

Correlated Factors Affecting Health-Related Quality of Life of Patients with Chronic Obstructive Pulmonary Disease and Asthma in Jordan

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Received July 25, 2023; Revised September 25, 2023; Accepted November 14, 2023

Cite This Paper in the Following Citation Styles

(a): [1] Ahmad Rajeh Saifan, Rami A. Elshatarat, Ateya Megahed Ibrahim, Khaled M. Al-Sayaghi, Nora H. Elneblawi, Samia Mahmoud Teleb, Khaldoun M. Hamdana, Mohammad Mashaqbeh, Ahmad Alabbadi, Bayan Oleimat, Bandar Naffaa Alhumaidi, "Correlated Factors Affecting Health-Related Quality of Life of Patients with Chronic Obstructive Pulmonary Disease and Asthma in Jordan," *Universal Journal of Public Health*, Vol. 11, No. 6, pp. 800-812, 2023. DOI: 10.13189/ujph.2023.110603.

(b): Ahmad Rajeh Saifan, Rami A. Elshatarat, Ateya Megahed Ibrahim, Khaled M. Al-Sayaghi, Nora H. Elneblawi, Samia Mahmoud Teleb, Khaldoun M. Hamdana, Mohammad Mashaqbeh, Ahmad Alabbadi, Bayan Oleimat, Bandar Naffaa Alhumaidi (2023). *Correlated Factors Affecting Health-Related Quality of Life of Patients with Chronic Obstructive Pulmonary Disease and Asthma in Jordan*. *Universal Journal of Public Health*, 11(6), 800-812. DOI: 10.13189/ujph.2023.110603.

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Abstract Introduction: Patients with chronic obstructive pulmonary disease (COPD) and asthma often face a significant symptom burden and reduced health-related quality of life (HRQoL). Understanding the factors influencing HRQoL in this population is essential for developing effective interventions. **Purpose:** This study aimed to assess the perceived symptoms, physical limitations, and impacts on HRQoL among COPD and asthma patients in Jordan. Additionally, we aimed to identify factors correlated with HRQoL in this population. **Methods:** A cross-sectional survey was conducted among 120 patients, utilizing the St. George's Respiratory Questionnaire for COPD patients. Participants reported their recent respiratory symptoms, limitations in physical

activity, and impacts on daily life. Correlation analyses were performed to investigate the associations between various factors and HRQoL. **Results:** The survey revealed a high prevalence of symptoms, including cough, phlegm production, breathlessness, and wheezing, with the symptoms significantly impacting patients' physical activity and overall well-being. Young age, a higher level of education, perceived excellent or very good health status, increased sleep duration, and a high Forced Expiratory Volume (FEV1) were found to be positively and significantly correlated with higher HRQoL. In contrast, smoking, higher BMI, the presence of comorbidities, a high respiratory rate, and mental health symptoms such as anxiety and depression were positively and significantly

correlated with lower HRQoL. **Conclusion:** This study provides valuable insights into the factors affecting HRQoL among patients with COPD and asthma in Jordan. The findings underscore the need for comprehensive interventions addressing both physical and emotional aspects to improve the well-being of this patient population. Further research is warranted to explore and implement targeted interventions for enhancing HRQoL in these patients.

Keywords Health-Related Quality of Life, Chronic Obstructive Pulmonary Disease, Asthma, Jordan, Factors Influencing HRQoL

1. Introduction

Respiratory diseases, particularly chronic obstructive pulmonary disease (COPD) and asthma are a global health challenge, causing significant morbidity and mortality, with millions of individuals affected [1, 2]. Dyspnea, a hallmark symptom of COPD, has a profound impact on patients' quality of life (QoL), leading to increased healthcare costs and mortality [1, 2]. As the prevalence of COPD continues to rise, effective interventions are increasingly essential [3, 4]. Dyspnea not only limits physical activity but also induces anxiety and restricts independence. Sleep disturbances, resulting from physiological changes, hypercapnia, and inflammation, further worsen the well-being of COPD patients, exacerbating concerns related to health-related QoL [3-6]. The frequent hospitalizations due to COPD exacerbations underscore the substantial burden this condition imposes on individuals and healthcare systems [1, 4, 6, 7].

COPD and asthma are two prevalent and often coexisting chronic respiratory diseases that impact the health and well-being of millions of individuals globally [3]. In Jordan, as in many other countries, COPD and asthma represent significant public health challenges, affecting both physical and psychological aspects of patients' lives [3, 7, 8]. While these conditions are characterized by respiratory symptoms and reduced lung function, they also have far-reaching implications for psychological well-being, including depression and anxiety [3, 7]. Understanding the factors associated with the QoL and psychological well-being of individuals living with both COPD and asthma in Jordan is essential to provide comprehensive healthcare interventions and improve patient outcomes [7, 8].

COPD is a progressive lung disease characterized by persistent airflow limitation and is often accompanied by symptoms such as breathlessness, chronic cough, and sputum production. Asthma, on the other hand, is characterized by reversible airflow obstruction, recurrent wheezing, and variable respiratory symptoms [3, 5]. Both diseases share commonalities in terms of symptomatology

but differ in their pathophysiological mechanisms and treatment strategies. The coexistence of COPD and asthma, often referred to as the "overlap syndrome," presents a unique challenge in the management of these patients and necessitates a holistic approach to address their physical and psychological needs [3, 5].

