

Quality of life and its determinants in patients with chronic respiratory diseases in the Fes-Meknes region, Morocco

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Abstract

Chronic respiratory diseases (CRDs) pose a serious public health issue, affecting social functioning and psychological

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well-being and leading to a deterioration in the quality of life. The aim of this study was to assess the quality of life of patients with CRDs and determine the factors associated with their impairment in Morocco. A cross-sectional study was conducted in the Pulmonology Department of the Hassan II University Hospital in Fez in 2021. Data collection was carried out using an anonymous questionnaire containing sociodemographic, clinical, and therapeutic information. We employed the Moroccan version of the 12-item short-form (SF-12) scale to assess the mental and physical quality of life of patients. Bivariate analysis was performed to investigate the association between various factors and quality of life, using tests appropriate to the types of variables studied. Subsequently, multivariate analysis through multiple linear regression was employed to determine factors associated with quality of life, taking into account confounding factors. The threshold for inclusion in the model was set at 20%. Significant associations are presented as β values along with their 95% confidence intervals (CI). Our study included 209 patients, with 50.7% being female and 74.2% aged over 50 years. The most frequent clinical symptom was coughing. The average physical quality of life was estimated at 34.45 ± 13.78 , and the mental quality of life was 33.72 ± 19.79 . Multivariate analysis revealed that the deterioration of physical quality of life was associated with marital status (single) [$\beta = -6.84$; 95% CI (-11.43; -2.25); $p = 0.004$], stage II dyspnea on the Modified Medical Research Council scale [$\beta = -4.94$; 95% CI (-9.41; -0.52); $p = 0.029$], and the presence of cyanosis [$\beta = -9.65$; 95% CI (-15.64; -3.67); $p = 0.002$]. The factors negatively associated with mental health in our patients were age ≥ 50 [$\beta = -7.84$; 95% CI (-15.05; -0.62); $p = 0.033$], marital status (single) [$\beta = -7.81$; 95% CI (-15.14; -0.48); $p = 0.037$], and presence of cyanosis [$\beta = -10.70$; 95% CI (-20.08; -1.32); $p = 0.026$]. The SF-12 calculation reflected an impairment in the quality of life of patients with CRDs. It is imperative to integrate the assessment of quality of life into the management strategy for this pathology.

Introduction

Chronic respiratory diseases (CRD) constitute a serious public health problem due to their frequency, severity, economic impact, and foreseeable trends, particularly in developing countries, of which Morocco is one [1]. The term "chronic respiratory diseases" covers a number of conditions, of which

chronic obstructive pulmonary disease (COPD) and asthma are the most common. According to the World Health Organization, in 2019, an estimated 262 million people suffered from asthma, and the disease was responsible for 455,000 deaths, most of them in low- and middle-income countries [2].

A study has shown that the prevalence of COPD in the Middle East and Africa regions is around 4% [3]. COPD is the third leading cause of death worldwide. It caused 3.23 million deaths in 2019. Almost 90% of COPD deaths in people under 70 occur in low- and middle-income countries [4].

The global prevalence of diffuse infiltrative pulmonary disease (DIP) is estimated at between 60 and 80 cases per 100,000 people. Incidence is approximately 30 cases per 100,000 people per year. Sarcoidosis and idiopathic pulmonary fibrosis are the two most common DIPs, together accounting for over 50% of cases [5].

The prevalence of bronchiectasis (DDB) is poorly understood and underestimated. To date, few large-scale studies have been carried out worldwide [6]. In 2013, prevalence in the United States was estimated at 139 per 100,000 people over the age of 18 [7]. In a retrospective study carried out in Morocco on 5525 patients hospitalized between 2010 and 2015, DDB was diagnosed in 195 patients, representing an estimated prevalence of 3.5% [8].

The frequency of post-tuberculosis radiological pulmonary sequelae is high, reaching 56.7% in one study [9]. These sequelae lead to impaired respiratory function, recurrent lung infections, and sometimes chronic respiratory failure [10]. They represent a significant morbidity resulting from residual tissue damage, particularly in the lungs [11].

Chronic lung diseases are common disorders that impair activities of daily living, social functioning, and psychological performance. The presence of depression and anxiety, which would be associated with these diseases, could only increase the deterioration of social functioning and quality of life for these patients [12].

COPD is one of the leading causes of morbidity and mortality worldwide, with prevalence in Morocco reaching 12.6% according to the BOLD study [13]. Its impact on the patient's daily activities is a major factor and should be systematically assessed and managed on a routine basis, in the same way as for other symptoms [14].

