Knowledge about chronic obstructive pulmonary disease among physicians, nurses and students at a regional hospital in Nepal

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ABSTRACT

Introduction: In 2019, Nepal had the highest mortality from chronic obstructive pulmonary disease (COPD) globally, and the prevalence of COPD in Nepal is expected to increase. Available research shows that the knowledge of COPD among patients in Nepal is poor and that the practice of COPD management among healthcare personnel needs to improve.

Objectives: To assess the knowledge of COPD among healthcare personnel at a regional hospital and students at a local School of Health Science.

Methods: A cross-sectional, questionnaire-based study was conducted among healthcare professionals and students in Tansen, Palpa district, Nepal. Scoring was based on a scale of up to 12 points, with a result of 10 points or above considered satisfactory knowledge.

Results: A total of 56 healthcare workers and 208 students participated in the survey. All participants' median (IQR) score was 9[8,10]. Among healthcare professionals, the level of knowledge was below expected on questions regarding vaccinations to prevent pneumonia and spirometry to set the diagnosis. The time spent in the healthcare profession did not increase knowledge scores. Second- and third-year nursing students had a statistically significantly higher level of knowledge than first-year nursing students.

Conclusions: While healthcare personnel showed a high degree of skills in several aspects of COPD knowledge, significant gaps persist, highlighting areas for improvement in COPD care within Nepal.

Keywords: COPD, Nepal, knowledge, health care professionals, questionnaire

INTRODUCTION

The Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2023 report defines chronic obstructive pulmonary disease (COPD) as a heterogeneous lung condition characterised by chronic respiratory symptoms, i.e., dyspnoea, cough, and expectoration, which may lead to exacerbations.[1] This is due to abnormalities in the airways (bronchitis and bronchiolitis) and alveoli (emphysema) that cause persistent, often progressive, airflow obstruction. With three million deaths every year, COPD is the third leading cause of death globally, and almost 90% of COPD-related deaths in those under 70 years occur in low- and middle-income countries (LMICs).[2] Respiratory diseases, prominently COPD, rank second among causes of death in Nepal.[3] In 2019, the country recorded the highest mortality and disability-adjusted life years from COPD globally.[4]

While cigarette smoking is a significant cause of COPD in high-income countries, household air pollution from cooking with biomass fuel is a substantial risk factor for COPD in LMICs like Nepal.[2,5,6] Outdoor air pollution from vehicles is also a significant risk factor for COPD in Nepal[7], and Kathmandu, the capital of Nepal, is the second most polluted city globally regarding air quality in April 2024.[8] The convergence of high-risk factor prevalence and low educational levels positions COPD as a critical public health challenge in Nepal, demanding both preventive and improved therapeutic measures.[9]

According to the GOLD report, a definitive COPD diagnosis should be made using spirometry.[1] Treatment primarily

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involves smoking cessation, pharmacotherapy with bronchodilators, appropriate vaccinations, and pulmonary rehabilitation.[1] Evidence suggests that patients' COPD awareness is linked to better self-management.[10] However, a study from rural Nepal about COPD self-management showed inadequate knowledge of COPD among patients and that there are difficulties with the communication between healthcare personnel and patients regarding the management of COPD.[11] Another study about the knowledge and practice of COPD management among physicians in Nepal showed that although the understanding of COPD management is good, the practice of COPD management is inadequate.[12]

Due to improved life expectancy and a high burden of risk factors, the prevalence of COPD in Nepal is expected to increase. This raises the need for health education programs and interventions to reduce the disease burden and improve the quality of life for patients with COPD.[3,5] Caring for a COPD patient is a multidisciplinary task. Therefore, our study aimed to assess the knowledge of COPD among both healthcare personnel and students.

METHODS

A cross-sectional, questionnaire-based study was conducted from October 19 to October 31, 2023, in Tansen, Palpa District in central Nepal, at United Mission Hospital Tansen (UMHT) and Tansen School of Health Sciences (TSHS). The participants responded to the Chronic Obstructive Pulmonary Disease Knowledge Questionnaire (COPD-KQ), a validated tool for assessing knowledge of COPD in LMICs. The questionnaire was developed in Nepal, Peru, and Uganda using an expert panel and the GOLD report for COPD management.[12] It comprises 12 statements to be marked as true or false, with "yes," "no," and "I don't know" options. It also included an additional section for free-form text responses.

