RESEARCH PAPER

# Assessment of Patients' Knowledge Regarding COPD Utilising the Bristol COPD Knowledge Questionnaire (BCKQ)

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**ABSTRACT**

**Background:** Comprehensive knowledge of treatment strategies for chronic obstructive pulmonary disease is essential for optimizing disease management.

**Objectives:** The primary objective of this study was to assess participants' knowledge of medication and medication device techniques using the Bristol COPD Knowledge Questionnaire before and after clinical pharmacist intervention.

**Methods:** A prospective study was conducted with 96 subjects recruited according to predefined inclusion criteria. Participants' knowledge was assessed using a validated Bristol COPD Knowledge Questionnaire (BCKQ). Reassessment was performed after a 6-month period, and results were compared, evaluated, and analyzed using appropriate statistical methods.

**Results:** Patient knowledge in the domains of chest infection (Q6), smoking (Q8), vaccination (Q9), and antibiotics (Q11) demonstrated the highest mean scores. The highest mean value was observed in the domain of oral corticosteroids (Q13) at 5.67, while the lowest mean scores were found in the domains of epidemiology (Q1), pathophysiology (Q2), and symptoms (Q5), each at 4.08 in post-counseling scoring.

**Conclusion:** The pharmaceutical care program led to improved patient outcomes in this study. This improvement was supported by significant increases in knowledge regarding the disease, pharmacological agents, risk factors, medication administration techniques, and enhanced positive attitudes toward medication effectiveness.

**Keywords:** COPD, BCKQ, Knowledge, Clinical Pharmacist.

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**Conflict of interest:** None

## Introduction:

Recently, there has been increased emphasis on educating patients and their families about medical conditions. This trend is partly due to patients seeking greater understanding of their illnesses and partly due to healthcare professionals recognizing the importance of self-management. Studies examining the effects of education on patients with chronic obstructive lung disease have shown inconsistent results1. For example, one study reported a reduction in healthcare utilization following educational interventions. However, since more than one-third of the participants were asthmatic, these findings may not be applicable to chronic obstructive pulmonary disease2 (COPD).

Although the importance of education is acknowledged, none of the studies have provided substantial data measuring learning outcomes or changes in patient knowledge3. To accurately assess the effects of educational interventions, it is essential that the content is tailored to the patient's needs and that educators possess comprehensive knowledge of both the disease and its management. Clinical pharmacists play a critical role in helping patients understand the nature of their disease, the potential benefits of treatment, addressing concerns about possible adverse effects, and encouraging the development of self-management skills.

## Subjects and methods:

This prospective, interventional study examines the impact of clinical pharmacist-mediated education regarding disease, medications, and administration techniques among subjects with chronic obstructive pulmonary disease (COPD). The study was conducted over a six-month period at Community Healthcare Centre, Anantapur. The study population included individuals aged 35 years and above diagnosed with COPD. Exclusion criteria comprised mobility problems, confusion, disorientation, terminal illness, and congestive heart failure.

Additionally, subjects who had attended a pulmonary rehabilitation program or consulted a pulmonary nurse or clinical pharmacist within the previous six months were excluded. Based on these criteria, 96 subjects were enrolled, and informed consent was obtained from all participants. Relevant data, including demographic information, were collected from case sheets and patient interviews.

Patient knowledge of COPD, breathing exercises, medications, relaxation, and stress control was assessed using the pre-structured Bristol COPD Knowledge Questionnaire (BCKQ), which consists of 13 true-or-false questions regarding the disease, medications, and administration techniques. The BCKQ demonstrates good internal consistency for its 65 items (Cronbach's alpha 0.73) and can be completed and scored within twenty minutes4. Data were collected both before and after the educational intervention. During the pre-assessment, patients completed the questionnaire in a private room. Subsequently, information regarding the disease, medications, and their administration was provided using a dummy inhaler and a patient information leaflet. Follow-up assessments were conducted six months later, and the results of the initial and follow-up assessments were compared and evaluated.

Data collected at baseline and ~~at~~ the six-month follow-up were coded and entered into SPSS software version 17 for statistical analysis, including data screening, descriptive statistics, and univariate analysis. Means and standard deviations were calculated and compared between pre- and post-counselling assessments, considering all subsets under each question as domains. Statistical significance was determined using a two-tailed test, with p-values $< 0.05$ considered significant.