In Jordan, COPD and asthma are significant public health challenges, affecting individuals with persistent respiratory symptoms and reduced QoL. These two diseases, although sharing some similarities, also have distinct features and management strategies influenced by socioeconomic, cultural, and environmental factors unique to the Middle Eastern context [7, 8]. Investigating the associated factors affecting the QoL of patients with both COPD and asthma in Jordan is crucial for tailoring healthcare interventions and improving patient outcomes in this specific population [7]. This study aims to investigate the associated factors influencing both the QoL and psychological well-being (specifically, depression and anxiety) of patients concurrently diagnosed with COPD and asthma in Jordan. By examining a range of clinical, sociodemographic, and environmental variables, this research seeks to gain a comprehensive understanding of the challenges faced by these patients in managing their conditions and addressing their mental health needs.

The healthcare landscape in Jordan is continuously evolving, and addressing the complex needs of individuals living with chronic respiratory diseases, especially those with comorbid mental health conditions, is a growing concern. This research endeavors to bridge gaps in knowledge by shedding light on the interplay between disease-specific factors, psychological well-being, and the Jordanian healthcare system. The findings of this study will provide valuable insights for healthcare practitioners, policymakers, and researchers, offering guidance on how to improve the lives of individuals grappling with the dual burden of COPD and asthma, including their psychological well-being, in Jordan.

1.1. Research Objectives

The objective of this study is to investigate and comprehensively analyze the health-related quality of life (HRQoL) among individuals diagnosed with COPD and asthma in Jordan. The study aims to achieve this by identifying: 1) the participants' perceptions of their recent respiratory problems and their impact on HRQoL using the symptoms component sub-scale of St. George's Respiratory Questionnaire for COPD patients (SGRQ-C); 2) the participants' perspectives on the limitations posed by respiratory issues on their physical activity and exercise capacity, as measured by the activity component sub-scale of SGRQ-C; 3) how COPD affects various aspects of participants' daily lives, including physical activity, sleep, and overall well-being, as assessed by the impacts component sub-scale; and 4) the correlated factors that contribute to variations in HRQoL among the participants

of this study, encompassing demographic, health-related, and psychological variables, thereby providing valuable insights into the multifaceted determinants of HRQoL in this population.

2. Methods

2.1. Research Design

This research employed a cross-sectional study design to investigate the factors influencing the HRQoL of patients diagnosed with COPD and asthma in Jordan.

2.2. Sample and Setting

The study employed a convenience sampling technique to ensure a diverse participant pool encompassing a wide range of demographics, including age, gender, socioeconomic status, and the severity of COPD or asthma conditions. A total of 120 participants willingly participated in the study after providing their informed consent. The research was conducted across six hospitals in different regions of Jordan, representing various sectors of the healthcare system, including two private, two governmental, one educational, and one military hospital. Inclusion criteria comprised a COPD or bronchial asthma diagnosis, age over 18 years, and the ability to read and write in Arabic. Patients with chronic conditions such as renal failure, cancer, or those in medically unstable conditions were excluded from the data collection process.

2.3. Ethical Considerations

Ethical approval for this study was obtained from Applied Private University in Amman, Jordan (Approval no. 2021-2022-8-82). Participants were provided with a detailed explanation of the study's purpose, procedures, and potential risks. Informed consent was obtained from each participant, and they were assured of the confidentiality and anonymity of their responses. Participation was voluntary, and participants had the right to withdraw at any time without consequences.

2.4. Data Collection Procedure

The data collection process strictly adhered to ethical guidelines and was conducted by three research authors, all holding PhDs in critical care nursing. Participants were approached during their hospital admissions, and the authors explained the study's objectives, invited eligible participants, and managed the recruitment and data collection processes. Furthermore, the authors meticulously verified the eligibility of potential participants by scrutinizing their medical records and seeking guidance from charge nurses at the designated healthcare facilities. After securing informed consent,

participants completed the questionnaire, which included the SGRQ-C, demographic and clinical characteristics, PHQ-2, and GAD-2. Trained healthcare staff and authors conducted physiological measurements following standardized procedures. Furthermore, a pilot study involving 20 eligible participants was conducted to ensure questionnaire consistency, clarity, and internal reliability. Feedback from pilot participants confirmed the questionnaires' clarity and comprehensibility, and internal reliability analysis indicated strong internal consistency with Cronbach's alpha values exceeding 0.83 for all Arabic version questionnaires that have been used. The participants who took part in the pilot study were excluded from the final analysis of the present study.

2.5. Measurement of Variables

Data collection involved the utilization of structured questionnaires in their Arabic version, encompassing multiple sections. These questionnaires incorporated validated scales and items specifically crafted to evaluate diverse facets associated with the HRQoL of individuals diagnosed with COPD.

