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Evaluation of health-related quality of life in respiratory disease patients in a tertiary care teaching hospital

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Abstract

In India, respiratory tract infections (RTI) are a significant public health concern, particularly among children and the elderly. The quality of life (QoL) of patients is greatly impacted by RTI. Enhancing patient care and treatment approaches requires an understanding of the variables that influence health-related QoL (HRQoL). Our study's goal was to assess patients' HRQoL using the St. George Respiratory Questionnaires (SGRQ) in those with respiratory diseases. A cross-sectional observational study was carried out in the inpatient department of Vivekananda Hospital, Hubli, over 6 months from August 1, 2023, to January 31, 2024. After fulfilling the inclusion requirements, 200 people were included in the study. In 200 patients, while assessing the QoL, we found a significant correlation between age, diagnosis, some biomarkers, smoking, days of hospitalization, the severity of disease, residency, antibiotics, income, and education with HRQoL using SGRQ questionnaires. Our study highlights that HRQoL is impaired in patients with RTI. Age positively correlated with symptoms, activity, and impact, especially in ages 55-69 years and 70-84 years. No correlation was found between gender, comorbidities, and alcohol consumption. Higher C-reactive protein and erythrocyte sedimentation rate levels were associated with greater impact and activity limitations. Our research concluded that several factors might impact a patient's HRQoL with respiratory disease. Determining these factors in advance can help identify individuals who are more likely to have poorer HRQoL and make interventions that could improve patient outcomes.

Key words: RTI, HRQoL, SGRQ, biomarkers, disease severity, cross-sectional study.

Introduction

Respiratory tract infections (RTIs) range from mild colds to severe illnesses like pneumonia and COPD, caused primarily by viruses such as rhinovirus, influenza, and respiratory syncytial virus. Symptoms include cough, sore throat, congestion, fever, and in severe cases, breathing difficulties [1,2]. RTI affect 11.3% of India's population, contributing to the nation's high lung disease mortality rate of 142.09 per 100,000 people [3]. COPD and asthma are major concerns, with India hosting 34.3 million asthma cases, experiencing thrice higher asthma mortality and double the global disability-adjusted life years (DALYs) [4]. Severe air pollution further exacerbates these issues, impacting nearly 100 million Indians annually, causing significant disability, reduced productivity, and contributing to 1 million deaths yearly from asthma and COPD [5,6]. Chronic respiratory infections, exacerbated by limited healthcare access, overburdened public health systems, and environmental factors, can lead to physical and mental health issues, anxiety, depression, and social isolation [7].

Our study's objective was to assess patients' HRQoL with respiratory diseases by utilising the SGRQ questionnaires. QoL is crucial for evaluating and managing respiratory diseases, as it evaluates a patient's health, daily functioning, and perceived well-being [8]. The SGRQ questionnaire, which focuses on symptoms, activity limitations, and social/emotional impacts, helps clinicians understand the burden of respiratory tract infections (RTIs) on patients' lives. Patients with mild or moderate conditions have a better QoL [9]. SGRQ consists of symptom domain which assesses frequency and severity of RTI, activity domain that evaluate limitations in daily activities and impact domain which examines psychosocial and social effects of RTI [10].

Materials and Methods

Study design

A cross-sectional observational study was conducted from August 2023 to January 2024. A pilot study was conducted to determine the sample size. After that, the research comprised 200 patients with RTI diagnosis who were admitted to the pulmonology department at Vivekananda General Hospital Hubballi, India.

Ethical considerations

The study's purpose was conveyed to the patients and their families. All of the patients provided written informed consent. The KLE College of Pharmacy Ethical Committee gave its approval to the study. IEC Reference Number: KLECOPH/IEC/2023-24/08

Study population

Inclusion criteria: patients of either gender above 18 years of age, diagnosed with respiratory disease and admitted to the inpatient pulmonology department.

