

Influence of Urinary Incontinence Related Factors on Health-Related Quality of Life in Patients with Chronic Obstructive Pulmonary Disease: A Cross-Sectional Study

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Purpose: Chronic obstructive pulmonary disease (COPD) is a progressive respiratory condition marked by airflow limitation and symptoms like chronic cough, breathlessness, and chest tightness. These factors, along with exacerbations and polypharmacy, may predispose COPD patients to urinary incontinence (UI). Unique challenges such as increased intra-abdominal pressure, pelvic floor weakness, and comorbidities may worsen UI and impair health-related quality of life (HRQoL). This study aimed to identify factors associated with UI severity in COPD patients and to examine its impact on HRQoL.

Methods: This cross-sectional study included 101 participants diagnosed with COPD who were reported to have UI. Participants completed the following questionnaires: the health status and UI severity were recorded using the COPD Assessment Test (CAT), International Consultation on Incontinence Questionnaire- Urinary Incontinence – short form (ICIQ-UI short form), and Incontinence Impact Questionnaire – short form (IIQ-7).

Results: UI severity was correlated with age, BMI, smoking, comorbidities, medications, chest tightness, and breathlessness. Severe UI predictors included age (OR=1.07), BMI (OR=1.09), and number of medications (OR=5.04), whereas breathlessness predicted moderate (OR=1.72) and severe UI (OR=1.87). Among COPD patients, 82.2% reported a mild impact of UI on HRQoL, and 6.9% reported a severe impact. Notably, among those experiencing moderate-to-severe HRQoL impairment, 63.6% had severe UI.

Conclusion: This study highlights urinary incontinence (UI) as a prevalent and impactful comorbidity in individuals with COPD, significantly affecting their HRQoL. UI severity was associated with clinical factors such as older age, higher body mass index (BMI), greater medication burden, and breathlessness. Notably, greater UI severity corresponded to more substantial impairments in HRQoL, with severe cases reporting greater negative effects on daily functioning. These findings underscore the importance of routine screening for UI in COPD patients and the implementation of targeted continence care strategies to enhance overall quality of life.

Plain Language Summary: This study highlights significant correlations between UI, HRQoL, and factors such as age, BMI, and breathlessness. This study emphasizes the need for routine UI screening in patients with COPD to improve HRQoL through specialized continence care.

Keywords: COPD, disease severity, health-related quality of life, urinary incontinence

Introduction

Chronic obstructive pulmonary disease (COPD) is a chronic progressive pulmonary disease that also exhibits extra-pulmonary manifestations such as urinary incontinence (UI).¹ Previous research indicates that urinary incontinence (UI)

affects approximately 25–40% of women in the general population, with prevalence rising to around 50% among women diagnosed with chronic obstructive pulmonary disease (COPD).² Consequently, UI represents a significant clinical concern for COPD patients due to its elevated prevalence and more pronounced impact compared to the general population. UI presents a dual challenge, affecting individuals both physically and socially, limiting daily activities, and significantly influencing health-related quality of life (HRQoL).^{3,4} Despite its profound implications, the extensive body of COPD literature often overlooks the factors that could be related to UI and its effect on HRQoL. Instead, the focus has primarily been on COPD itself and its substantial effects on daily life, including a notable reduction in HRQoL.^{5,6} This oversight highlights an evident gap in current research, emphasizing the need to explore interactions between COPD-specific factors, socio-demographic characteristics, and UI severity, and their collective impact on HRQoL. Addressing this gap will enable more informed clinical practice and contribute to improved management strategies, enhancing the overall well-being of individuals affected by both COPD and UI.

In patients with COPD, the etiology of UI in patients with COPD remains a subject of ongoing investigation. It is evident that numerous contributing factors play a role in the severity of the UI. These factors encompass a wide spectrum ranging from anatomical and mechanical factors to pathophysiological and pharmacological influences.¹ It has been reported that the frequent coughing associated with COPD causes an increased intra-abdominal pressure. This increased pressure exerts mechanical forces on pelvic tissues, eventually resulting in connective tissue deformation and stress UI.^{7–9} Additionally, respiratory distress frequently encountered in COPD may further impair neural control mechanisms of micturition, heightening the risk of developing UI, particularly in advanced disease stages.^{1,10}

