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Research Article

Predictors of Impaired Quality of Life and Work Disability in Patients with Systemic Diseases

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ABSTRACT

Background: Systemic diseases are heterogeneous diseases that represent one of the leading causes of disability with high rates of premature mortality and significant social costs.

Methods: We conducted a cross-sectional study at an Internal Medicine Department between July 2017 and September 2017. We investigated patients with systemic rheumatic diseases and we evaluated the Quality of Life (QoL). The outcomes were baseline Short Form Health Survey Physical (PCS) and Mental (MCS) Component Scores. Work disability was evaluated by the Work Productivity Assessment Impairment (WPAI) questionnaire. Correlations were calculated by the test t student or ANOVA factor test and comparison with Chi2 test and multivariate regressions were then performed.

Results: Two hundred thirty five patients were included, 183 females and 52 males. The average age was 48.3 years. 47% of the population had work during the study. The most frequent diseases were: Systemic lupus erythematosus in 66 patients, Behçet syndrome in 33 patients and Sjogren primary syndrome in 27 patients. Mean PCS were 52.55 ± 17.3 and MCS scores were 47.74 ± 14.8. For the predictors related to patients: the age ((PCS:r=-0.250,p=0.000), (MCS:r=-0.160,p=0.014)), the presence of comorbidities (PCS p=0.003) and the low level of education (p=0.001) were significantly correlated with impaired QoL, the presence of profession was not significantly correlated with QoL. For the predictors related to the disease; inflammatory myositis influences most the QoL. Pulmonary manifestations (PCS:p=0.021,MCS: p=0.006) were the most correlated with impaired QoL. Multivariate analysis showed effect of age, corticosteroids therapy and work disability on MCS and the effect of age and gender on PCS. Work disability was evaluated in working patients: absenteeism was at 31.16 ± 24, productivity impairment at 48.77and systemic sclerosis was the most disease predictive of absenteeism and work disability (p=0.011).

Conclusion: QoL may be severely impaired in patients suffering from systemic diseases. We studied for the first time, in Tunisia, the predictors of impaired QoL for all patients followed in our department. This measure aims to further humanize medical practice, to maintain the quality of life of patients and to take into account the individuality of each patient. .

Keywords: Autoimmune diseases; Autoimmunity; Quality of life; Work disability

INTRODUCTION

Systemic diseases are chronic inflammatory diseases with various clinical manifestations. They affect, in the United States, approximately 5% of the population [1,2]. In Tunisia, the estimation of the prevalence of these diseases is difficult with the absence of large-scale epidemiological studies. Systemic diseases include heterogeneous conditions, which represent one of the leading causes of disability in the industrialized world [3,4]. They are associated with high rates of disability, premature mortality, and significant social costs. Their impact on daily life is serious, due to the involvement of several organs: skin, joints, lungs and kidneys, etc. with a functional and psychological impact. In most cases, these diseases affect middle-aged people and their impact on social and professional life is major and often neglected which makes it challenging for the clinician to identify, in order to treat [5]. The burden of systemic diseases is overwhelming and continuously expanding, driven largely by population growth and ageing. Studies of quality of life's interest were to evaluate how patients experience their illness daily. Beside the objective criteria

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from clinical examination and para-clinical investigations, it seems essential to take into account the individuality of each patient. We therefore attempted to study the impact of systemic diseases on the Quality of Life (QoL), to identify predictors of QoL in a large sample of patients, taking into account at the same time patients' individual characteristics, disease related parameters (disease duration, clinical manifestations and treatment..) and to determine work disability during systemic diseases.

MATERIALS AND METHODS

Consecutive patients hospitalized in the department of internal medicine or attending as outpatient were recruited during three months from July 2017 to September 2017. All patients gave their oral informed consent before inclusion into the study. Individuals eligible for participation were those with an established diagnosis of a systemic disease. Demographical data were collected carefully from all participants including comorbidities, education level.

QoL was evaluated by use of the Medical Outcomes Study Short-form 36 (SF-36). The SF-36 is a generic scale for measuring QOL and includes 9 dimensions [6]: Physical functioning, physical problems, pain, the general state of health, emotional well-being, emotional problems, vitality, social functioning and changes from last year. The score of each dimension is between 0 and 100 with high numbers indicating a better QoL [7]. The scores can also be obtained by the algebraic sum of the final values items composing each dimension. An algorithm has been developed to allow calculate a score by "component": a Physical Component Score (PCS), and a Mental Component Score (MCS) [8]. A threshold value of 66.7 has been proposed by Lean et al. below of which the QOL is impaired. The reliability and validity of the SF-36 are very good [9,10].