**Results:**

A total of 96 COPD subjects were recruited into the study. None of the subjects withdrew during the study period**.** Results indicated similar sociodemographic and clinical characteristics among the study participants. Among the 96 study participants, 60 (62.5%) were classified as geriatric and 36 (37.5%) as adults. This distribution likely reflects the higher incidence of chronic obstructive pulmonary disease (COPD) in the geriatric population, which is associated with increased exposure to risk factors. The mean age was 63.03 ± 11.5 years. All participants were male. This gender distribution may be due to higher exposure to risk factors among males, potentially influenced by social factors such as peer pressure, as well as limited awareness or knowledge regarding COPD among females. Long-term tobacco exposure was highly prevalent, with all participants reporting a minimum smoking history of 10 years. The largest proportion (41.67%) reported smoking for 10–25 years, followed by 26–40 years (37.50%). Notably, 20.83% had smoked for more than 40 years, indicating a significant subgroup with prolonged exposure. Regarding alcohol consumption, 27 participants (27.8%) reported current use. The occupational profile revealed a predominance of individuals engaged in agriculture and manual labor. Farmers constituted the largest group (25%), consistent with the rural or semi-urban background of the study population. Worker-wage laborers and business owners each accounted for 14.4%, indicating substantial involvement in informal or small-scale economic activities. Teachers (10.3%) and shepherds (8.2%) formed moderate groups, while engineers (7.29%), finance professionals (7.20%), and healthcare workers (6.20%) represented smaller segments of skilled or semi-skilled occupations. Few participants were plumbers (2.1%), watchmen (3.1%), or marketing professionals (1%). The symptom profile indicated a predominance of respiratory-related clinical features, consistent with underlying pulmonary involvement. The most frequently reported symptoms were wheeze (88.7%), breathlessness (84.7%), and cough (82.7%), suggesting significant airway obstruction or irritation. Expectoration was also common (74.5%), indicating productive airway inflammation.

Pain (36.7%), infection-related symptoms (32.7%), and fever (17.3%) were less common but remained clinically relevant. The lower prevalence of systemic symptoms such as fever suggests that most participants had chronic or subacute respiratory conditions rather than acute infections. The majority of participants experienced moderate exacerbations (79.17%), indicating that most cases involved a noticeable worsening of symptoms requiring medical attention, but not reaching life-threatening severity. Severe exacerbations occurred in 13.54% of individuals, representing a smaller yet clinically significant group with marked respiratory compromise. Only 7.29% experienced mild exacerbations, indicating that mild symptom worsening was relatively uncommon in this cohort.

The GOLD staging distribution shows that the majority of participants fall under moderate airflow limitation (82.29%), indicating a substantial burden of clinically significant but not yet end-stage disease. A smaller proportion (17.71%) were classified as having severe obstruction, reflecting advanced impairment in lung function. Notably, no participants were categorized in the mild stage, suggesting that most individuals seek medical attention only after considerable disease progression. The mode of drug administration among the study participants shows a strong preference for nebulization, used by 65.3% of individuals. This indicates that a majority required a delivery method suitable for acute symptom relief or for patients with difficulty coordinating inhalation techniques.

Among inhalation devices, Rotahaler (31.6%) and MD inhaler (31.6%) were equally used, reflecting their accessibility and familiarity in routine management. Lupihaler (17.3%) and Revulizer (14.3%) were less commonly used, suggesting either limited availability, lower patient preference, or device-specific technique challenges. The majority of participants (76.04%) did not use a spacer with their inhalation devices, while only 23.96% reported using one. This indicates that spacer utilization is relatively low in the study population despite its known benefits in improving drug delivery, reducing oropharyngeal deposition, and enhancing inhaler technique—especially for metered-dose inhalers.

The low adoption rate may reflect limited patient awareness, lack of device availability, or insufficient counselling on proper inhaler technique. Given the high prevalence of moderate-to-severe respiratory disease in this cohort, improving spacer use could enhance treatment effectiveness and symptom control.

