

**ASSESSMENT OF INHALER THERAPY ADHERENCE RATES AND ITS
INFLUENCING FACTORS AMONG COPD PATIENTS IN RURAL
THIRUVANANTHAPURAM**

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JUNE 2025

DECLARATION

I hereby declare that this dissertation titled “**Assessment of Inhaler Therapy Adherence Rates and its influencing factors among COPD patients in Rural Thiruvananthapuram**” is a Bona fide record of my original research. It has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published and unpublished work of others has been duly acknowledged in the text.



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CERTIFICATE

Certified that the dissertation titled – **“Assessment of Inhaler therapy adherence rates and its influencing factors among COPD patients in Rural Thiruvananthapuram”** is a record of the research work undertaken by Dr. U Krishnapriya, in partial fulfilment of the requirements for the award of the degree of Master of Public Health under my guidance and supervision.



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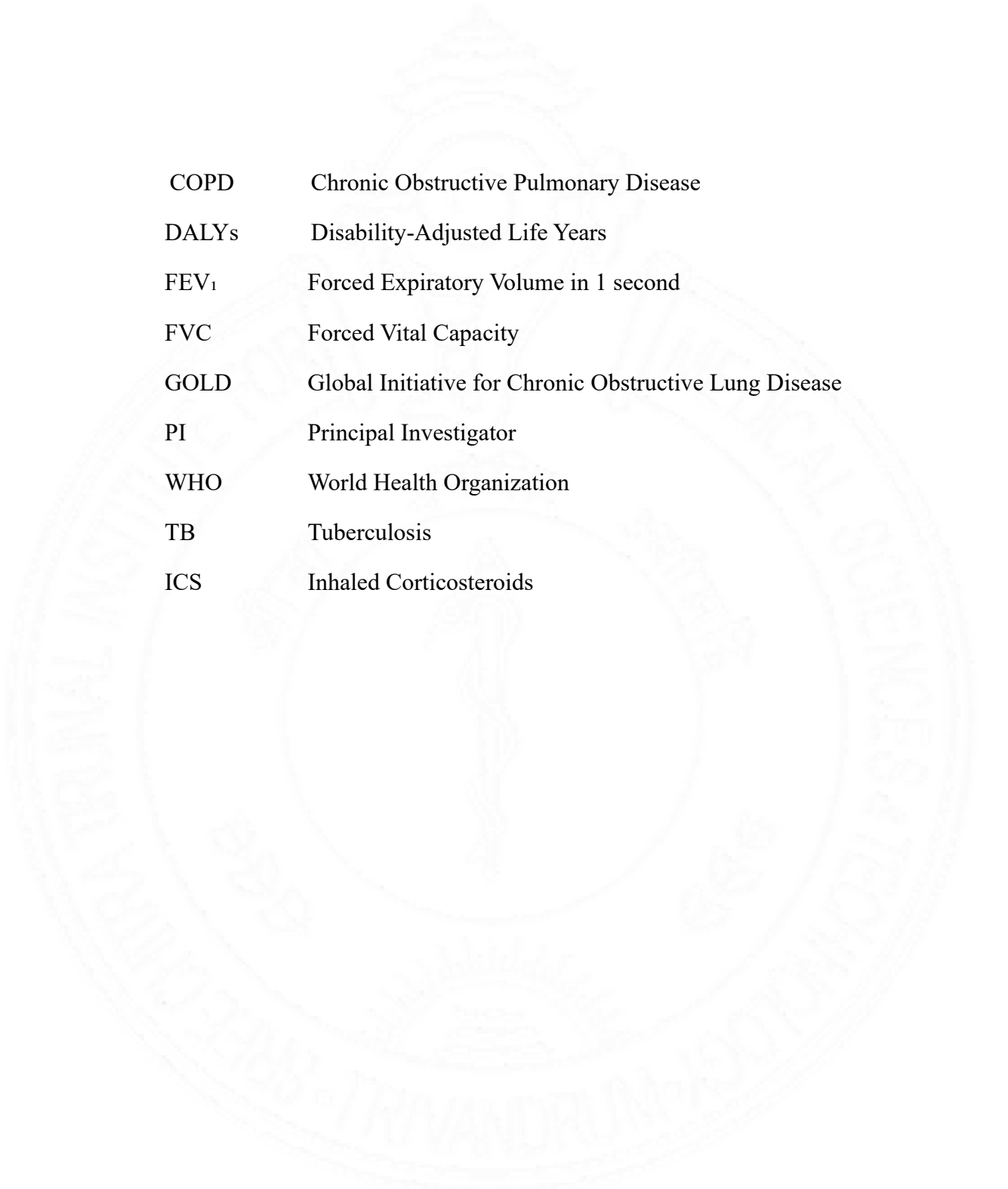


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GLOSSARY OF ABBREVIATION



COPD	Chronic Obstructive Pulmonary Disease
DALYs	Disability-Adjusted Life Years
FEV ₁	Forced Expiratory Volume in 1 second
FVC	Forced Vital Capacity
GOLD	Global Initiative for Chronic Obstructive Lung Disease
PI	Principal Investigator
WHO	World Health Organization
TB	Tuberculosis
ICS	Inhaled Corticosteroids

ABSTRACT

Background

Chronic Obstructive Pulmonary Disease (COPD) is a progressive and irreversible respiratory disorder associated with substantial morbidity, disability, and healthcare burden. Effective disease management heavily relies on consistent adherence to inhaler therapy; however, non-adherence remains a significant barrier to optimal outcomes. Socio-economic factors, educational attainment, and access to affordable medications are known to influence adherence behaviours. Despite the critical role of inhaler therapy in COPD management, there is a scarcity of data addressing adherence patterns and their determinants in rural regions of Thiruvananthapuram, highlighting the need for further investigation.

Aim

This study aimed to assess the rate of adherence to inhaler therapy among COPD patients in rural Thiruvananthapuram, Kerala, and to explore its various associated factors.

Methods

A cross-sectional survey was conducted among 224 adult COPD patients who had been using inhaler therapy for at least one year. Participants were randomly selected from line lists maintained by Accredited Social Health Activists (ASHA) across 48 rural wards in Thiruvananthapuram. Data were collected using a structured questionnaire, incorporating the Morisky Green Levine Medication Adherence Scale to evaluate adherence. Additional information on socio-demographic, socio-economic, behavioural, and treatment-related factors, cost related, health-system related, patient related, support related information were gathered. Multivariable logistic regression analysis was performed to identify factors

associated with adherence, with the best-fit model selected based on the Akaike Information Criterion (AIC) score.

Results

A total of 224 participants were interviewed for the study. The mean age of the participants was 61 ± 14 years. The proportion of women participants was 53.5%. The non-adherence rate was 76% (95% CI: 66%-84 %) in the study. Factors such as marital status, work status, Socioeconomic status, medical expenditure, type of treatment facility, Cost of inhaler medicines, and SWAAS registration were associated with adherence. Forgetfulness (16%) and carelessness (32%) were common reasons for non-adherence, along with discontinuation of medications once symptoms improved (58%). In the multivariable regression analysis, skilled workers (OR=0.1, 95% CI:0.00, 0.71), individuals with higher medical expenses (OR=0.17, 95% CI:0.02, 0.91), and those receiving care at private facilities (OR=0.39, 95% CI:0.18, 0.82) were likely to adhere to their prescribed therapy compared to government employees, individuals with lower medical expenses, and those receiving care at government facilities, respectively.

Conclusion

Three out of four COPD participants were non-adherent to inhaler therapy. Financial challenges and exceptionally high medical costs are major contributors to non-adherence. My study also underscores the importance of addressing patient behaviour in improving Inhaler intake. Improving access to affordable medications, enhancing government health programs such as SWAAS, and providing better educational resources on inhaler use can play a crucial role in improving adherence rates and managing COPD more effectively.

Public health impact

This study highlights critical factors influencing non-adherence to prescribed inhaler therapy among COPD patients in rural Thiruvananthapuram. By identifying these key barriers to adherence, the findings provide valuable insights for designing targeted interventions to improve medication adherence. Expanding access to affordable medications, improving education on proper inhaler technique, and ensuring the regular supply of drugs through the government program, such as SWAAS, could significantly enhance adherence and overall COPD management. Such interventions can enhance the effectiveness of COPD management, reduce disease progression, and ultimately improve the quality of life for patients. Furthermore, addressing these factors can help reduce the healthcare burden associated with COPD, leading to better resource allocation and cost-effective healthcare delivery in rural settings.

CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

1.1 BACKGROUND

Chronic Obstructive Pulmonary Disease is a condition that is prevalent worldwide, which is progressive and debilitating. (Ferrera et al., 2021) Adherence to inhaler therapy among COPD patients is essential for effective disease management. Poor adherence has been consistently associated with a higher risk of exacerbations and increased mortality. (Turégano-Yedro, Trillo-Calvo, et al., 2023) It could lead to a higher number of hospital admissions by not only worsening the individual's health but also by burdening the health system. Non-compliance with the prescribed treatment could give rise to prolonged treatment durations and increased healthcare expenditure. (Epping-Jordan et al., 2001) Many primary care physicians do not thoroughly follow the guidelines provided by the Global Initiative for Chronic Obstructive Lung Disease. This could directly affect the treatment quality. Similarly, knowledge on how to properly use the inhalers, lifestyle modifications, and the importance of perfectly adhering to the prescribed therapy by the patients are key essentials to optimal disease management. Patient education is generally given a low priority in health care settings. (Savran et al., 2021) Kerala has made commendable efforts to address this condition through initiatives like the SWAAS program which not only aims at early diagnosis and treatment but also prevention of the disease. Yet the burden of the disease still remains high. As of adherence to Inhaler therapy and the factors associated with, there is very limited knowledge.

1.2 REVIEW OF LITERATURE

1.2.1 Definition of COPD

Chronic Obstructive Pulmonary Disease is a heterogeneous lung condition characterised by chronic respiratory symptoms (dyspnoea, 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. COPD is a major public health problem that is both preventable and treatable. Due to the continued exposure to the risk factors and the increased population, COPD burden is projected to increase in the near future. (2024 GOLD Report - Global Initiative for Chronic Obstructive Lung Disease - GOLD, 2024; Mathers and Loncar, 2006)

1.2.2 Global burden of COPD

It is estimated that the global annual deaths due to COPD are around 3 million. By 2060, an annual death of 5.4 million is estimated, due to increased prevalence of smoking and aging population in LMIC's and HIC's respectively. (colinmathers, 2022; GBD 2013 Mortality and Causes of Death Collaborators, 2015; Lopez et al., 2006) Tobacco smoking and household air pollution are the major risk factors where smoking accounts for 30-40 % cases. (Global Alliance against Chronic Respiratory Diseases (GARD), 2024) The conclusions of the one-day summit held by GOLD in 2018 highlighted the major problems with accessing and affording quality-assured pharmacological and non-pharmacological therapies. According to the Burden of Obstructive Lung Disease (BOLD) and many big-scale epidemiological studies, the estimated global prevalence of COPD is 10.3%. (Adeloye et al., 2015, 2022) From 1990 to 2019, as per the GBD study, the primary cause of the worldwide increase in DALY was due to COPD. (Chen et al., 2023; Safiri et al., 2022) A shift from 59.2 million to 74.4 million DALYs with a total increase of 25.7 percent from 1990 – 2019 in Southeast Asia, India, Sub-Saharan Africa, and South America has caused a substantial rise in global health burden by COPD. (Li et al., 2022)

1.2.3 Burden of COPD in India

Regarding the prevalence trends of COPD in India, very little is known. Existing evidence shows that the prevalence is around 5% in the adult population, with a higher rate among smokers, males, and in rural areas. Usage of domestic fuel, as well as socioeconomic factors, also play a significant role. Though the diversity and size of India hinder the prevalence estimation, they are crucial since COPD is a major contributor in India. For adequate management in the future, a satisfactory estimation as well as future predictions are a must. According to the National Health Policy 2017 of India, the aim to reduce the premature mortality from NCDs by 25% by 2025 is guided by the WHO goal of 25 by 25. Even so, there isn't a national disease control programme specifically for COPD. (Halpin et al., 2019)

COPD imposes a significant economic burden in terms of both direct and indirect costs in LMIC settings. (2024 GOLD Report - Global Initiative for Chronic Obstructive Lung Disease - GOLD, 2024) There is a significant burden of co-morbidities, including cardiovascular diseases, diabetes mellitus, musculoskeletal impairments, and these conditions are associated with an additional increase in resource utilisation and health care costs. (Mannino et al., 2015; Simon-Tuval et al., 2011) For the poor population, the primary source of drugs is from public facilities. Purchasing one of each salbutamol and beclomethasone inhalers costs between 1.6 and 2.3 days' wages for a lowest-paid government employee. (Halpin et al., 2019) A study finding states that COPD forces at least two individuals, that is, the patient and the caregiver, who is a family member, to leave the workplace. (Sin et al., 2002) Even though all the main types of branded inhaler therapies are licensed to be used in India, they are not widely available or used since the prescription of inhalers in rural areas is perceived to be a stigma. (Gupta et al., 2013) Several

organisations, including the WHO, claim the poor availability and affordability of inhaler medicines in LMICs. (Stolbrink et al., 2022)

1.2.4 Kerala and COPD

Kerala aims to fulfil the SDGs adopted by the United Nations General Assembly on 25 September 2015. The target of subgoal 3.4 is to “By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.” According to available epidemiological information, Trivandrum has the highest prevalence of COPD, which is 10% higher than the national average. (SWAAS – Module for Staff Nurses, 2021)

1.2.5 SWAAS – A STEPWISE APPROACH TO AIRWAY DISEASE

SWAAS is the first state-level programme for chronic respiratory disease implemented in Kerala. It aims at the following aspects: Early identification of COPD in order to implement preventive strategies, such as facilitating earlier interventions like smoking cessation, to decrease mortality rates. Through this approach, the aim is to reduce the number of patients seeking treatment in the advanced stages. A structured diagnosis and treatment programme that can facilitate comprehensive management for COPD patients by linking health care facilities at all levels (primary care to tertiary care, including medical colleges). The programme also aims to gather information on prevalence, health-seeking behaviour, and risk factors specific to Kerala that could guide the planning of future interventions. Additionally, locally acceptable pulmonary rehabilitation techniques are also facilitated with the existing staff in the health care centre, which is a widely recommended therapeutic strategy in all international guidelines. (SWAAS – Module for Staff Nurses, 2021)

1.3 OUTCOMES RELATED TO COPD

1.3.1 Health-Related Quality of Life

Quality Of Life is an important parameter when evaluating a COPD patient. (Yorgancioglu et al., 2010) The scales measuring the quality of life are primarily designed to measure the psychological impact and personal experiences, which measure the subjective aspects of their distress and daily activity limitations. The symptom aspect of the scales helps to predict the risk of hospitalisation. (Osman et al., 1997) This study (Osman et al., 1997) shows that patients with poor QOL are more likely to be readmitted to the hospital following their primary stay. They are also more likely to be using home nebulisers and consulting specialists on a regular basis. The variations in the QOL are more linked to the clinical decisions and utilisation of resources than the differences in lung function, since hospital admissions and FEV1 or FVC percentages have shown no correlation. Disease-specific measurement of quality-of-life results from two studies done on patients belonging to the severe COPD category have proven that patients with the worst scores are more likely to have frequent exacerbations and hospitalizations. Acute exacerbations always lead to poorer quality of life. The survival curve showed a trend of shorter lifespan in patients with the worst SGRQ scores. (Osman et al., 1997; Seemungal et al., 1998a) There could be a reduction in lung function, which could not be reversed in a small proportion of patients. (Time Course and Recovery of Exacerbations in Patients with Chronic Obstructive Pulmonary Disease, 2000) Since activity limitation is more common with increasing age, it is expected that with increasing age, the QOL also worsens. In a study where activity and impact are taken as two components where the activity component is concerned with physical activity which results in breathing limitations and the impact component includes factors like employment, being in control of one's health, the need towards medication, the side effects of medication and so on, showed a statistically significant negative correlation. (Ketelaars et al., 1996) The self-perceived activity limitations between men and women, as

well as between older and younger patients, show a relevant difference. Women with COPD are reported to have greater activity limitations and more distress due to the illness, even though the symptom severity is not as severe as that of men. Similarly, psychological distress is more commonly seen among younger patients than among the aged. (Osman et al., 1997) Interestingly, studies have also shown positive correlations between an increase in severity and quality of life in patients above 65 years of age. It could be due to better capability to tolerate the effects of the obstructed airways due to a general reduction in activity and their reduced expectations in life. (Fh et al., 1991; Guyatt et al., 1987; Juniper et al., 1992; Quirk and Jones, 1990; Renwick and Connolly, 1996) Mood deflection will also play a role in how the symptom exaggeration occurs. However, the relation between depression and COPD symptoms remains unexplored. But in general, a dyspnoea patient whose functional restrictions are a matter of concern will be depressed. There will be a significant reduction in lung volume of COPD patients, hence they are never normoxic and normocapnic while at rest. At sleep, the findings show that COPD patients are hypoxemic compared to the control group members. As a result, the quality of sleep and daytime functional status are affected due to nighttime gas exchange deterioration. (Fletcher and Levin, 1984; Peruzza et al., 2003; Siafakas et al., 1995) Patients with severe COPD often face significant psychological challenges, such as the loss of their ability to engage in productive work.

