Chronic respiratory diseases and quality of life in elderly nursing home residents

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Abstract

Few studies have assessed the quality of life (QOL) related to chronic respiratory diseases in the elderly. In the framework of the geriatric study on the health effects of air quality in elderly care centers (GERIA) study, a questionnaire was completed by elderly subjects from 53 selected nursing homes. It included various sections in order to assess respiratory complaints, QOL (World Health Organization QOL (WHOQOL)-BREF), and the cognitive and depression status. The outcome variables were the presence of a score lower than 50 (<50) in each of the WHOQOL-BREF domains (physical health, psychological health, social relationships, and environmental health). Chronic bronchitis, frequent cough, current wheezing, asthma, and allergic rhinitis were considered as potential risk factors. The surveyed sample was ($n = 887$) 79% female, with a mean age of 84 years (SD: 7 years). In the multivariable analysis, a score of <50 in the physical domain was associated with wheezing in the previous 12 months (odds ratio (OR): 2.03, confidence interval (CI): 1.25–3.31) and asthma (OR: 1.95, CI: 1.12–3.38). The psychological domain was related with a frequent cough (OR: 1.43, CI: 0.95–2.91). A score of <50 in the environmental domain was associated with chronic bronchitis (OR: 2.89, CI: 1.34–6.23) and emphysema (OR: 3.89, CI: 1.27–11.88). In view of these findings, the presence of respiratory diseases seems to be an important risk factor for a low QOL among elderly nursing home residents.

Introduction

Chronic respiratory disease (CRD) represents a wide array of serious diseases, constituting a serious public health problem for millions of affected people worldwide.[1]

Various studies have indicated an increase in CRD prevalence, particularly asthma and chronic obstructive pulmonary disease (COPD), which may also converge and overlap in older people.[2–4] Among patients with CRD, the elderly might require significantly more care resources than younger patients,[5] as it is expected that they present additional comorbidities and a more pronounced lung function and immunological decline, resulting in a higher predisposition to respiratory infections.[6]

While the life expectancy among older people has been extended due to a higher accessibility to health

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care resources and more efficient drugs, the importance of the health-related quality of life (QOL) has been highlighted.[7] Actually, in recent years the burden of disease has been assessed beyond the traditional health indicators of morbidity and mortality. In this sense, a patient's QOL evaluation became an important outcome in several clinical studies.[8–10]

Different instruments have been proposed to measure QOL. One of these is the World Health Organization QOL (WHOQOL)-BREF, a WHO questionnaire that assesses various aspects of life.[11,12] This questionnaire is one of the best-known instruments and was developed for cross-cultural comparisons.[11] It has been used worldwide in healthy and unhealthy individuals, allowing comparisons between different populations and illnesses. Furthermore, WHOQOL-BREF and St. George's Respiratory Questionnaire show comparable reliability and validity for patients with COPD.[13]

Few studies have assessed QOL related to CRD in the elderly[3,13–15] and evaluated to what extent these conditions could constitute an independent risk factor for a low QOL. For this purpose, the influence of heart disease on health-related QOL in asthma and COPD should be taken into account.[16]

The current article reports the results from the GERIA Project (geriatric study on the health effects of air quality in elderly care centers) conducted in Portugal, the country with the 8th oldest population in the world and the 6th oldest in Europe, with 23% of the population who are more than 60 years old.[17] Here, we aimed to study the association between elderly QOL and the reported respiratory diseases.

Material and methods

Study design and setting

The GERIA Project was conducted in the two main Portuguese cities, Lisbon and Oporto,[18] and comprised two phases. In the present article, we only report the results from phase I. Within the scope of this study, 53 nursing homes (33 in Lisbon and 20 in Oporto) were selected through proportional stratified random sampling (by parish) from the 151 included in the Portuguese Social Charter (95 in Lisbon and 56 in Oporto). These 53 nursing homes were attended by 2110 residents (1442 in Lisbon and 668 in Oporto).

From September 2012 to April 2013, an interviewer conducted the questionnaire with nursing home residents older than 65 years of age. It included different sections to assess the respiratory complaints,

QOL and the cognitive and depression status. The interviewers were health technicians who were trained and certified by the GERIA team.

The GERIA project was approved by the Ethics Committee of NOVA Medical School/Faculdade de Ciências Médicas, Universidade Nova de Lisboa, Portugal. The procedures followed were in accordance with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki). The database was registered in the Portuguese Data Protection Authority. The elderly and their caregivers were informed about the study and their signed consent was obtained.

