"PHYSICIANS' PERCEPTION ON EFFICACY AND UTILITY OF MUCOLYTIC AGENTS IN THE MANAGEMENT OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND RELATED CONDITIONS"

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Mucolytic Agent: Erdosteine Launch

Chronic Obstructive Pulmonary Disease (COPD)

- Chronic obstructive pulmonary disease (COPD) is a common lung disease causing restricted airflow and breathing problems. It is sometimes called emphysema or chronic bronchitis.
- In people with COPD, the lungs can get damaged or clogged with phlegm. Symptoms include cough, sometimes with phlegm, difficulty breathing, wheezing, and tiredness.
- Smoking and air pollution are the most common causes of COPD. People with COPD are at higher risk of other health problems.
- COPD is not curable, but symptoms can improve if one avoids smoking and exposure to air pollution and gets vaccines to prevent infections. It can also be treated with medicines, oxygen, and pulmonary rehabilitation.

Chronic Obstructive Pulmonary Disease (COPD)

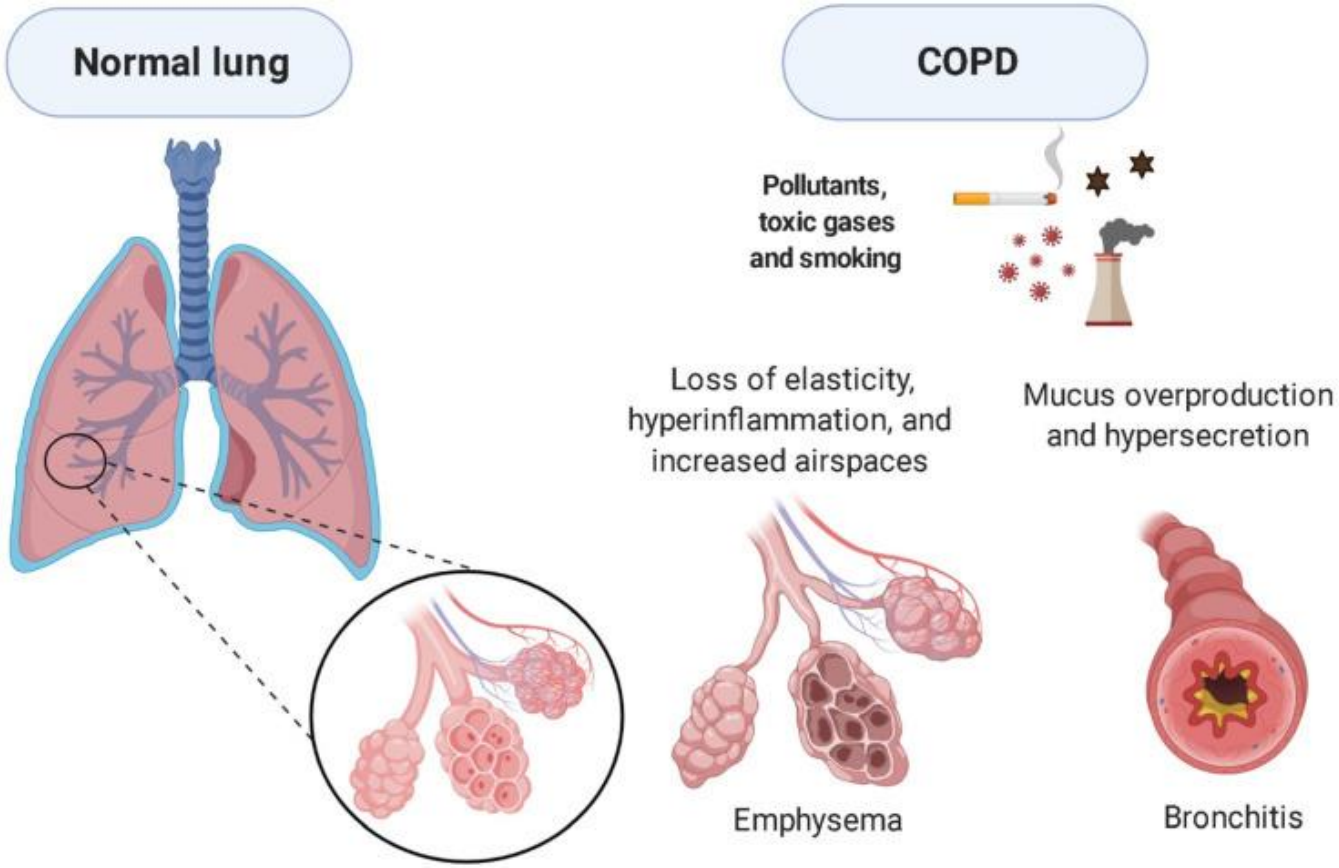

Figure: Normal Lung vs COPD

Mucolytics

Mucolytics are drugs used to manage mucus hypersecretion and its sequelae like recurrent infections in patients of COPD, cystic fibrosis, and bronchiectasis. They belong to a group of agents called mucoactive agents.