Eligible study participants were healthcare personnel working at UMHT, including physicians, nurses, and other healthcare professionals at the maternity, paediatric, surgical, orthopaedic, and medical wards, or students in the Nursing program or the Certificate in Medical Laboratory Technology (CMLT) program at TSHS. The nursing students learn about COPD during the second year, and the present second-year students had learned about COPD before this study. The CMLT students do not study COPD as a specific subject. Written ethical approval was obtained from the hospital director at UMHT and the principal at TSHS.

The questionnaires from the healthcare personnel were collected by one of the authors (MG). Teachers at TSHS collected the questionnaire from the students. The questionnaire was in English; no Nepali translation was available for students and physicians. However, the nurses and other healthcare professionals had a Nepali translation of the questions available when submitting the answers.

The primary outcome was knowledge of COPD, defined as the number of correct answers on the COPD-KQ, with a higher score indicating better knowledge of COPD. Secondary outcomes were the performance on each item on the COPD-KQ, defined as the number and percentage of correct answers on each item in each group, and the difference in total score based on time in profession or time in studies. A comparison was made between healthcare professionals with less than five years of experience and those with five years or more. Also, nursing students with less than two years of studies and two years or more of studies were compared.

Statistical methods

A correct answer at the COPD-KQ scored one, and an incorrect answer or "I don't know" scored zero. The maximum score was 12. Ten points corresponding to 80% correct answers or more were considered satisfactory knowledge. Missing answers were marked as "missing". A minimum of 80% completed questions needed to be included in the analysis. Data was analysed using IBM SPSS Statistics, version 28.0.1.0 (Chicago, USA). Descriptive analyses were conducted, and data was given as mean ± SD, median (IQR) or median (min/max). The One-Sample Kolmogorov-Smirnov Test was used for the normality test, and the Mann-Whitney U test for nonparametric distribution was used to determine the importance of time in profession or studies. For comparisons between groups of healthcare professionals and between groups of students, the Kruskal-Wallis test was used. A p-value of <0.05 was considered statistically significant. The free-form text was coded and categorised for content analysis (13).

RESULTS

The COPD-KQ was distributed to 60 healthcare professionals and 219 students. A total number of 56 healthcare professionals and 208 students responded to the questionnaire. Four of the questionnaires for the healthcare professionals were not submitted, and 11 students were absent at the time of the data collection.

Most participants were female, 66% of the healthcare professionals and 89% of the students. One healthcare professional and four students did not submit their gender. The time in the profession was 8 (2, 17) years. One healthcare professional did not specify their profession and was marked as "other" in the analysis. Demographic details are shown in Table 1. All questionnaires had a minimum of 80% completed items on the COPD-KQ, and all questionnaires were therefore included in the analysis.

Profession	Physicians n=21	Nurses n=29	Other* n=6	CMLT students n=56	Nursing students n=112	Special nursing student n=40
Age, yrs	38±12	35±11	36±13	18±2	18±3	21±2
Sex female	7 (33%)	29 (100%)	1 (16%)	52 (93%)	96 (86%)	38 (95%)
	Time in profession, yrs Median (min/max)			Time in studies, yrs Median (min/max)		
	7 (1/36)	8 (1/33)	12 (1/29)	2 (1/2)	2 (1/3)	3 (3/3)
	≥5 yrs in profession, n (%)			≥2 years in studies, n (%)		
	12 (57%)	20 (69%)	5 (8=3%)	28 (50%)	78 (70%)	40 (100%)

Data are given in mean ± SD, n (%) and median (min/max).

Abbreviations: CMLT – Certificate in Medical Laboratory Technology

* Medical assistant (n=3), Physiotherapist (n=1), Dietician (n=1), Other (n=1)

COPD-KQ performance

All participants' median (IQR) score was 9 (8–10), and the acceptable knowledge level was 47%. For healthcare professionals, the score was 10 (9,11), with an adequate knowledge of 66%. There was a statistically significant difference between physicians' and nurses' knowledge scores, p=0.005. For the students, the corresponding results are 9 (8, 10) and 41%. Nursing and special nursing students showed statistically significantly higher scores than CMLT students, p<0.001, with no statistically significant difference between nursing- and special nursing students. For each group of participants, see Figure 1.