Exclusion criteria: patients below 18 years of age, those attending the outpatient department, patients who were not conscious and oriented, patient who did not consent to participate in the study and pregnant and lactating women were excluded.

Statistical analysis

Statistics were performed using the Statistical Package for Social Sciences (SPSS) for Windows version 27.0. The mean and standard deviation were used to display continuous variable, while numbers and percentages were used to display categorical variables. The association between several clinical variables and HRQOL was investigated using independent t-test, ANOVA, and Pearson's correlation. A *p*-value of less than 0.05 was considered a statistically significant.

Results

Table 1 summarizes the clinical characteristics of the research patients. Of the 200 patients, 141(70.50%) were male and 59(29.50%) were female, suggesting a higher incidence of RTIs among the population was in males. Highest number of patients were from 55-69 years age group 70(35%) followed by 25-39 years: 42(21%), 40-54 years: 41(20.50%), 70-84 years: 26(13%), 18-24 years: 17(8.50%), and 85-99 years: 4(2%). Around 124(62%) patients were from rural areas and 76(28%) from urban, educational background of the patients was diverse, with 82(40.50%) being uneducated and 53(26.50%) having some schooling. The most common occupation among patients was farming 54(27%), construction labour 20(10%), industry workers 22(11%), and housewives 19(9.50%). Comorbidities were prevalent among the patients, 52(26%) had hypertension, and 13(6.5%) had type 2 diabetes mellitus. The 175(87.50%) of patients belonged to the low-income category. Inflammatory biomarkers were examined, and the results revealed raised CRP and ESR values. This indicates that RTI is predominantly an inflammatory process.

Correlation of patient's clinical characteristics with QoL using SGRQ questionnaire:

Table 2 summarizes that, when SGRQ scores were correlated with gender no statistical significance was found (p=.207), this indicates that gender does not affect HRQoL of the patients. The data indicates that female patients experience more negative effects on their QoL than male patients, with a higher mean score in all three domains. The data showed a significant correlation between all age categories and SGRQ domains (p<0.05), indicating that

all domains of QoL are affected regardless of age. No significant correlation was found between comorbidity and SGRQ scores(p=0.608), indicating that the QoL of patients isn't affected by comorbidities. Smoking significantly correlated with SGRQ (p<0.05), while alcohol(p=0.243) and SGRQ scores had no significant correlation. Smokers (65±10.20) QoL was affected more than non-smokers (45±10.21). We noted that the type of RTI affects HRQoL (p<0.05), patients with LRTI (58.89±15.14) had worse QoL than URTI (33.92±12.44) patients. The income status of patients had impacted SGRQ scores in both groups (p<0.05). We found that below poverty line (BPL) patients (65.51±10.79) had worse QoL than above poverty line (APL) patients (32.86±10.91). Residency and SGRQ scores were compared and a statistically significant correlation was found in both groups (p<0.05). We found that patients living in an urban locality (70.87±10.78) had worse QoL than those living in rural areas(45.59±10.75)**.** The number of antibiotics taken had a significant effect on SGRQ scores (p<0.05). Our results indicate that patients taking more than three antibiotics (55.21±23.42) had worse SGRQ scores compared to patients taking less than three antibiotics (45.16±26.56)

Education and SGRQ had a statistically significant correlation (p<.0.05). We found that uneducated patients (50.61±10.05) had worse QoL than educated patients (40.67±10.91). There was a significant correlation found between days of hospitalization and SGRQ (p<.0.05) Where patients admitted for more than six days (54.06±25.9) had worse QoL than those admitted for less than six days (46.67±22.31).

Table 3 summarizes the data that showed a significant correlation between all age categories and SGRQ domains (p<0.05, indicating that all domains of QoL are affected regardless of age All three domains revealed a significant positive association (P<0.05), suggesting that a rise in symptoms is accompanied with an increase in impact and activity.. CRP was positively correlated with SGRQ and ESR (p<0.05), which suggests that this relationship is statistically significant. ESR was positively correlated with activity and impact domain of SGRQ with p-values of (0.05) and (p<0.05) respectively.