There are 2 types of mucolytics:

1. Classic mucolytics: These are the more common form found in both over-the-counter (OTC) and prescription medications. They contain active agents like carbocysteine, erdosteine, and N-acetylcysteine.

2. Peptide mucolytics: These are used for more serious conditions like cystic fibrosis in which the mucus is thicker and often contains pus. Example: Dornase Alfa, and Thymosin β4.

Review of Literature

Cazzola M et al. (2010), In individuals with CB/COPD, erdosteine treatment is linked to a considerable improvement in symptom relief compared to placebo and mucolytics. This review supports the use of erdosteine in conjunction with standard therapy for respiratory disorders characterised by increased expectoration, such as acute CB/COPD exacerbations, despite certain limitations (such as incompletely validated ratings).

Calverley PM et al. (2019) erdosteine to regular COPD maintenance medicine may reduce the frequency of mild exacerbations and the duration of all exacerbations in individuals with moderate COPD and a history of exacerbations.

Review of Literature

- **Dal Negro RW et al. (2015)** Results show that erdosteine is a valuable component of the therapeutic approach for oxidative stress-induced inflammation prevention and therapy, which is often the first step toward the beginning of AECOPD. They also support the time- and dose-dependent actions of the antioxidant.

- **Crisafulli E et al. (2007),** This pilot study found that administering PO erdosteine 225 mg twice in addition to conventional chest physical therapy to these elderly patients with bronchiectasis and chronic mucus hyper-secretion had some positive physiological and clinical effects.

Methodology

1. Research Type

Exploratory and Descriptive research design

2. Sample Selection

2.1 Target Population

Chest Physicians and Consultant Physicians

2.2 Inclusion Criteria

Top KOLs & KBLs in respiratory medicine.

2.3 Sampling Method

Stratified and Cluster Sampling Method

2.4 Sample Size

217 Chest Physicians and Consultant Physicians

Methodology

3. Data Collection

3.1 Survey Instrument

Data was collected using a structured questionnaire developed specifically for this study.

3.2 Pilot testing

Done with 10 physicians to ensure clarity, relevance, and comprehensiveness.

3.3 Data Collection Procedure

The survey was done by personally meeting the doctors and getting the survey forms filled out by them.

Methodology

4. Data Analysis

- Descriptive statistics was used to analyse and summarise the data.
- Microsoft Excel was used to summarise the data.
- Pivot tables were used to analyse the data.
- Graphs, including bar charts and column charts, were used to visualise the data.

Results: Market Analysis

Table 4.1: NAC Market Category: Solid, Liquid, and Injection

		TOTAL	SOLIDS	INJECTIONS	LIQUIDS
VALUE (IN CRS)		212.0	177.0	35.0	0.1
UNITS ('000)		153,89	85,31	68,47	11
GROWTH%	VAL GR%	29%	30%	23%	528%
	UNIT GR%	21%	20%	22%	522%
CAGR% (5 Yrs)	VAL CAGR%	20%	20%	19%	104%
	UNIT CAGR%	14%	11%	17%	102%
NO. OF BRANDS			44	11	2
TOP BRANDS			Mucinac (Cipla) | 74% MS Mucomix (Samarth) | 5% MS Viscojoy (JB Pharma) | 4% MS	Mucomix (Samarth) | 54% MS Mucyst (Neo Pharma) | 19% MS Mucinac (Cipla) | 18% MS	Mucomix (Samarth) | 54% MS Nacfil (Fourrts) | 0% MS

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Data Source: IQVIA TSA sales audit for the period of MAT-Dec'23

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Results: Market Analysis

Table 4.2: Mucolytics market overview: Top brands and market value with growth

BRANDS	PRODUCT LAUNCH	COMPANY	VALUE (MAT-Dec'23)				UNITS (MAT-Dec'23)			
			IN CRS	GR%	CAGR%	MS%	IN '000	GR%	CAGR%	MS%
ALL INDIA			**177.0**	**30%**	**20%**	**100%**	**8531**	**20%**	**11%**	**100%**
MUCINAC	2005/4	CIPLA	130.6	35%	24%	74%	5835	23%	13%	68%
MUCOMIX	2005/1	SAMARTH PHARMA	8.6	38%	19%	5%	596	35%	15%	7%
VISCOJOY	2021/2	JB PHARMA*	6.6	68%	---	4%	363	59%	---	4%
LUMENAC	2009/4	LUPIN LIMITED	6.6	-2%	9%	4%	303	-6%	1%	4%
QUICNAC	2021/12	ALKEM*	5.4	103%	---	3%	330	94%	---	4%
MUCOTAB ET	2014/4	ZYDUS CADILA*	3.8	45%	19%	2%	174	34%	10%	2%
NACFIL	2004/4	FOURRTS INDIA	2.1	1%	-3%	1%	159	-4%	-7%	2%
FLUIMUCIL	2014/9	MODI MUNDIPHARMA	1.9	-21%	24%	1%	87	-28%	11%	1%
MUCOTAB	2010/10	ZYDUS CADILA*	1.1	7%	-4%	1%	45	-5%	-11%	1%
MUCARYL	2016/7	GLENMARK PHARMA	1.1	-7%	-18%	1%	57	-14%	-22%	1%

