Predictors and Drug-Related Problems in Chronic Obstructive Pulmonary Disease Patients at a Primary Hospital in Western Nepal

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Background

- Chronic Obstructive Pulmonary Disease (COPD) is a progressive lung disorder characterized by irreversible airflow, obstruction due to chronic bronchitis and emphysema.[1]
- Globally, COPD affects 5–10% of individuals over 40, and it was the third leading cause of death in 2019.[2]
- COPD management relies on maintenance therapy to ease symptoms, prevent exacerbations, and improve quality of life.
- While incurable, medications help control symptoms and enhance activity.[3]

Background

- A Drug-Related Problem (DRP) is an event or circumstance involving drug therapy that actually or potentially interferes with desired health outcomes.[4]
- Likewise, DRPs affects COPD patients contributing to unnecessary outpatient visits, hospital admissions, and long-term care, increasing patients' financial burdens and straining healthcare resources.[5]
- Since must of the DRPs (up to 88%) are often preventable, if pharmaceutical care services is integrated in drug therapy, overall health outcomes can be optimized. [6-8]

Research Gap

- DRPs are prevalent at all levels of health institutions, affecting patients, families, healthcare providers, and healthcare systems globally.[9]
- However, in Nepal limited studies exist on DRPs in non-communicable diseases, and none focus specifically on COPD. [10,11]

Study Objectives

Our study aims to

- Assess the prevalence of drug-related problems (DRPs)
- Explore associated factors
- To determine average prescription costs of COPD patients, and compare prescription costs between COPD patients with and without DRPs.

at a primary hospital in western Nepal: Dailekh District hospital.

Methodology

- **Study design:** Cross-sectional study
- **Study duration:** May 2024- September 2024
- **Study population:** Admitted COPD Patients
- **Study setting:** Dailekh District hospital
- **Estimated Sample Size:** 156
- **Sampling Technique:** Purposive sampling

Operational Modality

Initial screening of study participants as per the inclusion criteria

Interview of the study participants.

Patient cardex, laboratory investigation, medication history, prescription cost, observation for potential DRPs and DDI

Data collection, entry, and analysis

Methodology

- **Data collection tools**: PCNE V9.1 classification system.
- The two categories of PCNE classification i.e. Cause and Problem were used in the study.

Problems	**Causes**		
P1.Treatmemt effectiveness	C1.Drug selection	C4. Treatment duration	C7. Patient related
P2. Treatment safety	C2. Dosages form	C5. Dispensing	C8. Patient transfer related
P3. Others	C3. Drug selection	C6. Drug use process	C9. Others

Ethical Consideration

- Ethical approval was obtained from Institutional Review Committee (IRC) of Pokhara University Research Centre (Ref no- 76/2080/2081). Data collection was approved from Health Service Office (Dailekh District Hospital) (Ref no- 950/208/81).

- Informed Consent: Verbal & written consent was obtained from each participant.

- Patient and the prescriber confidentiality was maintained throughout the study period.

Study Variables

Dependent Variables	Categories
DRPs	Present =1, Absent=0
Prescription Cost	Measured in Rs
Independent Variables	
Age	Education level
Gender	Occupation
Ethnicity	Family history of COPD
Habit of drinking alcohol	Comorbid condition
Habit of smoking	Number of medications prescribed
Marital status	Severity of COPD
Residence	Drug Interaction

Data Analysis

- Data were entered into MS Excel and analyzed using SPSS version 20.
- Categorical data were summarized using frequencies and percentages, while continuous data were described using mean and standard deviation.
- A Chi-square test, followed by bivariate logistic regression analysis, was employed to identify predictors of DRPs.
- Variables with a p-value less than 0.1 in the Chi-square test were included in the bivariate logistic regression.

Data Analysis….