Furthermore, the coexistence of multiple comorbidities and polypharmacy in patients with COPD plays a significant role in exacerbating the risk of UI.^{11,12} Anticholinergic therapy for COPD may lead to urinary discomfort; however, it is unlikely to be a direct cause of urinary incontinence.¹³ Previous studies on UI have predominantly focused on women, often neglecting a thorough evaluation of both respiratory and non-respiratory risk factors.^{1,3} In addition, there has been a paucity of studies examining the effects of UI on HRQoL and identifying predictive factors across sex in COPD patients, with a notable absence of such studies in regions such as the Middle East, including Saudi Arabia.^{1,14} Given the considerable prevalence of UI and its pronounced impact on QoL, there remains a critical gap in the understanding of UI in the context of COPD. This study aimed to identify factors associated with UI severity among individuals with COPD and to examine the relationship between UI severity and its impact on HRQoL in this specific population.

Materials and Methods

Study Design and Participants

This cross-sectional study involved a convenience sample of patients diagnosed with COPD and exhibiting urinary incontinence (UI). All participants presented with UI symptoms, as evidenced by scores of 3 or higher on the International Consultation on Incontinence Questionnaire-Urinary Incontinence Short Form (ICIQ-UI SF). COPD diagnosis was medically confirmed with spirometry, categorizing patients into stages I–IV according to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines, characterized by a FEV1/FVC ratio of less than 70%.¹⁵ Study encompassing both sexes and individuals aged 45 years and older. Exclusion criteria included pregnancy; other chronic lung diseases such as cystic fibrosis and asthma; and any medical, surgical, or rehabilitative interventions for UI conducted within the prior six months. The participants were recruited from various pulmonary hospital departments in Saudi Arabia. The sample size was calculated using G*Power 3.1.9.4 software. A medium effect size (0.30) was used. Assuming that the α error probability was 0.05, a power of 80% was considered. The acceptable sample size for this study was estimated as 84. Considering the possible missing data, the sample size was increased to 101 participants.

This study was approved by the Institutional Review Board of King Saud University (Ref. No.20/0288/IRB) and was conducted from September 2020 to February 2021, in accordance with the Declaration of Helsinki guidelines. All participants were informed of the study and provided their consent by signing a consent form. Data were collected

through interviews. All participants were interviewed by the same interviewer to ensure consistency in the data-collection process.

Demographic and Clinical Data

The following demographic data were collected: sex, age, weight, height, BMI (kg/m^2), marital status, education level, place of residence, and smoking history. For the specific categorization of body mass index (BMI), participants were stratified into distinct groups, including individuals characterized as underweight ($<18.5 \text{ kg}/\text{m}^2$), normal weight ($18.5\text{--}24.9 \text{ kg}/\text{m}^2$), overweight ($25\text{--}29.9 \text{ kg}/\text{m}^2$), and obese ($>30 \text{ kg}/\text{m}^2$).¹⁶ Information about the following medical-related factors was collected: symptoms of an overactive bladder, pelvic disorder as prostate/prolapse history, and pelvic procedures or operations such as vaginal/prolapse repair, hysterectomy, and/or prostatectomy. Comorbidities, including hypertension, cardiac conditions, neurological disorders, diabetes, back pain, and arthritis, were recorded for each participant.^{1,17} The participants' medications were recorded using an electronic file. The total number of comorbidities and medications taken by each participant was recorded.

COPD severity was determined by the recent lung function test within the last three months and retrieved from the system, and recorded according to the GOLD guidelines.¹⁸ Participants were interviewed and asked about their respiratory symptoms, including coughing, sputum production, chest tightness, and breathlessness.

Outcome Measures

COPD Assessment Test (CAT)

It is a self-administered questionnaire that is used to evaluate the impact of COPD on health status. It includes eight questions about cough, sputum production, chest tightness, breathlessness while going up a stair/hill, activity limitations at home, confidence in leaving home, sleep, and energy. Each question was answered on a scale ranging from 0 to 5, with the overall score ranging from 0 to 40. Higher scores indicated a worsening impact of COPD on patient health. To complete the questionnaire, the participants were instructed to select one response for each question that best described their current situation.¹⁹ The Arabic version of the CAT has been found to be easy to administer, and reliable ($\text{ICC} = 0.9$; $p = 0.001$).²⁰

The Incontinence Questionnaire- Urinary Incontinence – Short Form (ICIQ-UI) Questionnaire