Assessment of work disability was by use of the Work Productivity and Activity Impairment (WPAI) questionnaire. The WPAI questionnaire is an instrument to measure deficiencies in work if paid or not. It measures absenteeism, productivity during work, as well as deficiencies in unpaid activities due to health problems during the last seven days. In addition, the WPAI questionnaire was used to compare impairments at work between treatment groups in trials or between subjects with different levels of severity of disease [11]. All questionnaires were performed by one investigator to avoid information bias.

STATISTICAL ANALYSIS

Data analysis was performed using SPSS (Statistical Package for Social Sciences) software, version 24. Results were expressed as average ± standard deviation (m ± SD) or median (inter-quartile range) for continuous variables and as frequencies for qualitative variables. The comparison of 2 independent series averages was performed using the Student's t test or the Anova test. The comparison of the percentages, on the independent series, was carried out by the test Pearson's Chi-square test, and in case of non-validity of this test, by the exact bilateral test of Fisher. Correlations between 2 quantitative variables were studied by the correlation coefficient of Pearson. The correlation coefficient "r" varies from -1 (negative correlation: the higher the variable is, the lower is the other variable and conversely) to +1 (the higher one variable is, the higher is the other one and vice versa) going through zero. Correlations with a value r>0.8 (in absolute value) are generally considered very strong, from 0.6 to 0.8 strong, 0.4 at 0.6 moderate, 0.2 to 0.4 weak, and absent if r<0.2. Multivariate regression analysis was conducted to determine independent predictors' effect on baseline PCS and MCS, after adjusting for sociodemographic variables. A probability value of p<0.05 was considered statistically significant.

RESULTS

We collected 235 patients in our study, 183 female and 52 male, with average age of 48.3 and extremes (15-90 years). The average disease duration was of 6.48 years (1-43 years). Baseline characteristics of the study population are demonstrated in Table 1. The predominant systemic diseases were Systemic Lupus Erythematosus (28.1%, 66), Behçet's disease (14%, 33), Primary Sjögren's Syndrome (11.5%, 27), Giant cell arteritis (8.1%, 19), Rheumatoid arthritis (6%, 14) and Systemic Sclerosis (5.1%, 12). According to the SF36 score, the QoL of all patients included in our study was impaired in all domains of the score and was above 66.7 except for physical functioning. Vitality was most affected with a score of 41.76. Physical and mental component scores were respectively estimated at 52.55 and 47.74. All averages are illustrated in Table 2. Inverse correlations were found between age and QoL: PCS (r=-0.250, p=0.000), MCS (r=-0160, p=0.014) with a higher one between age and physical functioning (r=-0.405, p=0.000). According to gender, physical functioning and vitality were significantly less impaired in men (p=0.025, p=0.023) respectively. We didn't notice a difference in the rest of domains or in the PCS or MCS. Scores in physical functioning and general state of health were significantly higher in patients with no history of autoimmune diseases or general related health problems (p<0.001) and in patients with higher

Table 1: Baseline characteristics of the study population.

Sociodemographic variables	
Age (years)	48.3
Gender (%)	
Female	77.9
Male	22.1
Comorbidities (%)	
Without history	51.9
General health problems	34.5
Autoimmune diseases	13.6
Educational level (%)	
Primary	52.3
Secondary	37.4
University	10.2
Full or part-time employment (%)	
Disease variables	47.2
Disease duration (years)	
Disease category (%)	6.48
Auto immune diseases	60.8
Vascularitis	32.7
Infiltrative diseases	3.4
Autoinflammatory diseases	5.1
Medications variables (%)	
Corticosteroids	40.4
Immunosuppressive or biological therapy	38.3
Symptomatic treatment	21.3

Table 2: Impact on QoL of systemic diseases according to SF36 score.

SF36 score	Average (SD)
Physical functioning	67,44 ± 20,4
Physical problems	51,63 ± 28,7
Physical pain	48,32 ± 25,1
General State of Health	42,80 ± 14,1
Emotional well -being	50,20 ± 11,6
Emotional problems	53,27 ± 32,9
Vitality	41,76 ± 14,5
Social functioning	45,74 ± 20,9
Changes from last year	55,93 ± 20,2
Score SF36 par composant	
PCS	52,55 ± 17,3
MCS	47,74 ± 14,8

educational level (p=0.001). Those results are the same in mental health domains (vitality and emotional well-being).

To assess whether disease category exerted a significant impact on quality of life, SF36 score was compared among patients with different diseases. We noted that inflammatory myopathies have the lowest scores and this was significantly different in 5 domains of the SF36 score: physical functioning (36.2, p=0.000), physical pain (18.7, p=0.040), emotional well-being (46.2, p=0.039), vitality (37.5, p=0.007), social functioning (23.8, p=0.006), and last year changes (43.7, p=0.033). This was also noted in PCS (23.43, p=0.002) and MCS (28.9, p=0.000). We didn't notice a significant relation between QoL and disease duration but results showed that correlations of physical domains of the score and QoL were negatives and mental domains of the score were positives, concluding that QoL worsen physically with disease duration and is better mentally.