Demographic and Clinical Characteristics: A section of the questionnaire collected data on participants' age, gender, nationality, marital status, educational level, employment status, smoking history, presence of comorbidities (e.g., diabetes mellitus, hypertension), and perceived current health status.

Physiological Measurements: Physiological assessments included heart rate, respiratory rate, and body mass index (BMI) to gauge participants' clinical condition. Additionally, Forced Expiratory Volume in 1 second (FEV1), determined during a pulmonary function test, assessed lung function and airflow obstruction.

St. George's Respiratory Questionnaire for COPD Patients (SGRQ-C): The SGRQ-C is a tool employed to assess the HRQoL of individuals with COPD [9]. Developed in the early 1990s by Dr. Paul Jones and his team at St. George's Hospital in London, this questionnaire consists of three components: symptoms, activity, and impact. It serves as a comprehensive assessment of how respiratory conditions affect various aspects of patients' daily lives, encompassing physical activity, sleep, and overall well-being [9, 10]. The SGRQ-C has been rigorously validated in numerous studies, demonstrating its reliability and validity. It comprises questions that explore the impact of respiratory symptoms across three HRQoL domains: symptoms, activity, and impacts [9-11]. These questions delve into the frequency and severity of symptoms, assess how symptoms impede daily activities, and explore the emotional and psychological consequences of respiratory issues. Scores are calculated as a percentage, where 100 signifies the poorest health status, and 0 represents the best health status [9, 10]. This tool has found extensive use in clinical trials and research studies, aiding

in the evaluation of interventions for COPD patients, including drug therapies, oxygen treatment, and pulmonary rehabilitation programs [10, 11]. Furthermore, the Arabic version of the SGRQ-C is a validated adaptation designed to measure the impact of chest diseases on the HRQoL and well-being of COPD-diagnosed patients [11]. Its use in research and clinical practice provides valuable insights into the effects of respiratory symptoms on patients' lives, facilitating the development of interventions aimed at enhancing their HRQoL [9-11].

Patient Health Questionnaire-2 (PHQ-2): It is a concise self-administered screening tool used in healthcare settings to assess depressive symptoms. It is a shorter version of the PHQ-9, primarily utilized for diagnosing and monitoring depression. Comprising only two questions, the PHQ-2 offers a quick initial assessment of depressive symptoms. Respondents rate their experiences on a 0 to 3 scale for two questions related to diminished interest or pleasure in activities and feelings of depression or hopelessness over the past two weeks. Total scores range from 0 to 6 [12]. Extensive studies have validated the PHQ-2, demonstrating its good sensitivity and specificity for identifying depressive symptoms. While it serves as an efficient and reliable tool for detecting potential depression, a comprehensive evaluation, like the PHQ-9, is often necessary for confirming a diagnosis and gauging its severity [12-14].

Generalized Anxiety Disorder-2 (GAD-2): It is a concise and widely used self-report screening tool designed to assess the presence of generalized anxiety disorder (GAD) symptoms in individuals. It is a shortened version of the GAD-7 questionnaire, which is more comprehensive and used for the diagnosis and monitoring of GAD [15]. The GAD-2 consists of just two questions, making it a quick and straightforward way to initiate the screening process for generalized anxiety symptoms. Respondents are asked about their experiences over the past two weeks, specifically regarding the frequency of feeling nervous, anxious, or on edge, and the frequency of not being able to stop or control worrying. Participants rate their responses on a scale of 0 to 3, with options such as "Not at all," "Several days," "More than half the days," and "Nearly every day." The scores from these two questions are summed to yield a total score that can range from 0 to 6 [15, 16]. The GAD-2 is known for its simplicity and efficiency in identifying individuals who may be experiencing symptoms of GAD, although further assessment may be required to confirm a diagnosis and assess symptom severity, as offered by the GAD-7 questionnaire. The GAD-2 demonstrates strong internal consistency, ensuring reliable measurement of anxiety symptoms. It exhibits significant criterion and construct validity, correlating with GAD-7 and capturing GAD features. As a simple and reliable screening tool, it aids in identifying potential GAD cases for further assessment and intervention [13, 15, 16].

2.6. Data Analysis

Data analysis was carried out using SPSS (Version 22). Descriptive statistics, such as means, standard deviations, frequencies, and percentages, were computed to summarize participant characteristics and questionnaire responses. Correlation analyses, including Pearson's or Spearman's correlation, were employed to investigate relationships between variables, encompassing the three SGRQ-C components, the total SGRQ-C score, participant characteristics, health status indicators, physiological parameters (e.g., heart rate, respiratory rate, and FEV1), and psychological well-being (PHQ-2 and GAD-2). A significance level of $p < 0.05$ was set for statistical significance.

