ORIGINAL ARTICLE

Assessment of Knowledge, Attitude, and Practices among respiratory patients on inhalation therapy in a tertiary care hospital

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ABSTRACT

Background: Obstructive airway disease (OAD) causes significant morbidity and healthcare expenses. Smoking cessation, drug therapy, and pulmonary rehabilitation reduce morbidity and improve outcomes. However, each strategy requires knowledge, positivity, adherence, compliance, and technique to improve OAD clinical outcomes. **Aim and objective**: To assess the knowledge and attitude of OAD patients and to evaluate their medication adherence in a tertiary care hospital. **Methodology**: A north Indian tertiary care hospital conducted this six-month prospective, observational, questionnaire-based investigation. Subjects were asked questions on their disease knowledge, attitude, and drug adherence. **Results**: 152 patients were analyzed for this study. Here, 80 (51.9%) patients were male and 74(48.1%) were female. Among the subjects, 46.9% (n=72, p=0.0001) have adequate knowledge about their treatment and ailment. Out of the total patients, 71.2% (n=110, p=0.007) have an optimistic attitude towards their treatment, while 42.5% (n=65) of patients adhere to their therapy. **Conclusion**: OAD patients have low drug adherence. Simplified treatment regimens, self-management education, and provider abilities in patient education, communication, and adherence counseling can solve shortcomings.

KEYWORDS

Obstructive Airway Disease; Adherence; Compliance; Technique; Knowledge; Attitude

INTRODUCTION

OAD is a significant public health challenge that leads to increased morbidity and healthcare costs. OAD-related health issues are predicted to rise in the next decade, but effective management strategies can help alleviate this burden. Success depends on the patient's knowledge, positive attitudes, and adherence to proper techniques (1,2,3).

Pressurized metered-dose inhalers (pMDIs) came in 1950, followed by dry powder inhalers (DPIs) in 1970. In 1987, CFCs were phased out from pMDIs due to the Montreal Protocol. Spacers and valved holding chambers were introduced in 1970, with soft mist inhalers appearing in the early 21st century (4,5,6,7,8,9).

Inhalation therapy is the primary treatment for OAD. By directly targeting the lung, it provides quicker action, better safety, and fewer side effects than oral medications especially in asthma management, where corticosteroids are used. Inhaler therapy is advisable for all age groups (10, 11, 12, 13).

Various inhaler devices are designed for specific patient groups to ensure effective drug delivery (14). The Global Initiative for Asthma (GINA) and

the Global Initiative for COPD (GOLD) offer strong guidelines for OAD.

Aim: Assessing the knowledge and attitudes of patients with OAD.

Objective: Evaluating medication adherence among patients.

MATERIAL & METHODS

Study design, study type, and study settings: A prospective, observational, questionnaire-based study in respiratory medicine was conducted over six months in collaboration with the pharmacology division in tertiary care hospitals in North India.

Study population: Following the inclusion and exclusion criteria, 152 cases of OAD coming to the OPD of respiratory medicine were randomly included in the study. The institution's ethical committee approved the study protocol, and the study was conducted according to that protocol.

Study duration: Six months.

Sample size calculation: The sample size was calculated from this formula-

$N = Z^2 \times p \times (1-p)/d^2$

Here:

N: Required sample size

Z: Z-score corresponding to the desired confidence level (Z=1.96 for 95% confidence)

p: Estimated proportion (0.5 is used for maximum variability)

d: Desired margin of error (0.08, provides reasonable accuracy and balance between feasibility and validity).

= 3.8416 X 0.5 X (1-0.5)/ 0.08

= 0.9604/0.0064

=150.06

=151

Inclusion criteria:

1. Patients suffering from OAD confirmed with spirometry reports.
2. Patients giving informed consent.

Exclusion criteria:

1. Patients suffering from any life-threatening co-morbidity that may interfere with the inhaler therapy.
2. Patients not giving informed consent for the study.

Strategy for data collection: All the study participants were interviewed face-to-face. The study population was asked questions to evaluate their knowledge, attitude, and medication adherence toward their disease and treatment. We assessed patients' compliance with the correct use of inhaler devices. Basic preliminary understanding, attitude, and practice toward inhaler devices were evaluated to assess medication adherence among OAD patients in a tertiary care hospital.