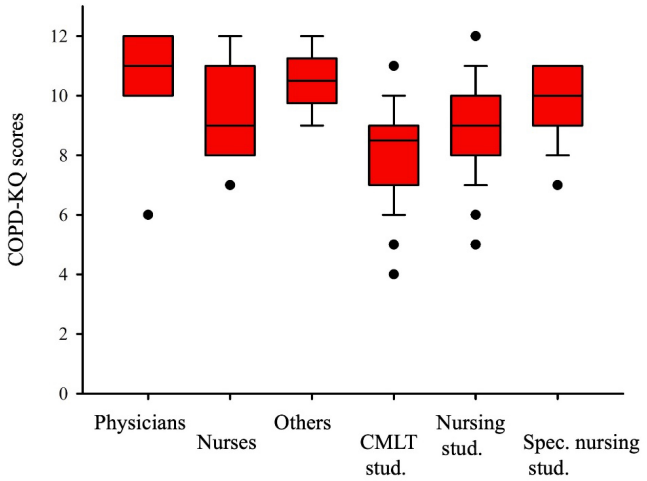

Figure 1. The total COPD-KQ score among the participants divided into the respective professions. The maximum score was 12 points, and 10 points was considered a satisfactory level of knowledge.

COPD-KQ item performance

Five COPD-KQ items fell below the 80% correct response benchmark across all participants, notably COPD's preventability, persistent cough, reversibility, diagnostic confirmation via breathing tests, and pneumonia vaccination. Table 2 presents these results in detail.

Table 2. Correct answers on each item on the COPD-KQ of healthcare professionals and students.

	COPD-KQ item n (%)*	Physicians	Nurses	Other**	CMLT students	Nursing students	Special nursing students
1	COPD is preventable	18 (86%)	18 (62%)	5 (83%)	13 (23%)	98 (88%)	39 (98%)
2	People with COPD often have a cough that won't go away	18 (86%)	20 (69%)	6 (100%)	54 (96%)	77 (69%)	33 (83%)
3	People with COPD may feel short of breath	21 (100%)	29 (100%)	6 (100%)	55 (98%)	111 (99%)	40 (100%)
4	Cigarette smoking is a major cause of COPD	20 (95%)	22 (76%)	6 (100%)	28 (50%)	104 (93%)	36 (90%)
5	Stopping smoking can help to improve symptoms related to COPD	18 (86%)	28 (97%)	6 (100%)	51 (91%)	108 (96%)	39 (98%)
6	Regular exposure to smoke from burning charcoal, wood, or dung can cause COPD	21 (100%)	29 (100%)	6 (100%)	45 (80%)	105 (94%)	40 (100%)
7	COPD can be reversed	13 (62%)	5 (17%)	2 (33%)	16 (27%)	48 (43%)	15 (38%)
8	COPD can spread from person to person	21 (100%)	28 (97%)	6 (100%)	44 (79%)	101 (90%)	36 (90%)
9	COPD can be confirmed by breathing tests	20 (95%)	13 (45%)	2 (33%)	28 (50%)	43 (38%)	17 (43%)
10	People with COPD should get a pneumonia vaccination	16 (76%)	22 (76%)	6 (100%)	32 (57%)	32 (29%)	11 (28%)
11	The medicine albuterol (inhaler), Ventolin, or salbutamol can be used if the patient feels short of breath	21 (100%)	29 (100%)	6 (100%)	46 (82%)	98 (88%)	40 (100%)
12	People with COPD may be more likely to develop chest infections	21 (100%)	28 (97%)	6 (100%)	51 (91%)	108 (96%)	40 (100%)

*Number of participants with correct answers and percentage for each group. **Medical assistant, Physiotherapist, Dietician, Other

Correct answers on each COPD-KQ item among healthcare professionals

Physicians and nurses scored below 80% on items regarding COPD's reversibility and the role of pneumonia vaccination. Nurses also scored below 80% on additional items, including COPD symptoms and diagnosis via breathing tests. The performance on each item among the healthcare professionals is shown in Table 2.

Correct answers on each COPD-KQ item among students

CMLT students scored below 80% on six items, notably COPD prevention, diagnosis, and treatment, while scoring higher on symptoms-related items. Nursing students displayed similar patterns, particularly with diagnosis and treatment items. Special nursing students scored below 80% in the same areas yet scored ideally in others. The students' performance on each item is shown in Table 2.

COPD-KQ performance by time in profession or studies

When comparing healthcare professionals with less than five years in their profession (n=19) with healthcare professionals with five or more years in their profession (n=35), there was no difference in total score, 10 (9, 11) for both groups, p=0.883.