3. Results

The demographic analysis of the study participants revealed an average age of approximately 55.1 years, with some variation around this mean, as indicated by the standard deviation of (± 8.12). The majority of participants were Jordanian citizens (76.7%), male (55.8%), married (79.2%), and employed (71.7%). Smoking was prevalent among participants, with 65.8% being current smokers. A significant portion had completed high school education (52.5%). On average, participants reported a daily sleep duration of approximately 6.52 hours in the two weeks leading up to their hospital admission, shedding light on their sleep patterns during that period. Furthermore, the study assessed various health-related parameters. The analysis of perceived current health status indicated that a significant portion had perceived their health as "good" (52.5%) and 45 individuals (37.5%) rated their health as "Excellent/Very good." The average BMI was 25.61, with a standard deviation of ± 4.23 , suggesting some variability in BMI within the study population. In terms of chronic illnesses, nearly half of the participants had been diagnosed with diabetes mellitus (49.2%) and hypertension was prevalent among 50 participants (41.7%). FEV1 had an average value of 57.3, with a standard deviation of ± 17.2 , indicating variations in lung function. During the data collection period, the average recorded heart rate was 91.2 beats per minute, showing some variability around this mean, as indicated by the standard deviation of ± 8.26 . Additionally, the average respiratory rate was 26.5 breaths per minute, with a standard deviation of ± 2.94 . The study also evaluated participants' mental health using the PHQ-2 and GAD-2 scores. The PHQ-2 scores revealed that 89 participants (74.2%) did not exhibit major depression symptoms ($\text{PHQ-2} < 3$), while 31 individuals (25.8%) had major depression symptoms ($\text{PHQ-2} \geq 3$). In terms of anxiety, as assessed by GAD-2 scores, 71 participants (59.2%) did not have anxiety ($\text{GAD-2} < 3$), while 49 individuals (40.8%) reported having anxiety ($\text{GAD-2} \geq 3$) (Table 1).

Table 1. Participants' characteristics and health status (N=120)

Characteristics	n (%) or mean (\pm SD*)
Age (years)	55.1 (\pm 8.12)
Gender	
Men	67 (55.8%)
Women	53 (44.2%)
Marital status	
Married	95 (79.2%)
Single/Divorced/ Widowed	25 (2-0.8%)
Nationality	
Jordanian	92 (76.7%)
Syrian	28 (23.3%)
Level of education	
< High school grade	57 (47.5%)
\geq High school grade	63 (52.5%)
Employment status (Yes)	86 (71.7%)
Smoking status (Yes)	79 (65.8%)
Perceived current health status	
Excellent/Very good	45 (37.5%)
Good	51 (42.5%)
Fair/Poor	24 (20.0%)
Body mass index (Kg/m²)	25.61 (\pm 4.23)
Duration of sleep (hours/ day) (prior 2 weeks of admission to hospital)	6.52 (\pm 1.25)
Chronic illnesses	
Hypertension	50 (41.7%)
Diabetes mellitus	59 (49.2%)
Forced Expiratory Volume (FEV 1)	57.3 (\pm 17.2)
Heart rate	91.2 (\pm 8.26)
Respiratory rate	26.5 (\pm 2.94)
PHQ-2 (scores range: 0-6)	
No major depression symptoms (PHQ-2 is < 3)	89 (74.2%)
Have major depression symptoms (PHQ-2 is \geq 3)	31 (25.8%)
GAD-2 (scores range: 0-6)	
No anxiety (GAD-2 is < 3)	71 (59.2%)
Have anxiety (GAD-2 is \geq 3)	49 (4-0.8%)

*SD: Standard deviation

Table 2 presents the results of patients' perceptions of their recent respiratory problems as assessed by the symptoms component of the SGRQ-C, which provides insights into the HRQoL for COPD patients. Patients were asked to respond to Likert-point questions related to various aspects of their chest troubles. For the question "I cough," the majority of participants indicated "Several days a week" (44.2%). Regarding "I bring up phlegm (sputum)," the majority of participants responded "Only with chest infections" (53.3%). When asked about "shortness of breath," the majority reported experiencing it "Several days a week" (48.3%). Similarly, for "attacks of wheezing," most participants reported "Several days a week" (40.8%). Regarding the frequency of chest trouble attacks in the last

year, most participants reported "1 or 2 attacks" (59.2%). When asked about the frequency of good days with little chest trouble, the majority responded with "Most days are good" (43.3%). For the question "If you have a wheeze, is it worse in the morning?" the majority of participants answered "No" (72.5%). The symptoms component sub-scale assesses the symptoms that impact the HRQoL for COPD patients, with scoring typically conducted on a scale from 0 to 100, where higher scores signify a poorer HRQoL. The study's results revealed that the average total score for the symptoms component sub-scale was Mean (SD) = 66.7 (12.7). This score offers a comprehensive view of the collective symptom burden encountered by the participants in the study.