Indeed, their quality of life is constantly and prematurely impaired by the symptoms (coughing, sputum production, and especially dyspnea), exacerbations, and activity limitation they entail [15].

Quality of life also appears to be impaired in asthmatics. Only optimal management of asthma and associated co-morbidities can improve control and, consequently, quality of life [16]. As well as providing a better quality of life, asthma is also balanced. However, because of extra-pulmonary factors, poor quality of life can be perceived by patients with mild asthma [17].

Diffuse infiltrative lung disease is also responsible for a progressive deterioration in respiratory functional parameters. It induces a major functional handicap, altering patients' quality of life [18].

To the best of our knowledge, in the Moroccan context, there are no studies providing information on the impact of CRD on patients' quality of life. The aim of this study was to measure the quality of life of patients with CRD and determine the factors associated with its alteration in the Fes-Meknes region, Morocco.

Materials and Methods

Study designs and population

This is a cross-sectional study conducted in the Pneumology Department of the Hassan II University Hospital in Fez during 2021 (from January 2021 to December 2021). Patients aged 18 and over diagnosed with a CRD (COPD, asthma, bronchial dilatation, sarcoidosis, diffuse interstitial lung disease, or sequelae disease) were recruited, informed of the study, and invited to participate. All participants who had consulted a doctor for other pathologies and who had a psychiatric disorder prior to the diagnosis of the disease were excluded.

Collecting data

After obtaining approval from the ethics committee of the University Hospital Center Hassan II in Fes, all subjects were informed about the study conditions and provided their informed consent. Anonymity and confidentiality were ensured for all participants. Data were collected from multiple sources. Firstly, an exploitation of participants' medical records was conducted. This involved extracting all relevant information for the study, including medical and surgical history, diagnostic test results such as spirometry (which was performed by qualified personnel in an appropriate environment and in compliance with quality standards. Participants were provided with necessary instructions to ensure they understood how to perform the respiratory maneuvers correctly, the 6-minute walk test, and gasometry when available, as well as other essential clinical data [type of disease, clinical symptoms, forced expiratory volume in 1 second, treatments received (number of treatments considered high when it exceeds the median =2), oxygen therapy]. In addition to sociodemographic data such as age, gender, place of residence, marital status, level of education, occupation, monthly income, and smoking status. To complement missing information and measure quality of life using a predefined scale [12-item short-form (SF-12)], a telephone survey was conducted with participants. This survey was carried out to ensure the confidentiality of the responses obtained and to respect the participants' rights.

The severity of COPD has been classified according to the Global Initiative for Chronic Obstructive Lung Disease classification, which combines a spirometric assessment of the severity of obstruction with a clinical evaluation of risk and symptoms [19]. Asthma has been classified according to the recommendations of the Global Initiative for Asthma classification. Severity is determined by symptoms and lung function tests [20] (*Supplementary Material*).

Sampling and number of subjects required

To calculate the minimum sample size, we used the formula adapted for estimating a mean in a cross-sectional study: $n = (Z_{\alpha/2} \times S^2) / i^2$ [21].

The sample size required for a desired precision (i) of 2 points, an α risk of 5% and a standard deviation of 8.17, which corresponds to the standard deviation of a mean of physical quality of life (PCS) scores estimated in patients with COPD (the most common pathology) using the SF-12 scale [22]. We took 209 to increase power and to stratify our sample according to the different pathologies, we used the statistics of the pulmonology department of the CHU Hassan II in which we carried out our study, as follows (35% COPD, 25% asthma, 20% bronchial dilatation, 10% sequellar disease and 10% sarcoidosis and other diffuse interstitial

lung diseases), in addition to patients with a combination of two pathologies and non-respondents.

Measuring quality of life

Quality of life was measured using the SF-12 scale, an abbreviated version of the SF-36 scale developed and analyzed by John Ware *et al.* [23]. The SF-12 has been validated in the Moroccan dialect, enabling it to be used to assess the health status of the population [24]. This 12-item questionnaire examines two scores describing mental well-being (the Mental Component Summary-MCS) and physical well-being (the Physical Component Summary-PCS). Scores range from 0 to 100, with higher scores indicating better quality of life [25]. It comprises eight zones: i) PCS – physical functioning, physical role (RP), body pain, general health (GH); ii) MCS – vitality, social functioning, emotional role, mental health. The SF-12 questionnaire used is reported in the *Supplementary Material*.

The score was calculated according to the scoring guidelines of the SF-12 scale [26]. Scores above 50 indicate a better quality of life than the overall quality of life [22]. “Impaired quality of life” was defined as a score below the average for general quality of life.