Participants

In order to participate in the study, residents had to be at least 65 years old, been living in the nursing home for more than 2 weeks, and have the cognitive and interpretative skills to complete the questionnaire.

Data sources

Data were collected by the questionnaire that included different sections. These sections were:

CRD assessment. It included questions about respiratory symptoms, diseases, and risk factors derived from the American Thoracic Society and the Division of Lung Diseases (ATS-DLD-78) questionnaire.[19] These questions have been translated to different languages and have been widely used in surveys, such as the Bronchial Obstructive Lung Disease study,[20] which also took place in Portugal.[21] Frequent cough was considered if there was a usual cough as much as four to six times a day, four or more days of the week. Current wheezing was assumed if there was at least one episode in the previous 12 months. According to the standardized definition, chronic bronchitis was defined as the presence of cough and sputum production for at least 3 months in each of 2 consecutive years. Frequent cough and sputum was defined as the presence of cough and sputum production for at least 3 months. Asthma, allergic rhinitis, and heart troubles were defined on the basis of the presence of a previous medical diagnosis. Smoking was defined as more than 20 packs of cigarettes or 12 oz of tobacco in a lifetime or at least one cigarette a day for 1 year. A current smoker was considered if the subject smoked during the last 30 days. Occupational exposure was assumed for those who have ever worked for a year or more in any job with dusty air.

QOL assessment. The Portuguese version[22] of the WHOQOL-BREF questionnaire was used for this purpose.[23] It is focused on the QOL definition advocated by the WHO, which includes the culture and context that influence an individual's health perception. It comprises 24 core items organized into four domains: physical health (7 items), psychological health (6 items), social relationships (3 items), and environmental health (8 items). These four domain scores denote an individual's perception of QOL in each particular domain. There are two additional items, intended as indicators of overall QOL and health perception. Domain scores are scaled in a positive direction (higher scores denote a higher QOL). The mean score of items within each domain is used to calculate the raw domain score. Then, two transformation methods are used: the first one converts the domain raw scores to range between 4 to 20 and the second converts domain scores to a 0–100 scale. Considering the 4–20 scale, the midpoint where QOL is judged to be neither good nor poor is 12.0 (11) (which corresponds to 50 on the 0–100 scale). In the present study, we considered the 0–100 scale.

Cognitive status assessment. The mini mental state examination was used to evaluate cognitive status.[24] It is an easy to conduct questionnaire, which allows cognitive function assessment in temporal and spatial orientation, calculation, memory, and verbal and written skills. The maximum score is 30. Considering the education level,[23] the cut off values for the Portuguese population, indicative of cognitive impairment, are: ≤ 15 (for illiterates), ≤ 22 (for those with 1–11 years of schooling), and ≤ 27 (for people with more than 11 years of schooling).

Depression status assessment. In order to evaluate the depression status the 15-item Geriatric Depression Scale (GDS-15) was used.[25] In GDS-15, for each positive answer on items 2–4, 6, 8–10, 12, 14, and 15 one point is allocated. In turn, for each negative answer on items 1, 5, 7, 11, and 13 one point is also given. Considering the Portuguese population, the interpretation is the following: more than 5 points is considered suggestive of depression and more than 10 points is considered indicative of depression.

Variables

The outcome variables were the presence of a score lower than 50 (<50) in a 0–100 scale in the physical health, psychological health, social relationships, and environmental health WHOQOL-BREF domains. Chronic bronchitis, frequent cough, current wheezing, asthma, and allergic rhinitis were considered as potential risk factors for a low WHOQOL-BREF score. Gender, age, education level, marital status, smoking habits, past occupational exposure to dust, and residing at nursing home (number of years) were considered as potential confounders. Comorbidities (reported heart disease, presence of cognitive impairment, and presence of depression) were also considered as potential confounders.

Statistical analysis

Firstly, an exploratory analysis of the variables of interest was carried out. The prevalence of frequent cough, chronic bronchitis, reported asthma, and allergic rhinitis were estimated in the sample.

Median, 25th (P_{25}), and 75th (P_{75}) percentiles were estimated for every WHOQOL-BREF domain. A low-QOL domain score was considered if the WHOQOL-BREF transformed score was <50 in the 0–100 scale.

Logistic regression models were used to explore the association between the presence of a low-QOL domain (outcome) and the above-mentioned risk and confounding factors. Covariates with a p value lower than 0.25 were selected as candidates for the multivariable analysis and a purposeful selection was used for the choice of the variables in the final model.