- To gain deeper insights variables with p-values <0.1 in the Chi-square test, such as age, gender, and comorbidities, were analyzed domain-wise to identify specific predictors, excluding those with cell counts below five.
- The adjusted odds ratio was calculated at a 95% CI, and a p-value less than 0.05 was considered statistically significant.
- An independent t-test assessed prescription cost differences across each problem and cause domains, with p-values <0.05 considered statistically significant.

Results (n=156)

General Characteristics of Participants

- Mean age of the participants was 72.2 (±9.3) years and 54.5% were males.
- 41.7% of the participants were illiterate
- 44.9% of the participants were housewife
- 23.7% of the participants had known history of COPD

Table 1: General Characteristics of Participants

SN	Characteristics	Category	Frequency	Percentage (%)
1	Age	Mean ± S.D. – 72.2 ± 9.3		
		Less than 65 years	29	18.6
		Younger old (65-74)	59	37.8
		Middle old (75-84)	55	35.5
		Older old (>85)	13	8.3
2	Gender	Male	69	44.2
		Female	87	55.8
3	Ethnicity	Dalit	28	17.95
		Janajati	14	8.97
		Bhramin/Chhetri	95	60.90
		Others	19	12.18
4	Residence	Urban	87	55.8
		Rural	69	44.2

SN	Characteristics	Category	Frequency	Percentage (%)
5	Educational Level	Illiterate	65	41.7
		Literate without formal education	68	43.6
		Literate with formal education	23	14.7
6	Occupation	Housewife	70	44.9
		Business	20	12.8
		Retired	19	12.2
		Daily labor	13	8.3
		Others	34	21.8
7	Family history of COPD	Absent	17	10.9
		Present	37	23.7
		Unknown history	103	66

Table 2: Clinical Characteristics of respondents

SN	Characteristics	Category	Frequency	Percentage (%)
1	Comorbidity	Yes	105	67.3
		No	51	32.7
2	Duration of COPD diagnosis	Mean ± SD: 9.0 ± 5.1		
		< 5 years	26	16.7
		5-9 years	56	35.9
		10-14 years	48	30.7
		≥15 years	26	16.7
3	Severity of Disease	Moderate	145	92.9
		Severe	11	7.1

SN	Characteristics	Category	Frequency	Percentage (%)
4	Drug interaction	No Interaction	86	55.1
		Interaction	70	44.9
5	Days of hospitals stay	Mean ± SD: 3.4 ± 0.7		
6	Number of drugs prescribed	Mean ± SD: 9.5 ± 2.2		
7	Total cost of prescribed drug	Mean ± SD: Rs 6543 ± 1423.9		