Table 2. Participant's perception of their recent respiratory problems that affect their HRQoL

Symptoms component sub-scale of SGRQ-C	n (%)
Questions about how much chest trouble you have:	
I cough	
Most days a week	18 (15.0%)
Several days a week	53 (44.2%)
Only with chest infections	21 (17.5%)
Not at all	28 (23.3%)
I bring up phlegm (sputum):	
Most days a week	11 (9.2%)
Several days a week	34 (28.3%)
Only with chest infections	64 (53.3%)
Not at all	11 (9.2%)
I have shortness of breath:	
Most days a week	37 (3-0.8%)
Several days a week	58 (48.3%)
Not at all	25 (20.8%)
I have attacks of wheezing:	
Most days a week	19 (15.8%)
Several days a week	49 (4-0.8%)
A few days a month	22 (18.3%)
Only with chest infections	20 (16.7%)
Not at all	10 (8.3%)
How many attacks of chest trouble have you had during the last year?	
3 or more attacks	36 (3-0.0%)
1 or 2 attacks	71 (59.2%)
None	13 (1-0.8%)
How often do you have good days (with little chest trouble)?	
No good days	9 (7.5%)
A few good days	28 (23.3%)
Most days are good	52 (43.3%)
Every day is good	31 (25.8%)
If you have a wheeze, is it worse in the morning?	
No	87 (72.5%)
Yes	33 (27.5%)
Total score average of symptoms component sub-scale (ranged from 0 to 100)*	Mean (SD)
	66.7 (12.7)

*The scores are transformed into a scale ranging from 0 to 100, with 0 representing no impairment and 100 representing maximum impairment.

Table 3 presents the patient's self-reported perceptions of how respiratory problems affect their physical activity and exercise capacity. This assessment was conducted using the activity component sub-scale of SGRQ-C. The results indicate that various activities triggered breathlessness among participants, with the following percentages reporting such experiences: getting washed or dressed (20.8%), walking around the home (25.8%), walking outside on level ground (32.5%), walking up a flight of stairs (80.8%), and walking up hills (71.7%). Furthermore, participants were asked about the impact of their breathing difficulties on daily activities, and the responses were as follows: 36.7% of participants reported taking a long time to get washed or dressed, 51.7% mentioned they could not take a bath or shower without difficulties, 24.2% stated they walked more slowly than others or had to take breaks, 69.2% found that tasks like

housework required a long time or breaks, 85.0% indicated that they had to go slowly or stop when walking up one flight of stairs, 70.8% reported that they had to slow down or stop when hurrying or walking fast, 81.7% found it difficult to engage in activities like walking up hills, carrying things up stairs, or light gardening, and 86.7% struggled with more demanding activities like carrying heavy loads, jogging, brisk walking, playing tennis, or swimming. The total score average for the activity component sub-scale, which is transformed into a scale ranging from 0 to 100 (0 representing no impairment and 100 representing maximum impairment), was calculated to be Mean (SD) = 61.9 (19.5). This score provides an overarching evaluation of how respiratory issues impact the physical activity and exercise capacity of the study participants.

Table 3. Participant's perception about the limitations imposed by respiratory problems on their physical activity and exercise capacity

Activity component sub-scale of SGRQ-C	n (%)
What activities usually make you feel breathless	
Getting washed or dressed (True)	25 (20.8%)
Walking around the home (True)	31 (25.8%)
Walking outside on the level (True)	39 (32.5%)
Walking up a flight of stairs (True)	97 (80.8%)
Walking up hills (True)	86 (71.7%)
How activities may be affected by your breathing	
I take a long time to get washed or dressed (True)	44 (36.7%)
I cannot take a bath or shower, or I take a long time (True)	62 (51.7%)
I walk more slowly than other people, or I stop for rests (True)	29 (24.2%)
Jobs such as housework take a long time, or I have to stop for rests (True)	83 (69.2%)
If I walk up one flight of stairs, I have to go slowly or stop (True)	102 (85.0%)
If I hurry or walk fast, I have to stop or slow down (True)	85 (70.8%)
My breathing makes it difficult to do things such as walk up hills, carry things up stairs, or light gardening such as weeding (True)	98 (81.7%)
My breathing makes it difficult to do things such as carry heavy loads, jog or walk at miles per hour, play tennis or swim (True)	104 (86.7%)
Total score average of activity component sub-scale (ranged from 0 to 100)*	Mean (SD)
	61.9 (19.5)

*The scores are transformed into a scale ranging from 0 to 100, with 0 representing no impairment and 100 representing maximum impairment.

In Table 4, participants' perceptions of the impacts of COPD on their physical activity, sleep, and overall well-being were assessed using the impacts component of SGRQ-C. The majority of participants (52.5%) considered their chest condition as "The most important problem I have," highlighting the significant burden of COPD. When queried about their cough and breathlessness, several participants reported experiencing discomfort, with 32.5% mentioning that their cough hurts and 19.2% feeling tired due to their cough. Additionally, 8.3% reported breathlessness while talking, and 15.8% experienced breathlessness when bending over. Sleep disturbances were prevalent, affecting 26.7% of participants. Moreover, 14.2% mentioned feeling easily exhausted. When exploring other effects of chest trouble, participants revealed substantial emotional and physical impacts. Embarrassment in public due to cough or breathing issues was reported by 42.5%, and 37.5% felt that their chest trouble was a nuisance to their family, friends, or neighbors. A significant proportion (78.3%) reported fear or panic during breathlessness episodes, while 61.7% felt a lack of control over their chest problem. Furthermore, 35.0% believed they had become frail or an invalid due to their chest condition, and 47.5% considered exercise unsafe. For many participants, daily activities were marked by substantial effort (36.7%). In terms of daily life, 88.3% could not engage in sports or games, 49.2% were unable to go out for entertainment or recreation, and 22.5% could not leave the house for shopping. Housework was challenging for 26.7%, and a small proportion (5.8%) had limited mobility from their bed or chair. When asked to describe how their chest affected them, the most common response (51.7%) was that it prevented them from doing one or two things they would like to do. Furthermore, the results of the study involved transforming the scores from the impacts component sub-scale, which ranges from 0 to 100, with 0 indicating no