Statistical analysis

We carried out a descriptive study of all variables; frequencies were used for categorical variables, means and standard deviations were used for quantitative variables. The study of the association between the various factors and the quality-of-life score was carried out using Student’s *t*-test, and normality was verified using a Kolmogorov-Smirnov test. We performed multiple linear regression to determine the factors associated with poor quality of life in our patients, adjusting for confounding factors. Factors with $p \leq 0.2$ in bivariate analysis were included in the model, and the significant association was presented using the adjusted β and its 95% confidence interval (CI). The significance level was set at 5%. Data were entered into Excel (Microsoft, Redmond, WA, USA) and analyzed using SPSS version 26 (IBM, Armonk, NY, USA).

Results

Socio-demographic characteristics

Of the 209 patients recruited, the majority (74.2%) were aged 50 or over, 50.7% were women, over half lived in rural areas (51.2%), the majority were married (74.3%), half were illiterate (53.8%), most were unemployed (73.8%), and almost all lived with their families (97.3%). Results are shown in Table 1.

Clinical characteristics of participants

The majority of participants (43.1%) had COPD, followed by asthma, which was present in 32.2% of participants. The mean duration of the disease was 7.5 ± 7.6 years, and more than half the participants (53.1%) had comorbidities, with cough (56.5%) and dyspnea (52.6%) being the most frequent symptoms. 34.3% had desaturation on the 6-minute walk test, and 51.3% had respiratory insufficiency as measured by gasometry. In terms of treatment, 14.4% were on oxygen therapy, and the majority (93.8%) were hospitalized less than twice a year. Results are shown in Table 2.

Quality of life

Physical health

The PCS was altered with an average of 34.45 ± 13.78 . The RP was the most affected with an average of 31.10 ± 36.32 , followed by the GH 34.45 ± 41.50 (Table 3). The univariate analysis showed that the deterioration of the PCS was significantly associated with an older age ($p < 0.001$), marital status (single) ($p = 0.001$), smoking status ($p = 0.006$), COPD ($p = 0.005$), presence of dyspnea ($p = 0.008$), presence of cyanosis ($p = 0.001$), desaturation in 6-minute walk test ($p = 0.014$), respiratory insufficiency ($p = 0.001$), and a high number of treatments ($p < 0.001$).

In multivariate analysis, we found that unmarried life [$\beta = -6.84$; 95% CI (-11.43; -2.25)], presence of dyspnea [$\beta = -4.94$; 95% CI (-9.41; -0.52)] and presence of cyanosis [$\beta = -9.65$; 95% CI (-15.64; -3.67)] were negatively associated with the physical component of quality of life (Table 4).

Mental health

The MCS was altered with an average of 33.72 ± 19.79 . Vitality was the most altered, followed by mental health, with an average of 37.68 ± 36.20 and 38.10 ± 28.74 , respectively (Table 3). The univariate analysis showed that Impaired MCS was associated with age ≥ 50 ($p = 0.002$), marital status (single) ($p = 0.005$), having sarcoidosis ($p = 0.005$), presence of dyspnea ($p = 0.016$), and presence of cyanosis ($p = 0.007$).

In multivariate analysis, the factor negatively associated with MCS in our patients was age ≥ 50 with [$\beta = -7.84$; 95% CI (-15.05; -0.62)], marital status (single) [$\beta = -7.81$; 95% CI (-15.14; -0.48)], and presence of cyanosis [$\beta = -10.70$; 95% CI (-20.08; -1.32)] (Table 5).

Table 1. Socio-demographic characteristics.

Variables	n (%)
Age (n=209)	
<50 years	54 (25.8)
≥ 50 years	155 (74.2)
Gender (n=209)	
Male	103 (49.3)
Female	106 (50.7)
Habitat (n=205)	
Rural	105 (51.2)
Urban	100 (48.8)
Marital status (n=187)	
Married	139 (74.3)
Unmarried	48 (25.7)
Level of education (n=173)	
Illiterate	93 (53.8)
Literate	80 (46.2)
Profession (n=172)	
Unemployed	127 (73.8)
Employed	45 (26.2)
Lives (n=185)	
Alone	5 (2.7)
With family	180 (97.3)

Table 2. Clinical characteristics.