1.3.2 Exacerbations

As per the modified criteria from Anthonisen and colleagues, exacerbations are defined as the occurrence of any two “major” or one “minor” symptom for at least two consecutive days. (Anthonisen et al., 1987)

The major set of symptoms includes dyspnoea, purulent sputum, and sputum volume. The minor sets of symptoms are wheezing, throat soreness, cough, nasal congestion, and

discharge. The likelihood and frequency of future exacerbations can be predicted by monitoring the occurrence of past exacerbations. (Yorgancioglu et al., 2010) Exacerbations are considered the most crucial factor of morbidity and mortality in COPD patients. It is a major determinant of the health status. Usually, exacerbations are associated with physiological deterioration, though there is very little evidence on the time changes of these actions both at the onset and recovery from exacerbations. This information can be very useful when planning a long-term treatment by giving specific attention to the symptoms that require particular attention. Some studies have considered exacerbations as a primary outcome measure. (Seemungal et al., 1998b; Time Course and Recovery of Exacerbations in Patients with Chronic Obstructive Pulmonary Disease, 2000.)

1.3.3 Comorbidities

The most common psychiatric comorbidities among COPD patients are Anxiety and Depression. The most commonly used study tool is the Hospital Anxiety and Depression Scale. The relationship between psychiatric comorbidities and COPD is usually studied by considering various factors like symptom scores, quality of life, adherence to medication, hospitalisations, mortality, outcomes of rehabilitation, rate of smoking, and cognitive decline. There are very few studies done to find the relationship in developing countries. (Dua et al., 2018; Khmour et al., 2012; Maurer et al., 2008) Available study findings confirm that higher depression and anxiety levels are also accompanied by higher levels of fatigue, Shortness of breath, and more frequent COPD symptoms. (Doyle et al., 2013) Chances of associations between depression and the current smoking status in COPD patients are also found in a few studies. (Chavannes et al., 2005; Dua et al., 2018; Ng et al., 2007) A prognosis can be made with indices like the BODE index, which has shown varying, contrary results in many of the studies. The persisting studies focused only upon the prevalence of mental disorders and not the impact it induces. The attention should be more

focused on patients with higher symptom scores and poor quality of life to screen for psychiatric comorbidities actively. (Dua et al., 2018)

Due to multiple co-morbidities like CA lung or coronary artery diseases, there are limitations in the accurate confirmation of the cause of death in COPD patients.

In a study conducted, among patients with one comorbidity, the majority of the patients had hypertension, followed by obstructive apnoea syndrome, depression, and ischemic cardiopathy. (Raheison et al., 2018)

1.3.4 Mortality

In cases of mild to moderate COPD, comorbidities like cardiovascular diseases or Lung cancer tend to be the most common causes of death. As the severity of COPD increases, respiratory-related deaths are more common among patients. Non-pharmacological interventions like smoking cessation could reduce the chances of worsening cardiovascular diseases or lung cancer, and improve the chances of survival. (Berry and Wise, 2010) Smoking cessation could also prevent the progression of emphysema, which could reduce the chances of mortality. (Bai et al., 2017; Zamorro García et al., 2011) As per the recent findings, the prevalence of smoking in India had decreased to 28.6% from 34.6% among individuals aged 15 and above, which could be expected to contribute to the reduction in COPD prevalence in the future. (Global_Adult_Tobacco_Survey2_India_2016-17_June2018.pdf, 2018) As second-hand smoke also contributes to mortality, reducing smoking could have multiple benefits in lowering death rates. (Hagstad et al., 2014; Ukawa et al., 2017) However, smoking prevalence and COPD mortality do not always collide. (Burney et al., 2014; Salvi and Barnes, 2009) Reduction in the FEV1 in the first second is also associated with increased mortality. (The Effect of Pulmonary Impairment on All-Cause Mortality in a National Cohort - CHEST, 1993.) When a comparison between people with normal lung function and a COPD patient with mild severity is done, the risk of all-

cause mortality tends to be higher. (Mannino et al., 2003) In a trial done on patients undergoing treatment on Inhaled steroids in Obstructive Lung disease, the majority of the patients died of Cardiovascular disease, followed by cancer and Non-malignant respiratory disease. (Burge et al., 2000) In an advanced stage, when resting hypoxaemia is present, additional treatment options like Oxygen supplementation, LVRS or lung transplantation are the options that could improve the chances of survival. (Lacasse et al., 2020; Leggett et al., 1976)

Air pollution plays another major role in mortality and morbidity in COPD, especially in non-smoking females who are intensely exposed to poor-quality Indoor air created from biomass cooking fuel usage. (Behera and Jindal, 1991) In India, around 925,000 deaths occur yearly due to exposure to air pollution from cooking. (GBD 2013 Risk Factors Collaborators et al., 2015)

With the hope of reducing this burden, the Ujjwala Scheme in India introduced LPG to most of the people in the country to reduce the usage of biomass fuels. (Pillarisetti et al., 2017)

Under better financial conditions, death from COPD tends to fall since the patients are better adherent to the treatments, leading to fewer exacerbations and hospitalisations. (Burney et al., 2014; Kotsiou et al., 2018) Under the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS), COPD is brought as an important NCD issue to come up with curative measures and preventive strategies through NCD clinics at the district and the state level. In the primary level of care where most of the patients follow up, there is a lack of efficient spirometry diagnosis and specialists' opinions on the health of people, which leaves a major proportion of cases undiagnosed. This calls for a better diagnostic policy implementation at the primary level

of care, which could overall reduce the disease burden caused by COPD. (Spyratos et al., 2016) At the individual level, patients who belong to a poor socioeconomic status are usually presented late to the health care facility due to many influencing factors, contributing to their increased hospitalisations and increased number of deaths. (Eisner et al., 2009; Gershon et al., 2015) Improving the socio-economic status in states like Rajasthan, Uttar Pradesh, Jammu and Kashmir, and Tripura would help in reducing the deaths from COPD. (Roy, 2020)

1.4 TREATMENT MODALITY FOR COPD PATIENTS

When a medication is administered through oral, intravenous, or intramuscular routes, it travels through the bloodstream to reach different organs and tissues, including the airways. In contrast, inhalation delivers the drug straight to the airways, the primary target in obstructive diseases like asthma and COPD. This method results in faster relief, typically requires smaller doses of the active drug, and tends to cause fewer side effects. Inhalation therapy delivers medication directly into the airways, making it an important treatment for conditions like asthma and chronic obstructive pulmonary disease. The devices used to administer these inhaled medications are essential for effective treatment. To achieve optimal drug delivery to the lungs, an inhalation device must ensure the release of a high proportion of fine particles, be user-friendly, and provide consistent and accurate doses of the active ingredient.

Currently, four main types of inhalers are commonly used: nebulisers, dry powder inhalers (DPI's), pressurised metered-dose inhalers (pMDIs) and soft mist inhalers (SMI's).

Nebulisers are often used by patients who struggle with other inhaler types. While effective, they require more prolonged administration and may not always ensure precise dosing. Most commercially available nebulisers fall into three main types: jet (or pneumatic), ultrasonic, and mesh nebulisers. These inhalers have become popular because they are easy

to use and require only normal breathing. This makes them ideal for emergencies, as they don't need specialised patient education or cooperation. Nebulisers are also suitable for older adults with cognitive or physical limitations, as well as for children.

pMDIs were the first widely used portable devices for delivering multi-dose inhaled therapy. These inhalers can administer single or combined medications, such as glucocorticoids, beta-agonists, and antimuscarinic bronchodilators. A standard pMDI includes: (1) a metal canister holding the medication in a solution or suspension along with a pressurised liquefied gas propellant; (2) a metering valve that ensures accurate dosing; and (3) a plastic mouthpiece that allows the patient to activate the device. The first pMDIs gained popularity due to their small size, affordability, speed, and quiet operation. Their performance has been enhanced with the use of spacers and newer technologies that slow down the delivery speed.

DPIs are devices that deliver medication to the airways using the energy generated by the patient's inhalation. These inhalers contain a mixture of micronized drug particles attached to larger carrier molecules, typically lactose. For the medication to be effectively deposited in the lungs, the drug-carrier mixture must break apart during a forceful inhalation against the device's internal resistance. This process allows the active drug particles to reach the airways while the carrier particles are left behind. These inhalers do not require coordination between actuation and inhalation, but patients must be able to generate a sufficient inspiratory flow to detach the drug from the carrier particles. SMIs, on the other hand, dispense medication as a slow aerosol cloud without the use of propellants, relying on the energy from a spring. New technology and cheaper sensors have made it possible to create "smart inhalers." These are devices that attach to or are built into inhalers. They can track when the inhaler is used, remind patients to take their medicine, and give feedback on how well they are using it. Smart inhalers can connect to a smartphone via Bluetooth,

so the data can also be shared with the patient's doctor. This helps improve medication use and can make treatment more effective.

(Sorino et al., 2020)

1.5 ADHERENCE TO THERAPY

Managing adherence to therapy in COPD is complex. Patients need comprehensive education on the disease process, comorbidities and proper use of various medications and devices to ensure effective treatment. (*Clinical and Experimental Pharmacology and Physiology*, 1981; Dolce et al., 1991) As per the ABC taxonomy / Ascertaining Barriers to Compliance taxonomy, the target of the adherence management is “to achieve and maintain the best use, by patients, of appropriately prescribed medicines in order to maximize benefit and minimize the risk of harm”. (Vrijens et al., 2012) It is the involvement of the health care systems, patients, providers, and their social networks in the process of monitoring and supporting the patients towards adherence to medication.

Adherence to medications is the process by which patients take the prescribed medicines as prescribed.

The three components to adherence are –

- Initiation- Implementation and Discontinuation. Initiation means the intake of the first dose as prescribed.
- Implementation- means how closely a patient's actual medication dosing aligns with the prescribed regimen, starting from the beginning to the end of the dose intake.
- Discontinuation- occurs when the omission of the next dose is made and no further doses are taken.

- Persistence means the period between initiation and the last dose before discontinuation.

The main focus of the adherence-related science is the understanding of the gaps between the prescribed and the actual exposure to medicines. (Rogliani et al., 2017)

According to Boubeau and Bartlett, COPD medication adherence is multifactorial. Several factors, such as health beliefs, cognitive abilities, self-efficacy, comorbidities, psychological profile, and the conscientiousness of the patients, are important, followed by physician factors like administration methods, dosing regimen, polypharmacy, and side effects. Societal factors, such as patient-prescriber relations, social support, medication access, device training, and follow-up, are also important. (J Bourbeau and Bartlett, 2008)

1.6 DEFINITION OF MEDICATION ADHERENCE

Medication adherence means medication-taking behaviour, whether or not the behaviour coincides with the advice the patient had been given. Major causes of non-adherence are forgetfulness, carelessness, health beliefs, financial constraints, emotional concerns, severity of disease, and so on. (Md et al., 2016)

Adherence to medical therapy is considered the “new pharmacological problem.” According to the WHO, “maximizing the effectiveness of investments aimed at increasing compliance may have a far better impact on people’s health than any other progress in the therapeutic arena”. Despite the level of severity of the disease, poor adherence rate is recorded among COPD patients. (Sanduzzi et al., 2014)

1.6.1 CLASSIFICATION OF ADHERENCE

Classification of Non-adherence - Primary and secondary non-adherence. Primary nonadherence is when the patient fails to fill the medicines as prescribed. (Fischer et al., 2010) Secondary Non-adherence means failing to take medicines even if the prescription

is filled. It could be overuse, underuse, or even alteration of the scheduled doses of medicine.

The other classification of nonadherence is intentional and Unintentional. Intentional non-adherence is when the patient actively decides to stop the medication. Patient cognition levels and personal beliefs are major factors in this type.

Unintentional non-adherence is when there is a lack of knowledge in using the medicines, forgetfulness, etc. (Clifford et al., 2008; Lehane and McCarthy, 2007; Lowry et al., 2005; Wroe, 2002)

Cognitive impairment is a notable problem among elderly people with COPD. (George and Bender, 2019) Difficulty in correctly executing the inhaler usage technique and sustaining it is a real challenge. Unlike Meter-dose inhalers and nebulisers, Dry powder inhaler requires forceful and fast inspiration for the medicines to get delivered to the lungs. (de Llano et al., 2018)

Inhaled medications are the key essentials in controlling COPD and its exacerbations, but proper adherence and poor availability are major issues in Low-middle-income countries. According to a study done in Kyrgyzstan, 68.9% of the study population were buying respiratory medicines out-of-pocket. 68.3% reported financial cause as the root barrier to poor adherence, and 80% showed poor adherence. (Tabyshova et al., 2022) Associations have been found between poor disease outcomes (exacerbations) and Nonadherence and a higher health-economic burden in terms of direct and indirect costs. (Mäkelä et al., 2013a; Usmani et al., 2018) A similar study found that the total health care utilization reimbursement and co-payments account for a total of \$331, where co-payments contributed to 22% of the patient's annual income. (Tabyshova et al., 2021)

As of mean per capita out-of-pocket payments for health care by states in India (NSS 2004- NSS 2014), Kerala has the highest number of households with Out-of-pocket payments and mean per capita out-of-pocket payments. (Pandey et al., 2018)

1.6.2 Determinants of non-adherence to inhaled medication based on WHO

As per the WHO, adherence is a multi-dimensional phenomenon. And there are five dimensions to it. Among them are factors like social and economic, the medical team assisting the patient, the health system, disease characteristics, the treatment, and patient-related factors. Hence, it should be understood that the non-adherence is not just the patient's fault. (Organization, 2003)

Table 1.1 Determinants of non-adherence to inhaled medication based on WHO

Socioeconomic factors	Socio-economic class
Patient-related factors	Social stigma, lack of knowledge about inhaled medication, inappropriate technique to use inhaled medication, and lack of follow-up.
Therapy-related factors	Duration of therapy, Complexity of treatment, Fixing dose
Health care system factors	Duration of travel, long waiting hours for the appointment, inadequate time for consultation, and the doctor-patient relationship
Condition-related factor	Acute attacks, comorbidities

(Nazareth et al., 2023a)

1.6.3 Methods to measure adherence

In OP settings, in order to measure adherence, a valid, reliable, and cost-effective method that is acceptable to both the patients and providers is necessary. Some of the methods are tracking of pharmacy refills, electronic monitoring, and self-reported questionnaires. All these methods are not perfect. Each has its limitations.

The costliest scientific method is measuring the level of drugs or the metabolites in the blood, urine, or a biological marker that could confirm the intake. One of the limitations of this method, apart from being costly, is that pharmacokinetic variations could influence it. Information on the timing of medication intake and adherence variations between the visits cannot be measured here.

On the other hand, a less expensive measurement method is comparing the number of doses taken to the number of doses prescribed. It will help us understand the number of pills that have been removed from the medicine bottle, and not the timing of the doses. Another limitation of this method is that patients could purposefully discard medicines to appear adherent, and they could also switch medications.

Another method to measure adherence is self-reporting, but it is not an accurate method and has only moderate reliability. This method can affect the patient-provider relationship when compared to objective measures.

Defined daily doses (DDD) that can be obtained from pharmacies are another method to assess adherence to long-term treatment medicines. The positive side of this study is that it avoids direct reminding of patients to take their medicines, which could eliminate bias. One of the negative sides is that it does not give information on the daily dose pattern of patients. The result of this method is that it gives an overestimated count of adherence since returned medicines are not considered.