impairment and 100 signifying maximum impairment. The findings revealed that the average total score for participants on the impacts component sub-scale was Mean (SD) = 67.1 (15.7). This score reflects the extent of impairment experienced by participants across various dimensions of their daily lives due to COPD, providing a quantitative assessment of the overall impact of the condition on their well-being.

Table 5 highlights the significant correlated factors influencing the HRQoL of participants, as assessed through correlation analyses involving the three sub-scales of SGRQ-C (symptoms component, activity component, and impact component), as well as the total score encompassing these three components. The study revealed that certain variables, including young age, education level (equal to or greater than high school grade), perceived current health status (rated as excellent/very good), increased duration of sleep (measured in hours per day in the two weeks before hospital admission), and having a high FEV1, were negatively and significantly correlated with the three sub-scales and the total score of the SGRQ-C. These negative correlations imply that an increase in these factors or improvements in these aspects are associated with an enhancement in the participants' HRQoL. Conversely, the study found positive correlations between the sub-scales and total score of the SGRQ-C and certain variables, such as current smoking status, high BMI, the presence of chronic diseases like hypertension and diabetes, a high respiratory rate, and the presence of depressive symptoms and GAD. These positive correlations indicate that an increase in these variables corresponds to a decrease in HRQoL. This comprehensive analysis offers valuable insights into the multifaceted factors influencing the well-being of individuals with COPD, underscoring the importance of addressing these factors to improve their QoL.

Table 4. Participants' perception about the impacts of COPD on their physical activity, sleep, and overall well-being

Impacts component sub-scale of SGRQ-C	n (%)
How would you describe your chest condition? *	
The most important problem I have	63 (52.5%)
Causes me a few problems	45 (39.2%)
Causes no problem	10 (8.3%)
Questions about your cough and breathlessness	
My cough hurts (True)	39 (32.5%)
My cough makes me tired (True)	23 (19.2%)
I get breathless when I talk (True)	10 (8.3%)
I get breathless when I bend over (True)	19 (15.8%)
My cough or breathing disturbs my sleep (True)	32 (26.7%)
I get exhausted easily (True)	17 (14.2%)
Questions about other effects your chest trouble may have on you	
My cough or breathing is embarrassing in public (True)	51 (42.5%)
My chest trouble is a nuisance to my family, friends or neighbors (True)	45 (37.5%)
I get afraid or panic when I cannot get my breath (True)	94 (78.3%)
I feel that I am not in control of my chest problem (True)	74 (61.7%)
I have become frail or an invalid because of my chest (True)	42 (35.0%)
Exercise is not safe for me (True)	57 (47.5%)
Everything seems too much of an effort (True)	44 (36.7%)
How your chest trouble usually affects your daily life	
I cannot play sports or games (True)	106 (88.3%)
I cannot go out for entertainment or recreation (True)	59 (49.2%)
I cannot go out of the house to do the shopping (True)	27 (22.5%)
I cannot do housework (True)	32 (26.7%)
I cannot move far from my bed or chair (True)	7 (5.8%)
Which do you think best describe how your chest affects you? *	
It does not stop me doing anything I would like to do	14 (11.7%)
It stops me doing one or two things I would like to do	62 (51.7%)
It stops me doing most of the things I would like to do	36 (30.0%)
It stops me doing everything I would like to do	8 (6.7%)
Total score average of impacts component sub-scale (ranged from 0 to 100)*	Mean (SD)
	67.1 (15.7)

*The scores are transformed into a scale ranging from 0 to 100, with 0 representing no impairment and 100 representing maximum impairment.

Table 5. Correlated factors for the participants' HRQoL

Variables	Symptoms component (r) [*]	Activity component (r) [*]	Impact component (r) [*]	Total score of 3 components (r) [*]
Age (years)	-0.49[*]	-0.63[*]	-0.52[*]	-0.55[*]
Gender (Men)	-0.21	-0.17	-0.09	-0.19
Marital status (Married)	-0.09	-0.11	-0.08	-0.09
Nationality (Jordanian)	-0.27	-0.18	-0.25	-0.23
Level of education (> High school grade)	-0.35[*]	-0.37[*]	-0.29[*]	-0.31[*]
Employment status (Yes)	-0.31	-0.28	-0.15	-0.22
Smoking status (Yes)	0.89[*]	0.54[*]	0.83[*]	0.78[*]
Perceived current health status (Excellent/Very good)	-0.77[*]	-0.85[*]	-0.80[*]	-0.81[*]
Body mass index (Kg/m ²)	0.76[*]	0.91[*]	0.88[*]	0.87[*]
Duration of sleep (hours/ day) (prior 2 weeks of admission to hospital)	-0.57[*]	-0.53[*]	-0.72[*]	-0.64[*]
Chronic illnesses				
Hypertension (Yes)	0.41[*]	0.73[*]	0.61[*]	0.58[*]
Diabetes mellitus (Yes)	0.75[*]	0.84[*]	0.65[*]	0.76[*]
Forced Expiratory Volume (FEV 1)	-0.88[*]	-0.90[*]	-0.84[*]	-0.86[*]
Heart rate	0.29	0.51[*]	0.23	0.30
Respiratory rate	0.84[*]	0.91[*]	0.85[*]	0.82[*]
PHQ-2	0.49[*]	0.64[*]	0.58[*]	0.56[*]
GAD-2	0.76[*]	0.62[*]	0.79[*]	0.71[*]