Crude regression coefficients and corresponding odds ratio (OR) with 95% confidence intervals (95% CI) were calculated first. Adjusted ORs were obtained as a result of fitting the multivariable logistic regression models to the data.

The level of significance considered was $\alpha = 0.05$, although p values greater than 0.05 and lower than 0.1 were still considered.[23] Data analysis was performed using IBM SPSS Statistics Version 21® (New York, USA).

Results

From the initially selected nursing homes, 63 (53.5%) refused to participate (28 in Lisbon and 35 in Oporto) and were replaced following the initial sampling scheme.

The overall questionnaire's answer rate was 44% (931/2, 110). The main reasons to not participate in the study were lack of collaboration due to incapacity (75%), elderly refusal (9.5%), being younger than 65 years (9.5%), and institution refusal (6%). Even though, in the analysis, only the WHOQOL-BREF

Table 1. Participants' characteristics according to sociodemographic and quality of life (WHOQOL-BREF) assessment.

	Total number of participants (%)	Median (P_{25}–P_{75})
Gender		
Female	704 (79.0)	
Male	183 (21.0)	
Age in years		85 (79–89)
65–75	106 (12.0)	
76–85	377 (42.5)	
>85	404 (45.5)	
Years living in the NH		4 (1–8)
≤1	255 (28.7)	
2–5	313 (35.3)	
>5	319 (36.0)	
Number of years of education completed		
≤4 years	603 (68.0)	
>4 years	279 (31.5)	
DK/NA	5 (0.5)	
Marital status		
Single	174 (19.6)	
Married	130 (14.7)	
Divorced	72 (8.1)	
Widower	500 (56.4)	
DK/NA	11 (1.2)	
Cognitive impairment		
No	517 (58.3)	
Yes	368 (41.5)	
NA	2 (0.9)	
Indicative or suggestive of depression		
No	400 (45.1)	
Yes	479 (54.0)	
NA	8 (0.9)	
WHOQOL-BREF score		
Overall perception of QOL and health		50.0 (37.5–75.0)
<50	560 (63.1)	
≥50	313 (35.3)	
NA	14 (1.6)	
Physical health		64.3 (47.3–75.0)
<50	248 (28.0)	
≥50	603 (68.0)	
NA	36 (4.0)	
Psychological health		62.5 (50.0–75.0)
<50	242 (27.3)	
≥50	619 (69.8)	
NA	26 (2.9)	
Social relationships		75.0 (58.3–75.0)
<50	60 (6.8)	
≥50	525 (59.2)	
NA	302 (34.0)	
Environmental health		62.5 (56.3–71.9)
<50	111 (12.6)	
≥50	647 (72.9)	
NA	129 (14.5)	

DK: did not know; NH: nursing home; NA: not available; QOL: Quality of life; P_{25}: 25th percentile; P_{75}: 75th percentile

Table 2. Frequency of reported symptoms, diseases and exposures.

	Total of participants (%)
Frequent cough	
No	715 (80.6)
Yes	172 (19.4)
DK	0 (0.0)
Chronic bronchitis	
No	894 (95.8)
Yes	39 (4.2)
DK	0 (0.0)
Frequent cough and sputum	
No	787 (88.7)
Yes	100 (12.3)
DK	0 (0.0)
Wheezing in the previous 12 months	
No	787 (88.7)
Yes	100 (11.3)
DK	0 (0.0)
Asthma—doctor diagnosis	
No	809 (91.2)
Yes	76 (8.6)
DK	2 (0.2)
Emphysema—doctor diagnosis	
No	866 (97.6)
Yes	17 (1.9)
DK	4 (0.5)
Tuberculosis—doctor diagnosis	
No	835 (94.1)
Yes	47 (5.3)
DK	5 (0.6)
Allergic rhinitis—doctor diagnosis	
No	762 (85.9)
Yes	122 (13.8)
DK	3 (0.3)
Heart disease—doctor diagnosis	
No	534 (60.2)
Yes	347 (39.1)
DK	6 (0.7)
Smoking status	
Never was a smoker	731 (82.4)
Former smoker	128 (14.4)
Current smoker	28 (3.2)
DK	0 (0.0)
Exposure to dust in the workplace	
Never	691 (77.9)
Former exposure	187 (21.1)
DK	9 (1.0)

DK: did not know.

questionnaires with less than 20% of missing answers ($n = 887$) were considered.