This questionnaire was used to assess the severity of UI. It consists of three questions about the frequency of UI, amount of leakage, and overall impact of UI. The score was summed from 0 to 21, and the severity of UI was defined as follows: 0, no leak; 1–5, slight leakage; 6–12, moderate leakage; 13–18, severe leakage; and 19–21, serious leakage. In addition, separate items at the end of the questionnaire allowed respondents to report instances of incontinence. The participants were instructed to consider their experiences over the past four weeks when answering the questions. The Arabic version of ICIQ-UI short form is a simple questionnaire that demonstrates excellent reliability and internal consistency ($\alpha = 0.97$; 95% CI: 0.88–0.98).²¹

The Incontinence Impact Questionnaire – Short Form (IIQ-7) Questionnaire

This questionnaire was designed to assess the effect of UI on HRQoL. It comprises seven questions that encompass various aspects such as physical activity, travel, social relations, and emotional health. Each item was rated on a three-point scale: zero (indicating no impact), one (suggesting a minor impact), two (indicating a moderate impact), and three (denoting a significant impact).²² The total score, ranging from 0 to 100, provides a quantitative measure of the HRQoL. A score below 50 signifies a mild impact, 50–70 reflects a moderate impact, and a score above 70 indicates a severe impact on HRQoL.²³ The Arabic version of the IIQ-7 has been recognized for its ease of use, reliability, and valid questionnaire.²⁴

Data Analysis

Data were analyzed using Statistical Package for Social Sciences (SPSS) version 27 (IBM Corp., Armonk, NY, USA). Data normality was examined prior to analysis. Categorical data are presented as frequency and percentage, and non-normally distributed data are reported as median and interquartile range (IQR) for quantitative variables. Categorical data were compared using the chi-squared test. The correlation coefficient (r) was used to determine the relationships between variables of interest. A multinomial logistic regression model was used to investigate the factors associated with UI severity. Two categories, severe and serious urinary leakage, were merged into severe urinary leakage, and mild urinary leakage was used as the reference category. Statistical significance was set at p -value <0.05 .

Results

A total of 480 patients diagnosed with COPD were invited to participate in the study. After the screening process, 379 participants were excluded for various reasons: non-consent to participate, resolution of urinary incontinence (UI) symptoms, presence of communication barriers such as language or hearing disabilities, or the absence of available pulmonary function test results (Figure 1). Consequently, 101 participants met the inclusion criteria and were enrolled in this study. The patients median age 70 years (IQR: 62–78.5) and BMI 30.4 kg/m² (IQR:26.5–37.8). The majority had moderate COPD (70.2%) and over half were obese (53.5%). Of all the participants, 70.3% had more than two diseases and 63.4% took at least two medications. The other demographic and medical-related factors are shown in Table 1.

Urinary Incontinence Severity

Table 2 shows that the patient had a COPD profile and UI characteristics. The UI severity of patients with COPD has been reported to have a median (IQR) of 10 (8–13). Patients with COPD were stratified according to UI severity as follows:12 participants were categorized as slight (11.9%), 59 as moderate (58.4%), 27 as severe (26.7%), and 3 as serious urinary leakage (3%). In terms of urinary incontinence subtypes among participants, urge urinary incontinence was the most commonly reported (85.1%), followed by stress urinary incontinence (63.4%) and mixed urinary incontinence (50.5%).