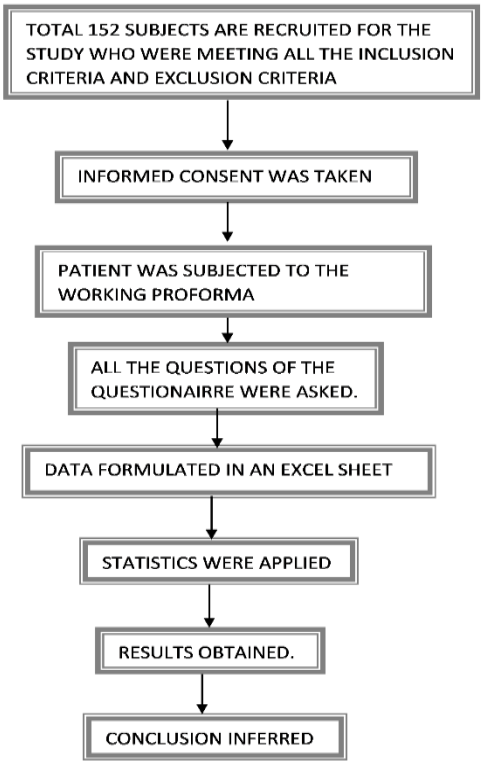
Working definition: Chronic Obstructive Pulmonary Disease (COPD): -It is a heterogeneous lung condition characterized by chronic respiratory symptoms (dyspnea, cough, sputum production, and/or exacerbations) due to abnormalities of the airways (bronchitis, bronchiolitis) and/or alveoli (emphysema) that cause persistent, often progressive, airflow obstruction.

Asthma: - Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms, such as wheeze, shortness of breath, chest tightness, and cough, that vary over time and in intensity, together with variable expiratory airflow limitation

Ethical issues & informed consent: The study was approved by our university's Institutional Ethical Committee. Each participant provided proper written informed consent, which was also elaborated upon verbally.

Data analysis - software: Statistical analysis was carried out with SPSS version 21. The mean, median, and mode were calculated and assessed among different parameters. A $\chi 2$ test was used to compare the differences between categorical patient characteristics. P values < 0.05 were considered significant. Logistic regression was used to get the adjusted odds after accounting for all covariates, regardless of their statistical significance.

Flow diagram:



RESULTS

The study participants' demographics (Table 1), was 97 (64%) males and 55 (36%) females. A total of 152 patients with obstructive airway disease who visited the OPD during the study period and had proper informed consent were included in this study. Here 97 (64%) were male and 55(36%) were female patients. The majority (23%, n=35) of our study population was 18 -29 years. Out of the total population, most patients belonged to lower (32.2%, n=49) and middle (27.6%, n=42) socio-economic statuses. The domicile of our study population was almost equally distributed among the urban and rural areas.

TABLE 1: Table elaborating the demographic profile of our study participants. (N=152)

Study Parameters	N Value	Percentage
Gender		
Male	97	64%
Female	55	36%
Age		
Less Than 18 Years	2	1.3%
18 To 29 Years	35	23%
30 To 39 Years	25	16.4%
40 To 49 Years	28	18.4%
50 To 59 Years	24	15.8%
60 To 69 Years	24	15.8%
70 To 79 Years	8	5.3%
More Than Or Equal To 80 Years	6	4%
Socioeconomic Status		
Lower	49	32.2%
Lower-Middle	16	10.5%
Middle	42	27.6%
Upper-Middle	12	7.9%
Upper	33	21.7%
Residence		
Rural	77	50.7%
Urban	75	49.3%

In Table 2, we have enlisted the clinical symptoms of patients. Breathlessness was the most common clinical symptom of the patients, and 98% (n=149) had complaints of the same, out of which 98.7% (n=147) had chronic breathlessness, followed by cough,78.3% (n=119), usually productive (61.3%, n=73) in type and chronic in duration (98.3%, n=117). Most (65.8%, n=100) of the study subjects have no family history of respiratory illness. Even the majority (73%, n=111) had no childhood illness that could predispose them to these diseases. Only 34.2% (n=52) have a history of exposure to biomass fuel. All the clinical symptoms of our patients are tabulated in Table 2.

TABLE 2: Table listing the various clinical symptoms of our patients.