The surveyed sample included 79% females and 21% males, with a mean age of 84 years (SD: 7 years). In the surveyed sample, 41.5% presented cognitive

Table 3. WHOQOL-BREF domain scores according to symptoms/diseases: median (P_{25}–P_{75}).

	Overall perception	Physical health	Psychological health	Social relationships	Environmental health
Frequent cough	50 (25–63)	54 (43-71)	58 (40-87)	67 (58-75)	59 (53–70)
Chronic bronchitis	38 (13–63)	54 (37-64)	60 (42-70)	71 (58-83)	56 (41–66)
Wheezing (previous 12 months)	38 (25–63)	53 (39–71)	58 (39–71)	67 (58–75)	59 (53–70)
Asthma	38 (25–50)	54 (43–68)	58 (42–71)	75 (58–75)	59 (56–69)
Emphysema	25 (12–50)	54 (32–59)	52 (36–63)	75 (46–85)	55 (37–63)
Tuberculosis	50 (25–63)	57 (43–71)	67 (42–71)	67 (58–75)	63 (56–72)
Allergic rhinitis	38 (25–63)	57 (46–71)	63 (46–71)	67 (58–75)	63 (57–72)
Heart disease	50 (38–75)	57 (46–71)	63 (50–75)	75 (67–75)	63 (57–72)

P_{25}: 25th percentile; P_{75}: 75th percentile; WHOQOL-BREF: World Health Organization quality of life-BREF.

Table 4. Relationships between sociodemographic characteristics and WHOQOL-BREF domains (score < 50)—crude odds ratios.

	Physical Health		Psychological health		Social relationships		Environmental health	
Variable	OR (95% CI)	p Value	OR (95% CI)	p Value	OR (95% CI)	p Value	OR (95% CI)	p Value
Gender								
Male	1		1		1		1	
Female	1.89 (1.26–2.83)	0.002	1.97 (1.31–2.98)	0.001	0.92 (0.47–1.79)	0.802	0.85 (0.53–1.37)	0.504
Age in years								
65–75	1		1		1		1	
76–85	1.05 (0.64–1.72)	0.860	1.35 (0.80–2.26)	0.256	1.59 (0.64–3.96)	0.319	1.10 (0.54–2.40)	0.784
>85	1.28 (0.78–2.09)	0.325	1.47 (0.88–2.46)	0.137	0.85 (0.33–2.22)	0.746	1.35 (0.67–2.70)	0.400
Years living in the NH								
≤1	1		1		1		1	
2–5	0.67 (0.46–0.96)	0.027	0.81 (0.56–1.17)	0.253	0.84 (0.45–1.58)	0.592	0.97 (0.58–1.61)	0.592
>5	0.75 (0.52–1.08)	0.123	0.96 (0.66–1.38)	0.806	0.55 (0.28–1.08)	0.079	0.98 (0.59–1.62)	0.923
Years of education[a]								
≤4 years	1		1		1		1	
>4 years	0.65 (0.47–0.90)	0.011	0.73 (0.52–1.01)	0.067	0.93 (0.53–1.64)	0.806	0.70 (0.44–1.09)	0.116
Marital status								
Single	1		1		1		1	
Married	1.25 (0.72–2.18)	0.423	1.04 (0.62–1.77)	0.878	1.22 (0.48–3.10)	0.674	1.72 (0.83–3.58)	0.674
Divorced	1.90 (1.02–3.55)	0.044	0.94 (0.49–1.80)	0.863	1.93 (0.75–4.97)	0.175	2.18 (0.95–4.97)	0.065
Widower	1.92 (1.23–2.92)	0.003	1.30 (0.87–1.94)	0.199	0.99 (0.49–2.06)	0.998	1.59 (0.87–2.88)	0.129
Cognitive impairment								
No	1		1		1		1	
Yes	1.28 (0.95–1.73)	0.103	1.35 (1.00–1.83)	0.048	2.05 (1.20–3.52)	0.009	2.44 (1.62–3.68)	<0.001
Depression[b]								
No	1		1		1		1	
Yes	7.12 (4.89–10.36)	<0.001	23.41 (13.55–40.5)	<0.001	2.99 (1.63–5.50)	<0.001	6.19 (3.61–10.61)	<0.001

NH: nursing home; OR: odds ratio; CI: confidence interval; WHOQOL-BREF: World Health Organization quality of life-BREF.
[a]Years of completed education.
[b]Indicative or suggestive of depression.

impairment and 54% a GDS-15 score that was indicative or suggestive of depression. The description of the sample is presented in Table 1.