**Table no. 01 Mean value of the pre-counselling BCKQ scores among study participants**

| Question NO. | Mean | N | Standard Deviation | Standard Error |
|---|---|---|---|---|
| Q1 | 6.53 | 96 | 2.707 | .276 |
| Q2 | 6.53 | 96 | 2.707 | .276 |
| Q3 | 6.56 | 96 | 3.218 | .328 |
| Q4 | 6.64 | 96 | 2.699 | .276 |
| Q5 | 6.58 | 96 | 2.422 | .247 |
| Q6 | 6.61 | 96 | 3.100 | .316 |
| Q7 | 6.56 | 96 | 3.218 | .328 |
| Q8 | 6.61 | 96 | 3.100 | .316 |
| Q9 | 6.61 | 96 | 3.100 | .316 |
| Q10 | 6.56 | 96 | 3.218 | .328 |
| Q11 | 6.61 | 96 | 3.100 | .316 |
| Q12 | 6.56 | 96 | 3.218 | .328 |
| Q13 | 6.67 | 96 | 3.426 | .350 |

**Table No. 02 Mean value of the post-counselling BCKQ scores among study participants**

| Question NO. | Mean | N | Standard Deviation | Standard Error |
|---|---|---|---|---|
| Q1 | 4.07 | 96 | 2.022 | .206 |
| Q2 | 4.07 | 96 | 2.022 | .206 |
| Q3 | 4.88 | 96 | 1.650 | .168 |
| Q4 | 4.86 | 96 | 1.639 | .167 |
| Q5 | 4.07 | 96 | 2.022 | .206 |
| Q6 | 4.88 | 96 | 1.650 | .168 |
| Q7 | 4.08 | 96 | 2.223 | .227 |
| Q8 | 4.88 | 96 | 1.650 | .168 |
| Q9 | 4.88 | 96 | 1.650 | .168 |
| Q10 | 4.08 | 96 | 2.223 | .227 |
| Q11 | 4.88 | 96 | 1.650 | .168 |
| Q12 | 4.08 | 96 | 2.223 | .227 |
| Q13 | 5.67 | 96 | 1.678 | .171 |

**Table No. 03: Pre-post mean value of the BCKQ scores among study participants**

| QUESTION NO. | | Paired Differences | | | t-test | Sig. (2-tailed) |
|---|---|---|---|---|---|---|
| | | Mean difference | Std. Deviation | Std. Error Mean | | |
| Pair 1 | Q1 PRE - Q1 POST | 2.458 | 2.563 | .262 | 9.399 | .001 |
| Pair 2 | Q2PRE - Q2 POST | 2.458 | 2.563 | .262 | 9.399 | .001 |
| Pair 3 | Q3PRE - Q3 POST | 1.688 | 3.366 | .344 | 4.911 | .001 |
| Pair 4 | Q4PRE - Q4 POST | 1.771 | 2.993 | .305 | 5.797 | .001 |
| Pair 5 | Q5PRE - Q5 POST | 2.510 | 2.526 | .258 | 9.739 | .001 |
| Pair 6 | Q6PRE - Q6 POST | 1.740 | 3.341 | .341 | 5.101 | .001 |
| Pair 7 | Q7PRE - Q7 POST | 2.479 | 3.563 | .364 | 6.818 | .001 |
| Pair 8 | Q8PRE - Q8 POST | 1.740 | 3.341 | .341 | 5.101 | .001 |
| Pair 9 | Q9PRE - Q9 POST | 1.740 | 3.341 | .341 | 5.101 | .001 |
| Pair 10 | Q10PRE - Q10POST | 2.479 | 3.563 | .364 | 6.818 | .001 |
| Pair 11 | Q11PRE - Q11POST | 1.740 | 3.341 | .341 | 5.101 | .001 |
| Pair 12 | Q12PRE - Q12POST | 2.479 | 3.563 | .364 | 6.818 | .001 |
| Pair 13 | Q13PRE - Q13POST | 1.000 | 3.767 | .384 | 2.601 | .011 |

## Discussion:

In this study, all 96 subjects (100%) were male. This finding aligns with the results of a study on gender-related differences in the severity and early onset of chronic obstructive pulmonary disease (COPD) by Silverman EK et al., which reported that 50% of the sample were male and 43.3% were female. This disparity may be attributed to greater exposure to risk factors among males or potentially to underreporting or lack of disease awareness among females.5

Men exhibit higher prevalence rates of chronic obstructive pulmonary disease (COPD) than women, a trend historically attributed to higher rates of cigarette smoking among males. The present analysis also demonstrated a greater occurrence of COPD in men compared to women, as confirmed by demographic data, which is primarily associated with cigarette smoking.