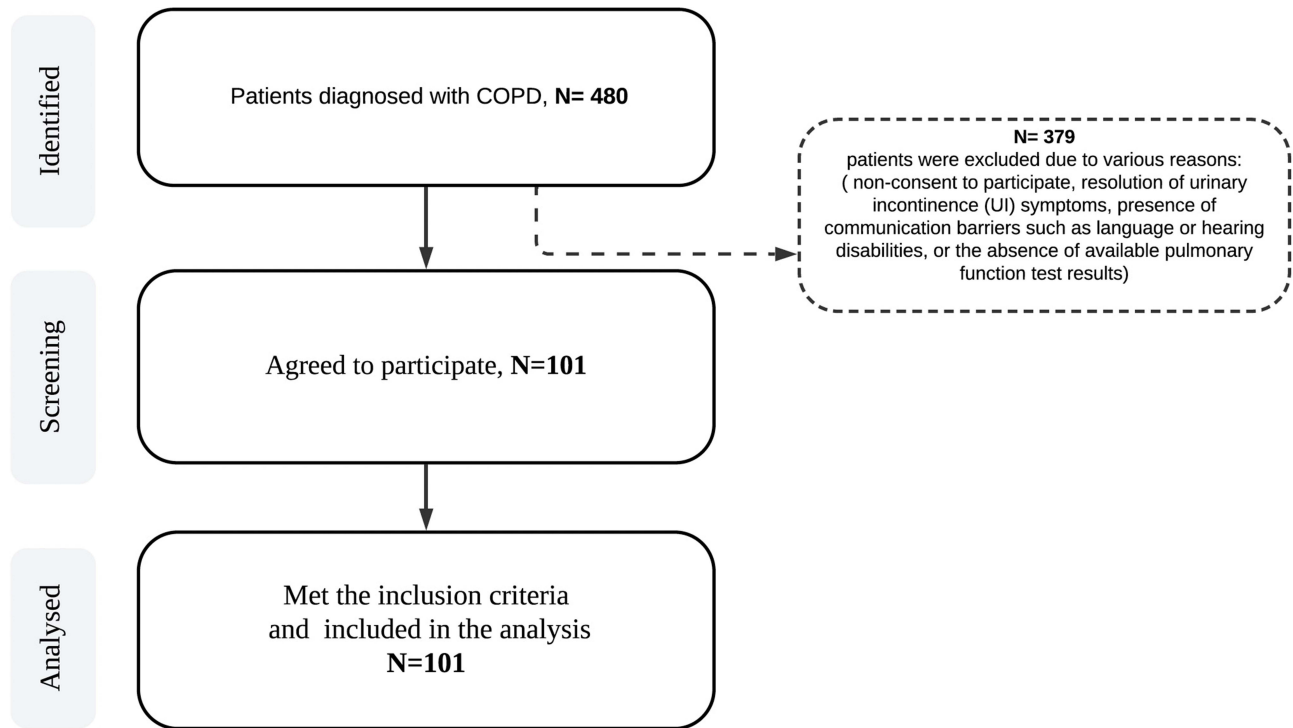


Figure 1 Flow diagram of the study.

Table 1 Baseline Characteristics of the Demographic and Health Status of the of Participant (N=101)

Variable	Response (value)	N (%)
Age category, n (%)	45–55	11 (10.9)
	56–65	24 (23.8)
	66–75	28 (27.7)
	> 75	38 (37.6)
Sex, n (%)	Men	49 (48.5)
	Women	52 (51.5)
Marital Status, n (%)	Married	64 (63.4)
	Divorced or widowed	37 (36.6)
Educational level, n (%)	Illiterate	56 (55.4)
	High School or Lower	36 (35.7)
	University or Higher	9 (8.9)
BMI, n (%)	Underweight	6 (5.9)
	Normal weight	17 (16.8)
	Overweight	24 (23.8)
	Obese	54 (53.5)
Smoking, n (%)	Yes	20 (19.8)
	No	81 (80.2)
Pelvic Disorder, n (%)	Yes	24 (23.8)
	No	77 (76.2)
History of pregnancy (n=52)	Yes	48(92.3)
	No	4(7.7)
Frequency of pregnancy, n (%)	<5	8(16.7)
	5–10	18(37.5)
	>10	22(45.8)
Experiences delivery	Yes	44(92.3)
	No	4(7.7)
Number of childbirths	<5	11(22.9)
	5–10	26(54.2)
	>10	11(22.9)
Menopause, n (%)	Yes	52(100)
	No	0(0)
Duration of menopause, n (%)	<5 years	1(1.9)
	5–10 years	18(34.6)
	>10 years	33(63.5)

Notes: Data presented as frequency and percentage; N (%).

Abbreviations: BMI, Body Mass Index; COPD, Chronic Obstructive Pulmonary Disease.

Factors Associated with UI Severity

There was a correlation between UI severity scores and age ($r_s = 0.26$), BMI ($r_s = 0.29$), smoking status ($r_s = 0.25$), number of relevant comorbidities ($r_s = 0.22$), medications ($r_s = 0.27$), chest tightness ($r_s = 0.25$), and breathlessness ($r_s = 0.26$) (all p values < 0.05). There was a correlation between IIQ-7 score and UI severity ($r_s = 0.43$; $p < 0.05$) (Table 3).