The students with two or more years in studies had a statistically significant higher score than the first-year students, 10 (9, 10) and 8 (6.75, 9), respectively (p<0.001). For the CMLT students, there was a statistically significant increase in knowledge in less than two years compared to two or more years in studies 7 (6, 8) and 9 (9, 10), p<0.001. The corresponding results for nursing students were 8 (7, 9.25) and 10 (9, 10.25), p<0.001. Special nursing students were excluded from this analysis since all special nursing students were third-year students.

Qualitative insights of the free-text responses

Analysis of 39 special nursing students' additional comments yielded insights into three main categories: symptoms and consequences, treatment and diagnosis, and risk factors and prevention. They recognised symptoms like breathlessness and cough and the necessity for interventions like deep breathing exercises and oxygen therapy. Risk factors such as smoking, dust, and seasonal changes were highlighted for their impact on COPD progression. Table 3 provides a breakdown of these qualitative findings.

Table 3. Qualitative content analysis of the free-form text into categories and the frequency of their codes.

Category	Symptoms and consequences	Treatment and diagnosis	Risk factors and prevention
Codes	Chronic bronchitis Emphysema Dyspnoea/shortness of breath Pigeon/barrel chest Chronic cough Clubbing of fingernails Cyanosis Pursed lip breathing Risk of chest infection Jugular vein Raised red blood cells Fatigue Leg oedema Chest pain Asthma	Deep breathing and coughing exercises Oxygen therapy Salbutamol/bronchodilator Semi Fowler's/Fowler's position Steam inhalation Spirometry test Corticosteroids Nutrition	Aggravated by cold season Avoid cigarette smoking Avoid dust Avoid smoke from charcoal Isolation/avoid crowding Avoid allergens Avoid alcohol Avoid excessive exercise Wear mask outside Should drink warm water Influenza vaccination

Symptoms and consequences

According to the students, this category represents the symptoms and consequences following COPD. Signs of dyspnoea and cyanosis were mentioned, along with chronic bronchitis and emphysema as the definition of COPD.

"It's [COPD] symptoms are shortness of breath, chronic cough, cyanosis, clubbed nail, and barrel chest."

"COPD is a group of illnesses, i.e., bronchitis and emphysema."

Treatment and diagnosis

This category represents COPD treatment and diagnosis. Deep breathing, coughing exercises, and oxygen therapy were mentioned frequently.

"Patients with COPD should do regular deep breathing and coughing exercises; it helps to remove secretion from lungs."

"I think we must provide oxygen therapy."

Some students also mentioned spirometry tests for diagnosing COPD.

Risk factors and prevention

This category represents risk factors and prevention of COPD. Cigarette smoking, dust, and burning charcoal are mentioned most frequently as risk factors. Cold weather was mentioned several times as an aggravating factor.

"Patients with COPD should stay away from smoke, dust, and allergens."

"COPD is aggravated by cold season."

DISCUSSION

This mixed-methods study found that healthcare workers at a regional hospital and students at a nearby school of health science in the Palpa district of Nepal had good knowledge of various aspects of COPD, including its symptoms, risk factors, treatment, and its association with increased pneumonia risk. Nonetheless, there were gaps in knowledge regarding COPD's chronicity, the role of spirometry in diagnosis, and the preventative impact of vaccinations against pneumonia in COPD patients.

Despite the awareness that COPD patients have a higher risk of pneumonia, this study revealed a gap in knowledge concerning vaccination recommendations from the GOLD report.[1] This lack of knowledge might stem from the fact that, in Nepal, the high cost of vaccines prevents COPD patients from receiving vaccinations. Interestingly, enhanced education about pneumococcal vaccines for healthcare workers has increased patient vaccination rates in a study conducted in Patan.[14]

Many participants were aware of the benefits of quitting smoking since it is a major risk factor for developing COPD. There also seemed to be a slightly higher awareness of household air pollution as a risk factor for COPD than cigarette smoking. A possible explanation could be that most of the participants in this study were female, and women in Nepal are more exposed to smoke from biomass fuel from cooking, while a higher amount of men smoke cigarettes.[3] This study did not investigate the differences in knowledge between women and men. However, the difference in total score on the items regarding cigarette smoking and household air pollution among the healthcare professionals was most evident among the nurses, where all participants were female, whilst most of the physicians and other healthcare professionals were men, and they did not show a noticeable difference in knowledge between these items. Interestingly, the physicians scored lowest on the item "Stopping smoking can help to improve symptoms related to COPD" among the groups. It is essential for patients who are diagnosed with COPD and still smoke to be properly educated by their physician since smoking has a negative impact on the progression of the disease and increases the mortality rate.[15]