Regarding parameters related to clinical characteristics of diseases, the presence of pulmonary involvement has a significant impact on physical functioning (p<0.001), physical pain (p=0.021) and PCS (p=0.006). The presence of muscular involvement affect significantly physical problems (p=0.044) and social functioning (p=0.050). When evaluating the impact of the treatment on QoL, we found that the adjunction of Immunosuppressive (IS) or biological therapy to the general corticosteroids therapy has a significant impact on general state of health (39.77 *vs* 45.18, p=0.030). Scores were lower in all SF36 domains when associating IS treatment to corticosteroids which indicate worse QoL. Regarding general corticosteroids doses, we divided groups of patients using corticosteroids on low doses if <0.5 mg/kg/d, moderate doses if (0.5-0.7 mg/kg/d) and high doses if >0.7 mg/kg/d, we found that all scores of different domains were lower with the increase of corticosteroids doses without significant differences.

Our multivariate analysis (Table 3) showed that age, corticosteroids therapy and work disability were the independent predictors of a worse MCS. For the PCS, age and gender showed a significant effect on PCS. To assess work disability in our study, WPAI was evaluated in 111 working patients (47.2% of the study population). Absenteeism at work was estimated at 31.16%. Presenteeism accounted for 44.07%. The loss of productivity during work as well as during general activities was noted respectively at 48.77 and 45.12%. When evaluating QoL, we didn't find a significant

Table 3: Multiple linear regression showing effect on PCS and MCS.

Independent predictors of MCS				
	β	95% CI		p value
Age	0.955	0.915	0.997	0.038
Corticosteroids	4.167	1	17.359	0.05
Work disability	4.585	1.196	17.573	0.026
Independent predictors of PCS				
Age	0.965	0.944	0.986	0.001
Gender	2.188	1.076	4.449	0.031

difference between workers and those without work but it is important to precise that 40.4% of patients without work have lost their jobs due to complications and significant impact of their disease. Regarding the impact of each disease on QoL, Systemic Sclerosis was the disease influencing most work ability, in fact loss of productivity during general activities was at 71.42% (p=0.011).

DISCUSSION

Many studies have demonstrated that patients with systemic diseases have a significantly worse quality of life compared to the general population. While signs and symptoms of the disease are frequently measured using disease activity indices, social and psychological problems are assessed with various QOL questionnaires. Assessment of Health-Related QOL (HRQOL) allows healthcare providers to better address patients' individual needs and to tailor possible solutions to their specific problems. To the best of our knowledge our study is the first Tunisian study evaluating the quality of life of patients with systemic diseases and encompassing all epidemiological features socio-demographic and clinical measures, characteristics of the diseases (disease duration, use of drugs) and the presence of comorbidities in order to provide valid predictive factors of impaired QoL in this specific group of patients. It should be pointed out at first that there may be a slight bias in regard of the nonuse of a control group to compare the results of the score between two groups for more objectivity. Besides, the overall size of the sample is sufficient but the number of patients for each group of disease is different, this was due to the limited duration of data collection.

Our study showed impaired HRQoL in all SF36 score domains with vitality most affected domain of systemic diseases (41.76). Laas et al. studied the impact of systemic diseases on HRQoL of 295 patients compared to general population; the HRQoL was impaired in all domains of generic score used with a significant difference compared to the general population (p<0.05) [12]. This difference was also significant according to Rugiene et al. [13] (p=0.000) in a study including 128 women with Systemic Lupus Erythematosus (SLE) and Rheumatoid Arthritis (RA). Greenfield et al. [14] studied also 315 patients with systemic diseases including 118 SLE, 108 Systemic Sclerosis (SS), 64 RA, and 25 Inflammatory Myopathy (IM). The mean physical scores were 38.9 in SLE, 37.1 in RA, 35 in SS and 28 in IM and mental scores were 40.1 in SLE, 45 in RA, 44.4 in SS, and 33.6 in IM. In this same study, the category of disease was an independent predictor of impaired HRQoL. Depression and anxiety were particularly studied in 514 patients with systemic diseases and results indicated a significant correlation with HRQoL [15]. Depressive disorders are not only frequent but also among the leading causes of disability in patients with chronic diseases [16]. It has been shown that in patients with

Table 4: Predictors of impaired QoL in different studies.