Data Source: IQVIA TSA sales audit for the period of MAT-Dec'23

Results: Market Analysis

Table 4.3: Market: Demography wise

	CVM		MUCINAC				
	VAL (In Crs)	GR%	VAL (In Crs)	GR%	EI	MS%	Δ MS%
ALL INDIA	**176.9**	**30%**	**130.6**	35%	**104**	**74%**	**3%**
WEST BANGAL	22.9	48%	17.2	56%	105	75%	4%
UTTAR PRADESH	18.1	24%	13.5	24%	99	75%	0%
DELHI	10.8	58%	9.4	69%	107	87%	6%
RAJASTHAN	7.1	17%	4.9	23%	105	69%	3%
ASSAM	6.2	25%	4.5	35%	108	72%	5%
ORISSA	4.7	39%	3.8	51%	109	81%	7%
PUNJAB	4.6	15%	3.4	15%	100	74%	0%
HARYANA	4.2	9%	3.0	18%	109	71%	6%
BIHAR	3.3	13%	2.4	27%	113	70%	8%
MADHYA PRADESH	3.1	6%	1.9	15%	108	62%	4%
UTTARAKHAND	2.8	36%	1.8	31%	96	66%	-3%
JAMMU & KASHMIR	2.0	22%	1.2	20%	99	58%	-1%
HIMACHAL PRADESH	1.0	7%	0.8	5%	99	77%	-1%
CHATTISGARH	0.8	-7%	0.4	-15%	92	50%	-5%

Data Source: IQVIA TSA sales audit for the period of MAT-Dec'23

Results: Market Analysis

Table 4.4: Target customer and prescription contribution

N-Acetyl Cysteine (NAC)						
	MAT			Rxn Contri.		
	MAT Dec'22	MAT Dec'23	Gr%	MAT Dec'23	MAT Dec'23	Δ Contri.
SPR	**4354**	**5240**	**20%**	**100%**	**100%**	**---**
G P	894	1293	45%	21%	25%	4%
E N T	787	1040	32%	18%	20%	2%
CONS PHY	638	761	19%	15%	15%	0%
CHEST	718	656	-9%	16%	13%	-4%
DIABETO	177	281	59%	4%	5%	1%
CARDIO	186	238	28%	4%	5%	0%

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Data Source: IQVIA TSA sales audit for the period of MAT-Dec'23

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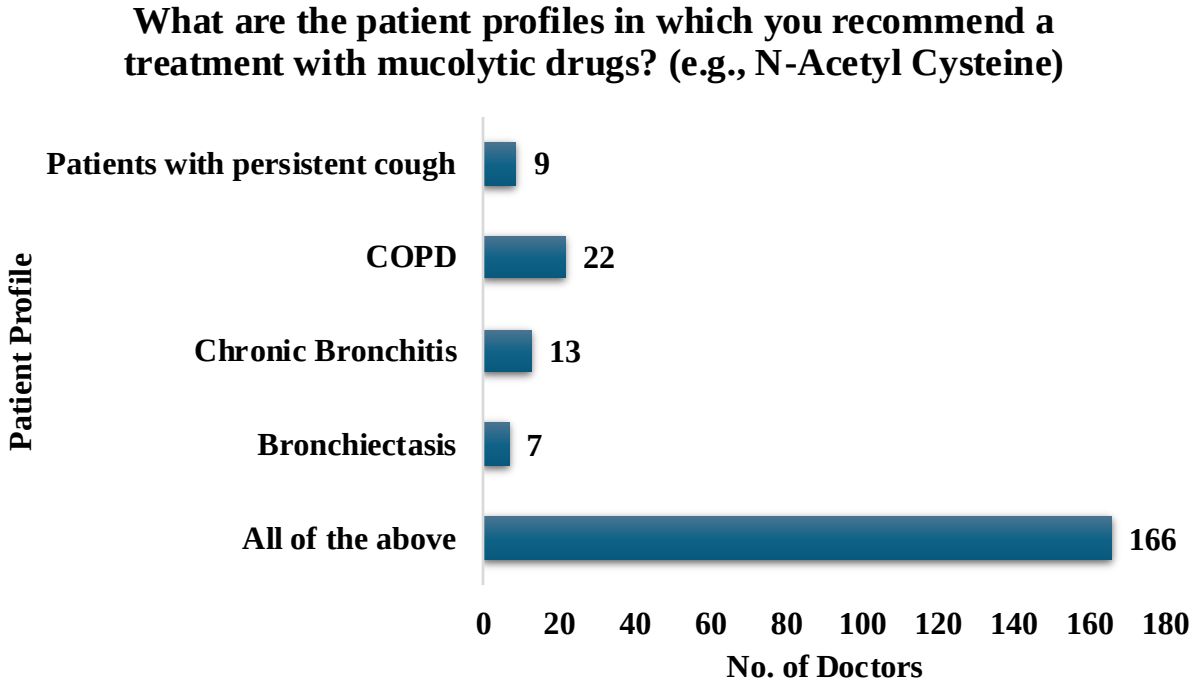
Results: Survey Analysis