In India, individuals typically begin smoking between the ages of 20 and 30, and it generally requires at least 10 to 15 years of smoking to develop chronic obstructive pulmonary disease (COPD). In the present study, 60 participants (62.5% of the total population) were aged 60 years or older. This finding aligns with the results of P. Sawant et al., who reported that the majority of COPD cases occurred in the 61–70 year age group, with the youngest diagnosed case being 34 years old. COPD is a slowly progressive disease, and its symptoms usually develop gradually over several years; therefore, it is more commonly observed in elderly individuals.6

The typical Indian male begins smoking between the ages of 20 and 30 years. It generally requires a minimum of 10 to 15 years of smoking to develop Chronic Obstructive Pulmonary Disease (COPD).

According to the current study, 60 individuals, accounting for 62.5% of the total population, were aged 60 years or older. This finding is consistent with a study by P. Sawant et al., which found that the majority of COPD patients were in the 61-70 age group, with a minimum age at diagnosis of 34 years. Chronic Obstructive Pulmonary Disease (COPD) is a slowly progressive illness, with symptoms typically manifesting late over the years; therefore, COPD is more commonly observed in the elderly.

Demographic analysis indicated that all 96 subjects had a history of smoking for at least 10 years. Among these, 40 participants (41.67%) were chronic smokers for 10 to 25 years, 36 participants (37.50%) had smoked for 26 to 40 years, and 20 participants (20.83%) reported a smoking duration exceeding 40 years. These findings align with the study by Llordés M[7] et al., which confirmed a high prevalence of COPD in individuals over 45 years of age with a history of smoking. The prevalence may be underestimated due to some active smokers' refusal to participate in the survey. The 24.3% prevalence observed in the population-based study is consistent with other epidemiological research using similar COPD criteria and involving populations of comparable age and smoking habits. Notably, studies focusing exclusively on smokers have reported COPD prevalence rates ranging from 22% to 26%.

Among a total of 96 participants with chronic obstructive pulmonary disease (COPD), farmers (25%) were the most affected group relative to individuals engaged in other occupations within the study cohort. This disparity may be attributable to their lifestyle choices or a lack of awareness pertaining to the disease, medication, and inhalation techniques. This observation aligns with the findings of Guillien A[8] et al., who conducted a cross-sectional analysis involving 917 non-farming working controls and 3787 farmers aged 40–75 years. The study assessed respiratory symptoms, tobacco exposure, occupational history (without direct exposure measurement), and lung function. The prevalence of COPD among farmers was higher compared to non-farming controls and was influenced by factors such as farming activities, regional differences, and the criteria employed to define COPD.

In the present study, the most preferred mode of administration was nebulization, prescribed to nearly 65.30% of the sample. This route exhibited the highest bioavailability among the modes of administration and was highly favoured by geriatric subjects; however, concerns regarding cost and maintenance persist. MD Inhalers and Rota-halers were also notably preferred, each utilised by 31.60% of the participants. A spacer was prescribed for

individuals unable to administer the medication using the device alone. Out of 96 participants, 23 were prescribed a spacer, accounting for 23.9% of the total. The remaining 76.04% were either capable of administering the medication independently or unable to afford the device. This finding contrasts with a study conducted by Gigi A. et al., where the most preferred route of administration was oral, at 44.5%.[9]

In this investigation, we examined the progressions in BCKQ following clinical pharmacist intervention. The BCKQ was identified as an effective instrument for detecting data requirements both at baseline and after intervention. The educational-related changes were statistically significant and demonstrated a substantial effect size across all sites. All domain scores showed improvement, with the knowledge domain related to medication being one of the most markedly improved areas.

The Bristol COPD Knowledge Questionnaire (BCKQ) is a validated multiple-choice instrument, comprising 13 topics, each with a stem and five statements. Respondents are required to indicate whether each statement is 'true', 'false', or if they do not know. Its validity, reliability, and responsiveness have been previously evaluated, and it has received prior approval. This questionnaire primarily serves to assess patients' knowledge of the disease. Additionally, the questionnaire measures patients' knowledge before and after pharmacist counselling concerning the disease.

In the present study, the pre-counselling values[mean=6.6; SD=±3.1; N=96; SE=.316] of the BCKQ score and the post-counselling values[mean=4.8; SD=±1.9; N=96; SE=.168] after three months have been analysed through correlation, paired t-test, significance testing, and Pearson's correlation coefficient to assess statistical significance. A notable difference in the means was observed between the pre- and post-counselling measurements. The mean values prior to counselling are marginally higher than those following counselling.