Study	Patiens	Predictors of impaired QoL							
		Age	Gender	Comorbidities	Educational level	Profession	Disease category	Disease duration	Clinical features
Our study	235	x	0	0	x	0	x	x	x
Anyfanti et al. [20]	360	x	x	x	x	-	-	x	-
Arvidsson et al. [19]	185	x	0	0	x	x	-	-	-
Laas et al. [12]	295	x	-	-	-	-	x	-	-
Greenfield et al. [14]	315	-	-	-	-	-	x	x	x
Chen et al. [21]	541	-	-	-	-	-	x	-	-
Goulia et al. [22]	320	x	-	-	-	-	-	-	-

(x): Positive correlation, (0): Negative correlation, (-): Not studied

autoimmune diseases, when depression coexists, the quality of life is worse and the medical treatment and health care are compromised [17]. This was also noted in our study where the mental score was more affected than the physical score (47.74 *vs* 52.55) which must lead us to insist on the psychological care that is often neglected in our patients.

Health-related QoL in patients suffering from systemic diseases has been a subject of previous investigation, as shown in previous studies. It is thus well-acknowledged that patients, followed for systemic diseases, exhibit impaired QoL compared to general population. However, the real challenge lies in identifying predictors of impaired QoL in this specific group of patients. This is particularly important given the nature of diseases, which are typically chronic and often associated with severe physical disability and mental distress, and the characteristics of the affected patients, who are predominantly women and may exhibit several comorbidities [18]. Arvidsson et al. [19] used subscales of the Short Form-36 (SF-36) health survey questionnaire to conclude that younger age, low-level of exercise, higher educational level, work capacity, and good sleep could predict a better outcome in health-related QoL, but other comorbidities were not taken into account. In our work, it has been shown that systemic diseases have a considerable impact on HRQoL. This impact is continuously increasing with age, low education level, type of clinical involvement, high doses of corticosteroid therapy and combination with an immunosuppressive or biological therapy. In a study including 360 patients with rheumatic diseases, Anyfanti et al. [20] showed that disease duration ($p=0.014$), anxiety and depression ($p<0.001$ for both), as well as sexual dysfunction ($p=0.001$ for females, $p=0.042$ for males), correlated with QoL. Female sex ($p<0.001$), advanced age ($p=0.029$), lower educational level ($p=0.005$), and cardiovascular factors (hypertension, dyslipidemia, diabetes, lack of systemic exercise) also appeared to negatively affect QoL. Overall, it remained rather unknown which and up to what extent each of the epidemiological, individual, disease related parameters contributes to predict HRQoL in patients suffering from systemic diseases. We have now shown beyond doubt that several factors may interfere with QoL in patients suffering from rheumatic diseases, all related to emotional and physical side. Table 4 shows several studies evaluating predictors of impaired QoL [21,22]. Studying the professional impact of systemic diseases is of growing interest in recent years. In 2007, more than 30 articles were published for this topic. On the other hand, a PubMed search for the period 1975-1989 found only 60 articles in total. They were only 200 for the whole period from 1990 to 2004 [23]. In 2013, Mankia et al. [24] evaluated the impact of these diseases on professional QOL according to the patient's point of view. Of the 1455 patients invited, 504 responded (35%). 165 patients (33%) were in a paid employment. Of the 339 patients who were not working: 66 (19%) were not working because of their rheumatic condition. 25% of workers reported that their condition had brought them to both change jobs and hinder the progression of their careers. Physical limitation, pain and fatigue were the most important factors commonly perceived as limiting work in all patients. The impact of their condition on personal relationships (13%), social activities (28%) and finances (20%) was independent of professional status. In 2016, Mok et al. studied the professional impact of depression and anxiety during the SLE and showed that patients with depression or anxiety are more frequently subject to loss of productivity during work with 16% of patients had either left their or reduced hours of work [25]. Our study showed the same huge professional impact of systemic diseases, but several limitations need to be mentioned. In fact, we studied this impact as a whole explaining the lack of several variables such as the sector of activity, grade, exposure, professional future...

CONCLUSION

Knowing these results, it is imperative that physicians dealing with patients with systemic diseases are aware of these outcomes in order to alleviate patients' mental and physical symptoms and preserve their QoL. The strengths of our study include the sufficient size of the study sample, the use of reliable, widely applied, validated questionnaire, and the assessment of a cluster of characteristics and various conditions that may interfere with QoL in this population. We then should recommend that managing these diseases should be global centered on the patient and not only on the disease with collaborated work between internists, rheumatologists, and psychologists. As physicians, it's important to raise awareness among general population *via* the media about the considerable impact of systemic diseases on QoL or make training sessions to explain well the pathologies and provide information about the diseases. Create forums for exchange and join associations of patients with systemic disease to enable them to better understand their disease and to share the experience with other patients.

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CONFLICT OF INTEREST

Authors declare no conflicts of interests.

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