Variables	n (%)
Duration of disease, mean±SD	7.5±7.6
FEV1, mean±SD	1.5±0.8
COPD, n (%)	90 (43.1)
Severity group (n=78), n (%)	
A or B	26 (33.3)
C or D	52 (66.7)
Level of control (n=77), n (%)	
Well-controlled	36 (46.8)
Poorly controlled	41 (53.2)
Asthma, n (%)	67 (32.2)
Step (n=56), n (%)	
1 or 2	46 (82.1)
3 or 4	10 (17.9)
Level of control (n=56), n (%)	
Well-controlled	37 (66.1)
Poorly controlled	19 (33.9)
Diffuse interstitial lung disease, n (%)	8 (3.8)
Bronchiectasis, n (%)	59 (28.2)
Sarcoidosis, n (%)	17 (8.1)
Sequelae disease, n (%)	32 (15.4)
Comorbidity, n (%)	111 (53.1)
Surgical antecedents, n (%)	43 (20.7)
Smokers/ex-smokers, n (%)	78 (37.3)
Cough, n (%)	118 (56.5)
Dyspnea stage mMRC≥2, n (%)	110 (52.6)
Cyanosis, n (%)	21 (10.1)

Variables	n (%)
Sputum, n (%)	99 (47.6)
Wheezing, n (%)	56 (26.8)
Pain, n (%)	35 (16.7)
Hemoptysis, n (%)	18 (8.6)
Infection, n (%)	60 (28.7)
Fatigue, n (%)	92 (44.0)
Weight loss, n (%)	55 (26.3)
Anorexia, n (%)	41 (19.7)
6-minute walk test, n (%)	
Desaturation	69 (34.3)
No desaturation	132 (65.7)
Gasometry, n (%)	
Respiratory insufficiency	99 (51.3)
No respiratory insufficiency	94 (48.7)
Patient under oxygen therapy, n (%)	
Yes	30 (14.4)
No	178 (85.6)
Number of treatments, n (%)	
<2	60 (28.7)
≥2	149 (71.3)
Number of exacerbations, n (%)	
<2/year	138 (66.0)
≥2/year	71 (34.0)
Number of hospitalizations, n (%)	
<2/year	196 (93.8)
≥2/year	13 (6.2)

SD, standard deviation; FEV1, forced expiratory volume in 1 second; COPD, chronic obstructive pulmonary disease; mMRC, modified Medical Research Council.

Table 3. Components of the 12-item short-form.

Variables	Mean±SD
PCS	34.45±13.78
Physical functioning	34.45±48.94
Role-physical	31.10±36.32
Bodily pain	49.88±45.50
General health	34.45±41.50
MCS	33.72±19.79
Vitality	37.68±36.20
Social functioning	52.63±44.59
Role-emotional	46.47±39.17
Mental health	38.10±28.74

SD, standard deviation; PCS, physical health; MCS, mental health.

Discussion

Our study represents the first attempt, to our knowledge, to assess the quality of life in patients with CRD in the Moroccan context. The primary objective is to comprehensively evaluate the well-being of these patients and provide valuable insights within this patient population.

In the context of our study, the average scores of SF-12 PCS and MCS were found to be below the mean (50), namely 34.45±13.78 and 33.72±19.79, respectively. These findings align

with a study conducted in Asia that also assessed the quality of life using the SF-12 and reported lower scores, particularly among patients with COPD and asthma [22].

Furthermore, these results are consistent with those of a study conducted in Portugal, which utilized the World Health Organization Quality of Life scale (WHOQOL-BREF). The study revealed scores below 50 in each of the WHOQOL-BREF domains, including PCS, psychological health, social relationships, and environmental health [27].

This recent study has also revealed potential risk factors for the impairment of quality of life, namely chronic bronchitis, frequent coughing, wheezing, asthma, and allergic rhinitis. However, in our study, we identified several risk factors other than these. For PCS, we observed significant associations with advanced age, marital status (single), presence of comorbidities, smoking, COPD, dyspnea, cyanosis, desaturation during the 6-minute walk test, respiratory insufficiency in gasometry, and a high number of treatments. On the other hand, for MCS, associations were observed with advanced age, marital status (single), sarcoidosis, dyspnea, and cyanosis.

The association between advanced age and impaired quality of life suggests that older individuals may face additional challenges related to their physical well-being, emphasizing the need to address emotional aspects in these individuals. Additionally, the relationship between marital status and quality of life highlights the importance of social support in preserving physical and emotional well-being. The coexistence of multiple medical conditions can worsen overall health and affect PCS. Smoking is a major risk

factor for many respiratory and cardiovascular diseases, contributing to a decline in PCS.

Dyspnea and cyanosis as symptoms appear to play a major role in the impairment of PCS, emphasizing their impact on daily activities and psychological well-being. A decrease in oxygen saturation during a physical exertion test and respiratory insufficiency in gasometry may indicate a decline in physical capacity and, therefore, quality of life.