Assessing self-reported asthma diaries is another method that could also give information on changes in the type of medication. However, the adherence to keeping a truthful diary could also be unreliable.

The gold standard method is electronic monitoring since it has an advantage over other methods. This method can accurately measure dosage information. However, it is expensive, can be prone to malfunction, and cannot measure whether the patient has taken the medicine.

Canister weighing is another simple method to track adherence. However, the patients could deliberately actuate the inhaler medicines, falsely indicating good adherence.

Pharmacy refill records show patterns of medication refill. Refill records can be incomplete and difficult for providers to incorporate into their practice. Dumping means discarding medicines to appear compliant.

The Morisky-Green test includes four questions related to forgetfulness, carelessness, stopping medication when feeling better, and discontinuing medicine when feeling worse, with incorrect answers indicating nonadherence.

The Batalla test assesses patients' understanding of COPD. It involves understanding patients' awareness about the chronicity of the disease condition, which directly indicates the level of correct adherence.

Combining the Batalla test with the Morisky scale is an effective method of measuring adherence.

(J. Bourbeau and Bartlett, 2008; George et al., 2007; Leiva-Fernández et al., 2014; Rand and Wise, 1994; Rogliani et al., 2017)

1.6.4 Rationale:

Contemporary studies report that more than half of all people who are prescribed medication for the management of COPD do not adhere to therapy. Medication adherence is critical for managing COPD, yet it remains suboptimal. Poor adherence leads to more frequent exacerbations, hospitalizations, and healthcare costs. Currently, no studies in Kerala measure the adherence to inhaler therapy in COPD patients. This study aims to quantify the prevalence of medication adherence among COPD patients in rural Thiruvananthapuram and identify factors contributing to non-adherence. Understanding how cost-related, patient-related, therapy and healthcare system-related, behaviour-related, socio-economic status-related, disease-related, severity-related, and support-related factors impact adherence is essential. The study will provide insights into improving adherence, reducing the economic burden on patients, and enhancing COPD management in rural Kerala and similar regions by examining these factors. Understanding the prevalence of adherence and its impact on cost-related factors can guide the development of targeted interventions, improve healthcare access, and patient financial barriers.

1.7 OBJECTIVES:

1.7.1 Major Objective:

To estimate the adherence to inhaler therapy in COPD patients

1.7.2 Minor Objective:

To identify the factors associated with adherence to inhaler therapy in COPD patients.

CHAPTER 2

METHODOLOGY

2.1 Study design

A cross-sectional survey was conducted among adult COPD patients residing in Rural Thiruvananthapuram, Kerala, to assess the adherence rate to Inhaler therapy.

2.2 Study setting

The study was conducted in Rural Thiruvananthapuram. The study participants were selected randomly from 72 wards.

2.3 Study population

Adult COPD patients residing in Rural Thiruvananthapuram who have been undergoing inhaler therapy for at least 1 year were approached to participate in the study.

2.4 Sample size estimation

The sample size was calculated using OpenEpi version 3.1 software. A recent study reported that adherence to inhaler therapy is 31.3% (Nazareth et al., 2023) Using this information, with a relative precision of 20%, a confidence interval of 95%, and a design effect of 1.5, and considering a 5% non-response rate, the final sample size was 339.

2.5 Sample selection procedure

Cluster sampling and simple random sampling were used as sampling strategies. Out of the 11 blocks in rural Thiruvananthapuram, 4 blocks were selected using simple random sampling with the assistance of R software. Panchayaths were randomly chosen from each of these selected blocks, resulting in 12 panchayaths. wards were chosen through random sampling within each panchayath, yielding 48 wards. To achieve the target sample size of

224 participants, 4 to 5 individuals were selected from each ward for interviews. One eligible patient was chosen in each selected household using the lottery method.

2.6 Sampling strategy

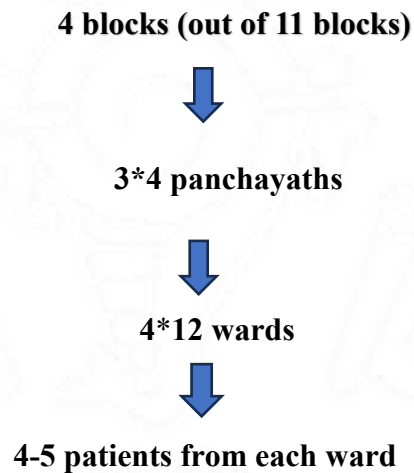


Figure 1 Sampling Strategy

2.7 Subject selection

2.7.1 Inclusion criteria:

All adult diagnosed COPD patients prescribed Inhalers are included in the Line list of ASHA workers

2.7.2 Exclusion criteria:

- Bedridden Patients
- Those who are not willing to participate
- Patients who are not prescribed inhalers
- Patients diagnosed in less than 6 months

2.8 Study duration

The duration of data collection was 2 months, from 10th January 2025 to 14th March 2025.

2.9 Data collection process

A structured questionnaire schedule was developed in English and translated into Malayalam. The Morisky Green Levine scale was also administered to measure adherence. The patients to be interviewed were selected randomly in each ward from the line list maintained by the Accredited Social Health Activists (ASHA). Before going to each block and its respective wards, the respective ASHA workers, JPHN, and the medical officers were contacted and informed about the study. To each household, ASHA workers accompanied the principal investigator, which reduced the nonresponse rate, except in situations where the patients were at the work site. If more than one COPD patient was in a single household, one eligible person was selected using the lottery method, but there were very few situations. During the household visit, the investigator explained the purpose of the study. Then they were asked whether they are using inhaler therapy and are above 18 years. After the confirmation of one eligible adult participant, the information sheet was explained. After clarifying their concerns, they were asked to sign the consent form. Then the interview was taken.

2.10 Data collection tools

The tool for data collection was a structured interviewer-administered questionnaire, which included the Morisky Green Levine Scale (MGL scale). Toward the end of the interview, the patients were also provided a paper illustration on how to use inhalers. The different sections of the questionnaire were as follows-

- General Information
- Socio-Demographic information
- Socio-Economic information.
- Cost-related information

- Behaviour-related information
- Disease-related information
- Treatment-related information
- Severity Assessment – mMRC dyspnoea scale and exacerbation history.
- Therapy and health system-related information
- Support related information
- Patient-related information
- Morisky Green Levine Scale – measuring Adherence.

2.11 Data entry and storage

Data entry was done in the Open Data Kit (ODK) platform. PI is responsible for the data security and any breach of confidentiality. The online forms had no personal identifying information, and all the participants were coded with a unique participant ID. The online collected data was stored in a password-protected computer.

2.12 OPERATIONAL DEFINITIONS OF VARIABLES

2.12.1 Outcome variable

Adherence

Morisky-Green Levine scale is a 4-item tool, a self-reported yes/ no questionnaire, which consists of questions on Forgetfulness, Carelessness, medication-taking behaviour of the patients when they get worse and better. The tool measures scores from 0 (minimum) to 4 (maximum). High adherence is for patients who score 0, 1-2 for medium adherence, and 3-4 for low adherence.

2.12.2 Independent variable

The independent variables used were:

- Socio Demographic information included age, sex, religion, marital status, educational status, and occupational status.
- Socio-Economic factors like household expenditure, medical expenditure, annual income, and ration card colour.
- Cost-related information, such as the cost spent on treatment, and the availability of health insurance.
- Behaviour-related information, like smoking status and cooking status.
- Disease-related information, such as the number of years of COPD diagnosis, and the number of years of inhaler intake.
- Treatment-related information, such as the name of the prescribed medicines and the type of inhaler, is also included
- Severity Assessment – mMRC dyspnoea scale and exacerbation history.
- Therapy and health system-related factors like treatment-seeking facility, SWAAS registration.
- Support-related information, like hospital accompaniment.
- patient-related information, like inhaler administration difficulty, stigma issues, etc.
- Other factors like affordability, transportation facilities etc.

2.13 Data analysis

The data were analysed using R version 4.4.1. Frequencies and proportions were calculated for categorical variables, and the mean with standard deviation was computed for age. The adherence rate was determined by calculating the proportion of participants who scored high, medium, and low, along with their corresponding 95% confidence intervals. Associations between adherence and various factors—including socio-demographic, socio-economic, cost-related, behaviour-related, disease-related, treatment-related, severity,

therapy, health system-related, support-related, and patient-related factors—were assessed using the Pearson chi-square test. To identify the most appropriate multivariable model, stepwise model selection based on the Akaike Information Criterion (AIC) was performed. The final multivariable logistic regression model included variables with the lowest AIC value, allowing for adjustment of potential confounders and identification of independent predictors of adherence.

2.14 Ethical consideration

The Institutional Ethics Committee of Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram, Kerala, had reviewed the study and gave clearance to conduct the study (SCT/IEC/2349/DECEMBER/2024).

Permission was obtained from the District Medical Officer for the study. Before moving to each ward, permission was obtained from the respective medical officer. Participation in the study was completely voluntary. The interview was conducted only after obtaining informed consent from the participants. The participant's identity and personal information were kept confidential. All the copies of consent forms will be kept under the custody of the PI.

2.15 Study Obstacle

My calculated sample size was 339. However, due to an unforeseen strike by ASHA workers beginning in February, I was only able to collect data from 224 participants. The strike affected fieldwork significantly, as ASHA workers were unavailable to accompany me to the patients' households, thereby limiting access and participation.

CHAPTER 3

RESULTS

This chapter presents the study's findings in detail and is divided into three sections. The first section outlines the baseline characteristics of the participants, including demographic information, socio-economic information, cost-related information, behaviour-related information, disease-related information, treatment-related information, severity assessment, therapy and health system-related information, support-related information, and patient-related information. The second section explores adherence scores and their categories. The third section examines the association between the independent variables and adherence.

3.1 Sociodemographic information of the participants

The study included 224 participants with a mean age of 61 years ($SD = 14$), indicating that the population primarily consisted of middle-aged to elderly individuals. The gender distribution showed a slight predominance of females (53.6%) over males (46.4%). A majority of the participants were married (81.7%), while 18.3% were single. In terms of educational attainment, most participants had completed at least secondary school (40.1%), followed by those with primary education (33.5%) and less than primary education (17%). Only a small proportion had pursued higher education, with 8% having completed college or university and 1.4% having postgraduate qualifications. Regarding employment status, more than half of the participants (55.8%) were unemployed, while 30.8% worked as unskilled labourers, 9.4% as skilled workers, and 4% were government employees. In terms of religion, the majority identified as Hindu (68.3%), followed by Christians (23.2%) and Muslims (8.5%). This demographic profile reflects a predominantly low-income, middle-

aged population with limited higher educational attainment and a significant level of unemployment.

Table 3.1 Sociodemographic information

Variable	Frequency (N=224)
Age of the participant in years	61(14)
Mean (SD)	
Sex of the participants	
Male	104 (46.4%)
Female	120 (53.6%)
Marital Status	
Single	41 (18.3%)
Married	182 (81.7%)
Educational status	
Less than primary	38 (17.0%)
Primary school completed	75 (33.5%)
Secondary school completed	86 (40.1%)
College /University completed	18 (8.0%)
Post graduation completed	3 (1.4%)
Employment status	
Government employee	9 (4.0%)
Skilled worker	21 (9.4%)
Unskilled worker	69 (30.8%)
Unemployed	125 (55.8%)
Religion	
Hindu	153 (68.3%)
Christian	52 (23.2%)
Muslim	18 (8.5%)

3. 2 Socio-economic information

In this study, 39.3% of participants reported having a known annual income, while 60.7% did not disclose their income. Among those who provided income details (N=136), the largest proportion (39%) reported earning more than ₹30,000 annually. Smaller segments fell into lower income brackets, with 12.5% earning up to ₹10,000, 5.1% between ₹10,001–₹20,000, and 7.4% between ₹20,001–₹30,001. With regard to recent healthcare expenses, a vast majority (95.5%) reported medical expenditures of less than ₹5,000 in the past 30 days, while only 4.5% had spent more than ₹5,000. In terms of ration card distribution,

which often serves as a socioeconomic indicator in India, 70.5% of participants held Below Poverty Line (BPL) ration cards, while 29.5% possessed Above Poverty Line (APL) cards. This data reflects a predominantly low-income population, with limited financial resources and high economic vulnerability, which may impact their ability to afford and adhere to consistent COPD treatment.

Table 3.2 Socioeconomic information

Variable	Frequency
Annual Income	
Yes	88 (39.3%)
No	136 (60.7%)
Annual income amount (N=136)	
Up to 10000	17 (12.5%)
100001-20000	7 (5.1%)
20001-30001	10 (7.4%)
More than 30000	53 (39%)
Medical expenditure for the last 30 days	
Less than 5000	214 (95.5%)
More than 5000	9 (4.5%)
Ration card type	
APL Ration card	65 (29.5%)
BPL Ration card	158 (70.5%)

3.3 Cost related information

In this study, over half of the participants (55%) reported not visiting an outpatient (OP) facility in the last 30 days, while 31% had visited at least once, and 13% reported more than one visit. When specifically considering OP visits due to respiratory illness, 60% had no such visits, 30% had visited once, and 9% had more than one visit. Regarding inpatient (IP) admissions, 75% of participants had never been admitted, while 25% had experienced at least one admission. IP admissions specifically due to respiratory illness were lower, with 80% never having such admissions, 17% having been admitted once, and 3% more than once. A significant proportion of participants (88.8%) reported spending money on inhaler therapy, with 87.5% of them spending less than ₹3,000 over the past three months,

and 12.5% spending more than ₹3,000. In terms of IP admission costs, 21.2% reported spending money for such care, while 78.8% incurred no expenses. When asked about health insurance coverage, 59% of the participants reported having some form of health insurance, while 28.8% did not, and 12.2% were unsure of their insurance status. Among those with insurance, 42% were covered under government schemes, and 16.5% under private insurance plans. Interestingly, 29.4% of the overall participants had no insurance at all, and 12.1% were not aware of their insurance type.

Table 3.3 Cost related information

Variable	Frequency
Number of OP visits in the last 30 days	
Never	123(55.0%)
At least once	70(31.0%)
More than once	30(13.0%)
Number of OP visits in the last 30 days due to respiratory illness	
Never	135(60.0%)
At least once	68(30.0%)
More than once	20(9.0%)
Number of IP admissions	
Never	167(75.0%)
At least once	56(25.0%)
Number of IP admissions due to respiratory illness	
Never	179(80.0%)
At least once	37(17.0%)
More than once	7(3.0%)
Any Money spent for inhaler	
Yes	198(88.8%)
No	23 (11.2%)
Cost spent for Inhaler medicines in the past 3 months (N= 198)	
Less than 3000	196(87.5%)
More than 3000	27(12.5%)
Any IP cost spent	
Yes	40(21.2%)
No	175 (78.8%)

Possession of Health Insurance	
Yes	131(59.0%)
No	64 (28.8%)
Don't know	27 (12.2%)
Type Of health Insurance (N= 131)	
Government insurance	94 (42.0%)
Private insurance	37 (16.5%)
No insurance	65 (29.4%)
Not aware	27 (12.1%)

3.4 Behaviour-related information

In this study, 36.1% of the participants were current or former smokers, while a larger proportion, 63.9%, reported being non-smokers. Alcohol consumption was relatively rare, with only 7.2% reporting current alcohol use, and 92.8% abstaining. When looking at cooking habits, 43.9% had never cooked regularly, while 40.8% reported currently cooking on a regular basis. An additional 15.3% had cooked regularly in the past but no longer do so. Among those who currently cook (N=91), 77.5% reported having access to a separate kitchen, while 22.5% did not.

Table 3.4 Behaviour-related information

Variable	Frequency
Smoking status	
Smoker	81 (36.1%)
Non-smoker	141 (63.9%)
Alcohol consumption status	
yes	16 (7.2%)
no	206 (92.8%)
Cooking Status	
Never cooked regularly	98 (43.9%)
Cooks regularly now	91 (40.8%)
Cooked regularly in the past	34 (15.3%)
Availability of a separate kitchen (N=89) (N=91)	
Available	69 (77.5%)
Not available	20 (22.5%)

3.5 Disease-related information

In terms of disease duration, the majority of participants (75%) had been diagnosed with COPD for more than five years, indicating a long-standing burden of illness in the study population. A smaller proportion had been diagnosed between three to five years ago (15%), while only 10% had received a diagnosis within the past three years. Regarding inhaler usage, 47.3% of the participants had been using inhalers for a period of 5 to 10 years, and 16.1% had been using them for more than 10 years. Meanwhile, 36.6% had been on inhaler therapy for less than four years.