Interpretation:

This graph shows that 77% of the doctors recommend treatment with mucolytic agents in all patient profiles (i.e. Patients with persistent cough, COPD patients, Chronic Bronchitis, and Bronchiectasis). So, we can say that mucolytic drugs are used in various respiratory diseases.



Use of mucolytics in different types of patient profiles

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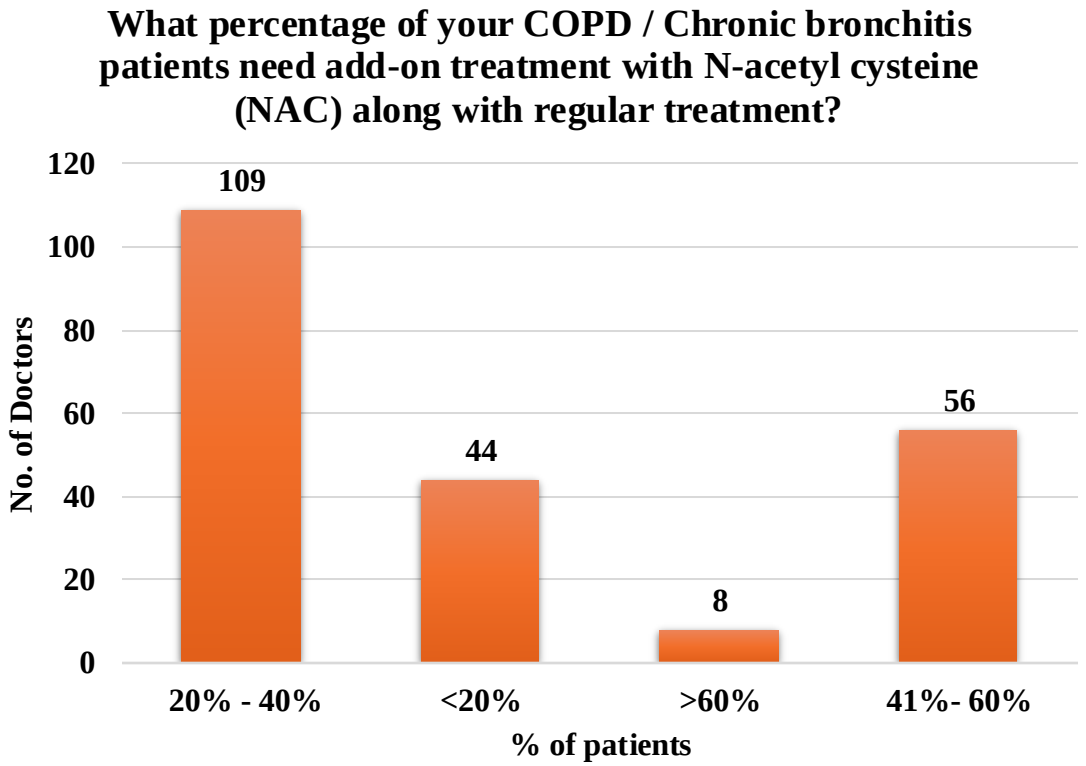
Results: Survey Analysis

Interpretation:

We can see that maximum doctors have a 20-60 % inflow of patients who require add-on treatment with N-Acetyl cysteine. So, we can undoubtedly see that mucolytics are in high demand.