Study Parameters	N Value	Percentage
Clinical Assessment- Cough		
Present	119	78.3%
Type:		
Dry	46	38.7%
Productive	73	61.3%
Duration:		
Acute	1	0.8%
Sub-Acute	1	0.8%
Chronic	117	98.3%
Absent	33	21.7%
Clinical Assessment-Expectoration		
Present	86	56.6%
Type Of Expectoration		
Purulent	40	46.5%
Mucopurulent	46	53.5%
Diurnal Variation		
Morning	34	39.5%
Evening	5	5.8%
Throughout	40	46.5%
Morning And Evening	7	8.1%
Absent	66	43.4%
Clinical Assessment- Chest Pain		
Present	92	60.5%
Severity: Mild	68	73.9%
Moderate	22	23.9%
Severe	2	2.2%
Absent	60	39.5%
Clinical Assessment- Breathlessness		
Present	149	98%
Duration:		
Acute	0	0%
Sub-Acute	2	1.3%
Chronic	147	98.7%
Absent	3	2%
Clinical Assessment- Wheezing		
Present	75	49.3%
Duration:		
Acute	0	0
Sub-Acute	0	0
Chronic	75	100%
Absent	77	50.7%
Family History		
Present	52	34.2%
Absent	100	65.8%
Childhood Factors		
Present	41	27%
Absent	111	73%
Biomass Fuel Exposure		
Present	52	34.2%
Absent	100	65.8%

The smoking status of the study participants is tabulated in Table 3. The majority, i.e., 57% (n=40) of the smokers, were addicted to only bidi, while 77.3% (n=34) of tobacco chewers were simultaneously addicted to smoking. Among smokers, 47.1% (n=33) were heavy smokers, 22.9% (n=16) were moderate smokers, and 30% (n=21)

were light smokers. Out of the total study population, 13.2% (n=20) were active smokers, 32.9% (n=50) were ex-smokers, and 53.9% (n=82) were non-smokers.

TABLE 3: - Table depicting the smoking status of our study population.

Study Parameters	N Value	Percentage
Smoking Status		
Active Smoker	20	13.2%
Ex-Smoker	50	32.9%
Non-Smoker	82	53.9%
Type Of Smoking		
Bidi	40	57.1%
Cigarettes	24	34.3%
Both Bidi And Cigarettes	6	8.6%
Severity Of Smoking		
Light Smoker	21	30%
Moderate Smoker	16	22.9%
Heavy Smoker	33	47.1%
Tobacco Chewing		
Present	44	28.9%
Absent	108	71%
Subjects Who Were Both Tobacco Chewers As Well And Smoker	34	77.3%
Patient Who Was Only Tobacco Chewer	10	22.7%

On assessing the overall knowledge of the participants regarding inhaler therapy and ailment, 78.9% (n=120, p=0.001) of the subjects had proper knowledge, out of which 94.7%(n=144) knew about the benefits of using an inhaler, but 35.5% (n=54) lacked the knowledge about proper cleaning and maintenance of the inhaler device. Similarly, when assessing the total attitude of our study population regarding inhaler therapy, 75.5% (n=115, p=0.007) had a positive attitude. In comparison, 24.5% had an undesirable attitude, out of which 90.8%(n=138) found it beneficial when they were counseled about their disease symptoms, while 53.9%(n=84) of the subjects did not want to change their treatment to some other or better option.

In our study, the majority, 52%(n=80) of the subjects used DPI, and the rest used pMDI, 47.4% (n=72). On assessing the practices of pMDI users among users, only 65.3% (n=47) pressed the inhaler once as directed. Likewise, after assessing the practices of DPI users, only 65% (n=52) held their breath inside for 8 to 10 seconds. Overall practices of both inhaler therapies are presented in Table 4.

TABLE 4: Table showing the assessment of different practices of both pMDI and DPI.