Table 3.5 Disease-related information

Variable	Frequency
Number of years since COPD diagnosis	
Less than 3	23(10.0%)
3-5 years	33(15.0%)
More than 5 years	165(75.0%)
Number of years since Inhaler usage	
Less than 4 years	82(36.6%)
5-10 years	106(47.3%)
More than 10 years	35(16.1%)

3.6 Treatment-related information

The data on medication and inhaler use reveals that Foracort® was the most commonly used inhaler among participants, with 43% reporting its use. This was followed by Seroflo® (20%), Tiova® (13%), Levolin® (9.3%), and Asthalin® (6.7%). Additionally, 17% of participants reported using other types of inhalers. Regarding the type of inhaler devices used, a majority (55%) used metered-dose inhalers (MDIs) without spacers, while 27% used MDIs with spacers and 18% used dry powder inhalers (DPIs). In terms of the number of inhalers used, most participants (87%) used only one inhaler, 12.6% used two, and only 0.4% reported using three inhalers.

Table 3.6 Treatment-related information

Variable	Frequency
MEDICINES	
Foracort®	97 (43.0%)
Seroflo®	44 (20.0%)
Levolin®	21 (9.3%)
Tiova®	28 (13.0%)
Asthalin®	15 (6.7%)
Others	52 (17.0%)
TYPE OF INHALER	
Metered dose inhaler without spacer	123(55.0%)
Metered dose inhaler with spacer	61 (27.0%)
Dry powder inhaler	40 (18.0%)
TOTAL NUMBER OF INHALERS USED	
1	194 (87.0%)
2	29 (12.6%)
3	1 (0.4%)

3.7 Severity of Chronic Obstructive Pulmonary Disease (COPD)

The majority of respondents (59%) were classified under **GOLD E**, indicating more frequent exacerbations or higher symptom burden. **GOLD B** accounted for 32% of the cases, reflecting individuals with significant symptoms but fewer exacerbations. A smaller proportion (8.6%) fell under **GOLD A**, representing those with milder symptoms and low risk of exacerbation.

Table 3.7 Severity of Chronic Obstructive Pulmonary Disease

Variable	Frequency
Severity Of COPD	
GOLD A	19 (8.6%)
GOLD B	71 (32.4%)
GOLD E	134 (59%)

Table 3.7.1: Gold category and ICS usage

Category	GOLD A	GOLD B	GOLD E
ICS	9(5.0%)	52(30.5%)	109(64.1%)
No ICS	10(18.5%)	19(35.1%)	25(46.2%)

3. 8 Comorbidities

Approximately 68% of patients had at least one comorbidity, with the most prevalent being high blood pressure (38%), diabetes mellitus (28%), and heart disease (12%). Other notable conditions included thyroid disease (9.4%), dyslipidaemia (8.9%), and osteoporosis (6.3%). Rarer conditions, such as lung cancer, epilepsy, stroke, and liver failure, each accounted for less than 2% of cases.

In terms of ongoing treatment, high blood pressure (37%) and diabetes mellitus (27%) were the most commonly managed conditions, followed by heart disease (12%). Treatment rates for other conditions, including osteoporosis (5.4%), lung cancer (1.3%), and rare disorders, were relatively low.

Table 3.8 Comorbidities

Variable	Frequency
Comorbidities (N= explain)	
High blood pressure	85 (38.0%)
Diabetes mellitus	62 (28.0%)
Osteoporosis	14 (6.3%)
Heart disease	27 (12.0%)
Lung cancer	3 (1.3%)
Oral disease	2 (0.9%)
Others	54 (24.3%)
Treatment continuation ()	
Diabetes mellitus	61 (27%)
High blood pressure	83 (37%)
Heart disease	27 (12%)
Lung cancer	3 (1.3%)
Oral disease	2 (0.9%)
Osteoporosis	12 (5.4%)
Others	52 (22.4%)

3.9 Health system-related information

A majority of individuals (75%) sought care from government facilities, with only 25% attending private centres. Proximity influenced facility choice for 36% of patients, while

affordability played a role for 58%. Trust in healthcare providers was relatively low, with only 29% citing it as a reason for selection, and just 17% felt that good quality care was provided. Minimal numbers considered shorter wait times or friendly staff important (each only 3%). Regarding awareness of the SWAAS program, 21% reported enrollment, 38% were not enrolled, and 41% were unaware of the program. Rehabilitation exercises were received by 59% of patients, predominantly from doctors (96.9%). Modified diet advice was given to 46%, while 54% did not receive any. Most patients (70%) paid for medicines out of pocket, often purchasing from local shops (70%), with a smaller proportion relying on government supply (8.5%) or a mix of both (19%). Nebulisation was reported by 52% of participants, and among them, 63% used it regularly. Emergency injections were administered to 51% of individuals. Inhaler device training was widely disseminated (92%), mainly by doctors (84%). However, 45% of patients reported difficulty acquiring medicines, and only 10% substituted inhalers with nebulisation.

Table 3.9 Health system-related information

Variable	Frequency
Treatment Seeking Facility	
Government facility	169 (75.0%)
private	55 (25.0%)
Reasons for seeking a facility	
Nearby Location	
Yes	81 (36.0%)
No	143 (64.0%)
Easily Affordable	
Yes	129 (58.0%)
No	95 (42.0%)
Trust over the provider	
Yes	66 (29.0%)
No	158 (71.0%)
Good quality care	
Yes	38 (17.0%)
No	186 (83.0%)
Shorter waiting time	
Yes	7 (3.0%)
No	217 (97.0%)

Table 3.9 Health system-related information

Friendly staff	
Yes	7 (3.0%)
No	217 (97.0%)
Registered Under SWAAS	
Yes	48 (21.0%)
No	85 (38.0%)
Don't know	91 (41.0%)
Received Rehabilitation Exercise Training	
Yes	132 (59.0%)
No	92(41.0%)
Training given by (N=132)	
Doctor	128 (96.9%)
Nurse	4 (3.1%)
Received Advice Regarding Modified Diet	
Yes	104 (46.0%)
No	120(54.0%)
Medicines for regular treatment obtained from	
Government supply	19 (8.5%)
Out of pocket payment	157 (70.0%)
Government supply and out of pocket payment	42 (19.0%)
ECHS	6 (2.5%)
If out of pocket payment, Medicines Purchased From:	
Local medical shop	156 (70.0%)
Janaushadhi store	25 (11.0%)
Community pharmacy	10 (4.5%)
Medical representatives	1 (0.4%)
In house drug bank	12 (5.4%)
Whether undergone Nebulisation	
Yes	116 (52.0%)
No	108(48.0%)
Frequency of Nebulisation (N=116)	
Regularly	74 (63.0%)
Occasionally	35(31.0%)
Rarely	7 (6.0%)
Emergency Injection	
Yes	114 (51.0%)
No	110(49.0%)
Received Inhaler Device Usage Training	
Yes	206 (92.0%)

No	18(6.0%)
Device Training obtained from (N=206)	
Doctor	188 (84.0%)
Nurse	10 (9.4%)
Pharmacists	8 (6.6%)
Difficulty to Acquire Medicines	
Yes	100 (45.0%)
No	124(55.0%)
Substitution With Nebulisation	
Yes	23 (10.0%)
No	201(90.0%)

3.10 Support related factors

Majority of patients (62%) were accompanied to the hospital, while 38% attended alone.

Table 3.10 Support related factors

Variable	Frequency
Accompaniment to the Hospital	
Yes	139 (62.0%)
No	85(38.0%)

3.11 Patient related factors

21% struggled with using their inhaler correctly. The most common issue was hand-mouth coordination (12%), followed by trouble holding the device (8.9%) and partial spray leakage (6.3%). A group of 3.6% found inhalers hard to use. 25% reported experiencing side effects from their medication. When it came to disease awareness, most patients (62%) felt moderately informed about their condition, while 26% believed they had a good understanding. However, 12% had poor knowledge about their illness.

Table 3.11 Patient related factors

Variable	Frequency
Difficulty in Administering Inhaler Medicines	
Yes	46 (21.0%)
No	178(79.0%)
Type of difficulty faced (N=128)	
Difficult Hand and Mouth Coordination	27 (21.0%)
Difficulty to Hold	20 (15.6%)
Partial Outwards Spraying	14 (10.9%)
Not Easy to Use	8 (0.06%)
Side Effects	57 (44.5%)
Other Difficulties	2 (0.0%)
Difficulty to administer inhaler medicines when not at home	
Yes	0
No	224(100%)
How informed about the disease	
moderately	134 (62.0%)
well	56 (26.0%)
Poorly	27 (12.0%)

3.12 Adherence to inhaler medication

It is measured using the Morisky Green Levine Scale, which shows various patterns of medication behaviour. A majority of individuals (84%) did not forget to take their medication, while 16% admitted to forgetfulness. Carelessness in medication management was reported by 32% of patients, while 68% denied it. A significant portion (58%) stopped using inhaler medication when they felt better, which might reflect a misunderstanding of the importance of continuous medication use. Conversely, only 4.5% of participants stopped their medication when their condition worsened.

When classified by adherence levels, 76% (CI of 66% - 84%) of individuals were Non-adherent and 24% (CI of 16% - 34%) were adherent.

Table 3.12 Adherence to inhaler medication

Variable	Frequency
MORISKY GREEN LEVINE SCALE-ADHERENCE MEASUREMENT	
Forgetfulness	
Yes	35 (16.0%)
No	188(84.0%)
Carelessness	
Yes	70 (32.0%)
No	154(68.0%)
Stops Inhaler medications when gets better	
Yes	131 (58.0%)
No	93(42.0%)
Stops Inhaler medications when gets worse	
Yes	10 (4.5%)
No	214(95.5%)
Classification of Adherence Level Based on Score	
Low Adherence	10 (4.0%)
Medium Adherence	161 (72.0%)
High Adherence	53 (24.0%)
Adherence by quantified method	
Adherent	115(51.3%)
Non-Adherent	109(48.7%)

3.13 Other factors related to adherence

65% found medicines difficult to afford. Half of patients (50%) reported medicines running out too quickly, while 31% faced transportation issues accessing treatment. Fewer patients struggled with complicated regimens (5.0%), fear of side effects (10%), or lack of belief in medication (1.4%). Only 0.4% found usage instructions unclear.

Table 3.13 Other factors

Variable			Frequency
Difficult to Afford Medicines			
Yes			145 (65%)
No			78(35%)
Difficulty in Transportation			
Yes			68 (31%)
No			154(68.7%)
Medicines	Gets	Over	
Quickly			
Yes			111 (50%)
No			112(50%)
Instruction to Use Medicines are not clear			
Yes			1 (0.4%)
No			223(99.5%)
Complicated treatment regime			
Yes			11 (5.0%)
No			213(95%)
Fear of the Side Effects			
Yes			23 (10%)
No			200(85%)
No Belief Upon Medication			
Yes			3 (1.4%)
No			221(98.6%)

3.14 Association of Adherence with the Independent Variables

Association of independent variables with adherence are shown from Table 3.14.1 to 3.14.12. A statistically significant association was observed between marital status and adherence ($p = 0.041$), with a higher adherence rate among single individuals (31.7%) compared to married participants (21.4%). Work status also showed a strong association with adherence ($p < 0.001$); notably, skilled workers had the highest adherence (57.1%) while unskilled workers and government employees had substantially lower adherence rates (13.2% and 11.1%, respectively). Although not statistically significant, trends were noted in adherence rates increasing with higher educational attainment, with 38.9%

adherence among university graduates. Participants who had spent more medical expenses in the last 30 days showed markedly higher adherence (66.7%) compared to those who spent less (21.5%, $p = 0.006$). Similarly, APL ration card holders were more seen to be adherent (35.4%) than BPL card holders (18.4%, $p = 0.006$). Adherence was 24.4% among those who spent on inhalers vs. only 8.3% among those who did not with a statistical significance of 0.012. The type of healthcare facility used was strongly associated with adherence ($p < 0.001$). Those visiting private facilities had substantially higher adherence (43.4%) than those using government services (16.7%). Registration under SWAAS programme also showed significance ($p = 0.024$), with higher adherence among those not registered or unaware of the program compared to those registered. Difficulty in acquiring medicines was associated with lower adherence (16.0% vs 29.3%, $p = 0.02$). Similarly, those who reported difficulty in affording medications ($p = 0.009$), transportation issues ($p = 0.017$), or who experience quick exhaustion of medicines ($p < 0.001$) were significantly less adherent. Only 17.9% of those who couldn't afford medicines were adherent vs. 33.3% who could. 13.2% adherence in those with transportation problems vs. 27.9% without. Just 12.6% adherence among those who ran out of medicines, compared to 33.9% who didn't. Those who were well-informed about their disease tended to be more adherent (33.3%) compared to those with moderate or poor understanding. Inhaler device training did not reach significance, but a trend toward better adherence among those trained by a doctor was observed.

Table 3.14.1 Association of Sociodemographic Factors with Adherence

Variable	N	Adherence		p-value Chi-square
		Adherent	Non-Adherent	
Age of the participants in years (Median, SD) 61 (14)				
Gender				0.40
Female	119	25 (21.0%)	94 (79.0%)	
Male	104	27 (26.0%)	77 (74.0%)	
Religion				0.50
Christian	52	15 (28.8%)	37 (71.2%)	
Hindu	153	34 (22.2%)	119 (77.8%)	
Muslim	18	3 (16.7%)	15 (83.3%)	
Marital Status				0.041
Married	182	39 (21.4%)	143 (78.6%)	
Single	42	13 (31.7%)	28 (68.3%)	
Education Status				0.09
Less than primary school	38	4 (10.5%)	34(89.5%)	
Primary school completed	75	16 (21.3%)	59 (78.7%)	
Secondary school completed	85	22 (25.9%)	63 (74.1%)	
University completed	18	7 (38.9%)	11 (61.1%)	
Postgraduate degree	3	1 (33.3%)	2 (66.7%)	
other	4	2 (50.0%)	2 (50.0%)	
Work Status				<0.001
Government employee	9	1 (11.1%)	8 (88.9%)	
Skilled worker	21	12 (57.1%)	9 (42.9%)	
Unemployed	125	30 (24.0%)	95 (76.0%)	
Unskilled worker	68	9 (13.2%)	59 (86.8%)	

Table 3.14.2 Association of Socioeconomic factors with Adherence

Variable	N	Adherence		p-value Chi-square
		Adherent	Non-Adherent	
Amount of annual income				0.50
Up to 10000	17	1(5.9%)	16 (94.1%)	
10001-20000	7	2 (28.6%)	5 (71.4%)	
20001-30001	10	2 (20.0%)	8 (80.0%)	
More than 30000	53	14 (26.4%)	39 (73.6%)	

Medical expenditure in the past 30 days			0.006
Less than 5000	214	46 (21.5%)	168 (78.5%)
More than 5000	9	6 (66.7%)	3(33.3%)
Ration Card Type			0.006
APL Ration card	65	23 (35.4%)	42 (64.6%)
BPL ration card	158	29 (18.4%)	129 (81.6%)

Table 3.14.3 Association of Cost related factors with Adherence

Variable	N	Adherence		p-value Chi square
		Adherent	Non-Adherent	
Number of OP Visits in the last 30 days				0.20
At least once	70	19(27.1%)	51 (72.9%)	
More than once	30	10 (33.3%)	20(66.7%)	
Never	123	23(18.7%)	100 (81.3%)	
Number of OP Visits in the last 30 days due to respiratory illness				0.50
At least once	68	19 (27.9%)	49 (72.1%)	
More than once	20	5 (25.0%)	15 (75.0%)	
Never	135	28 (20.7%)	107 (79.3%)	
Number of IP Admission in the last 30 days				>0.9
At least once	56	10 (21.4%)	44 (78.6%)	
Never	167	40 (24.0%)	127 (76.0%)	
Number of IP Admission in the last 30 days due to respiratory illness				0.70
At least once	37	7 (18.9%)	30 (81.1%)	
More than once	7	2 (28.6%)	5 (71.4%)	
Never	179	43 (24.0%)	136 (76.0%)	
Any money spent on Inhaler				0.012
Yes	197	48 (24.4%)	149 (75.6%)	
No	24	2 (8.3%)	22 (91.7%)	
Cost of Inhalers in the past 3 months				0.70
Less than 3000	196	45 (23.0%)	151 (77.0%)	
More than 3000	27	7 (25.9%)	20(74.1%)	
Any IP admission cost				0.20
Yes	40	12 (30.0%)	28 (70.0%)	
No	176	40 (22.7%)	136 (77.3%)	