Figure 1: Prevalence and Distribution of DRPs as per PCNE V9.1 Classification

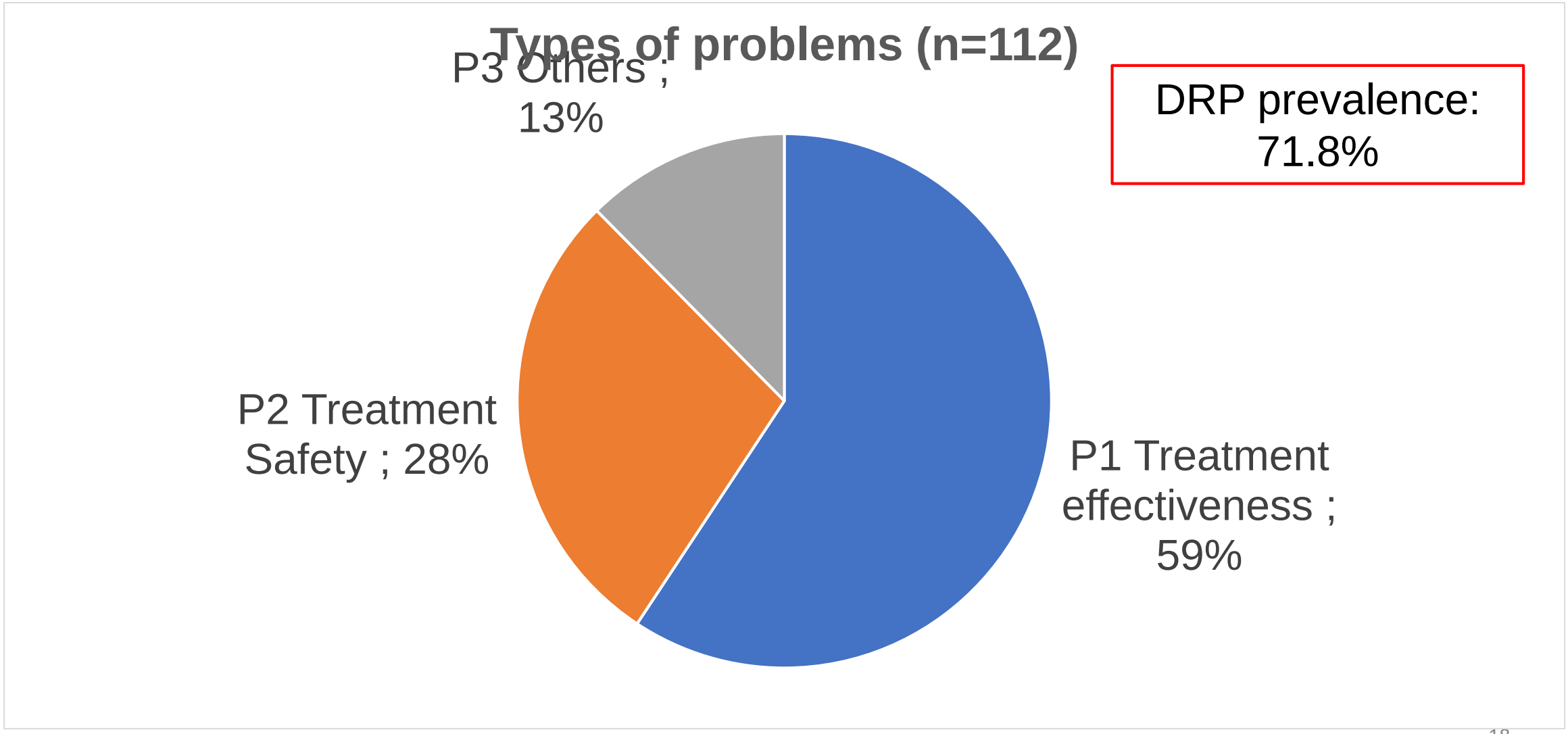

Figure 2: Prevalence and Distribution of DRPs as per PCNE V9.1 Classification

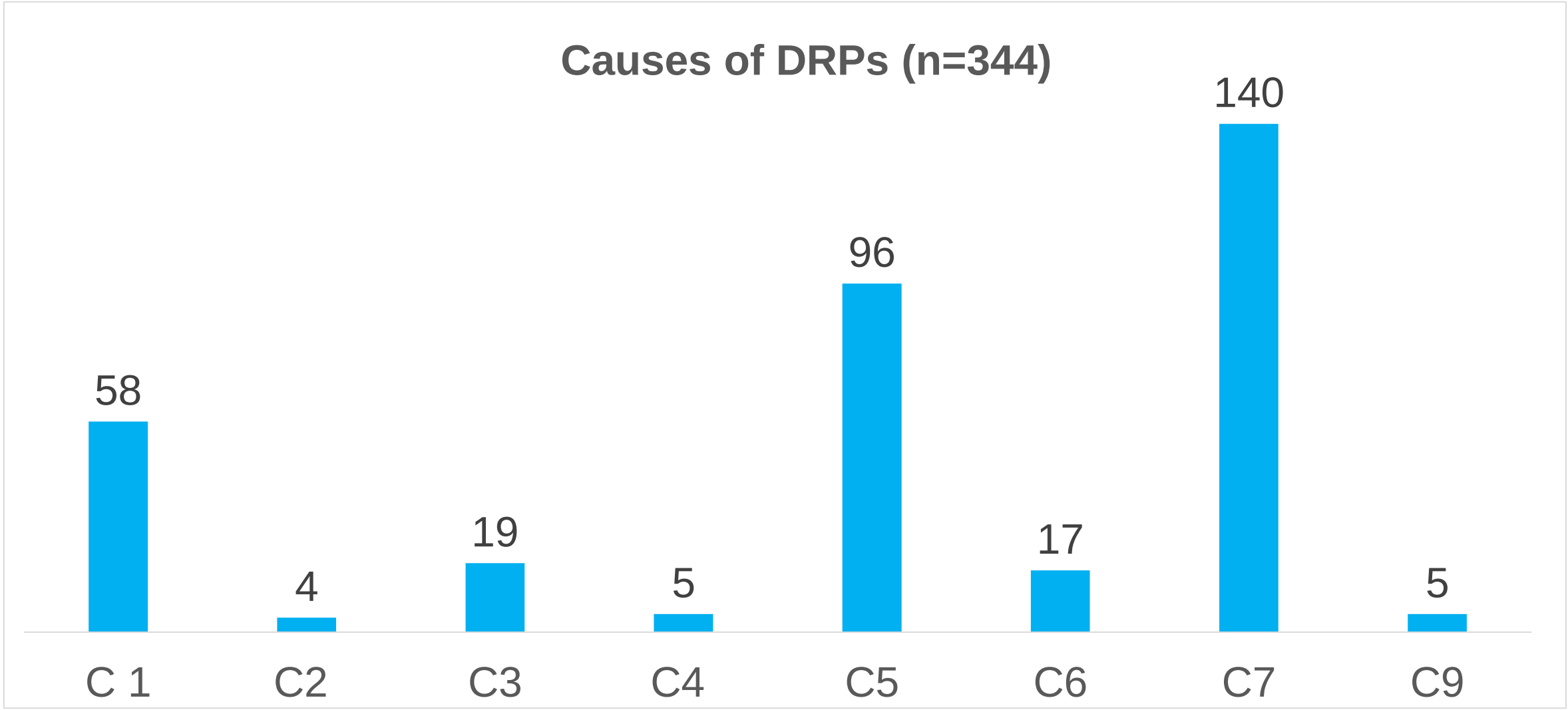

Table 3: Factors Associated with the Presence of Drug-Related Problems (DRPs)

Variable	Category	DRP Present (%)	DRP Absent (%)	P-value
Ethnicity	Dalit/Janajati	37 (88.1)	5 (11.9)	0.01
	Brahmin/ Others	75 (65.8)	39 (34.2)	
Educational Level	Informal/Illiterate	100(75.2)	33(24.8)	0.02
	Formal Education	12(52.2)	11(47.8)	
Comorbidity	Yes	28(54.9)	23(45.1)	0.01
	No	84(80)	21(20)	
Severity of Disease	Moderate	101(69.7)	44(30.3)	0.03
	Severe	11(100)	0(0)	
Drug interaction	No Interaction	43(50)	43(50)	<0.01
	Interaction	69(98.6)	1(1.4)	

Domain wise factors associated with DRPs among COPD patients

- Male (AOR: 2.3, 95% CI: 1.1-4.9) had higher odds of having DRP related to the treatment safety (Domain P2) compared to female.

- Co-morbid (AOR: 2.3 95%CI: 1.1-4.7) patients had higher odds of having DRP related to treatment safety (Domain P2) and (AOR: 3.9 95% CI: 1.1-14.0) DRP related to domain others (P3).