Table 4 suggests, based on the severity of the disease it was categorized into mild, moderate, and severe categories, we found as the severity of the disease increases, SGRQ scores also increases.

Discussion

In our study, we analyzed 200 patients from the in-patient pulmonology department of Vivekananda General Hospital Hubballi, males had a higher incidence of RTIs when compared to female patients. We found age group of 55-69 years had the highest occurrence, A related investigation was carried out by Antje Hader et al. were over 55 and above years of age were at risk of severe respiratory infections due to age-related changes [11,12]. Patients

from rural 124(62%) were more than urban 76(38%) areas, a cognate study by Hassanat et al. found that rural children are more affected by ARIs compared to urban children [13]. Majority of the patients were uneducated which can be a reason for their poor QoL, similar to Tomas M.L Eagan et al. [14], which concluded that more educated a person is, he/ she can prevent themselves from getting infected. Most of the participant's occupations were farming where they were more exposed to mold spores, pesticide vapors, and dusty conditions. T. Sigsgaard et al. stated agricultural professions, construction, mining, glass/ceramic/mineral work, fur/leather work, and metal work are associated with an increased risk of respiratory infections [15]. 120(60%) patients had comorbid conditions which significantly increased the risk, severity, and mortality associated with RTI in adults, a cognate study by Ejaz H et al. stated similar results [16]. 175(87.5%) patients had lower annual income, comparable results by Adam G et al. found lower income was associated with higher respiratory symptoms [17]. Medical bills can add a financial burden as the majority of the patients were unemployed or poorly employed 166(83%) [18]. 181 (90.5%) patients had been diagnosed with LRTI, David Lieberman et al. found similar results as our study where the incidence of LRTI was higher than that of URTI [19].

SGRQ questionnaires were used to measure the impact of various factors that may worsen or help in improving a disease condition [20]. In our study, we found that gender doesn't have any significant impact on the QoL of patients but indicates that females experience a lower QoL than males, a comparative study by Sarah et al. and Hyosun et al. stated similar results [21,22] . We found a positive correlation between age and SGRQ ($p<.001$), based on our study, we stated that age can influence respiratory health, and QoL, Shahrukh et al. conducted a study with comparable findings [23]. Diagnosis plays an important role, patients diagnosed with LRTI had poor QoL ($p<.001$), and Smith et al. stated that patients with LRTI had worse QoL [24]. When we assessed the influence of comorbidities and alcohol on the QoL, there wasn't any negative impact found. In our study, we conclude that the comorbidities weren't severe and well managed which is why it didn't affect or worsen the QoL of patients. Smoking harmed the QoL of patients, a comparative study by Cheng et al. stated similar results [25]. Biomarkers like CRP and ESR both had a positive correlation with all three SGRQ domains($P<.001$), Elevated levels of biomarkers like CRP and ESR are linked to inflammatory processes and poorer health-related QoL, as found in a study by Kelly and Probasco [26]. Low income significantly impacts patients' QoL, leading to poor healthcare access and increased stress. Residency, particularly in urban areas having low income, also contributes to poor QoL, as stated by Meghji et al. [27,28]. The study by Rodríguez N et al. found similar results [29], patients with intake of more than three antibiotics and more days of hospitalization had poor QoL. Studies showed that the three domains of the SGRQ (symptoms, activity, and impact)

have significant positive correlations, indicating that higher symptoms are associated with greater activity limitations and a greater impact on a patient's life [30]. ANOVA was used where the severity of the disease was significantly correlated with SGRQ, indicating severe the disease poorer the QoL, Hindu Kallaru et al. had comparable findings [31]. The fact that our research was restricted to a single hospital may limit the findings' application to other situations with distinct demographics and RTI prevalence. Eventually, more research on the HRQOL of RTI patients will require a longer-term study with a bigger sample size.