Possession Of Health insurance	0.30		
Yes	131	26 (19.8%)	105 (80.2%)
No	65	19 (29.2%)	46 (70.8%)
Don't know	27	7 (25.9%)	28 (75.7%)
Type of Health Insurance	0.60		
Government insurance	94	17 (18.1%)	77 (81.9%)
Private insurance	37	9 (24.3%)	8 (80.0%)
No insurance	65	19 (29.2%)	46 (70.8%)
Not aware	27	7 (25.9%)	20 (74.1%)

Table 3.14.4 Association of Behaviour related factors with adherence

Variables	N	Adherence		p-value Chi-square
		Adherent	Non-Adherent	
Smoking Status				0.20
Smoker	81	21 (25.9%)	60 (74.1%)	
Never	141	30 (21.3%)	111 (78.7%)	
Alcohol consumption status				0.40
Yes	16	2 (12.5%)	14 (87.5%)	
No	205	50 (24.4%)	155 (75.6%)	
Cooking Status				0.80
Never cooked regularly	98	22 (22.4%)	76 (77.6%)	
Cooks regularly now	90	23 (25.6%)	67 (74.4%)	
Cooked regular in the past	34	7 (20.6%)	27 (79.4%)	
Availability of a Separate Kitchen				0.40
Available	68	16 (23.5%)	52 (76.5%)	
Not available	20	7 (35.0%)	13 (65.0%)	

Table 3.14.4 Association of Disease related factors with Adherence

Variable	N	Adherence		p-value Chi-square
		Adherent	Non-Adherent	
Number of years since COPD diagnosis				0.091
Less than 3 years	26	7 (26.9%)	19 (73.1%)	
3-5 years	32	12 (37.5%)	20 (62.5%)	
More than 5 years	165	33 (20.0%)	132 (80.0%)	

Number of years since Inhaler usage			0.70
5-10	106	22 (20.8%)	84 (79.2%)
Less than 5 Years	82	21 (25.6%)	61 (74.4%)
More than 10 years	35	9 (25.7%)	26 (74.3%)

Table 3.14.5 Association of Treatment related factors with Adherence

Variable	N	Adherence		p-value Chi-square
		Adherent	Non-Adherent	
Foracort®				0.70
Yes	97	24 (24.7%)	73(75.3%)	
No	126	28 (22.2%)	98 (77.8%)	
Seroflo®				0.50
Yes	44	12 (27.3%)	32 (72.7%)	
No	179	40 (22.3%)	139 (77.7%)	
Levolin®				0.20
Yes	21	2 (9.5%)	19 (90.5%)	
No	202	50 (24.8%)	152 (75.2%)	
Tiova®				0.80
Yes	28	7 (25.0%)	21 (75.0%)	
No	195	45 (23.1%)	150 (76.9%)	
Asthalin®				0.50
Yes	15	2 (13.3%)	13 (86.7%)	
No	208	50 (24.0%)	158(76.0%)	
Type of Inhaler				
Metered dose Without Spacer				>0.9
Yes	126	29 (23.0%)	97 (77.0%)	
No	97	23 (23.7%)	74 (76.3%)	
Metered dose With Spacer				0.20
Yes	61	18 (29.5%)	43 (70.5%)	
No	162	34 (21.0%)	128 (79.0%)	
Dry Powder				0.20
Yes	39	6 (15.4%)	33 (84.6%)	
No	184	46 (25.0%)	138 (75.0%)	
Total Number of Inhalers Used				0.40
1	193	48 (24.9%)	145 (75.1%)	
2	29	4 (13.8%)	25 (86.2%)	
3	1	0 (0.0%)	1 (100.0%)	

Table 3.14.6 Association of severity with Adherence

Variable	N	Adherence		p-value Chi Square
		Adherent	Non-Adherent	
Severity of COPD				0.20
Gold A	19	4 (22.2%)	14 (77.8%)	
Gold B	73	22 (30.1%)	51 (69.9%)	
Gold E	132	26 (19.7%)	106 (80.3%)	

Table 3.14.7 Association of Comorbidities with Adherence

Variable	N	Adherence		p-value Chi square
		Adherent	Non-Adherent	
Comorbidities				0.50
High blood pressure	85	16 (18.8%)	69 (81.2%)	
Diabetes mellitus	62	13 (21.0%)	49 (79.0%)	
Osteoporosis	14	5 (35.7%)	9 (64.3%)	
Heart disease	27	3 (11.1%)	24 (88.9%)	
Lung cancer	3	2 (66.7%)	1 (33.3%)	
Oral disease	2	0 (0.0%)	2 (100.0%)	
Other Comorbidities	50	10 (20.0%)	40 (80.0%)	
Treatment continuation				0.70
Diabetes mellitus	61	13 (21.3%)	48 (78.7%)	
High blood pressure	83	16 (19.3%)	67 (80.7%)	
Heart disease	27	3 (11.1%)	24 (88.9%)	
Lung cancer	3	2 (66.7%)	1 (33.3%)	
Oral disease	2	0 (0.0%)	2 (100.0%)	
Osteoporosis	12	4 (33.3%)	8 (66.7%)	
Others	47	10 (21.3%)	37 (78.7%)	

Table 3.14.8 Association of health system-related factors with adherence

Variable	N	Adherence		p-value Chi-square
		Adherent	Non-Adherent	
Treatment Seeking Facility				<0.001
Government facility	168	28 (16.7%)	140 (83.3%)	
Private	55	21 (43.4%)	31 (56.6%)	
Reasons for seeking a facility				
Nearby location				0.20
Yes	81	15 (18.5%)	66 (81.5%)	
No	142	37 (26.1%)	105 (73.9%)	

Table 3.14.9 Association of health system-related factors with adherence

Easily Affordable				0.028
Yes	128	23 (18.0%)	105 (82.0%)	
No	95	29 (30.5%)	66 (69.5%)	
Trust Over the Provider				0.40
Yes	66	18 (27.3%)	48 (72.7%)	
No	157	34 (21.7%)	123 (78.3%)	
Good Quality Treatment				0.03
Yes	38	14 (36.8%)	24 (63.2%)	
No	185	38 (20.5%)	147 (79.5%)	
Shorter Waiting Time				0.70
Yes	7	2.0 (28.6%)	5.0 (71.4%)	
No	216	50.0 (23.1%)	166.0 (76.9%)	
Staff Availability and Co-operation				0.70
Yes	7	2.0 (28.6%)	5.0 (71.4%)	
No	216	50.0 (23.1%)	166.0 (76.9%)	
Other Reasons				0.14
Yes	3	2.0 (66.7%)	1.0 (33.3%)	
No	220	50.0 (22.7%)	170.0 (77.3%)	
Registered Under SWAAS				0.024
Yes	48	7.0 (14.6%)	41.0 (85.4%)	
No	85	28.0 (32.9%)	57.0 (67.1%)	
Don't know	90	17.0 (18.9%)	73.0 (81.1%)	
Received Rehabilitation Exercise Training				0.60
yes	132	29.0 (22.0%)	103.0 (78.0%)	
no	92	23.0 (25.3%)	68.0 (74.7%)	
Training given by				0.20
Doctor	128	26.0 (20.5%)	101.0 (79.5%)	
Nurse	4	2.0 (50.0%)	2.0 (50.0%)	
Advice Regarding Modified Diet				0.20
Yes	104	28.0 (26.9%)	76.0 (73.1%)	
No	119	24.0 (20.2%)	95.0 (79.8%)	
Medicines for Regular Treatment Obtained From				0.70
Government supply	19	3.0 (15.8%)	16.0 (84.2%)	
Out-of-pocket payment	156	39.0 (25.0%)	117.0 (75.0%)	
Government supply and out-of-pocket payment	42	8.0 (19.0%)	34.0 (81.0%)	
ECHS	6	2.0 (33.3%)	4.0 (66.7%)	
Out-of-pocket payment				0.60
Local medical shop	155	40.0 (25.8%)	115.0 (74.2%)	
Janaushadi	25	3.0 (12.0%)	22.0 (88.0%)	

Table 3.14.10 Association of health system-related factors with adherence

Community pharmacy	10	3.0 (30.0%)	7.0 (70.0%)	
In-house drug Bank	12	3.0 (25.0%)	9.0 (75.0%)	
Medical representative	1	0.0 (0.0%)	1.0 (100.0%)	
Whether Undergone Nebulisation				0.30
Yes	116	24.0 (20.7%)	92.0 (79.3%)	
No	107	28.0 (26.2%)	79.0 (73.8%)	
Frequency of Nebulisation (N= 116)				0.50
Regularly	74	15.0 (20.3%)	59.0 (79.7%)	
Occasionally	30	5.0 (16.7%)	25.0 (83.3%)	
Rarely	8	3.0 (37.5%)	5.0 (62.5%)	
Emergency Injection				0.40
Yes	114	24.0 (21.1%)	90.0 (78.9%)	
No	109	28.0 (25.7%)	81.0 (74.3%)	
Received Inhaler device usage Training				0.60
Yes	205	46.0 (22.4%)	159.0 (77.6%)	
No	17	5.0 (29.4%)	12.0 (70.6%)	
Device Training By				0.10
Doctor	187	39.0 (20.9%)	148.0 (79.1%)	
Nurse	18	6.0 (33.3%)	12.0 (66.7%)	
Pharmacist	15	5.0 (33.3%)	10.0 (66.7%)	
Difficulty to Acquire Medicines				0.02
Yes	100	16.0 (16.0%)	84.0 (84.0%)	
No	123	36.0 (29.3%)	87.0 (70.7%)	
Substitution With Nebulisation				0.20
Yes	24	3.0 (12.5%)	21.0 (87.5%)	
No	196	46.0 (23.5%)	150.0 (76.5%)	

Table 3.14.11 Association of Support related factors with Adherence

Variable	N	Adherence		p-value Chi-square
		Adherence	Non-Adherent	
Does anyone accompany to the Hospital				0.60
Yes	138	30.0 (21.7%)	108.0 (78.3%)	
No	84	22.0 (26.2%)	62.0 (73.8%)	
Does anyone need to remind of Medication				0.40
Yes	30	5.0 (16.7%)	25.0 (83.3%)	
No	193	47.0 (24.4%)	146.0 (75.6%)	

Table 3.14.12 Association of patient-related factors with Adherence

Variable	N	Adherence		p-value Chi-square
		Adherent	Non-Adherent	
Difficulty in Administering Medicines				0.30
Yes	46	8.0 (17.4%)	38.0 (82.6%)	
No	177	44.0 (24.9%)	133.0 (75.1%)	
Partial Outwards Spraying				0.50
Yes	14	2.0 (14.3%)	12.0 (85.7%)	
No	209	50.0 (23.9%)	159.0 (76.1%)	
Difficult Hand and Mouth Coordination				0.11
Yes	27	3.0 (11.1%)	24.0 (88.9%)	
No	196	49.0 (25.0%)	147.0 (75.0%)	
Difficulty to Hold the Inhaler				0.60
Yes	20	3.0 (15.0%)	17.0 (85.0%)	
No	203	49.0 (24.1%)	154.0 (75.9%)	
Inhaler type not easy to use				0.20
Yes	8	0.0 (0.0%)	8.0 (100.0%)	
No	215	52.0 (24.2%)	163.0 (75.8%)	
Other Difficulties				0.054
Yes	2	2.0 (100.0%)	0.0 (0.0%)	
No	221	50.0 (22.6%)	171.0 (77.4%)	
Side Effects				0.80
Yes	57	14.0 (24.6%)	43.0 (75.4%)	
No	165	38.0 (23.0%)	127.0 (77.0%)	

Patients' information on the disease				0.071
Well	63	21.0 (33.3%)	42.0 (66.7%)	
Moderately	133	27.0 (20.3%)	106.0 (79.7%)	
Poorly	27	4.0 (14.8%)	23.0 (85.2%)	

Table 3.14.13 Association of other factors with adherence

Variable	N	Adherence		P-value Chi-square
		Adherent	Non-Adherent	
Difficult to Afford Medicines				0.009
Yes	145	26.0 (17.9%)	119.0 (82.1%)	
No	78	26.0 (33.3%)	52.0 (66.7%)	
Difficulty in Transportation				0.017
Yes	68	9.0 (13.2%)	59.0 (86.8%)	
No	154	43.0 (27.9%)	111.0 (72.1%)	
Medicines Get Over Quickly				<0.001
Yes	111	14.0 (12.6%)	97.0 (87.4%)	
No	112	38.0 (33.9%)	74.0 (66.1%)	
Instructions for Using Medicines Not Clear				0.2
Yes	1	1.0 (100.0%)	0.0 (0.0%)	
No	222	51.0 (23.0%)	171.0 (77.0%)	
Complicated Treatment				0.071
Yes	11	0.0 (0.0%)	11.0 (100.0%)	
No	211	52.0 (24.6%)	159.0 (75.4%)	
Fear of the Side Effects				0.8
Yes	23	5.0 (21.7%)	18.0 (78.3%)	
No	200	47.0 (23.5%)	153.0 (76.5%)	
No Belief In Medication				>0.9

3.15 Factors Associated with Adherence: Results from Multivariable Regression

Variable selection for the final model was guided by the Akaike Information Criterion (AIC), with the model having the lowest AIC selected as the best fit. The final model included four key variables: work status, medical expenditure in the past 30 days, treatment-seeking facility, and difficulty in affording medicines. Compared to government employees, skilled workers had significantly lower odds of non-adherence to inhaler therapy (AOR = 0.10, 95% CI: 0.00–0.71, $p = 0.047$), suggesting they were more likely to

adhere to inhaler therapy. No statistically significant differences were observed for unskilled workers or unemployed individuals relative to government employees. Participants who spent more than Rs. 5000 on medical expenses in the last month had significantly lower odds of non-adherence compared to those who spent less than Rs. 5000 (AOR = 0.17, 95% CI: 0.02–0.91, $p = 0.048$). This indicates better adherence among individuals with higher medical spending. Patients who sought care from private facilities were significantly less likely to be non-adherent compared to those attending government facilities (AOR = 0.39, 95% CI: 0.18–0.82, $p = 0.013$), suggesting higher adherence in the private sector. Although participants who reported difficulty affording medications had higher odds of non-adherence (AOR = 1.94, 95% CI: 0.94–3.97), this association did not reach statistical significance ($p = 0.071$).

Table 3.15.1 Multivariable regression of variables obtained from the best-fit model

Variable	N			Adjusted Odds ratio	95% CI	p-value
		Adherent	Non adherent			
Work Status						
Government employee	9	1.0 (11.1%)	8.0 (88.9%)	—	—	
Skilled worker	21	12.0 (57.1%)	9.0 (42.9%)	0.1	0.00, 0.71	0.047
Unemployed	12	30.0 (24.0%)	95.0 (76%)	0.28	0.01, 1.76	0.3
Unskilled worker	5	9.0 (13.2%)	59.0 (86.8%)	0.57	0.03, 3.92	0.6
Medical expenditure in the past 30 days						
Less than 5000	21	46.0 (21.5%)	168.0 (78.5%)	—	—	
More than 5000	4	6.0 (66.7%)	3.0 (33.3%)	0.17	0.02, 0.91	0.048
Treatment Seeking Facility						
Government	16	28.0 (16.7%)	140.0 (83.3%)	—	—	
Private	8	23.0 (43.4%)	30.0 (56.6%)	0.39	0.18, 0.82	0.013
Other	53	1.0 (50.0%)	1.0 (50.0%)	0.19	0.01, 5.43	0.3
Difficult to Afford Medicines						
Yes	2	23.0 (18.0%)	105.0 (82.0%)	1.94	0.94, 3.97	0.071
No	12	29.0 (30.5%)	66.0 (69.5%)	—	—	

Chapter 4

4.1 Discussion

This section has a detailed discussion of the study findings. The study aimed to find the extent of adherence to inhaler therapy among COPD patients in Rural Thiruvananthapuram. For this, a cross-sectional survey was done among 224 patients from the Line list of ASHA workers. The study also intends to explore the demographic characteristics, socio-economic information, cost-related information, behaviour-related information, disease-related information, treatment-related information, severity assessment, therapy and health system-related information, support-related information, and patient-information that can be associated with treatment adherence.

