality of life assessment was performed and collected from 60 Parkinsonian patients followed and hospitalized at Hassan II University Hospital in Fez. Different instruments were used, the Hoehn and Yahr scale and the Parkinson’s disease questionnaire (PDQ-39) UPDRS engine, MMS, clinical fact sheet.

According to our results, through the different tests and scale of evaluation, we observed an impaired quality of life in the areas of physical discomfort, cognitive disorder, activity of daily living, mobility, and emotional well-being, especially in patients with duration of evolution more than 5 years. There was no significant difference between the two sexes. In addition, the severity of the disease tended to give the impression of an impaired quality of life with respect to the dimensions of activities of daily living and cognition, which is relevant to improving the quality of life patient life and clinical interventions.

**Key words:** Parkinson’s disease, Neurocognitive disorder, Quality of life
INTRODUCTION

Parkinson’s disease (PD) is a neurodegenerative disease that places a heavy burden on patients. The disease has a profound and progressive impact on various neurological and neuropsychological functions, but its etiology is not fully understood. An increasingly recognized and important factor in Parkinson’s disease (PD) is its impact on quality of life and its evaluation is becoming increasingly important in clinical trials and routine practices (Opara JA, et al., 2012). The perspectives of quality of life in PD, as perceived by patients, in clinical practice and in research, can be very different. PD involves motor symptoms, such as slowness (bradykinesia) and stiffness (stiffness) that are a major concern for patients (Politis M, et al., 2010), but also cause various non-motor symptoms that are often overlooked and / or not reported. (Bostantjopoulou S, et al., 2013) (Todorova A, et al., 2014). It is important that these perspectives are aligned to fully assess the impact of the disease on each patient and better monitor the effects of treatment.

Quality of life is a general term that refers to the well-being and overall satisfaction of an individual. This holistic approach encompasses various aspects of the patient’s condition and is increasingly recognized as an important measure of the impact and condition of the disease. Quality of life is also a criterion that can be improved with cognitive treatment or remediation (Uitti RJ 2012). Quality of life related to health is a component of quality of life and is a result reported by the patient. The physical, mental and social domains can be evaluated at a given time and during a given period.

Due to its progressive and chronic characteristics, the disease affects the quality of life of patients. At the beginning of the illness, the physical aspects seem to be the most affected because, at the beginning, there are motor symptoms. However, as the disease progresses, changes involving other aspects of quality of life develop (A Campo LEI, et al., 2011). This is due to the fact that the evolution of the disease leads to an increase in activity limitations of daily living (ADL) (Rodrigues de Paula F, et al., 2006) (Carod-Artal FJ, et al., 2007), associated with the appearance of cognitive dysfunctions and bodily disorders, increasing the impact on the quality of life, including physical, psychological, emotional, social and economic aspects (Souza RG, et al., 2007) (Suzukamo Y, et al., 2006) (Knipe M, et al., 2011).

The purpose of this study was to assess the quality of life of people with Parkinson’s disease and to identify the factors that most influence the patient’s quality of life, as these issues may not be obvious on clinical examination nor be one of the most common motor symptoms. Therefore, studying the quality of life of these patients becomes important to understand the course of the disease and seek strategies to improve the physical and psychological well-being of these individuals, thereby improving the planning of therapeutic interventions and cognitive remediation that are intended for them.
MATERIALS AND METHODS

Study population
The study is conducted at Hassan II university hospital in Fes, in the neurology department. It included 60 Moroccan patients followed up or hospitalized for Parkinson’s disease. Patients are selected on the basis of diagnostic criteria and after confirmation of Parkinson’s disease.

Men and women over the age of 30, regardless of their phase of the disease, were included in this study. The most impaired patients, who were not able to answer the questionnaire, were excluded as well as patients who were visually impaired and unable to express themselves.

Procedure and Data Collection
At the time of the interrogation each patient is summoned individually in a consultation room. All patients who agreed to participate in the study signed a consent form to participate in this study. Patient interview data are collected on a clinical fact sheet, which includes items on non-motor and motor signs of Parkinson’s disease and current treatments. Our patients are all Moroccans. In French-speaking patients, we used the French version of PDQ 39. For non-French speakers, a version translated into dialectal Arabic was used. Each subject was encouraged to complete the PDQ-39 questionnaires by himself. Those who were illiterate or unable to complete the questionnaires (due to hand tremors, akinesia) were interviewed by a doctor.

Patients were assessed using the Parkinson’s Disease Rating Scale (UPDRS) and the Hoehn and Yahr (HY) Scale ranging from stages 1 to 5 to assess severity of the disease. The mini-mental state (MMS) is used to detect major neurocognitive disorders. The Mini Mental State is a tool for evaluating cognitive functions in 30 questions. It explores temporospatial orientation, attention, learning, memory, mental arithmetic, language, and praxis. Total score is between 0 and 30, the rating is scored as a result (wrong answer 0 and correct answer 1), the evaluation time is 5 to 10 minutes (Folstein 1975).