The differences in the mean values are paired, with a mean change of 1.74, a standard deviation of ±3.4, a sample size of 96, and a standard error of 3.4. The significance of the paired difference was assessed using the paired t-test (t=5.101) and the two-tailed significance test (p=0.00). Additionally, the correlation value was reported as $p < 0.05$ for all 13 questions, indicating that these findings are statistically significant and reveal a notable difference in knowledge about the disease before and after counselling. This outcome contrasts with a study conducted by Rossi V et al., on the knowledge of COPD in primary care, where 26 subjects using the BCKQ as the primary outcome at two primary care sites in the UK over month follow-up period showed no significant improvement, with a mean change of 7.93 (95% CI 3.19-12.67, P=0.003), in patient knowledge regarding the disease.

**Conclusion:**

The present study demonstrated improved patient outcomes resulting from the pharmaceutical care programme. This was substantiated by significant advancements in knowledge concerning the disease, medications, risk factors, and administration techniques, as well as improved attitudes towards medication efficacy. Consequently, the study explicitly emphasises the importance of implementing pharmaceutical care programmes by clinical pharmacists to enhance health outcomes in patients with COPD. Further comprehensive research is warranted in this domain, particularly regarding the impact of such programmes on the quality of life for patients with COPD and other chronic conditions.

**References:**


1. Ries AL, Kaplan RM, Limberg TM, Prewitt LM. Effects of pulmonary rehabilitation on physiologic and psychosocial outcomes in subjects with chronic obstructive pulmonary disease. Annals of internal medicine. 1995 Jun 1;122(11):823-32.
2. Tougaard L, Sorknaes A, Ellegaard H, Krone T, Group P. Economic benefits of teaching subjects with chronic obstructive pulmonary disease about their illness. The Lancet. 1992 Jun 20;339(8808):1517-20.
3. Wedzicha JA, Bestall JC, Garrod R, Garnham R, Paul EA, Jones PW. Randomized controlled trial of pulmonary rehabilitation in severe chronic obstructive pulmonary disease subjects, stratified with the MRC dyspnoea scale. European respiratory journal. 1998 Aug 1;12(2):363-9.
4. White R, Walker P, Roberts S, Kalisky S, White P. Bristol COPD Knowledge Questionnaire (BCKQ): testing what we teach subjects about COPD. Chronic respiratory disease. 2006 Jul;3(3):123-31.
5. SILVERMAN EK, WEISS ST, DRAZEN JM, CHAPMAN HA, CAREY V, CAMPBELL EJ, DENISH P, SILVERMAN RA, CELEDON JC, REILLY JJ, GINNS LC. Gender-related differences in severe, early-onset chronic obstructive pulmonary disease. American journal of respiratory and critical care medicine. 2000 Dec 1;162(6):2152-8.
6. Sawant PM, Padwal LS, Kale SA, Pise NH, Shinde MR. Study of drug prescription pattern among COPD subjects admitted to medicine in-patient department of tertiary care hospital. IJBCP. 2017 Sep;6(9):2228-32.

7. Llordés M, Jaén A, Almagro P, Heredia JL, Morera J, Soriano JB, Miravitlles M. Prevalence, risk factors and diagnostic accuracy of COPD among smokers in primary care. COPD: Journal of Chronic Obstructive Pulmonary Disease. 2015 Jul 4;12(4):404-12.
8. Guillien A, Puyraveau M, Soumagne T, Guillot S, Rannou F, Marquette D, Berger P, Jouneau S, Monnet E, Mauny F, Laplante JJ. Prevalence and risk factors for COPD in farmers: a cross-sectional controlled study. European Respiratory Journal. 2016 Jan 1;47(1):95-103.
9. Gigi A, Sunil S, Hepzhiba P, Mahesh NM, Giri M, Krishnamurthy A. Assessment of Drug Prescribing Pattern in Chronic Obstructive Pulmonary Disease Subjects at a Tertiarycare Hospital. Journal of Pharmaceutical Research. 2015 Aug 1:45-
10. Rossi V, Houchen-Wolloff L, Schreder S, Singh S. Knowledge and COPD in primary care.