In this study, the mean age of the participants was 61 years (SD=14 years), unlike studies that mainly included much older patients. (Humenberger et al., 2018a; Izquierdo-Condoy et al., 2025) Most of the COPD-related studies showed male dominance. (Humenberger et al., 2018a) However, this study has a slightly higher proportion of female participants. This could be because COPD prevalence and incidence are showing an upward trend in women. (Suh et al., 2008) It could also be due to the peculiar distribution of the Line list handled by the ASHA workers, or it could be due to the timing of the cross-sectional study, which provided more female participants compared to other studies. The majority of participants (70.5%) belonged to households holding a Below Poverty Line (BPL) ration card, while only 29.5% held an Above Poverty Line (APL) ration card. This distribution indicates that a substantial proportion of the study population came from lower socioeconomic backgrounds. A very minority of the participants had only done higher education as well

(9.4%). These findings are very similar to other studies. (Alexander et al., 2025; Nazareth et al., 2023a)

The findings indicated that skilled workers demonstrated better adherence to inhaler therapy when compared to government employees. Additionally, individuals who sought care from private healthcare facilities showed higher adherence levels than those attending government facilities.

The study findings indicated registration under the SWAAS program and their adherence to inhaler therapy is associated. Participants who were registered under SWAAS had lower adherence compared to those who were not registered or were unaware of their registration status. Interestingly, adherence was highest among those not registered under SWAAS, and lowest among those who were registered. SWAAS, while designed to improve access to care and provide free medications, may not be effectively implemented in all parts of Rural Thiruvananthapuram. Patients might be enrolled but may not consistently receive follow-up, counselling, or medication supply. Alternatively, the lower adherence among SWAAS-registered patients may reflect that this group includes more severe or long-standing cases, where adherence challenges are more common despite program support.

This study findings show that people with higher medical expenditures are more likely to be adherent to inhaler therapy. This is in contrast to a study (Mäkelä et al., 2013b) which says that good adherence to treatment is generally associated with reduced healthcare utilization. However, this relationship between adherence and medical expenditure can vary depending on the severity of the disease and people who follow their treatment plan closely may have to spend more money on medications. Similarly, patients who have faced affordability issues tend to be more non-adherent than those who do not have such difficulties. The non-adherence rate in this study is 76%, which is higher than several other

previous studies. (Turégano-Yedro et al., 2023) The major reason for non-adherence found is stopping medication when feeling better (58%). This is followed by Forgetfulness (16%), the second highest reason for Non-Adherence These findings are similar to that of the given study (Fugate et al., 2015) The reasons for such behaviour could be mainly attributed to the chronic nature of the disease, high cost of the inhalers. 87.4% of the patients who faced the problem of quick exhaustion of medicines were found to be non-adherent.

According to the GOLD guidelines, single-inhaler therapy is associated with better treatment adherence. In this study, 87% of the patients were prescribed single inhalation therapy. Despite this, the actual adherence rate was only 24% suggesting that other factors also significantly influence adherence.

(Global Initiative for Chronic Obstructive Lung Disease - GOLD, 2025)

As per this study, only 32.6% of the patients using MDIs use them with spacers, among which a significant proportion are non-adherent (70.5%). The underusage of the spacers could be linked to the high cost of treatment borne by the patients. But studies show that using a spacer could enhance therapeutic effectiveness by increasing bronchodilation, making it a valuable tool in proper disease management. (Vincken et al., 2018)

According to some studies, difficulty using inhalers in the public setting was identified as a potential barrier to adherence. (Nazareth et al., 2023b) However, none of the patients experienced such a barrier in this study. One of the reasons could be that most of the patients had been diagnosed with COPD for more than 5 years. Hence, over time, they may have become more comfortable with their condition and adjusted to using inhalers in public.

According to the GOLD guidelines, inhaled corticosteroids are recommended to be used only by patients who belong to the most severe category that is, GOLD E, as they experience two or more exacerbations per year. (Savran et al., 2021) Despite these

guidelines, the study findings say that 35.5% of the patients outside this group use ICS, that is GOLD A and GOLD B. (Table 3.7.1)

4.2 Strength of the study:

- **Focus on a High-Burden, Understudied Area:** The study targets explicitly COPD patients in rural Thiruvananthapuram, a population with limited previous research, addressing a critical knowledge gap.
- **Use of Validated Measurement Tool:** Adherence to inhaler therapy was assessed using the Morisky Green Levine Medication Adherence Scale, a well-established and validated tool, enhancing the reliability of findings.
- **Community-Based, Real-World Data Collection:** Participants were recruited from line lists maintained by Accredited Social Health Activists (ASHA), ensuring representation from grassroots healthcare systems and capturing real-world adherence behaviours.
- **Comprehensive Assessment of Determinants:** The study not only measured adherence rates but also systematically examined a wide range of socio-demographic, economic, behavioural, and healthcare-related factors influencing adherence.
- **Robust Analytical Approach:** Multivariable logistic regression with model selection based on Akaike Information Criterion (AIC) strengthened the identification of independent predictors, minimizing overfitting and enhancing analytical rigor.

- **Policy and Programmatic Implications:** Findings offer practical insights for improving government programs like SWAAS and inform strategies to make inhaler therapy more affordable and accessible.
- **Identification of Behavioural Barriers:** By highlighting issues like forgetfulness and symptom-driven discontinuation, the study points toward modifiable behavioural factors that could be targeted in adherence-improvement interventions.

4.3 Limitations of the study

- **Cross-Sectional Design:** The study's cross-sectional nature limits the ability to establish causal relationships between associated factors and adherence behaviour.
- **Self-Reported Data:** Adherence was measured through self-reported responses, which may be influenced by social desirability bias and recall bias, potentially leading to over- or underestimation of accurate adherence rates. Data on Prescription refill analysis would have improved the validity of the findings.
- **Incomplete Exploration of Clinical Variables:** Clinical severity of COPD (e.g., spirometry data) was not assessed, which could influence adherence and health outcomes.
- **Limited Generalizability:** Findings are specific to rural regions of Thiruvananthapuram and may not be directly generalizable to urban settings or other rural populations with different healthcare infrastructures or cultural contexts
- **Potential Selection Bias:** Recruitment through ASHA-maintained line lists may inadvertently exclude less engaged patients with the public health system, possibly biasing adherence rates.

- **Unmeasured Psychological and Cognitive Factors:** Factors like depression, cognitive impairment, or detailed health literacy, which are known to impact adherence, were not specifically assessed.
- **Cost-Related Data Limitations:** While economic factors were explored, detailed analysis of insurance coverage or catastrophic health expenditures was not performed.

4.4 Conclusion:

This study highlights a critically high non-adherence rate (76%) to inhaler therapy among COPD patients in rural Thiruvananthapuram, Kerala. Financial barriers, high out-of-pocket medical expenditures, and treatment at private healthcare facilities emerged as significant determinants of poor adherence. Additionally, behavioural factors such as carelessness and symptom-driven discontinuation of therapy were commonly reported reasons for non-adherence.

The study's strengths lie in its focus on an underserved population, validated adherence measures, comprehensive socio-economic and healthcare factors assessment, and robust analytical methods. However, limitations such as its cross-sectional design, reliance on self-reported data, and restricted generalizability must be considered when interpreting the findings.

The results underscore the urgent need for multi-pronged interventions, including improving access to affordable inhaler medications, strengthening government programs like SWAAS, and providing patients with targeted educational and behavioural support. Future research incorporating longitudinal follow-up and clinical severity measures would further enhance understanding and guide effective COPD management strategies in rural India.

4.5 Recommendation

- Extending the SWAAS program to all the FHCs to ensure uniform access. This can support early detection and timely intervention.
- Early detection could reduce the unnecessary usage of corticosteroids and their long-term dependence
- Training to properly use the inhaler devices, which could prevent wastage of resources

CHAPTER 5

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ANNEXURE I

Participant Information Sheet (English)

Achutha Menon Centre For Health Science Studies (AMCHSS)

Sree Chitra Tirunal Institute of Medical Sciences & Technology (SCTIMST)

Trivandrum -11

Participant Information Sheet

I am Dr U Krishnapriya, currently pursuing Master of Public Health (MPH) at Achutha Menon Centre for Health Science Studies (AMCHSS), Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, Kerala. I am studying “Assessment of Inhaler Therapy Adherence Rates and its influencing factors among COPD Patients in Rural Thiruvananthapuram” as a part of my course work. This study is being done under the supervision of Dr Jeemon P, Additional Professor at AMCHSS. If this information sheet contains any words or information that you do not understand, please feel free to clarify these. You may also ask any question related to this study.

Purpose of the study

Chronic Obstructive pulmonary disease is a growing concern which is progressive and requires a long-term management. Since the disease mainly affects older population, it could be a real challenge to sustain the prolonged and complex treatment on a daily basis with ease. So, it is important to understand how well the patients are adhering to the inhaler therapy they are being prescribed and what all factors are affecting this adherence. Several studies have shown that a significant proportion of the patients fail to follow the prescribed inhalers leading to poorer health outcomes and mortality. This study will help to estimate the level at which each factor contributes to the level of adherence.

A Survey is being carried out to assess the adherence rate to inhaler therapy and its influencing factors in COPD patients in rural Thiruvananthapuram. You have been chosen through a random process of selection with the help of ASHA workers. The study involves COPD patients above the age of 18 who have been prescribed Inhalers. The study excludes those who are not in a physical or mental condition to answer the questions, those

who are not prescribed inhalers, those who are diagnosed with COPD in less than 6 months, those who are bed-ridden and those who are not willing to participate.

Procedure

If you agree to participate in the study, you will be asked to complete an interview schedule that will include questions focused on your Socio-demographic details, Socio-economic details, current medication details, therapy related, disease related, support related, cost related, behavior related, health system related details, exacerbation history as well as comorbidities. Additionally, I will use the Morisky Green Levine scale to measure the level of adherence. This collected data will be used for research purposes only. I may contact you again if the collected information was found to be incomplete. The survey would take approximately 30 - 45 minutes of your valuable time

Risk and discomfort

Participation in this study poses no risk to your health, though there will be questions that you might find personal.

Benefits

There will be a direct benefit for you from this study. A paper illustration will be given to you at the end of the study from which you can learn to use the inhaler in its correct method. The information collected from you and from other participants will help in estimating the rate of adherence to inhalers and its influencing factors in COPD patients

Confidentiality

You will be interviewed in private. All information that is related to you will be kept completely confidential and your identity will not be relieved at any stage. A participant identification number will be assigned to each participant that will help in maintaining the confidentiality of the data collected. Access to this participant identification number will be restricted to those analyzing the data only.

Voluntary participation

Your participation in this study is purely voluntary which means you can decide

whether to participate in the study or not. If at any stage you wish to discontinue, you are free to do so without any adverse consequences.

If you have any research related questions or you would like to verify my credentials, you may contact me or a member of our institute's Ethics Committee at the following address.

Dr U Krishnapriya

Principal Investigator

MPH2023, AMCHSS, SCTIMST

Trivandrum

Contact number:9400581838

Gmail- krishnapriyau0@gmail.com

Alternatively, the member secretary of our institute's ethics committee at the following address:

Dr Srinivas G

Member Secretary Institutional Ethics Committee

SCTIMST, TRIVANDRUM- 695011

Office: 04712524689

Email: iec.mem.sec@sctimst.ac.in

ANNEXURE II

Consent Form (English)

I confirm that I have read / been read out and understood the information regarding the study “Assessment of Inhaler Therapy Adherence Rates and its influencing factors among COPD Patients in Rural Thiruvananthapuram “as provided in the participant information sheet. The nature of the study and my involvement has been explained and all my questions have been answered satisfactorily. By signing this consent form, I indicate that I understand what will be expected from me and that I am willing to participate in this study. I know that I can withdraw at any time. I have been informed who should be contacted if the need arises.

Date:

Place:

Name of the participant

Signature/Thumb impression

Name of Principal Investigator

Signature

ANNEXURE III

Interview Schedule (English)

Achutha Menon Centre for Health Science

Sree Chithra Tirunal Institute of Medical Science and Technology,

Thiruvananthapuram, Kerala ,695011

All information obtained from this interview will remain confidential and will be used for research purposes only. Individual information will not be disclosed to anyone under any circumstances.

1. GENERAL INFORMATION

1.1 Participant ID

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(Two digits from ward and two digits from participant number from the respective ward)

1.2	Date and time of interview	
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2. SOCIO-DEMOGRAPHIC CHARACTERISTICS

2.1	Age completed in years as of 1 st january 2025	
2.2	Sex	☐ 1.Male ☐ 2.Female ☐ 3.Others
2.3	Religion	☐ 1.Hindu ☐ 2.Muslim ☐ 3.Christian ☐ 4.Other, specify _____
2.4	Marital status	☐ 1.Single ☐ 2.Married ☐ 3.Divorced/ Separated ☐ 4.Widowed ☐ 5.Other(specify)

2.5	Type of family	☐ 1.Nuclear ☐ 2.Joint
2.6	Number of household members(specify)	
2.7	Education status	☐ 1.less than primary school ☐ 2.primary school completed ☐ 3.secondary school completed ☐ 4.college or university completed ☐ 5.postgraduate degree ☐ 6.Others(specify) _____
2.8	Number of years of formal schooling	
2.9	Which of the following best describes your main work status over the past 12 months?	☐ 1.government employee ☐ 2.skilled worker ☐ 3.unskilled or manual labourer ☐ 4.unemployed
2.10	Ownership of the house	☐ 1.Own ☐ 2.Rented ☐ 3.Relatives house
2.11	Since how long have you been staying at this house?	(In Number of years), specify _____

3. SOCIO-ECONOMIC FACTORS

3.1	What is the total household expenditure in the past one month?	☐ 1.INR _____ ☐ 2.Don't know
3.2	What was the total expenditure for your medical care in the past one month?	☐ 1.INR _____ ☐ 2.Don't know
3.3	What is your Annual income	☐ 1.INR _____ ☐ 2.No income
3.4	Does your household have a ration card? If the answer is "No" or "Don't Know", skip to 4.1	☐ 1.Yes ☐ 2.No ☐ 3.Don't know
3.4.1	What is the type of ration card you have?	☐ 1.White card ☐ 2.Yellow card ☐ 3.Pink card

		☐ 4.Blue card
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4. COST RELATED FACTOR

4.1	Number of Out Patient visits in the last 30 days	
4.2	Number of Out patient visits in the last 30 days due to respiratory distress	
4.3	Number of Inpatient admissions in last one year	
4.4	Number of Inpatient admissions related to respiratory distress in the last one year	
4.5	What is the average cost spent for OP visits in the in the past month?	☐ 1.INR _____ ☐ 2.Don't Know
4.6	What is the Average cost spent for inhaler medicines in the past 3 months?	☐ 1.INR _____ ☐ 2.No money was spent ☐ 3.Don't know
4.7	Cost of IP admission due to respiratory distress in last one year if any	☐ 1.INR _____ ☐ 2.No money was spent ☐ 3.Don't know
4.8	Do you have any health insurance? If the answer is "No" or "Don't know", skip to 5.1	☐ 1.Yes ☐ 2.No ☐ 3.Don't know
4.8.1	Which health insurance do you have?	☐ 1.PMJAY (Ayushman Bharat) ☐ 2.State health insurance scheme ☐ 3.ESI ☐ 4.Private insurance ☐ 5.Others
4.8.2	How much amount was reimbursed from health insurance?	☐ 1.INR _____ ☐ 2.Don't know