Conclusions

We recruited 200 patients from Vivekananda General Hospital, Hubballi, who were admitted to the inpatient pulmonology department. Additionally, our observations underscored the association between age and respiratory disease, incidence of disease increases with age. Furthermore, the study delved into the assessment of HRQOL using SGRQ questionnaires, revealing significant correlations based on smoking, residency, income, ESR, CRP, no of days of hospitalization, education, severity of disease, antibiotics and diagnosis. These insights contribute to a comprehensive understanding of respiratory health and patient well-being. Further research and tailored interventions may help mitigate these risks and improve the QoL for individuals affected by respiratory conditions.

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Table 1. Clinical characteristics of respiratory tract infection patients.

Sl.no	Categories	Sub-categories	Number of subjects N(%)
1.	Gender	Male	141 (70.50)
		Female	59 (29.50)
2.	Age	18-24	17 (8.50)
		25-39	42 (21)
		40-54	41 (20.50)
		55-69	70 (35)
		70-84	26 (13)
		85-99	4 (2)
3.	Residence	Urban	76 (38)
		Rural	124 (62)
4.	Qualification	Degree	23 (11.50)
		Diploma	3 (1.50)
		Intermediate	23 (11.50)
		Schooling	53 (26.50)
		Twelfth grade	17 (8.50)
		Uneducated	82 (40.50)
5.	Occupation	Farmer	54 (27)
		Construction Labour	20 (10)
		Industry worker	22 (11)
		Housewife	19 (9.50)
		Others occupations	85 (42)
6.	Comorbidities	Present	120 (60)
		Absent	80 (40)
7.	Income	Above poverty line	25 (12.50)
		Below poverty line	125 (87.50)
8.	Employment Status	Poorly employed	129 (64.50)
		Unemployed	37 (18.50)
		Well employed	34 (17)
9.	Social Habits	Smokers	58 (29)
		Non-Smokers	142 (71)
		Alcoholic	56 (28)
		Non-Alcoholic	144 (72)
10.	CRP	Normal Range (<10 Mg/L)	20 (10)
		Mild Range (10- 40 Mg/L)	133 (66.50)
		Moderate Range (40-100 Mg/L)	24 (12)
		Severe Range (>100 Mg/L)	23 (11.50)
11.	ESR	Normal Range (>10 Mm/Hr)	5 (2.50)
		Mild Range (10-40 Mm/Hr)	77 (38.50)
		Moderate Range (40-70 Mm/Hr)	55 (27.50)
		High Range (> 70 Mm/Hr)	63 (31.50)
12.	Diagnosis	LRTI	181 (90.50)
		URTI	19 (9.50)

Table 2. Impact of clinical characteristics on St. George Respiratory Questionnaire score using Independent Student *t*-test. *Statistically Significant p<0.05.