These findings have significant implications for clinical practice, underscoring the importance of a holistic approach in managing patients with CRD. Healthcare professionals should consider these specific risk factors when assessing the quality of life of their patients, in order to personalize interventions and improve clinical outcomes.

Our study is the first to assess the quality of life of Moroccan patients with CRD. It has highlighted a significant impairment in

Table 4. Factors associated with physical health: results of bivariate analysis and multivariate analysis.

Variables	PCS	p	Adjusted β (95% CI)	p
Age				
<50 years	40.80±11.54	<0.001		
≥50 years	32.24±12.85			
Marital status				
Married	38.90±13.41	0.001	Reference	0.004
Unmarried	31.25±13.13		-6.84 (-11.43; -2.25)	
Comorbidity				
Yes	31.60±13.54	0.001		
No	37.68±13.40			
Smoking status				
No	36.48±13.49	0.006		
Yes	31.05±13.67			
COPD				
No	36.74±13.76	0.005		
Yes	31.42±13.29			
Asthma				
No	33.19±14.03	0.064		
Yes	36.98±13.05			
Diffuse interstitial lung diseases				
No	34.55±13.79	0.282		
Yes	27.03±13.91			
Bronchiectasis				
No	33.05±14.14	0.019		
Yes	38.01±12.22			
Sarcoidosis				
No	35.00±13.54	0.019		
Yes	38.01±12.22			
Sequelae disease				
No	34.77±13.86	0.378		
Yes	32.42±13.49			
Disease severity				
Non-severe illness	32.74±12.57	0.738		
Severe illness	31.87±13.25			
Dyspnea				
No	38.67±12.23	0.008	Reference	0.029
Yes	32.95±14.03		-4.94 (-9.41; 0.52)	
Cyanosis				
No	35.42±13.38	0.001	Reference	0.002
Yes	25.36±14.84		-9.65 (-15.64; -3.67)	
6-minute walk test				
Desaturation	31.36±14.99	0.014		
No desaturation	36.39±12.98			
Gasometry				
Respiratory insufficiency	31.17±12.61	0.001		
No respiratory insufficiency	37.53±14.30			
Number of treatments				
<2	41.28±12.92	<0.001		
≥2	31.71±13.19			

PCS, physical health; CI, confidence interval; COPD, chronic obstructive pulmonary disease.

Table 5. Factors associated with mental health: results of bivariate analysis and multivariate analysis.

Variables	MCS	p	Adjusted β (95% CI)	p
Age				
<50 years	40.80±15.61	0.002	Reference	0.033
≥50 years	31.26±20.53		-7.84 (-15.05; -0.62)	
Marital status				
Married	40.83±17.47	0.005	Reference	0.037
Unmarried	30.73±21.10		-7.81 (-15.14; -0.48)	
Asthma				
No	32.57±19.98	0.248		
Yes	35.98±19.45			
COPD				
No	34.75±20.06	0.389		
Yes	32.36±19.45			
Diffuse interstitial lung diseases				
No	33.80±19.77	0.729		
Yes	30.33±26.41			
Bronchiectasis				
No	31.49±20.54	0.009		
Yes	39.39±16.61			
Sequelae disease				
No	33.40±20.10	0.567		
Yes	35.59±18.48			
Disease severity				
Non-severe illness	40.18±18.25	0.028		
Severe illness	31.24±21.09			
Sarcoidosis				
No	34.86±19.38	0.005		
Yes	20.89±20.41			
Dyspnea				
No	39.25±17.94	0.016		
Yes	31.75±20.10			
Cyanosis				
No	35.11±18.55	0.007	Reference	0.026
Yes	22.80±25.76		-10.70 (-20.08; -1.32)	

MCS, mental health; CI, confidence interval; COPD, chronic obstructive pulmonary disease.

the quality of life of these patients. However, these results should be interpreted considering the methodological limitations of cross-sectional studies. Firstly, the studied population does not reflect all patients with CRD, especially those in the private sector, who may not have the same sociodemographic and clinical characteristics. Secondly, some patients refused to respond to the questionnaire.

Conclusions

In summary, our study has highlighted an impairment in the quality of life among patients with CRD and has also revealed specific associations between impaired PCS and several factors. These findings suggest the need for a holistic approach in patient management, integrating specific interventions based on the identified risk factors. Our recommendations include the promotion of preventive programs, coordinated management of comorbidities, regular monitoring of at-risk patients, and continued research to refine our understanding and improve clinical practices. By following these recommendations, healthcare professionals can significantly contribute to enhancing the quality of life for patients with CRD.

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Online supplementary material:

Supplementary Material. SF-12 questionnaire translated into Moroccan dialect.