5.BEHAVIOUR RELATED FACTORS

5.1	Do you smoke or have you ever smoked? If the answer is "No, I have never smoked" skip to 5.2 If the answer is "Yes, I currently smoke", go from 5.1.1	☐ 1.Yes, I currently smoke. ☐ 2.Yes, I have smoked in the past.
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		☐ 3.No, I have never smoked
5.1.1	How many cigarettes do you smoke in a day?	
5.1.2	Have you received Smoking cessation counselling every time you visit the health care facility?	☐ 1.Yes ☐ 2.No
5.2	Do you consume any alcoholic beverages?	☐ 1.Yes ☐ 2.No
5.3	Do you regularly cook or have you regularly cooked in the past If the answer is “regularly cook now”, go from 5.3.1 If the answer is “Never cooked regularly”, skip to 5.4	☐ 1.Regularly cook now ☐ 2.Cooked regularly in the past ☐ 3.Never cooked regularly
5.3.1	How many hours do you spend in the kitchen for cooking per day?	
5.3.2	Does your house have a separate kitchen	☐ 1.Yes ☐ 2.No
5.3.3	Which type of cooking fuel is used in your household?	☐ 1.Wood ☐ 2.Biogas ☐ 3.LPG ☐ 4.Charcoal ☐ 5.Kerosene ☐ 6.Electricity ☐ 7.Other(specify)
5.4	How far is your house from the road frequently used by vehicles?	In Kms _____

6. DISEASE RELATED FACTORS

6.1	How long since you were first diagnosed with COPD?	_____ (in number of years)
6.2	How long have you been taking inhalers for COPD?	_____ (in number of years)

7.TREATMENT REGIME

7.1	7.1.1	7.1.2	7.1.3	7.1.4
Name of recently prescribed medicine/medicines	Type of inhaler (multiple options can be selected)	Total number of inhalers used (each type if any)	Dose per inhaler	Frequency (per day)
	☐ 1.Meter dose inhaler (with spacer) ☐ 2.Meter dose inhaler (without spacer) ☐ 3.Dry powder inhaler ☐ 4.Other, specify	Total number of inhalers used-	☐ 1.MDI (with spacer)- ☐ 2.MDI (without spacer)- ☐ 3.Dry powder inhaler- ☐ 4.Other, specify-	☐ 1.MDI (with spacer)- ☐ 2.MDI (without spacer) ☐ 3.Dry powder inhaler- ☐ 4.Other, specify- 5.Total number of puffs per day

8. ASSESSMENT OF SEVERITY OF COPD

To be filled by the patient

8.1 MODIFIED MEDICAL RESEARCH COUNCIL DYSPNEA SCALE

Please tick in the box that applies to you (one box only), grades 0-4

GRADE	DYSPNEA RELATED TO ACTIVITY	RESPONSE
0	Breathlessness only on strenuous exercise	
1	Breathless when hurrying on the level or walking up a slight hill	

2	Walks slower than other people of same age on the level due to shortness of breath or need to stop for breath when walking at own pace	
3	Short of breath after walking few minutes on the level or about 100 yards (90m)	
4	Too breathless to leave the house, or breathless when dressing or undressing	

8.2 EXACERBATION HISTORY (per year)

More than or equal to 2 moderate exacerbations / More than or equal to one leading to hospitalisation	
0 or 1 moderate exacerbation (not leading to hospitalisation)	

8.3 Patient belongs to :

GOLD A	
GOLD B	
GOLD E	

9. CO-MORBIDITIES

9.1	Do you have any other illness?	☐ Yes (specify _____) ☐ No
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If the answer is “no”, Skip to 10

9.1.1

Sl.no	Other disease	Continuing treatment	
1.	Diabetes	☐ 1.Yes	☐ 2.No

2.	High blood pressure	☐ 1.Yes	☐ 2.No
3.	Heart disease	☐ 1.Yes	☐ 2.No
4.	Lung cancer	☐ 1.Yes	☐ 2.No
5.	Depression/anxiety	☐ 1.Yes	☐ 2.No
6.	Insomnia	☐ 1.Yes	☐ 2.No
7.	Oral disease	☐ 1.Yes	☐ 2.No
8.	Osteoporosis	☐ 1.Yes	☐ 2.No
9.	Other (specify)	☐ 1.Yes	☐ 2.No

10.THERAPY AND HEALTH SYSTEM RELATED FACTORS

10.1	Where do you seek treatment?	☐ 1.Government facility ☐ 2.Private facility ☐ 3.ESI hospital ☐ 4.Other (specify)
10.2	What are reasons to choose a particular health facility?	☐ 1.Trust over the provider ☐ 2.Near to home ☐ 3.Affordable ☐ 4.Staff availability and co-operation ☐ 5.Good quality treatment ☐ 6.Shorter waiting time
10.3	Are you registered under the SWAAS programme	☐ 1.Yes ☐ 2.No ☐ 3.Don't know
10.4	Have you ever received exercise training as part of the pulmonary rehabilitation? If the answer is "No" skip to 10.5	☐ 1.Yes ☐ 2.No
10.4.1	Who gave the training?	☐ 1.Doctor

		☐ 2.Nurse ☐ 3.Other, Specify
10.5	Have you received any advice regarding modifying your diet?	☐ 1.Yes ☐ 2.No
10.6	How are you getting medicines for your regular treatment? If the answer is “Government free supply” Skip to 10.7	☐ 1.Government free supply ☐ 2.Purchasing from Medical Store out of pocket (Pharmacy)
10.6.1	From where do you purchase your drugs?	☐ 1.Local medical shop ☐ 2.Government drug store (Karunya, Neethi, Inhouse Drug Bank) ☐ 3.Jan aushadhi medical store ☐ 4.Medical representatives ☐ 5.Community pharmacy outlets
10.6.2	How much money does it cost for COPD inhaler medicines for a period of 3 months?	INR_____
10.7	Have you ever undergone nebulisation in the past month due to worsening of your condition? If the answer is “No”,skip to 10.8	☐ 1.Yes ☐ 2.No
10.7.1	How many times?	Specify_____
10.8	Have you received training on how to use your medication delivery device? If the answer is “No”, skip to 10.9	☐ 1.Yes ☐ 2.No

10.8.1	Who gave you the training?	☐ 1.Doctor ☐ 2.Nurse ☐ 3.Pharmacist
10.9	Have you ever felt difficulty in acquiring your inhaler medicines?	☐ 1.Yes ☐ 2.No
10.10	Have you ever had to substitute inhaler therapy with nebulisation due to its unavailability in the past 1 months?	☐ 1.Yes ☐ 2.No

11.SUPPORT RELATED FACTORS

11.1	Does anyone accompany you during your doctor's visits? If the answer is "No",skip to 11.2	☐ 1.Yes ☐ 2.No
11.1.1	Who accompanies you to your doctor's visit?	
11.2	Does anyone remind you to take your inhaler medicines daily? If the answer is "No" skip to 12.1	☐ 1.Yes ☐ 2.No
11.2.1	Who reminds you to take your inhaler medicines?	

12.PATIENT RELATED FACTORS

12.1	Do you find it difficult to administer the inhaler medication effectively? If the answer is "No", skip to 12.2	☐ 1.Yes ☐ 2.No
12.1.1	What difficulty do you face when administering the inhaler? (multiple answers can be selected)	☐ 1.Difficult hand-mouth coordination ☐ 2.Difficult to hold the inhaler ☐ 3.Partial spraying goes outside the mouth ☐ 4.The inhaler type not easy to use ☐ 5.No knowledge on how to effectively use it

		☐ 6.Other reasons, specify
12.2	Did you get any side effects due to inhaler therapy? If the answer is "No", skip to 12.3	☐ 1.Yes ☐ 2.No
12.2.1	Which side effects do you get? (multiple answers can be selected)	☐ 1.Hoarseness ☐ 2.cough ☐ 3.Foul breath ☐ 4.Oral thrush ☐ 5.Palpitation ☐ 6.Nervousness/anxiety ☐ 7.Tremors ☐ 8.Headache ☐ 9.Allergic reactions ☐ 10.Throat irritation ☐ 11.Dependence ☐ 12.Others (specify)
12.3	Do you find it difficult to administer inhaler medication when you are not at home? If the answer is "No", skip to 12.4	☐ 1.Yes ☐ 2.No
12.3.1	What difficulty do you face to administer inhaler medicines when you are not at home? (multiple answers can be selected)	☐ 1.Lack of privacy ☐ 2.Fear of stigma ☐ 3.Storage issue ☐ 4.Forgetfulness ☐ 5.Others(specify)
12.4	How informed are you about your disease condition?	☐ Well informed ☐ Moderately informed ☐ Poorly informed

MEASURING ADHERANCE

13. MORISKY GREEN LEVINE SCALE (4-ITEM)

		YES	NO
1.	Do you ever forget your COPD inhaler medicines?		
2.	Are you careless at times about taking your COPD inhaler medicines?		

3.	When you feel better, do you sometimes stop taking your COPD inhaler medicines?		
4.	When you feel worse, do you stop taking your COPD inhaler medicines?		

Yes-1

No-0

Adherence level

High adherence = 0

Medium adherence = 1-2

Low adherence = 3-4

14. Quantifying adherence

14.1	If meter dose inhaler (with or without spacer), How many days did your previous inhaler last?	
14.2	If meter dose inhaler, the number of days the inhaler should last as per the doctors prescription.	
14.3	If Dry powder inhaler, How many pills did you take in the last 30 days?	
14.4	If Dry powder inhaler, the number of pills that should be taken for 30 days as per the prescription.	

15. Only for those subject who are medium or low adherent

PATIENT REPORTED OUTCOMES

I do not take my inhaler medications regularly because:

Sl.no		1.Yes	2.No
1.	I could not afford it	☐	☐
2.	I have transportation difficulties	☐	☐
3.	I ran out of it	☐	☐
4.	I was not clear about the directions from my health care provider?	☐	☐
5.	My treatment regime is too complicated	☐	☐
6.	I have fear of the side effects	☐	☐
7.	I don't believe that it is effective	☐	☐

THANKYOU FOR YOUR CO-OPERATION!

ANNEXURE IV

Participant Information sheet (Malayalam)

അച്യുതമേനോൻ സെന്റർ ഫോർ ഹെൽത്ത് സയൻസ്
സ്റ്റഡീസ് (എ.എം.സി.എച്ച്.എസ്.എസ്.)

ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ
സയൻസസ് ആൻഡ് ടെക്നോളജി

തിരുവനന്തപുരം - 11

പങ്കെടുക്കുന്നവരുടെ വിവര ഷീറ്റ്

ഞാൻ ഡോക്ടർ കുഷ്ണപ്രിയ. ഇപ്പോൾ ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഓഫ് മെഡിക്കൽ സയൻസസ് ആൻഡ് ടെക്നോളജിയിലെ അച്യുതമേനോൻ സെന്റർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസിൽ (എഎംസിഎച്ച്എസ്എസ്) മാസ്റ്റർ ഓഫ് പബ്ലിക് ഹെൽത്ത് (എംപിഎച്ച്) പഠിക്കുന്നു. ഞാൻ പഠിക്കുന്നത് ഗ്രാമീണ തിരുവനന്തപുരത്തെ സിദ്ധിപി റോഗികൾക്കിടയിൽ ഇൻഫോമർ തെറാപ്പി പാലിക്കൽ നിരക്കുകളുടെ വിലയിരുത്തലും അതിന്റെ സ്വാധീന ഘടകങ്ങളും ആണ്. എ.എം.സി.എച്ച്.എസ്.എസിലെ അഡീഷണൽ പ്രൊഫസർ ഡോ.ജിമോൻ പിയുടെ മേൽനോട്ടത്തിലാണ് ഈ പഠനം നടക്കുന്നത്. ഈ വിവര ഷീറ്റിൽ നിങ്ങൾക്ക് മനസ്സിലാക്കാത്ത ഏതെങ്കിലും വാക്കുകളോ വിവരങ്ങളോ അടങ്ങിയിട്ടുണ്ടെങ്കിൽ, ഇവ വ്യക്തമാക്കാൻ മടിക്കേണ്ടതില്ല. ഈ പഠനവുമായി ബന്ധപ്പെട്ട ഏത് ചോദ്യവും നിങ്ങൾക്ക് ചോദിക്കാവുന്നതാണ്.

പഠനത്തിന്റെ ഉദ്ദേശ്യം

കോണിക് ഒബ്സർവ്വേർ പശ്ചാത്താപം വർദ്ധിച്ചു വരുന്നത് ഒരു ആശങ്കയാണ്. ഇതിനു ഒരു ദീർഘകാല അടിസ്ഥാനത്തിൽ ഉള്ള മാനേജ്മെന്റ് ആവശ്യമാണ്. രോഗം പ്രധാനമായും പ്രായമായവരെ ബാധിക്കുന്നതിനാൽ, ദൈനംദിന അടിസ്ഥാനത്തിൽ നീണ്ടുനിൽക്കുന്നതും സങ്കീർണ്ണവുമായ ചികിത്സ പ്രയാസമില്ലാതെ നിലനിർത്തുന്നത് ഒരു യഥാർത്ഥ വെല്ലുവിളിയാണ്. അതിനാൽ, രോഗികളിൽ നിർദ്ദേശിക്കുന്ന ഇൻഫോമർ തെറാപ്പി എത്ര നന്നായി പാലിക്കുന്നുവെന്നും ഈ അനുസരണത്തെ ബാധിക്കുന്ന എല്ലാ ഘടകങ്ങളും എന്താണെന്നും മനസ്സിലാക്കേണ്ടത് പ്രധാനമാണ്. രോഗികളിൽ ഒരു ഗണ്യമായ വിഭാഗം ഈ നിർദ്ദേശിച്ച ഇൻഫോമറുകൾ പിന്തുടരുന്നത് പരാജയപ്പെടുന്നതിനാൽ മോശം ആരോഗ്യ ഫലങ്ങളിലേക്കും മരണനിരക്കിലേക്കും നയിക്കുന്നുവെന്ന് നിരവധി പഠനങ്ങൾ തെളിയിച്ചിട്ടുണ്ട്. മരുന്നിനോടുള്ള അനുസരണത്തിന്റെ ഓരോ ഘടകവും സംഭാവന ചെയ്യുന്ന അളവ് കണക്കാക്കാൻ ഈ പഠനം സഹായിക്കും.

ഗ്രാമീണ തിരുവനന്തപുരത്തെ സിംഗിൾ രോഗികൾക്കിടയിൽ ഇൻഫോമർ തെറാപ്പി പാലിക്കൽ

നിരക്കുകളുടെ വിലയിരുത്തലും അതിന്റെ സ്വാധീന ഘടകങ്ങളും കണക്കാക്കാൻ ഒരു സർവ്വേ നടത്തുന്നു. ആശാ വർക്കർമാരുടെ സഹായത്തോടെ ക്രമരഹിതമായ തിരഞ്ഞെടുപ്പ് പ്രക്രിയയിലൂടെയാണ് നിങ്ങളെ തിരഞ്ഞെടുത്തിരിക്കുന്നത്. ചോദ്യങ്ങൾക്ക് ഉത്തരം നൽകാൻ ശാരീരികമോ മാനസികമോ ആയ അവസ്ഥയിലല്ലാത്തവർ, ക്ഷയരോഗമുള്ളവർ,

നിർദ്ദേശിക്കപ്പെട്ടിട്ടുള്ള 18 വയസ്സിന് മുകളിലുള്ള ദീർഘകാലമായി അനുഭവപ്പെടുന്ന ശ്വാസംമുട്ടൽ അഥവാ സീ ഓ പീ ഡീ രോഗികളെ പഠനത്തിൽ ഉൾപ്പെടുത്തിയിട്ടുണ്ട്. ചോദ്യങ്ങൾക്ക് ഉത്തരം നൽകാൻ ശാരീരികമോ മാനസികമോ ആയ അവസ്ഥയിലല്ലാത്തവർ, ഇൻഹെയ്ലർ മരുന്ന് നിർദ്ദേശിക്കപ്പെട്ടിട്ടില്ലാത്തവർ, 6 മാസത്തിനു താഴെ രോഗനിർണ്ണയം നടത്തിയവർ, കിടപ്പിലായവർ, പങ്കെടുക്കാൻ തയ്യാറാകാത്തവർ എന്നിവരെ പഠനത്തിൽ നിന്ന് ഒഴിവാക്കിയിട്ടുണ്ട്..