Domains	Clinical characteristics		Mean ± SD	P value
Symptoms	Gender	Male	56.79 ± 14.674	.205
		Female	59.81 ± 16.784	.232
Activity		Male	51.47 ± 25.230	.946
		Female	51.73 ± 24.423	.945
Impact		Male	53.41 ± 20.257	.497
		Female	55.54 ± 20.07	.496
Symptoms	Diagnosis	LRTI	58.89 ± 15.14	**<0.05***
		URTI	46.16 ± 12.44	**<0.05***
Activity		LRTI	53.40 ± 24.43	**<0.05***
		URTI	33.92 ± 23.21	**<0.05***
Impact		LRTI	55.86 ± 19.19	**<0.05***
		URTI	36.71 ± 21.62	**<0.05***
Symptoms	Comorbidities	Present	57.28 ± 15.086	.608
		Absent	58.46 ± 15.921	.614
Activity		Present	53.07 ± 24.263	.230
		Absent	48.60 ± 26.117	.242
Impact		Present	55.58 ± 19.348	.132
		Absent	51.04 ± 21.529	.147
Symptoms	Smoking	Smokers	65.00 ± 10.00	**<0.05***
		Non-smokers	50.01 ± 10.10	**<0.05***
Activity		Smokers	45.05 ± 15.04	**<0.05***
		Non-smokers	45.02 ± 10.21	**<0.05***
Impact		Smokers	65.13 ± 10.30	**<0.05***
		Non-smokers	52.87 ± 20.89	**<0.05***
Symptoms	Alcohol	Alcoholic	56.78 ± 12.98	.664
		Non- Alcoholic	57.83 ± 16.09	.633
Activity		Alcoholic	54.62 ± 26.32	.243
		Non- Alcoholic	50.03 ± 24.10	.263
Impact		Alcoholic	54.42 ± 18.70	.796
		Non- Alcoholic	53.60 ± 20.54	.788
Symptoms	Residence	Urban	65.10 ± 10.04	**<0.05***
		Rural	35.64 ± 10.88	**<0.05***
Activity		Urban	35.09 ± 10.14	**<0.05***
		Rural	65.01 ± 10.90	**<0.05***
Impact		Urban	70.87 ± 10.78	**<0.05***
		Rural	45.59 ± 10.75	**<0.05***
Symptoms	Income	APL	30.86 ± 10.91	**<0.05***
		BPL	65.51 ± 10.79	**<0.05***
Activity		APL	32.21 ± 21.65	**<0.05***
		BPL	52.88 ± 25.14	**<0.05***
Impact		APL	49.18 ± 19.15	.199
		BPL	54.73 ± 20.27	.188
Symptoms	Education	Educated	65.72 ± 10.60	**<0.05***
		Uneducated	50.61 ± 10.05	**.052***
Activity		Educated	40.67 ± 10.91	**.019***
		Uneducated	65.86 ± 10.07	**.012***
Impact		Educated	40.20 ± 15.63	**<0.05***
		Uneducated	65.30 ± 15.03	**<0.05***
Symptoms	Antibiotics	Less than three	40.07 ± 14.887	**<0.05***
		More than three	65.90 ±16.28	**<0.05***
Activity		Less than three	45.46 ± 26.562	**.008***
		More than three	55.21 ± 23.420	**.005***
Impact		Less than three	50.23 ± 23.976	**.046***
		More than three	56.17 ± 17.491	**.042***
Symptoms	Days of Hospitalization	Three-six days	57.44 ± 15.839	.874
		More than six days	57.80 ± 15.145	.876
Activity		Three-six days	46.67 ± 22.314	**.047***
		More than six days	54.06 ± 25.904	**.038***
Impact		Three-six days	53.91 ± 17.279	.949
		More than s ix days	54.10 ± 21.581	.946

Table 3. Impact of various factors on St. George Respiratory Questionnaire score using Pearsons's correlation test.

Age		Symptoms	Activity	Impact
18-24 years	P value	**<0.05***	**<0.05***	**<0.05***
25-39 years		**<0.05***	**<0.05***	**<0.05***
40-54 years		**<0.05***	**<0.05***	**<0.05***
55-69 years		**<0.05***	**<0.05***	**<0.05***
70-84 years		**<0.05***	**<0.05***	**<0.05***
85-99 years		.621	.805	.502
ESR	P value	**<0.05***	**<0.05***	**<0.05***
CRP	P value	**<0.05***	**<0.05***	**<0.05***
Comparison between domains of SGRQ				
P value		**<0.05***	**<0.05***	**<0.05***
*** Statistically Significant $p < 0.05$**				

Table 4. Impact of Severity of disease on St. George Respiratory Questionnaire scores using ANOVA test.

Disease Severity		Symptoms	Activity	Impact
Mild	P value	**<0.05***	**<0.05***	**<0.05***
Moderate		**<0.05***	**<0.05***	**<0.05***
Severe		**<0.05***	**<0.05***	**<0.05***
		<0.05*	**<0.05***	**<0.05***
*** Statistically Significant $p < 0.05$**				