- r is an abbreviation for correlation value

^{*} Significant *p* value (< 0.005) for this correlation value (r) is bolded

- HRQoL measured by using SGRQ-C. Component subscales and the total scores of 3 components (subscales) range from 0 to 100, with 0 representing no impairment and 100 representing maximum impairment

4. Discussion

COPD and asthma are prevalent chronic respiratory conditions with a substantial global burden [3, 5]. In Jordan, as in many other countries, COPD and asthma pose significant challenges to public health [7, 8]. These conditions can lead to a considerable decline in HRQoL for affected individuals [7, 17]. Understanding the factors that influence HRQoL in COPD and asthma patients is of paramount importance for several reasons [6, 7, 17, 18]. Firstly, COPD and asthma have a profound impact on patients' daily lives, affecting their physical and mental well-being. These conditions can lead to persistent symptoms, frequent exacerbations, and limitations in physical activity. Consequently, they often result in reduced HRQoL, creating a substantial societal and individual burden. Secondly, COPD and asthma are complex diseases influenced by a multitude of factors. While their primary etiologies differ (COPD is primarily linked to smoking, while asthma is characterized by airway inflammation), both conditions can be exacerbated or

ameliorated by various factors, including comorbidities, lifestyle choices, and environmental factors [5-7, 17, 18]. Understanding the interplay of these factors is crucial for developing effective management strategies and improving patients' HRQoL. Thirdly, as the prevalence of COPD and asthma continues to rise globally, the burden on healthcare systems and economies is increasing. Effective strategies to improve HRQoL in affected individuals can potentially reduce hospitalizations, emergency department visits, and healthcare costs associated with exacerbations and complications of these conditions [4, 17, 19].

Given the importance of addressing the HRQoL of COPD and asthma patients and the unique factors that may affect individuals in different regions, this study focusing on Jordan is highly relevant. Jordan's unique demographics, healthcare system, and environmental factors may influence the presentation and management of COPD and asthma differently compared to other countries. Therefore, the findings of this study can provide valuable insights into tailoring interventions and healthcare policies to improve HRQoL for patients in the Jordanian context and

potentially offer lessons applicable to other regions with similar characteristics [7, 17].

The demographic analysis in this study revealed several key characteristics of the study participants. The average age of approximately 55.1 years indicates that COPD and asthma predominantly affect older adults in Jordan. This aligns with global trends where advancing age is a known risk factor for the development of these conditions [17, 18, 20]. The preponderance of male participants, married individuals, and those employed signifies the gender, social, and economic dimensions of COPD and asthma in Jordan. This observation highlights the need for a gender-sensitive approach to care, considering how these conditions may affect men and women differently, and emphasizes the economic implications for families when individuals with COPD or asthma are unable to work or require long-term care [18, 21, 22]. The high prevalence of current smokers among participants underscores the urgent need for targeted smoking cessation interventions in Jordan. Smoking cessation programs have proven effective in reducing the risk of COPD and asthma exacerbations, and their implementation is essential to mitigate the burden of these conditions [7, 17, 18].

The analysis of health-related parameters, including sleep patterns, comorbidities, lung function (FEV1), and mental health (PHQ-2 and GAD-2 scores), provides a comprehensive clinical context. Sleep disturbances, comorbid conditions like diabetes and hypertension, and impaired lung function are associated with reduced HRQoL in COPD and asthma patients, consistent with the existing literature. Mental health, as assessed by depressive symptoms (PHQ-2) and anxiety (GAD-2), emerged as a significant concern [6, 7, 17, 18]. The high prevalence of depressive symptoms and anxiety among participants underscores the need for integrated mental health support within COPD and asthma management programs. Depression and anxiety can exacerbate symptoms, reduce adherence to treatment regimens, and further diminish HRQoL. Addressing these psychological aspects is crucial for holistic care [7, 17, 18].

The study's evaluation of patients' perceptions of respiratory symptoms and their impact on daily life provides a poignant illustration of the challenges faced by individuals with COPD and asthma. The high prevalence of symptoms such as cough, phlegm production, breathlessness, and wheezing underscores the persistent symptom burden that patients experience. These symptoms can severely limit physical activity, social engagement, and overall well-being. These observations are consistent with previous studies in the existing literature, which have consistently reported the substantial impact of these respiratory symptoms on patients' QoL [7, 17, 18, 22]. This consistency underscores the importance of addressing these symptoms effectively to improve the overall well-being of individuals living with COPD and asthma [7, 17, 18, 20].