Table 2 Description of the COPD Profile and UI Characteristic (N=101)

Variables		Median (IQR)
Spirometry Values	FEV1 (L)	51.8 (48.8–55)
	FVC(L)	80.4 (78.5–84.5)
	FEV1/FVC Ratio	63.8 (63.8–67.2)
GOLD stage, n (%)	I	4 (3.96)
	II	69 (68.32)
	III	23 (22.77)
	IV	5 (4.95)
Respiratory Symptoms	Cough	2 (1–4)
	Sputum Production	2 (1–4)
	Chest Tightness	3 (2–4)
	Breathlessness	4 (3–5)
Cough Frequency, n (%)	0	21(20.8)
	1	15(14.9)
	2	16 (15.8)
	3	23(22.8)
	4	11(10.9)
	5	15(14.9)
ICIQ-UI short form (total score)		10 (8–13)
IIQ-7 (total score) IIQ-7 categories, n (%)		23.8 (9.5–42.8)
	Mild	83(82.2)
	Moderate	11(10.9)
	Severe	7(7)
Comorbidities, n (%)	Yes	94(93.1)
	No	7(6.9)
Number of Comorbidities, n (%)	No	7 (6.9)
	1–2	23 (22.8)
	>2	71 (70.3)
Comorbidities, n (%)	Hypertension	67 (66.3)
	Heart disease	44 (43.6)
	Neurological diseases	10 (9.9)
	Diabetes	67 (66.3)
	Overactive bladder	16 (15.8)
	Back pain	56 (55.4)
	Arthritis	68 (67.3)
Number of Medications, n (%)	0	33 (32.7)
	1–2	64 (63.4)
	>2	4 (3.9)

(Continued)

Table 2 (Continued).

Variables		Median (IQR)
Medications	Diuretic	59 (58.4)
	Laxative	33 (32.7)
	Anti-depressant	1 (1)
	Anti-seizure	1(1)
	Narcotic	4 (4)
	Sedative	3 (3)

Notes: Data presented as median (interquartile range,) and frequency and percentage; N (%).

Abbreviations: COPD, Chronic Obstructive Pulmonary Disease; FEV1, Forced Expiratory Volume in One Second; FVC, Forced Vital Capacity, HRQoL, Health-Related Quality of Life; ICIQ-UI short form, International Consultation on Incontinence Questionnaire Urinary Incontinence; IIQ-7, Incontinence Impact Questionnaire; IQR, Interquartile Range; UI, urinary incontinence; GOLD, Global Initiative for Chronic Obstructive Lung Disease.

Table 3 Correlation Between Study Variables and UI Severity

Variables	Total ICIQ-UI Short Form Spearman Correlation (r_s)	
	r_s	p-value
Sociodemographic Characteristics		
Sex	0.04	0.66
Age	0.26	0.01*
Marital Status	0.05	0.61
Education Level	-0.18	0.07
BMI	0.29	0.001*
Medical-Related Factors		
Smoking	0.25	0.01*
Previous Pregnancy	0.04	0.77
Number of Pregnancies	0.13	0.36
Previous Delivery	0.04	0.77
Number of Deliveries	0.08	0.56
Duration of Menopause	0.24	0.08
Pelvic Disorder	-0.06	0.57
Pelvic Procedures or Operations	0.13	0.19
Number of Comorbidities	0.22	0.02*
Number of Medications	0.27	0.001*
Respiratory Symptoms		
Cough	0.06	0.54
Sputum Production	0.18	0.07
Chest Tightness	0.25	0.01*
Breathlessness	0.26	0.001*
COPD Severity	0.04	0.66
Health-Related Quality of Life		
Total IIQ-7	0.45	0.001*

Note: *Significant p-value <0.05.

Abbreviations: BMI, Body Mass Index; CAT, COPD Assessment Test; COPD, Chronic Obstructive Pulmonary Disease; ICIQ-UI short form, International Consultation on Incontinence Questionnaire – Urinary Incontinence; IIQ-7, Incontinence Impact Questionnaire.

Table 4 Assessment of the Relationship Between UI Severity and HRQoL Using IIQ-7

IIQ-7	ICIQ-UI Short Form				p-value
	Slight Leakage	Moderate Leakage	Severe Leakage	Serious Leakage	
	n (%)	n (%)	n (%)	n (%)	
Mild (n=83)	12(14.4)	52(62.7)	18(21.7)	1(1.2)	0.001 ^{a*}
Moderate (n=11)	0(0)	4(36.4)	7(63.6)	0(0)	
Severe (n=7)	0(0)	3(42.8)	2(28.6)	2(28.6)	

Note: ^aChi-square was used *Significance p-value <0.05.

Abbreviations: ICIQ-UI short form, International Consultation on Incontinence Questionnaire Urinary Incontinence; IIQ-7, Incontinence Impact Questionnaire.