% of patients who need add-on treatment with NAC

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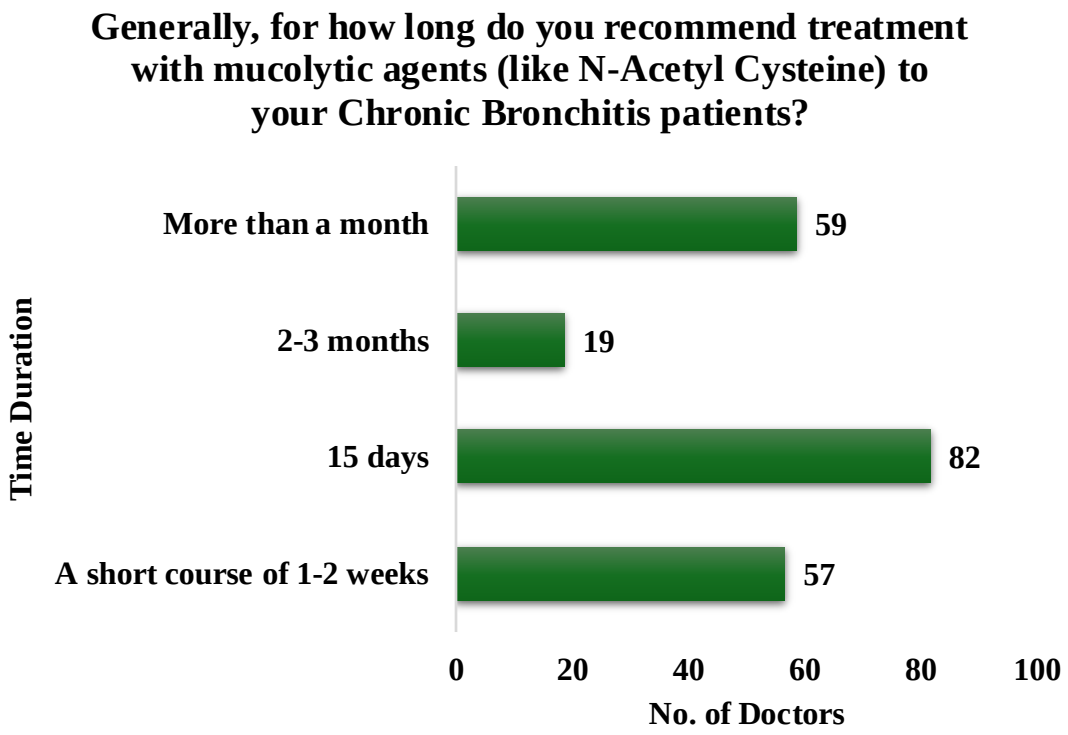
Results: Survey Analysis

Interpretation:

We can see that most doctors recommend treatment with mucolytic agents for a minimum of 1-2 weeks and even for a month. So, if we calculate the total units required for one patient, it will be only on the higher side.



Recommended time for treatment with mucolytic agents

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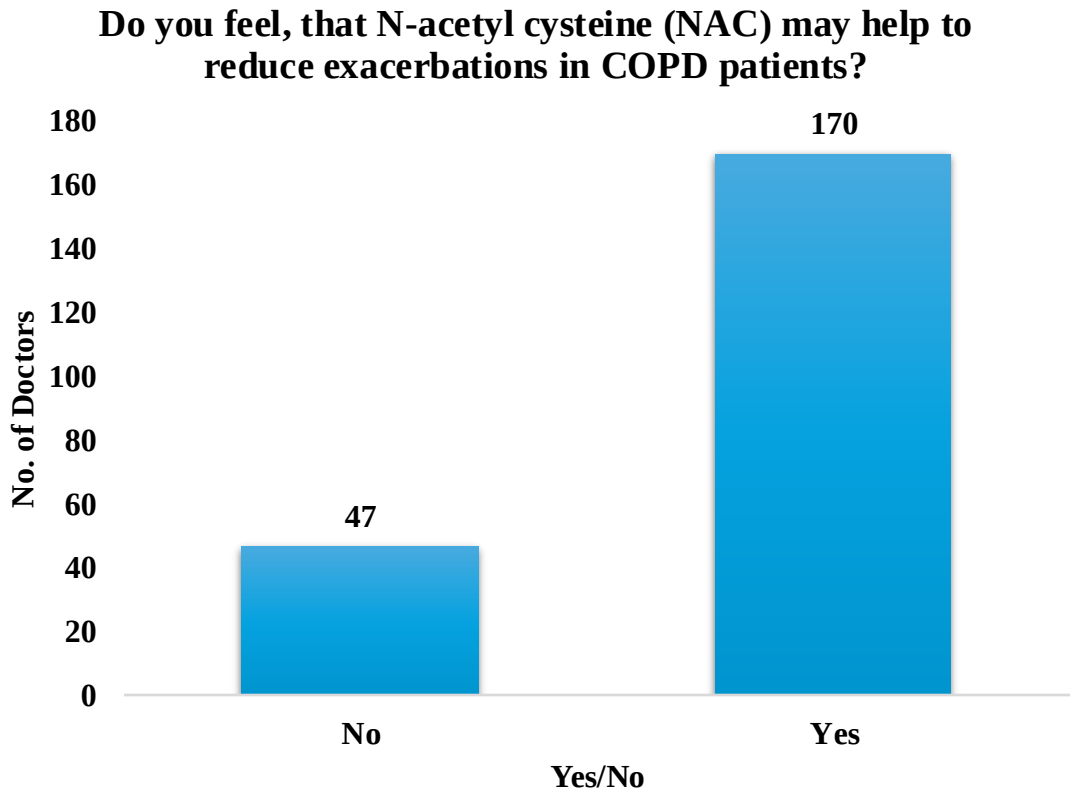
Results: Survey Analysis

Interpretation:

We can see that 78% of doctors say that NAC helps reduce COPD exacerbations. So, we see mucolytics also have another use apart from just showing the main mucolytic effect, i.e., to manage mucus hypersecretion. However, 22% of the doctors still do not agree with reducing exacerbations, so we can work on this.