The impact component sub-scale of the SGRQ-C revealed that COPD and asthma patients in Jordan face not

only physical limitations but also emotional and social challenges. Feelings of embarrassment, a lack of control, and fear during breathlessness episodes are not uncommon. Furthermore, the limitations reported in daily activities such as housework, shopping, and participation in recreational activities underscore the broad-ranging consequences of COPD and asthma on patients' lives. These limitations not only impact their independence and QoL but also can lead to social isolation and decreased participation in enjoyable activities [7, 17, 20, 21]. Importantly, these findings are in line with previous research in the field, which has consistently demonstrated that COPD and asthma have a profound impact on patients' emotional and social dimensions, in addition to their physical health. This consistency across studies emphasizes the need for comprehensive care approaches that address not only the physical symptoms but also the emotional and social well-being of individuals living with these conditions. It underscores the importance of healthcare providers considering the holistic needs of patients to improve their overall QoL [7, 8, 17, 21-23].

The correlation analyses in Table 5 offer crucial insights into the factors that influence HRQoL in Jordanian COPD and asthma patients. The study's findings reveal negative associations between participants' perceptions of lower HRQoL and several factors, including increasing age, higher levels of education, better perceived health status, longer sleep duration, and higher FEV1. These negative correlations suggest that interventions aimed at addressing these factors have the potential to enhance HRQoL among the participants. Conversely, the study identifies positive correlations between participants' perceptions of lower HRQoL and factors such as smoking, higher BMI, the presence of comorbidities, elevated respiratory rate, and the presence of mental health symptoms. These positive correlations underscore the importance of targeted interventions and support initiatives in these specific areas to improve HRQoL among the study population. Importantly, these findings align with prior research in the field, suggesting that these correlations are consistent across different populations of COPD and asthma patients [7, 17, 18, 21]. However, it's crucial to note that these correlations do not establish causation but indicate associations. Further research is indeed needed to explore these relationships more comprehensively and to develop tailored interventions that can effectively improve the HRQoL of patients with COPD and asthma in Jordan and other Arab countries [7, 8, 17, 18]. Such interventions should consider the multifaceted nature of these conditions and address physical, psychological, and social factors to enhance overall well-being.

4.1. Research Implications and Recommendations

This study provides valuable insights into the factors affecting the HRQoL of COPD and asthma patients in Jordan. These findings have implications for healthcare policy and practice in the region and offer a basis for

tailored interventions to enhance HRQoL. Smoking cessation programs, comorbidity management, mental health support, and personalized care plans are essential components of holistic care for COPD and asthma patients in Jordan. Additionally, environmental factors, such as air quality and access to healthcare services, should be considered in the broader context of respiratory health in the region [6, 7, 17, 24].

Future research should delve deeper into the specific challenges faced by COPD and asthma patients in Jordan, exploring regional variations, cultural factors, and the impact of air quality on disease outcomes [7, 8, 17, 18]. Furthermore, interventions aimed at improving HRQoL should be rigorously evaluated to assess their effectiveness and inform evidence-based practices that can be adopted not only in Jordan but also in similar regional contexts facing the challenges of COPD and asthma. Ultimately, improving the HRQoL of individuals with these conditions is a shared goal that requires multidisciplinary collaboration, targeted interventions, and a patient-centered approach to care [7, 17, 21, 24].

4.2. Study Limitation

One limitation of this study is the reliance on self-reported data, which may be subject to recall and reporting biases. Additionally, the study's cross-sectional design limits the establishment of causal relationships among the correlated factors and health-related quality of life. Further longitudinal research is needed to confirm these associations over time and to explore potential causal links.

5. Conclusions

In this study on patients with COPD and asthma in Jordan, the research sheds light on the complex factors influencing their HRQoL. Notably, a substantial symptom burden is evident, with prevalent issues such as cough, phlegm production, breathlessness, and wheezing, significantly affecting physical well-being and daily life activities. Emotional and social challenges, including feelings of embarrassment, lack of control, and fear during breathlessness episodes, further exacerbate the burden. The correlation analyses suggest that factors like age, higher education, better perceived health status, longer sleep duration, and higher FEV1 positively correlate with high HRQoL. Conversely, smoking, higher BMI, comorbidities, high respiratory rate, and mental health symptoms show negative correlations with high HRQoL, indicating areas that require support and intervention. While consistent with previous studies, the results emphasize the need for ongoing research and holistic care to enhance HRQoL for COPD and asthma patients in Jordan.

Acknowledgements

We would like to extend our heartfelt appreciation to all

the patients who participated in this study. We also extend our gratitude to the administrators of the selected hospitals for granting us the necessary approvals to conduct the study on their settings. This study is supported via funding from Prince Sattam Bin Abdulaziz University project number (PSAU/2023/R/1444).

Authors Declaration Statement

The authors declare that they have no conflicts of interest or competing interests.

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