The association between the categories of UI severity and their impact on HRQoL is shown in Table 4. It has been reported that the majority of patients with COPD 83 (82.2%) reported a mild impact on their HRQoL, while a smaller proportion 7 (6.9) reported a severe impact on their HRQoL. Among the participants who experienced moderate to severe impacts on their HRQoL, 63.6% reported severe impacts based on IIQ-7 scores. The chi-square test showed a significant association between UI severity categories and the impact on HRQoL ($p=0.001$).

Predictive Factors for UI Severity

Multinomial regression analysis identified several significant predictors of urinary incontinence (UI) severity in COPD patients (Table 5). Age was a significant predictor of severe UI ($p = 0.04$), with an OR of 1.07). BMI was also a significant predictor of severe UI ($p = 0.02$; OR = 1.09). Additionally, the number of relevant medications was a significant predictor of severe UI ($p = 0.03$, OR = 5.04). Breathlessness significantly predicted moderate UI ($p = 0.01$; OR = 1.72) and severe UI ($p = 0.01$; OR = 1.87). It was observed that for every one-unit increase in age, there was a 1.07 times greater odds ratio of experiencing severe UI ($p<0.05$). Similarly, for every one-unit increase in BMI, the odds ratio of severe UI increased by 1.09 ($p<0.05$). Furthermore, participants with COPD who reported breathlessness while going up a stair/hill were twice as likely to have moderate and severe UI, with an odds ratio of 1.87 ($p<0.05$).

Table 5 Multinomial Regression for Factors Predicting Urinary Incontinence Severity

Variables		β	SE	Wald	p-value	Exp (B)	95% CI	
							Lower	Upper
Age	Moderate	-0.00	0.03	0.01	0.93	0.99	0.94	1.06
	Severe	0.07	0.04	4.01	0.04*	1.07	1.00	1.15
BMI	Moderate	0.06	0.04	2.19	0.13	1.06	0.98	1.15
	Severe	0.09	0.04	4.87	0.02*	1.09	1.01	1.19
Number of Medications	Moderate	0.40	0.64	0.39	0.53	1.49	0.43	5.24
	Severe	1.62	0.75	4.60	0.03*	5.04	1.15	22.1
Chest Tightness	Moderate	0.33	0.27	1.46	0.22	1.39	0.82	2.36
	Severe	0.39	0.29	1.79	0.18	1.47	0.84	2.59
Breathlessness	Moderate	0.55	0.23	5.88	0.01*	1.72	1.11	2.68
	Severe	0.63	0.26	5.65	0.01*	1.87	1.12	3.13

Note: *Significance p-value <0.05.

Abbreviations: BMI, Body Mass Index; β , coefficient of predictor variables; S.E, standard error; CI, confidence interval; Exp (B), exponentiation of the B coefficient (odds ratio); ICIQ-UI short form, International Consultation on Incontinence Questionnaire Urinary Incontinence.

Discussion

To the best of our knowledge, this is the first study in Saudi Arabia to investigate the factors associated with UI and their impact on HRQoL in patients with COPD. The current results revealed that UI severity was moderate and negatively impacted HRQoL. In the current study, it was observed that urinary incontinence (UI) had a negative impact on HRQoL, with a positive correlation between the severity of UI and the scores of HRQoL. This result is in agreement with a recent study that reported positive correlations between the IIQ-7 and ICIQ-UI short-form scores in women with UI.²⁵ Several studies have reported similar findings in participants with UI using different outcome measurements.^{22,26} An early study showed a significant positive correlation between the number of UI episodes and IIQ-7 scores, indicating that an increase in the number of UI episodes would worsen the quality of life of women with UI.²² Another study found a significant positive correlation between the Urinary Distress Inventory-short form and IIQ-7 scores in relation to UI.²⁶ In addition, one study reported that men and women with COPD and UI had poor quality of life compared to those without UI.¹⁴

Our results found that there was a significant correlation between UI severity, age, and BMI, which were identified by regression analysis as predictors of UI. This finding aligns with a previous study indicating that UI is affected by age and is considered a risk factor for UI in COPD participants.²⁷ The increase in intra-abdominal pressure and age-related physiological changes in the smooth muscle, altered nerve transmission at the spinal and cortical levels, hypersensitivity of ion channels, and increased afferent nerve activity could be the causes of UI.¹²