Scales of PDQ 39
The PDQ 39 (Parkinson’s Disease Questionnaire) (Peto V, et al., 1998) is a specific scale of Parkinson’s disease, comprising 39 items that assess the quality of life of patients from a motor but also psychological point of view.

The 39 questions (items) concern the impact of the disease on the quality of life of the patient during the previous month and can be grouped into 8 dimensions: mobility (MOB: 10 items), activities of daily living (ADL: 6 items), emotional well-being (BEA: 6 items), psychological discomfort (GP: 4 items), social support (SS: 3 items), cognitive impairment (TC: 4 items), communication (COM: 3 items), physical discomfort (IP: 3 items). Each item is rated from 0 (normal) to 4 (maximum disruption).
Then, for each dimension, the sum of the scores of each item is divided by 4 (maximum score per item) multiplied by the number of items in the dimension. One multiplies then all by 100 and one obtains a score going from 0 (normal) to 100 (maximum perturbation). Total score of each subject is calculated as follows: (the sum of the patient’s scores in the 39 questions / 4 x 39) x 100.

Moreover, it is essentially a tool for clinical and therapeutic research. The fact that they take into account all areas affected by Parkinson’s disease should make their use more frequent (Crispin Jenkinson et al., 1993).

**UPDRS motor, Hoehn and Yahr**

The Unified Parkinson’s Disease Rating Scale (UPDRS) is used to measure the progression of Parkinson’s disease and the effectiveness of treatment. It consists of six (6) sections that can be used separately. Section I: Mental, Behavioral and Thymic Status (4 items) Section II: Activities of Daily Living (13 items) Section III, Analytical: Motor Exam (14 items) Section IV: Treatment Complications in the week preceding the exam (11 items) Section V: Hoehn and Yahr Stadium Section VI: Schwab and England Quality of Life Scale. The UPDRS can be performed annually, in its entirety or at least include motor analysis, Hoehn and Yahr’s stage and activities of daily living. UPDRS III is the most suitable for assessing motor function in Parkinson’s disease. It is used to measure the progression of the disease but it is also suitable for assessing the sensitivity to L-dopa.

For scoring, the UPDRS III motor has 14 points scored in 5 points, ranging from 0 points (normal) to 4 points (maximum disturbance). Scoring can be done in the “off” period (period of low mobility), and in the “on” period (period of high mobility, sometimes accompanied by dyskinesia). Axial motricity as well as segmental motricity are evaluated. The cardinal signs of tremor, akinesia, stiffness, but also walking disorders are all explored by this scale. The overall significance of the results are as follows, 6-12 / 108: honeymoon period, 12-30 / 108: installed disease, 30-80 / 108: severe illness (Christopher G. Goetz, et al., 2008).

**Statistical analysis**

In the statistical analysis, patient characteristics are expressed as a percentage for qualitative variables and as an average ± standard deviation for quantitative variables. Chi-square tests (Pearson), and Student’s test, were used to compare the variables. p-value <0.05 is considered statistically significant. The Spearman (r) rank correlation coefficient was used to verify the relationship between scales. The data was analyzed with Excel and the Statistics for Windows Social Science version 21 (SPSS) software. Cronbachα coefficients were calculated for PDQ 39 scale to estimate internal consistency. Its value is less than or equal to 1, generally considered acceptable from 0.7 (Lee Joseph Cronbach 1951).
RESULTS AND DISCUSSION

**Total score of PDQ 39**

The table represents the average scores, the standard deviation and the Cronbach alpha coefficient of the eight dimensions of PDQ 39. The scale we obtained composed of 8 dimensions, a satisfactory coherence. Cronbach’s alpha coefficient, are sufficiently correlated. Internal reliability was evaluated with Cronbach’s alpha value 0.761.

Correlation coefficients between the data were significant, correlation coefficient using the 95% confidence interval and p <0.01.

The eight dimensions of PDQ-39 were correlated with these scales (see table). Correlations were highest for the dimensions that measured the physical aspects of patients’ health status (mobility and activities of daily living on PDQ-39).
This means that the quality of life of Parkinson’s patients is more impaired in patients who have been living for more than 5 years.

**DISSCUSSION**

It is well known that Parkinson’s disease is a chronic condition that significantly affects quality of life as well as motor and non-motor disorder. PDQ-39 is used to evaluate the impact of Parkinson’s disease on the quality of life of patients. The quality of life evaluated by PDQ39 in Moroccan Parkinson’s patients is impaired. This is all the more true in patients with a duration of evolution greater than 5 years, a high UPDRS engine score and cognitive disorders.