Table 4: Domain Wise Factors Associated with DRPs among COPD Patients(Problems)

Variable	Category	Adjusted Odds Ratio (95% CI)			
		At least a problem	**Problem 1**	**Problem 2**	**Problem 3**
Age	< 65 years	0.6 (0.2-1.5)	0.7 (0.3-1.6)	0.8 (0.3-1.9)	N/A
	65 and above				Ref
Gender	Male	**3.0 (1.2-7.4)**	1.7 (0.8-3.6)	**2.3 (1.1-4.9)**	0.9 (0.4-2.1)
	Female				Ref
Ethnicity	Dalit/Janajati	**3.3 (1.1-9.8)**	1.4 (0.6-3.2)	1.7 (0.8-3.7)	1.3 (0.5-3.3)
	Brahmin/Others				Ref
Educational Level	Informal/Illiterate	2.8 (0.9-8.7)	1.9 (0.7-5.2)	1.6 (0.5-4.9)	N/A
	Formal Education				Ref
Comorbidity	Yes	**2.7 (1.2-5.9)**	**2.3 (1.1-4,7)**	**3.9 (1.7-8.8)**	**3.9 (1.1-14.0)**
	No				Ref

Table 5: Domain Wise Factors Associated with DRPs among COPD Patients(Causes)

Variable	Category	Adjusted odds ratio (95% CI)					
		At least a cause	**Cause 1**	**Cause 3**	**Cause 5**	**Cause 6**	**Cause 7**
Age	Less than 65 years	0.6 (0.2-1.5)	1.5 (0.6-3.6)	N/A	0.6 (0.2-1.4)	N/A	0.5 (0.2-1.2)
	65 and above	Ref					
Gender	Male	**3.0 (1.2-7.4)**	0.8 (0.4-1.7)	0.6 (0.2-1.8)	**2.2 (1.0-4.4)**	1.1 (0.4-3.1)	1.4 (0.7-2.8)
	Female	Ref					
Ethnicity	Dalit/Janajati	**3.3 (1.1-9.8)**	1.3(0.6-2.9)	1.9 (0.7-5.4)	**2.7 (1.2-6.0)**	1.1 (0.4-3.1)	1.3 (0.6-2.8)
	Brahmin/ Others	Ref					

Variable	Category	Adjusted odds ratio (95% CI)					
		At least a cause	**Cause 1**	**Cause 3**	**Cause 5**	**Cause 6**	**Cause 7**
Educational Level	Informal/Illiterate	2.8 (0.9-8.7)	1.2(0.3-3.8)	N/A	1.3 (0.5-3.7)	N/A	2.2 (0.8-6.3)
	Formal Education	Ref					
Comorbidity	Yes	**2.7 (1.2-5.9)**	1.4 (0.7-3.2)	0.7 (0.3-2.0)	**2.5 (1.2-5.3)**	1.2 (0.4-3.5)	**2.0 (1.0-4.1)**
	No	Ref					

Total cost of prescribed drugs

- In an average a patient invested a total of Rs 6543 (±1424).
- Among the patients who faced DRP related to Dispensing (C5), the cost increased in an average by Rs. 525.2 (95% CI: 81.0-969.5, p-value: 0.02)

Conclusion

- The study reveals a high prevalence of DRPs among COPD patients, with nearly three-quarters experiencing DRPs.
- Factors such as ethnicity, education, comorbidities, and disease severity were associated with the causes of DRPs.
- This emphasizes the importance of targeted interventions to reduce DRPs among high-risk groups.

Conclusion

- Evidence-based prescribing, following guidelines like GOLD and Beers criteria, is essential to minimize DRPs.
- Ensuring COPD medication availability and training pharmacists on COPD treatments can improve medication dispensing which could ultimately reduce the medication cost among COPD patients.
- Concludingly, this study highlights the importance of clinical pharmacists in structured counseling, personalized education, medication reconciliation, and patient monitoring.

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Breathe Easier, Live Better: Optimizing Medication for COPD

Thank you

Brief Bio

Lok Raj Pant B. Pharm(TU), M. Pharm Clinical Pharmacy (PoU)

Lok Raj Pant is a registered pharmacist with over five years of experience in the field of pharmacy. He has worked as a pharmacist in various government hospitals and has teaching experience at the diploma level. As a rising researcher, his interests include logistics management, pharmacovigilance, antimicrobial resistance, and evidence-based medicine. He has also published several research articles in prestigious journal.