Similar to previous studies, higher BMI was associated with more severe UI symptoms.^{25,28} Altaweel and Alharbi (2012) identified obesity as a significant predictor of UI.²⁷ The presence of obesity leads to a chronic increase in intra-abdominal pressure, which in turn weakens of pelvic floor muscles and fascia, thereby increasing the likelihood and severity of UI.^{29,30}

In current study, there was no observed correlation between UI severity and sex. This result is consistent with an earlier study that reported no significant relationship between sex and UI.³¹ However, some studies have reported a higher prevalence of UI in women compared than in men.^{31,32} This can be attributed to various factors such as urethral length, pelvic floor anatomy, giving birth, and hormonal changes.^{27,32} Additionally, cultural factors may play a role in the lower UI rate in men and could be cultural factors, as they are often considered embarrassing.³² Another study reported that the prevalence of UI is more common in younger women than in men, but as people get older, this difference decreases.³³

The analysis conducted in this study demonstrated a significant positive correlation between breathlessness and UI occurrence. Regression analysis identified breathlessness as a predictor of UI, which aligns with a previous study that also found breathlessness to be a significant factor associated with an increase in the prevalence of UI.⁹ A possible justification for this is that recurrent dyspnea could cause an imbalance and ischemia in the abdominal and pelvic muscles and impair the control of urination.^{29,34}

In this study, significant positive correlations and associated factors were found between the number of relevant medications and UI severity. This finding is consistent with that of a previous study that indicated a higher risk of UI with the consumption of more than five medications.³⁵ Another study found that participants who used polypharmacy had a higher prevalence of UI.³⁶ To the best of our knowledge, no previous study has investigated the association between UI severity and number of relevant medications in participants with COPD and UI.

This study had some limitations that merit consideration. First, it is essential to acknowledge that the study design is cross-sectional, which precludes the identification of causal relationships between variables. A longitudinal study is required to investigate the causal relationship between UI severity and risk factors for COPD. Second, we acknowledge that some traditionally relevant clinical and demographic variables—such as gender, BMI, and comorbidities—were not included in the final multivariable model, as they did not meet the criteria for statistical inclusion based on initial bivariate analyses. However, their exclusion may limit the ability to fully account for potential confounding or interaction effects. We recommend that future studies with larger and more diverse samples explore the role of these variables more comprehensively to strengthen the generalizability and clinical relevance of the findings. Third, focusing on a specific city could affect generalizability, because the sample may not be representative of the entire country. Fourth, the number of male participants were lower than that of female participants. It is possible that the men were either ashamed or

unaware that the condition was treatable.³³ However, the prevalence of UI in men is much lower than that in women, at approximately 3% to 11% overall.³⁴ Fifth, physical distancing and quarantine during the COVID-19 pandemic was necessary because the surveys were conducted via phone, and the participants were unlikely to reply to such sensitive questions over the phone from a stranger. In addition, the participants could not reflect the COPD population because 70.2% had stage 2 COPD, 5% had stage 4 COPD, and 77.3% of the cohort were classified as overweight or obese, while no control group was included in the comparison. Finally, some questions related to predictive factors were not asked, such as pelvic pelvic disorders, delivery type, delivery of a large birthweight baby, history of episiotomy or instrumental delivery, hysterectomy, and prostate hyperplasia status.

Conclusions

The association between chronic obstructive pulmonary disease (COPD) and urinary incontinence (UI) severity has been inadequately recognized in clinical practice. This study found a moderate correlation between UI severity and health-related quality of life (HRQoL) among COPD patients. The findings suggest that UI substantially affects HRQoL in this patient population. Additionally, UI severity was associated with multiple factors, including older age, higher body mass index (BMI), greater breathlessness, and increased medication use. The multifactorial nature of UI severity underscores the necessity of routine UI screening in COPD patients, accompanied by targeted educational interventions and specialist continence clinic referrals for comprehensive management.

Data Sharing Statement

The data are available for research purposes upon reasonable request from the corresponding authors.

Ethics Approval and Informed Consent

This study was approved by the Institutional Review Board of King Saud University (Ref. No.20/0288/IRB) and was conducted from September 2020 to February 2021 in accordance with the Declaration of Helsinki guidelines. Informed consent was obtained from all participants prior to their participation in this study.

Consent for Publication

No individual or identifiable data have been published as part of this manuscript.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare that this research was conducted in the absence of any commercial or financial relationships that could be construed as potential conflicts of interest.

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