NAC helps to reduce exacerbations or not

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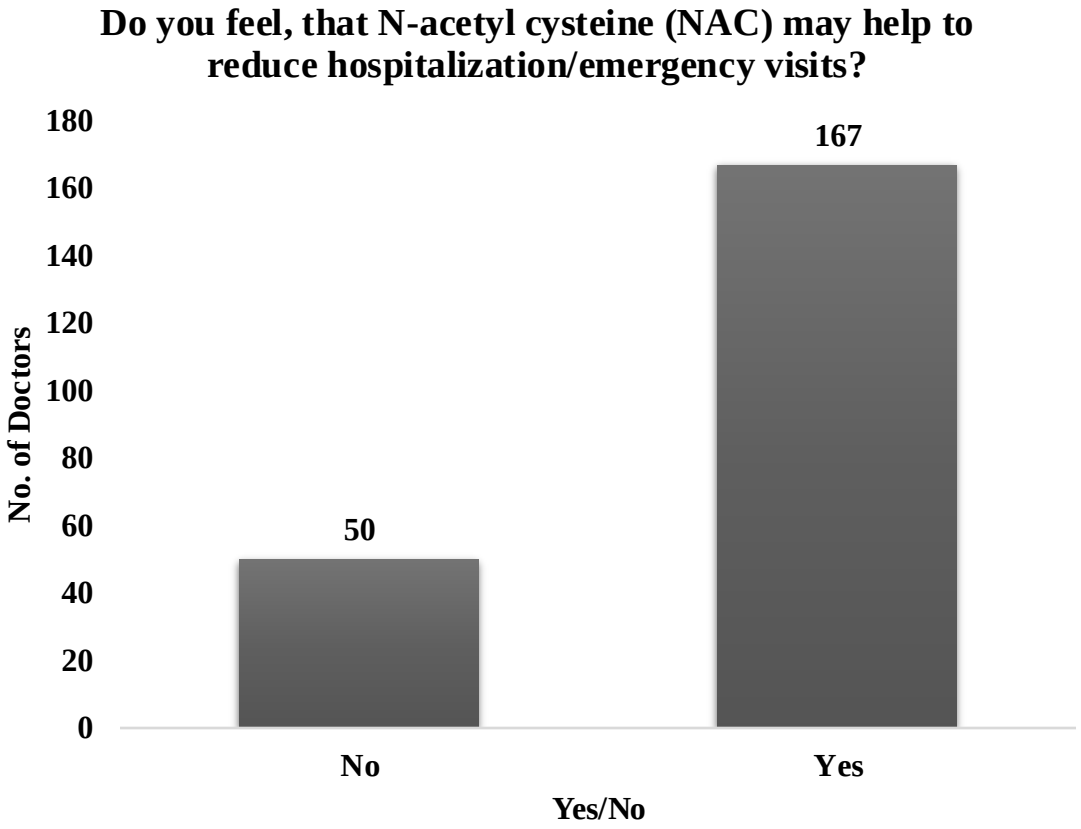
Results: Survey Analysis

Interpretation:

We can see that 77% of the doctors say that NAC helps to reduce hospitalisation/ emergency visits. So, it's an added advantage of mucolytic agents.



NAC helps to reduce hospitalisation or not

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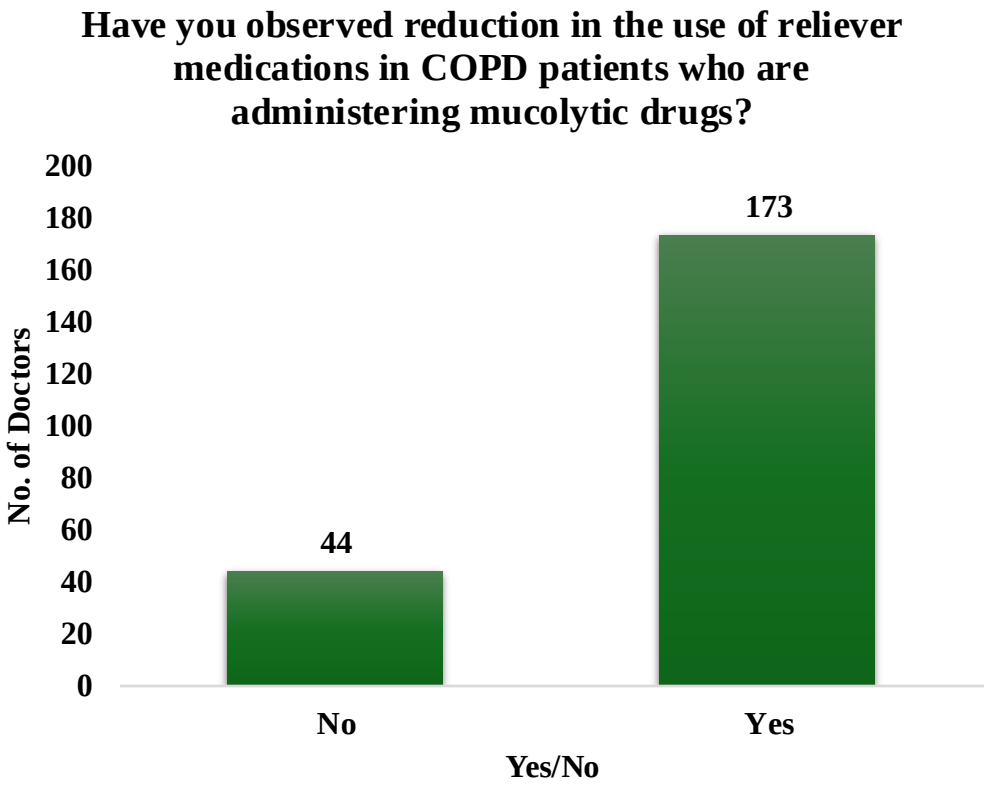
Results: Survey Analysis