We observed an impaired quality of life in the areas of physical discomfort, cognitive impairment, activity of daily living, mobility, and emotional well-being, especially in patients with a duration of more than 5 years. Most studies have shown similar results. Jenkinson C et al., 2006; Karsen et al., 1999 found a more negative perception of the quality of life of Parkinson’s patients in the physical domains. This indicates that the physical and cognitive aspects of the disease are those in which patients have the most impaired quality of life. It is known that

Our results have shown that the PDQ 39 is a reliable and valid evaluation tool. The Cronbach alpha coefficients for most PDQ-39 domains were more than 0.70 which gives us a reliability value of (0.761), similar to the Joana JESUS-RIBEIRO et al., 2017 study which suggest that the Portuguese PDQ-39 and PDQL, despite the measurement of different aspects of health-related quality of life (HRQOL), are both reliable and valid instruments. Indeed, Cronbach’s alpha coefficients for most PDQ-39 domains were greater than 0.7. All PDQL domains have managed to meet the standard criteria. The questionnaire is simple and fast enough to use, it is reliable and validated (Fitzpatrick R, et al., 1997). Consistency with the UPDRS and the Hoehn and Yahr stadium is high. It is specific to Parkinson’s disease (Fitzpatrick R, et al., 1997), (Jenkinson C, et al., 1999).

The UPDRS III motor, is useful and reliable as an international reference tool for the evaluation, monitoring and decision making of patients with Parkinson’s disease, in clinical practice and for research. Our results on the UPDRS III motor score, is statistically significant between the group of patients in phase-on and off- phase. Correlation coefficients are used to quantitatively describe the strength and direction of the relationship between two variables, indicating that changes in one of the variables are proportional to changes in others. In this study, we find that the correlation between the UPDRS III engine rating scale, HY, PDQ 39, MMS (see Table 3) is very significant and showing a close link.

What seems to be confirmed in our study is that the presence of motor fluctuations leads to a faster decline in quality of life compared to those who are not fluctuating (Karlsen KH, 1999). This factor was not evaluated directly in our study; but only indirectly by studying the duration of evolution assuming that the patients with fluctuations are more found in the group that has been evolving for more than 5 years and we confirmed that this group had a quality of life more impaired.

The majority of our patients had a Hohen and Yahr score between stage 2 and stage 3, which was below stage 5. In addition, 15 patients were on antidepressant treatment, most of whom are elderly, with stage of HY up to stage 3. The quality of life in these patients under antidepressant is more impaired than in other patients, this differences is confirmed by the score of PDQ 39 and UPDRS motor.

The study by (Renata Guzzo Souza et al., 2007), showed that the severity of the disease, assessed by the stages of Hohen and Yahr, adversely affects the quality of life in activities involving motor skills. The higher the stage of illness, the lower the quality of life in some aspects of physical independence. According to the study by (Zuzana Slezakova, et al., 2013), there is consistency in clinical symptoms related to mobility, which worsens the perception of quality of life in patients. Studies that follow patients with Parkinson’s disease have shown that quality is not reduced because of the classic symptoms, but rather by depression and dementia.
In addition, we used the MMSE neuropsychological test to assess cognitive deficits in our subjects. The result allowed us to highlight the cognitive deficits in the elderly patients, who had longer evolution with a score of $13 \leq \text{MMS} < 24$, (on the other hand in the elderly patients) a slight cognitive deficit with a score between $18 \leq \text{MMS} < 28$. A score below 24 out of 30 is often considered the threshold representing cognitive impairment, although this has been widely criticized in terms of specificity, and diagnostic bias with education because educated demented patients may have a higher score; (Teresi JA et al., 1995, Marshall SC et al., 1997, Naugle RI et al., 1989, O’Connor DW et al., 1989).

According to the study by Mehri Salari et al., 2017, showed strong correlations between the duration of the disease and non-motor symptoms. Non-motor symptoms develop throughout the illness and lead to disability that worsens motor symptoms. This is demonstrated by strong correlations between duration of illness and mood / cognition, problem of perception, hallucination, attention, memory and sexual domains. In addition, there were correlations between motor symptoms and non-motor symptoms, again indicating that disability is worsening, non-motor symptoms are also worsening.

Cognitive impairment correlated with non-motor symptoms and motor symptoms, but disease duration and MMSE scores were not associated, which may indicate that cognition is correlated with disease severity.

However, compared to the PDQ total score 39, an index that indicates which values represent good or poor perception of quality of life are not yet available in the literature.

**CONCLUSION**

In our study, we discussed the quality of life of patients with Parkinson’s disease. This pathology, with its gradual and irreversible evolution, and its specific symptomatology, such as motor and non-motor signs, cognitive disorders, the disease affects the quality of life of patients. The strategy for neurocognitive diagnosis and remediation aims to maintain a better and more satisfying level of functioning of sick people. Improvement of the quality of life should not focus only on the physical aspects (motor) but also mainly on non-motor aspects (neurocognitive disorder ....) of the patient. In recent years, several studies have been devoted to the evaluation of factors that negatively influence the patient’s quality of life. The improvement of the quality of life of Parkinsonian subjects remains the main objective of a rigorous follow-up.

**Conflict of interest**

The authors declare no conflict of interest

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