KNOWLEDGE, ATTITUDE AND PRACTICE, ASSESSMENT	N VALUE	PERCENTAGE
ADEQUATE KNOWLEDGE OF INHALER THERAPY		
PRESENT	120	78.95%
ABSENT	32	21.05%
OPTIMISTIC ATTITUDE TOWARD INHALER THERAPY		
PRESENT	115	75.49%
ABSENT	37	24.51%
ASSESSING PRACTICE		
pMDI USER	72	47.37%
SHAKE THE INHALER WELL-	67	93.06%
FIT THE INHALER INTO SPACER	70	97.22%
SEAL THE MOUTHPIECE BETWEEN LIPS	68	94.44%
BREATH OUT GENTLY	58	80.56%
PRESS THE MDI ONLY ONCE (OR AS DIRECTED)	47	65.28%
TAKE SLOW AND BREATHE 4-5 TIMES	57	79.17%
DON'T REMOVE THE SPACER IN BETWEEN	57	79.17%
REMOVE THE SPACER	70	97.22%
DPI USER	80	52.63%
PLACE THE CAPSULE IN THE CHAMBER	80	100%
BREAK THE CAPSULE BY ROTATION OR PRESSING, DEPENDING ON THE DEVICE'S TYPE.	78	97.5%
HOLD THE CHAMBER UPRIGHT CORRECTLY		
SEAL THE MOUTHPIECE INTO THE LIPS AND TEETH.	74	92.5%
BREATHE OUT GENTLY.	73	91.25%
TAKE A DEEP FORCEFUL INSPIRATION	63	78.75%
HOLD THE BREATH FOR 8 TO 10 SECONDS	69	86.25%
REMOVE THE DEVICE FROM THE MOUTH.	52	65.00%
	76	95.00%

Discussion

In our study, there was a preponderance of male subjects with OAD than females, as seen in a similar study conducted by Mohamed Om et al.' which showed similar findings, reflecting male population carries a higher proportion of the disease burden (17).

In this study, 52%(n=80) of the participants were DPI users. DPI is the most commonly prescribed type of inhaler because the medication is delivered in a precise amount, aerosol is used for every use, and it is cost-effective and portable compared to pMDI with a spacer. In a study conducted in Spain by Plaza V et al., DPI was the predominant inhaler among patients with OAD (18).

Among the pMDI users, about 34.7% had their inhaler technique incorrect. The error most exhibited by them was in the step of "press the inhaler once as directed," which is similar to that of the previous studies conducted in Spain by Giner J. et al. (19).

While in DPI users, about 35% were practicing the wrong inhaler technique. The error was mostly done in the step of "hold the breath inside for 8 to 10 seconds". In a similar study conducted by Sodhi R. et al.' in a tertiary center in North India,71.8% were using inhalers incorrectly (20).

In our study, 94.7% of the subjects knew about the disease. Also, when assessing the total attitude of our study population regarding inhaler therapy, 75.5% had a positive attitude. Similar findings were reflected in a study conducted by Gajanan G. et al., where about 88% knew that this disease affected the lungs. The attitude of the patients varied widely from patient to patient. In that study, 60% of the patients had a positive attitude regarding their inhaler therapy (21).

Conclusion

Our research findings indicate that patients possess a moderate level of knowledge regarding chronic obstructive pulmonary disease (OAD). While some patients exhibited a positive attitude toward managing their condition, others demonstrated insufficient motivation for effective disease management. Additionally, adherence to prescribed medication regimens among OAD patients was notably inadequate. To effectively address these challenges, it is imperative to identify and focus on specific areas of deficiency. This can be accomplished by implementing streamlined treatment regimens, enhancing patient education on self-management strategies, and improving the ability of healthcare providers to educate, communicate, and counsel patients about medication adherence. Comprehensive patient education programs aim to increase awareness about OAD, reduce social stigma, and rectify prevailing misconceptions held by the public regarding the disease.

At our study center, dry powder inhalers emerged as the most commonly prescribed and utilized devices for OAD management. This preference is primarily attributed to their compatibility with patient needs and their cost-effectiveness as a treatment option. Furthermore, our country faces significant economic challenges, with a substantial proportion of patients from low socioeconomic backgrounds. These patients perceive dry powder inhalers as a more affordable approach to inhaler therapy.

Recommendation

Smoking cessation, medication therapy, and pulmonary rehabilitation have all been shown to diminish morbidity and improve patient outcomes. However, each of these strategies requires knowledge and a positive attitude. The results of all the inhaler therapies lie in proper adherence, compliance, and technique, which are crucial for optimizing clinical outcomes in OAD.

Relevance of the Study

In our country, the social stigma surrounding inhaler therapy needs to be addressed through proper counseling and knowledge impartation.

Authors Contribution

All authors have contributed equally.

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Nil

Conflict of Interest

There is no conflict of interest.

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Declaration of Generative AI and AI Assisted Technologies in the Writing Process

Statistical analysis was carried out with SPSS version 21.

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