There was no statistical difference between the respondents and nonrespondents ($p = 0.534$) concerning gender. The mean age of the nonrespondents was

Table 5. Relationships between cardiorespiratory symptoms, diseases, and WHOQOL-BREF domains (score < 50)—crude ORs.

	Physical Health		Psychological health		Social relationships		Environmental health	
Variable	OR (95% CI)	p Value	OR (95% CI)	p Value	OR (95% CI)	p Value	OR (95% CI)	p Value
Frequent cough								
No	1		1		1		1	
Yes	1.76 (1.23–2.51)	0.002	1.80 (1.26–2.57)	0.001	1.33 (0.72–2.44)	0.364	1.67 (1.05–2.67)	0.032
Chronic bronchitis								
No	1		1		1		1	
Yes	2.12 (1.07–4.19)	0.031	1.52 (0.77–3.00)	0.223	0.83 (0.19-3.62)	0.802	3.60 (1.77-7.34)	<0.001
Wheezing in the previous 12 months								
No	1		1		1		1	
Yes	2.78 (1.80–4.27)	<0.001	1.86 (1.20–2.88)	0.005	0.95 (0.42–2.18)	0.906	0.95 (0.50–1.82)	0.884
Asthma								
No	1		1		1		1	
Yes	2.44 (1.50–3.96)	<0.001	1.17 (0.70–1.96)	0.556	1.34 (0.58–3.12)	0.496	1.19 (0.60–2.36)	0.610
Emphysema								
No	1		1		1		1	
Yes	1.33 (0.49–3.64)	0.575	2.60 (0.96–7.00)	0.059	2.45 (0.66–9.02)	0.180	4.08 (1.42–11.69)	0.009
Tuberculosis								
No	1		1		1		1	
Yes	1.23 (0.65–2.24)	0.519	1.22 (0.81–1.86)	0.343	0.54 (0.13–2.31)	0.404	0.78 (0.30–2.03)	0.781
Allergic rhinitis								
No	1		1		1		1	
Yes	1.34 (0.89–2.01)	0.169	1.44 (0.77–2.70)	0.257	0.82 (0.38–1.79)	0.622	1.13 (0.64–1.98)	0.672
Heart disease								
No	1		1		1		1	
Yes	2.21 (1.64–2.99)	<0.001	1.19 (0.88–1.61)	0.267	0.91 (0.52–1.57)	0.729	0.89 (0.59–1.36)	0.606

OR: odds ratio; CI: confidence interval; WHOQOL-BREF: World Health Organization quality of life-BREF.

83 years (SD: 11 years) and despite being similar to the respondents, it was statistically different ($p = 0.004$). Missing information is reported in Tables 1 and 2.

Symptoms and diseases

Frequent cough was the most common symptom (19.4%), followed by wheezing in the previous 12 months (11.3%). Allergic rhinitis and asthma were the most reported respiratory diseases (13.8% and 8.6%, respectively), followed by chronic bronchitis (4.2%) and emphysema (1.9%). Heart trouble was the most reported condition (39%). Former and current smoking was reported by 14.4% and 3.2% of the sample, respectively. The frequency of the reported symptoms, diseases, and exposures is shown in Table 2.

WHOQOL-BREF results

Overall median scores for the different domains were modest (Table 1), with the exception of the social relationships domain where a median of 75

(P_{25}–P_{75}: 58.3–75.0) was found. The median scores for symptoms/diseases showed the same trend (Table 3). Overall QOL and health perception was low, particularly for respiratory diseases.

Associations between diseases and QOL

In the univariable analysis (Tables 4 and 5), the physical health domain was associated with gender, marital status, depression, frequent cough, chronic bronchitis, wheezing in the previous 12 months, asthma, and heart trouble, and inversely related with years living in nursing homes, single marital status, and years of education. The psychological domain was directly associated with gender, cognitive impairment, depression, frequent cough, wheezing in the previous 12 months, asthma, and emphysema, and inversely related with years of education. Concerning the social relationships, direct associations were found only for cognitive impairment and depression. The environmental domain was directly related with

Table 6. Relationships between respiratory symptoms, diseases, and WHOQOL-BREF domains (score < 50): odds ratios after adjusting for confounding.