Interpretation:

We can see that 80 % of the doctors believe there is a reduction in the reliever medications in COPD patients who are administering mucolytic drugs. So, we can say that it can help reduce the overall cost of the treatment, and the patient has to take fewer medications.



There is a reduction in the use of reliever medications o

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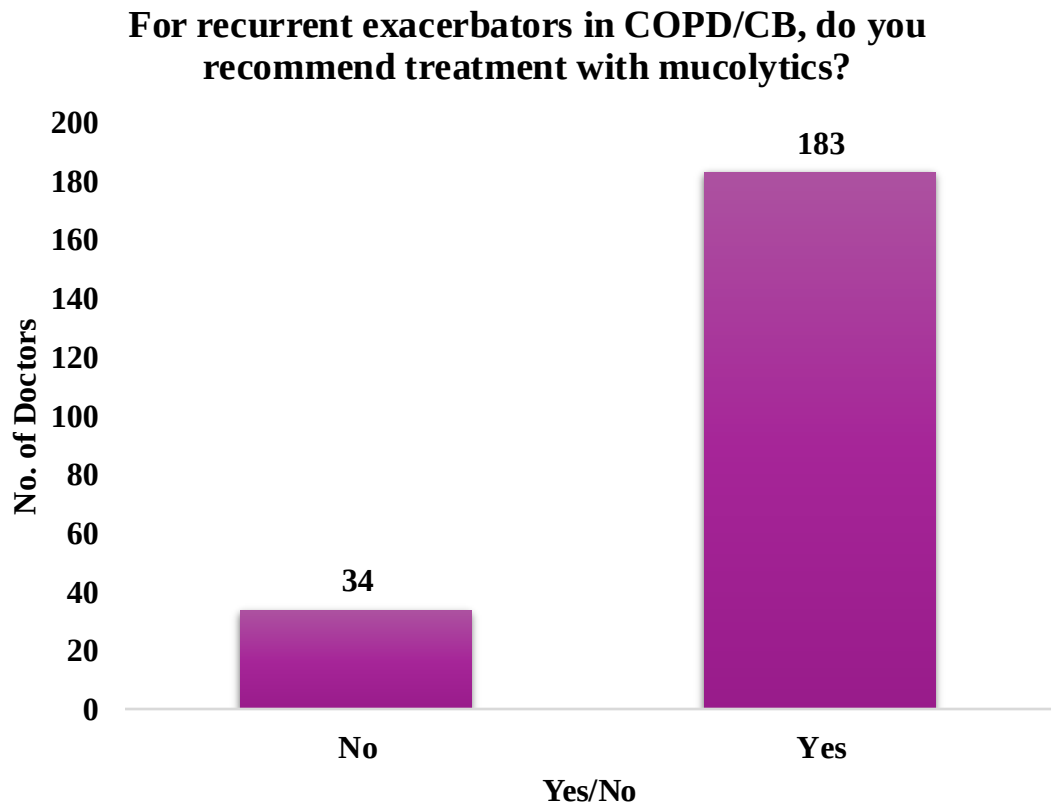
Results: Survey Analysis

Interpretation:

We can see that 84% of the doctors recommend treatment with mucolytics for recurrent exacerbators in COPD/CB. So, we can say that mucolytics also help treat recurrent exacerbations.