The knowledge of spirometry as a diagnostic method for COPD was lower than 80% in all groups except among physicians. However, some students suggested spirometry tests in the additional information field. Therefore, there is a possibility that the item was misunderstood since the question was about "breathing tests" and did not include "spirometry" as a word. Nevertheless, sufficient knowledge about spirometry should include the fact that it is a breathing test. In addition, another similar questionnaire uses the phrase "breathing test" when referring to spirometry.[16] Because of limited resources, spirometry is generally not used to diagnose COPD in Nepal. This was also the case at the study location, but it has changed since the study was conducted, and spirometry is now available. Moreover, COPD is likely underdiagnosed in the whole of South Asia due to a lack of standardised diagnostic criteria. This makes it challenging to estimate COPD's disease burden and make appropriate decisions regarding prevention and management strategies.[17]

The item with the lowest overall score was item 7, "COPD can be reversed". A reason could be that the questionnaire was not translated into Nepali for most of the participants. However, the nurses with a Nepali translation scored the lowest of all groups on this item. Another explanation could be that the question's meaning was not clear enough. The question aimed to assess the knowledge of COPD as a chronic, incurable, and non-reversible disease. However, adequate and timely treatment may reduce COPD symptoms, which may be how the participants understood the question. This item also had the lowest score, both pre-and post-education, when Robertson et al. developed the COPD-KQ, and they argue that this stresses the need for COPD education tools since a belief that COPD is reversible could lead to a lower motivation for interventions for COPD prevention.[18]

There was a statistically significant higher level of knowledge among the second- and third-year nursing students who had studied COPD compared to the first-year nursing students, which shows that the nursing students improved their knowledge about COPD during their education. Interestingly, CMLT students also increased their knowledge during their education, but without studies about COPD. Among the healthcare professionals, time in the profession did not increase their knowledge of COPD, which may indicate a good level of knowledge in general. Hypothetically, continuing education for healthcare professionals may have increased the scores. Additionally, the free-form text answers showed good knowledge about the symptoms of COPD, the pathophysiological changes in the lungs, and the importance of deep breathing and coughing exercises. The most frequently mentioned aggravating factor was cold weather. Smoking and burning charcoal were not mentioned as often as expected but were included as items in the COPD-KQ, which could be a reason for not mentioning them again in the text answers.

As previously mentioned, one limitation of this study is the absence of a Nepali questionnaire translation for the students and the physicians. This was caused by time constraints when the study was conducted and might have contributed to misinterpretation of the questions. Another limitation is the selection of participants. The study size for the healthcare professionals was 173, and for the students, including all students at TSH, it was 219. However, since the study was performed in a clinical setting, it was only possible to distribute the questionnaire to 60 healthcare professionals

and 208 students present during the study. This data collection method also increases the risk of selection bias since healthcare professionals with a better understanding of, or higher interest in, COPD could have been more likely to respond to the questionnaire. This could explain why the group with other healthcare professionals, the smallest group, scored 100% correct answers on more items than the other groups. All questionnaires met the criteria of 80% or more completed questions, which means no participants were excluded due to missing data. Additionally, a strength of the study was that there was no time to acquire knowledge prior to the study since the participants were not informed about the content of the questionnaire in advance.

To our knowledge, there are no national guidelines for treating COPD in Nepal at present. Following the GOLD report is recommended in Nepal.[19] Both vaccinations and spirometry are essential components of medical care for patients with COPD. It has been shown that educating healthcare personnel is an important step in implementing new strategies.[14] Thus, a beginning could be raising vaccination awareness to prevent pneumonia for COPD patients and the importance of standardised and correct diagnostic criteria, which should be based on spirometry according to the GOLD report.

CONCLUSION

In conclusion, the knowledge about COPD among healthcare professionals and students at a regional hospital in Nepal was good in several important domains. However, the disease burden from COPD is increasing in Nepal, and this study has shown that there are knowledge gaps among healthcare professionals that reflect areas of improvement in the medical care of COPD patients in Nepal. The next step could be to investigate how awareness about vaccinations and diagnostic methods for COPD patients could be raised among healthcare professionals.

Author contributions: M Gungner, O Säll, TB Adhikari, and M Högman designed the study. M Gungner collected data. M Gungner and M Högman performed statistical analysis. All authors made critical revisions to the manuscript, approved the final version, and agreed to be accountable for this work.

Conflict of interest: None

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