Variable	Physical health		Psychological health		Social relationships		Environmental health	
	OR (95% CI)	p Value	OR (95% CI)	p Value	OR (95% CI)	p Value	OR (95% CI)	p Value
Frequent cough								
No	I		I		I		I	
Yes	1.39 (0.93–2.07)	0.108	1.43 (0.95–2.91)	0.087	1.19 (0.64–2.22)	0.578	1.38 (0.83–2.31)	0.214
Chronic bronchitis								
No	I		I		I		I	
Yes	1.27 (0.61–2.67)	0.523	0.89 (0.43–1.86)	0.763	0.67 (0.15–2.97)	0.597	2.89 (1.34–6.23)	0.007
Wheezing 12 months								
No	I		I		I		I	
Yes	2.03 (1.25–3.31)	0.004	1.37 (0.83–2.29)	0.219	0.84 (0.36–1.96)	0.840	0.79 (0.40–1.57)	0.499
Asthma								
No	I		I		I		I	
Yes	1.95 (1.12–3.38)	0.018	0.82 (0.46–1.47)	0.501	1.33 (0.56–3.14)	0.522	1.08 (0.52–2.34)	0.831
Emphysema								
No	I		I		I		I	
Yes	1.07 (0.35–3.25)	0.903	2.00 (0.64–6.32)	0.235	2.32 (0.61–8.82)	0.217	3.89 (1.27–11.88)	0.017
Tuberculosis								
No	I		I		I		I	
Yes	1.29 (0.63–2.65)	0.494	1.29 (0.62–2.68)	0.503	0.51 (0.12–2.23)	0.374	0.85 (0.31–2.30)	0.742
Allergic rhinitis								
No	I		I		I		I	
Yes	1.23 (0.77–1.96)	0.395	1.11 (0.68–1.80)	0.684	0.84 (0.38–1.87)	0.669	1.23 (0.66–2.29)	0.522

OR: odds ratio; CI: confidence interval; WHOQOL-BREF: World Health Organization quality of life-BREF.

cognitive impairment, depression, frequent cough, chronic bronchitis, and emphysema.

In the multivariable analysis (Table 6), after adjusting the effect of diseases for the different confounders, associations were found between having a score <50 in the physical health domain and wheezing in the previous 12 months (OR: 2.03, CI: 1.25–3.31) and asthma (OR: 1.95, CI: 1.12–3.38). The psychological health domain was only related with coughing frequently (OR: 1.43, CI: 0.95–2.91) while no association was found for the social relationships domain. A score <50 in the environmental health domain was associated with chronic bronchitis (OR: 2.89, CI: 1.34–6.23) and emphysema (OR: 3.89, CI: 1.27–11.88).

Discussion

CRDs, such as asthma and COPD, are common among the older population, and COPD will become the third leading cause of death by 2030.[26] Even though these conditions are frequently underdiagnosed because the elderly tend to underreport their respiratory symptoms as they might regard complaints as a natural feature of aging and feel that

medical intervention may have little benefit.[27] Nevertheless, older people should be encouraged to seek help for their CRD so as to achieve a better QOL.[28]

In the present study, we found a modest frequency of respiratory diseases, especially chronic bronchitis. This might be due not only to underreporting but also to a lower life expectancy of the patients suffering from pulmonary conditions.[29]

We obtained modest median WHOQOL-BREF domains scores for the participating nursing home residents. However, the median scores were lower for those elderly who reported respiratory complaints or diseases.

Our study found that the presence of wheezing in the previous 12 months, asthma, and heart disease diagnosis were associated with low QOL, particularly for the physical health domain. These associations suggest that the mentioned conditions might interfere with pain and discomfort, fatigue, sleep, and rest, which are assessed in that domain. In addition, chronic bronchitis and emphysema were both associated with a low score in the environment domain whilst frequent cough was the only item related to the psychological domain. This last association indicates

a relationship between the elderly who report frequent cough and the presence of negative feelings.

The strengths of this study are the selection procedure of the participant nursing homes and the relatively large sample size of elderly people. Moreover, every resident who was able to answer the questionnaire was invited to participate in the survey. Furthermore, when we studied the association between QOL and respiratory conditions, different confounders were considered, including the presence of heart disease.

Our study also has some weaknesses, however. We considered the presence of respiratory conditions according to the answers given in the questionnaire, and this might have contributed to underreporting. On the other hand, we could not assess the QOL of many nursing home residents as they were too disabled to participate in the study. For this reason, our sample is not entirely representative of the elderly who attended the nursing homes and consequently we might have overestimated the real QOL of the residents.

Conclusion

In view of these findings, the presence of respiratory morbidities seems to be important regarding the risk factors for a low QOL among the elderly. A better control of these respiratory health conditions might improve the QOL of nursing home residents.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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