Mucolytics are recommended for recurrent exacerbators

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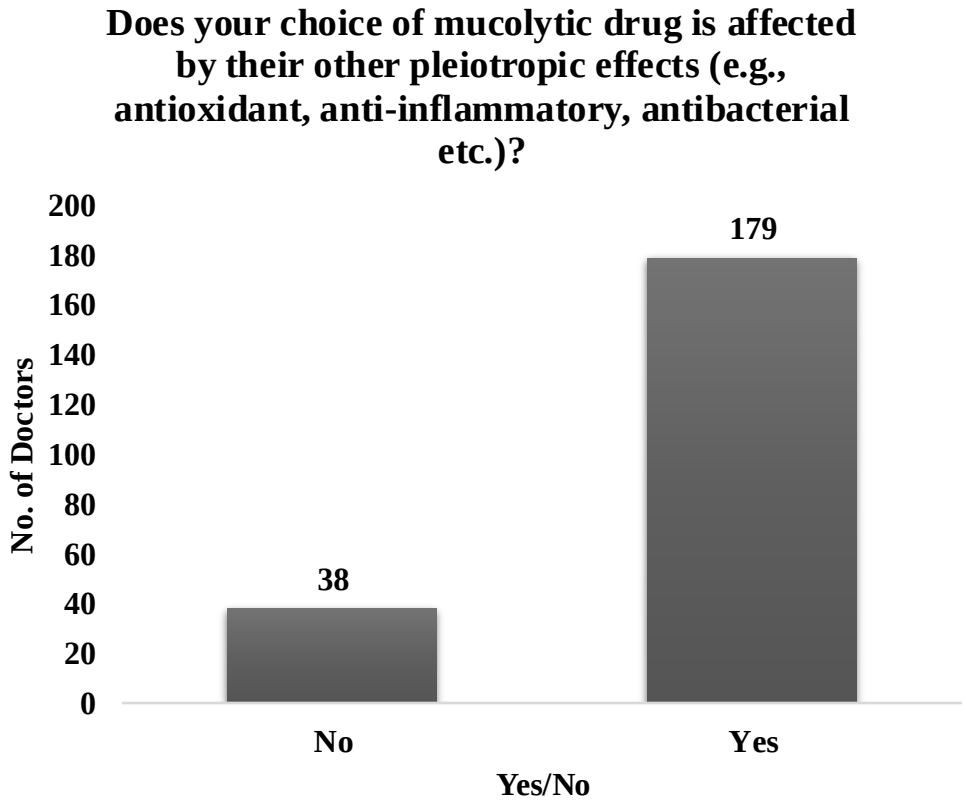
Results: Survey Analysis

Interpretation:

We can see that 82% of the doctors say that the choice of mucolytic drugs is affected by their other pleiotropic effects (e.g., antioxidant, anti-inflammatory, antibacterial, etc.). Here, we can talk about the difference between the two different mucolytics, i.e. NAC and Erdosteine, because Erdosteine is superior in this case.



Effect of pleiotropic effects on choice of mucolytics

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Recommendations

- **Regular Monitoring:** Implement regular follow-up appointments to monitor patient response to mucolytic therapy and adjust treatment plans as necessary.
- **Continuous Medical Education/Round Table Meet (CME/RTM):** Conducting the departmental meeting to create awareness about the molecule and discuss its efficacy and superiority.
- **Patient Awareness:** Sharing leaflets and prescriptions to the patients about precautions they should take during disease episodes.
- **Comparative Studies:** Conduct comparative effectiveness research to evaluate the benefits of mucolytic agents relative to other COPD treatments, such as bronchodilators and corticosteroids.

Strategies

- **Workshops and Seminars:** Organize workshops and seminars to discuss the latest research on mucolytic agents and share best practices among healthcare providers.
- **Online Platforms:** Utilize online platforms and forums to facilitate discussions and knowledge exchange among physicians regarding using mucolytic agents in COPD management.
- **Patient Support Groups:** Establish support groups for COPD patients where they can share experiences, receive encouragement, and learn about managing their condition effectively.
- **Research Networks:** Create networks of researchers and healthcare institutions to collaborate on studies investigating the efficacy and safety of mucolytic agents.

Conclusion

As a result, mucolytic drugs are generally thought to be effective and useful in the treatment of chronic obstructive pulmonary disease and associated disorders by physicians since they offer numerous advantages beyond simply decreasing mucus hypersecretion.

We can take the example of the most recently launched mucolytic agent: Erdosteine.

- Having antioxidant, anti-inflammatory, and antibacterial properties, ergotoxine is a potent mucolytic.
- When taken together, erdosteine and antibiotics have a synergistic effect.
- Several clinical trials' safety profiles indicate that erdosteine is more tolerable than NAC.
- After a 4-day treatment, erythropoietin significantly reduces the levels of cytokines and ROS.
- By day seven of treatment, there was a noticeable drop in the lipid peroxidation product 8-isoprostane.

Conclusion

Erdosteine has also been proven to be effective in:

- Lowering the likelihood of COPD acute exacerbations;
- Delaying the onset of a COPD exacerbation; and Shortening the AECOPD duration
- Reducing the chance of hospitalization because of AECOPD
- Increasing the cumulative global efficacy index (GCI), which is the total of all respiratory symptom scores that have been evaluated, including dyspnea, catarrh Ronchi at auscultation, viscosity, and purulence in the sputum.
- Reducing expectoration difficulty and improving the symptoms on the BSC (breathlessness-sputum-cough) scale


Thank you!