നടപടിക്രമം

പഠനത്തിൽ പങ്കെടുക്കാൻ നിങ്ങൾ സമ്മതിക്കുന്നുവെങ്കിൽ ചോദ്യാവലിയിൽ നിങ്ങളുടെ സാമൂഹിക വിശദാംശങ്ങൾ, സാമൂഹിക-സാമ്പത്തിക വിശദാംശങ്ങൾ, നിലവിലെ മരുന്ന് കഴിക്കുന്നതിന്റെ വിശദാംശങ്ങൾ, തെറാപ്പിയുമായി ബന്ധപ്പെട്ട,

രോഗവുമായി ബന്ധപ്പെട്ട, പിന്തുണയുമായി ബന്ധപ്പെട്ട, ചെലവുമായി ബന്ധപ്പെട്ട, പെരുമാറ്റവുമായി ബന്ധപ്പെട്ട, ആരോഗ്യ സംവിധാനവുമായി ബന്ധപ്പെട്ട ഘടകങ്ങൾ, തീവ്രമായി രോഗം വന്ന അവസരങ്ങൾ, മറ്റുരോഗങ്ങൾ എന്നിവയെക്കുറിച്ചുള്ള ചോദ്യങ്ങൾ അടങ്ങിയിരിക്കും. കൂടാതെ, അനുസരണത്തിന്റെ നില അളക്കാൻ ഞാൻ മോനിസ്കി ഗ്രീൻ ലെവിൻ സ്കെയിൽ ഉപയോഗിക്കും. ശേഖരിച്ച ഈ ഡാറ്റ ഗവേഷണ ഉദ്ദേശ്യങ്ങൾക്ക് മാത്രമായി ഉപയോഗിക്കപ്പെടും. ശേഖരിച്ച വിവരങ്ങൾ അപൂർണ്ണമാണെന്ന് കണ്ടെത്തിയാൽ ഞാൻ നിങ്ങളെ വീണ്ടും ബന്ധപ്പെടുകാം. സർവ്വേയ്ക്ക് നിങ്ങളുടെ വിലയേറിയ സമയത്തിന്റെ ഏകദേശം 30 - 45 മിനിറ്റ് എടുക്കും

അപകടസാധ്യതയും അസൗകര്യവും

ഈ പഠനത്തിലെ പങ്കാളിത്തം നിങ്ങളുടെ ആരോഗ്യത്തിന് ഒരു അപകടവും വരുത്തുന്നില്ല, എന്നിരുന്നാലും നിങ്ങൾക്ക് വ്യക്തിപരമായി തോന്നിയേക്കാവുന്ന ചോദ്യങ്ങളുണ്ടാകും.

ആനുകൂല്യങ്ങൾ

ഈ പഠനത്തിൽ നിന്ന് നിങ്ങൾക്ക് നേരിട്ടുള്ള പ്രയോജനം ഉണ്ടാകും. പഠനത്തിന്റെ അവസാനത്തിൽ നിങ്ങൾക്ക് ഒരു പേപ്പർ ചിത്രീകരണം നൽകും, അതിൽ നിന്ന് ഇൻഫോലർ അതിന്റെ ശരിയായ രീതിയിൽ ഉപയോഗിക്കാൻ നിങ്ങൾക്ക് പഠിക്കാൻ കഴിയും.

നിങ്ങളിൽ നിന്നും മറ്റ് പങ്കാളികളിൽ നിന്നും ശേഖരിക്കുന്ന വിവരങ്ങൾ ഇൻഫോലറുകൾ പാലിക്കുന്നതിന്റെ നിരക്കും ദീർഘകാലമായി അനുഭവപ്പെടുന്ന ശ്വാസംമുട്ടൽ അഥവാ സീ ഓ പീ ഡീ രോഗികളിൽ അതിന്റെ സ്വാധീന ഘടകങ്ങളും കണക്കാക്കുന്നതിന് സഹായിക്കും.

രഹസ്യാത്മകത

സ്വകാര്യമായി അഭിമുഖം നടത്തും. നിങ്ങളുമായി ബന്ധപ്പെട്ട എല്ലാ വിവരങ്ങളും പൂർണ്ണമായും രഹസ്യാത്മകമായി സൂക്ഷിക്കും, ഒരു ഘട്ടത്തിലും നിങ്ങളുടെ ഐഡൻറിറ്റിയെ ഒരിക്കലും പുറത്തു വിടുകയില്ല. ശേഖരിച്ച ഡാറ്റയുടെ രഹസ്യാത്മകത നിലനിർത്താൻ സഹായിക്കുന്ന ഓരോ പങ്കാളിക്കും ഒരു തിരിച്ചറിയൽ നമ്പർ നൽകും. ഡാറ്റ വിശകലനം ചെയ്യുന്നവർക്ക് മാത്രമായി ഈ തിരിച്ചറിയൽ നമ്പറിന്റെ അറിവ് പരിമിതപ്പെടുത്തും.

സ്വമേധയാ പങ്കാളിത്തം

ഈ പഠനത്തിലെ നിങ്ങളുടെ പങ്കാളിത്തം തികച്ചും സ്വമേധയാ ഉള്ളതാണ്, അതിനർത്ഥം പഠനത്തിൽ പങ്കെടുക്കണോ വേണ്ടയോ എന്ന് നിങ്ങൾക്ക് തീരുമാനിക്കാം. ഏതെങ്കിലും ഘട്ടത്തിൽ നിങ്ങൾ നിർത്താൻ ആഗ്രഹിക്കുന്നുവെങ്കിൽ, പ്രതികൂല പ്രത്യാഘാതങ്ങളൊന്നുമില്ലാതെ അത് ചെയ്യാൻ

നിങ്ങൾക്ക് സ്വാതന്ത്ര്യമുണ്ട്.

നിങ്ങൾക്ക് ഗവേഷണവുമായി ബന്ധപ്പെട്ട എന്തെങ്കിലും ചോദ്യങ്ങൾ ഉണ്ടെങ്കിൽ അല്ലെങ്കിൽ എന്റെ ക്രെഡൻഷ്യലുകൾ പരിശോധിക്കാൻ നിങ്ങൾ ആഗ്രഹിക്കുന്നുവെങ്കിൽ, ഇനിപ്പറയുന്ന വിലാസത്തിൽ നിങ്ങൾക്ക് എന്നെയോ ഞങ്ങളുടെ ഇൻസ്റ്റിറ്റ്യൂട്ടിന്റെ എത്തിക്സ് കമ്മിറ്റി അംഗത്തെയോ ബന്ധപ്പെടാം.

ഡോ.യു.കൃഷ്ണപ്രിയ
പ്രധാന അന്വേഷകൻ
MPH 2023, AMCHSS, SCTIMST

ബന്ധപ്പെടാനുള്ള നമ്പർ -9400581838

ഇ-മെയിൽ : krishnapriya0@gmail.com

പകരമായി, ഞങ്ങളുടെ ഇൻസ്റ്റിറ്റ്യൂട്ടിന്റെ നൈതിക സമിതിയുടെ മെമ്പർ സെക്രട്ടറി ഇനിപ്പറയുന്ന വിലാസത്തിൽ:

ഡോ. ശ്രീനിവാസ് ജി, ഡോ.

മെമ്പർ സെക്രട്ടറി സ്ഥാപന നൈതിക സമിതി

SCTIMST, തിരുവനന്തപുരം 695011

ഓഫീസ്: 04712524689

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ANNEXURE V

Informed Consent (Malayalam)

സമ്മത പത്രം

വിവര ഷീറ്റിൽ നൽകിയിട്ടുള്ള “ഗ്രാമീണ തിരുവനന്തപുരത്തെ ദീർഘകാലമായി അനുഭവപ്പെടുന്ന ശ്വാസംമുട്ടൽ അഥവാ സീ ഓ പീ ഡീ രോഗികൾക്കിടയിൽ ഇൻഹേലർ തെറാപ്പി പാലിക്കൽ നിരക്കുകളുടെ വിലയിരുത്തലും അതിന്റെ സ്വാധീന ഘടകങ്ങളും” എന്ന പഠനവുമായി ബന്ധപ്പെട്ട വിവരങ്ങൾ ഞാൻ വായിച്ചുവെന്നും അഥവാ വായിച്ചുതന്നുവെന്നും മനസ്സിലാക്കിയെന്നും ഞാൻ സ്ഥിരീകരിക്കുന്നു. പഠനത്തിന്റെ സ്വഭാവവും എന്റെ ഇടപെടലും വിശദീകരിക്കുകയും എന്റെ എല്ലാ ചോദ്യങ്ങൾക്കും തൃപ്തികരമായ ഉത്തരം നൽകുകയും ചെയ്തിട്ടുണ്ട്. ഈ സമ്മത പത്രത്തിൽ ഒപ്പിടുന്നതിലൂടെ, എന്നിൽ നിന്ന് എന്താണ് പ്രതീക്ഷിക്കുന്നതെന്ന് ഞാൻ മനസ്സിലാക്കുന്നുവെന്നും ഈ പഠനത്തിൽ പങ്കെടുക്കാൻ ഞാൻ തയ്യാറാണെന്നും ഞാൻ സൂചിപ്പിക്കുന്നു. എപ്പോൾ വേണമെങ്കിലും പിൻവാങ്ങാമെന്ന് എന്നിക്കറിയാം. ആവശ്യമെങ്കിൽ ആരെ ബന്ധപ്പെടണമെന്ന് എന്നെ അറിയിച്ചിട്ടുണ്ട്.

തീയതി:

സ്ഥലം:

പങ്കെടുത്ത ആളിന്റെ പേര്

ഒപ്പ് / പെരുവീരലടയാളം

പ്രധാന അന്വേഷകയുടെ പേര്

ഒപ്പ്



ANNEXURE VI

Interview Schedule (Malayalam)

**അച്ചുതമേനോൻ സെന്റർ ഓഫ് ഹെൽത്ത്
സയൻസ്**

**ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഓഫ്
മെഡിക്കൽ സയൻസ് ആൻഡ് ടെക്നോളജി
തിരുവനന്തപുരം, കേരളം, 695011
ഇന്റർവ്യൂ ഷെഡ്യൂൾ - മലയാളം**

ഈ അഭിമുഖത്തിൽ നിന്ന് ലഭിക്കുന്ന എല്ലാ
വിവരങ്ങളും രഹസ്യസ്വഭാവമുള്ളതായി തുടരും.
ഗവേഷണ ഉദ്ദേശങ്ങൾക്കായി മാത്രം ഉപയോഗിക്കും.
വ്യക്തിഗത വിവരങ്ങൾ ഒരു കാരണവശാലും
ആരോടും വെളിപ്പെടുത്തില്ല

1.പൊതുവായ വിവരങ്ങൾ

1.1 പങ്കാളിത്ത ഐഡി

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(വാർഡിൽ നിന്ന് രണ്ട് അക്കങ്ങളും അതത് വാർഡിൽ നിന്നുള്ള പങ്കാളി
നമ്പറിൽ നിന്ന് രണ്ട് അക്കങ്ങളും)

1.2	ഇന്റർവ്യൂ തീയതിയും സമയവും	
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2. സാമൂഹിക-ജനസംഖ്യാ സ്വഭാവവിശേഷങ്ങൾ

2.1	2025 ജനുവരി 1 വരെ പൂർത്തിയായ പ്രായം	
2.2	ലിംഗം	☐ 1.പുരുഷൻ ☐ 2.സ്ത്രീ ☐ 3.മറ്റുള്ളവർ
2.3	മതം	☐ 1.ഹിന്ദു ☐ 2.മുസ് ലിം ☐ 3.ക്രിസ്ത്യൻ ☐ 4.മറ്റുള്ളവ, ___ വ്യക്തമാക്കുക
2.4	വൈവാഹിക നില	☐ 1. അവിവാഹിതൻ/അവിവാഹിത ☐ 2. വിവാഹിതൻ/വിവാഹിത ☐ 3.വിവാഹമോചനം/ വേർപിരിഞ്ഞു ☐ 4.വിധവ/ വിധവൻ ☐ 5.മറ്റുള്ളവ(വ്യക്തമാക്കുക)
2.5	കുടുംബത്തിന്റെ തരം	☐ 1.ആണു കുടുംബം ☐ 2.കൂട്ട് കുടുംബം
2.6	കുടുംബാംഗങ്ങളുടെ എണ്ണം (വ്യക്തമാക്കുക)	
2.7	വിദ്യാഭ്യാസ നില	☐ 1.പ്രൈമറി സ്കൂളിനേക്കാൾ കുറവ് ☐ 2.പ്രൈമറി സ്കൂൾ പൂർത്തിയായി ☐ 3.സെക്കൻഡറി സ്കൂൾ പൂർത്തിയായി ☐ 4.കോളേജ് അല്ലെങ്കിൽ സർവ്വകലാശാല പൂർത്തിയായി ☐ 5. ബിരുദാനന്തര ബിരുദം ☐ 6.മറ്റുള്ളവ (വ്യക്തമാക്കുക) _____
2.8	ഔദ്യോഗിക സ്കൂൾ വിദ്യാഭ്യാസ വർഷങ്ങളുടെ എണ്ണം	

2.9	ഇനിപ്പറയുന്നവയിൽ ഏതാണ് കഴിഞ്ഞ 12 മാസത്തെ നിങ്ങളുടെ പ്രധാന തൊഴിൽ നിലയെ ഏറ്റവും നന്നായി വിവരിക്കുന്നത്?	☐ 1.സർക്കാർ ജീവനക്കാരൻ/ജീവനക്കാരി ☐ 2.വിദഗ്ദ്ധ തൊഴിലാളി ☐ 3.അവിദഗ്ദ്ധ അല്ലെങ്കിൽ കൈത്തൊഴിലാളി ☐ 4.തൊഴിൽ രഹിതൻ/രഹിത
2.10	വീടിന്റെ ഉടമസ്ഥാവകാശം	☐ 1.സ്വന്തം ☐ 2.വാടകയ്ക്ക് ☐ 3.ബന്ധുവിന്റെ വീട്
2.11	എത്ര കാലമായി നിങ്ങൾ ഈ വീട്ടിൽ താമസിക്കുന്നു?	(വർഷങ്ങളുടെ എണ്ണം) വ്യക്തമാക്കുക_____

3. സാമൂഹിക-സാമ്പത്തിക ഘടകങ്ങൾ

3.1	കഴിഞ്ഞ ഒരു മാസത്തെ മൊത്തം ഗാർഹിക ചെലവ് എത്രയാണ്?	☐ 1.INR_____ ☐ 2.അറിയില്ല
3.2	കഴിഞ്ഞ ഒരു മാസത്തെ നിങ്ങളുടെ മെഡിക്കൽ പരിചരണത്തിനായുള്ള മൊത്തം ചെലവ് എത്രയാണ്?	☐ 1.INR_____ ☐ 2.അറിയില്ല
3.3	നിങ്ങളുടെ വാർഷിക വരുമാനം എത്ര	☐ 1.INR_____ ☐ 2.വരുമാനമില്ല
3.4	നിങ്ങളുടെ വീട്ടിൽ റേഷൻ കാർഡ് ഉണ്ടോ? ഉത്തരം "ഇല്ല" അല്ലെങ്കിൽ "അറിയില്ല" ആണെങ്കിൽ, 4.1 ലേക്ക് പോവുക	☐ 1.ഉണ്ട് ☐ 2.ഇല്ല ☐ 3.അറിയില്ല
3.4.1	നിങ്ങളുടെ പക്കലുള്ള റേഷൻ കാർഡ് ഏത് തരം ആണ്?	☐ 1.വെളുത്ത കാർഡ് ☐ 2.മഞ്ഞ കാർഡ് ☐ 3.പിങ്ക് കാർഡ് ☐ 4.നീല കാർഡ്

ചെലവുമായി ബന്ധപ്പെട്ട ഘടകം

4.1	കഴിഞ്ഞ 30 ദിവസങ്ങളിൽ ഔട്ട് പേഷ്യന്റ് സന്ദർശനങ്ങളുടെ എണ്ണം	
4.2	ശ്വാസകോശ സംബന്ധമായ അസുഖം കാരണം കഴിഞ്ഞ 30 ദിവസത്തിനുള്ളിൽ ഒപി സന്ദർശനങ്ങളുടെ എണ്ണം എത്ര?	
4.3	കഴിഞ്ഞ ഒരു വർഷത്തിൽ ഉണ്ടായ കിടത്തി ചികിത്സയുടെ എണ്ണം	
4.4	കഴിഞ്ഞ ഒരു വർഷത്തിനിടെ ശ്വാസകോശ സംബന്ധമായ അസുഖവുമായി ആശുപത്രിയിൽ അഡ്മിറ്റ് ആയത് എത്ര തവണ	
4.5	കഴിഞ്ഞ ഒരു മാസത്തിൽ ഒപി സന്ദർശനത്തിനായി ചെലവഴിച്ച ശരാശരി ചെലവ് എത്രയാണ്?	☐ 1.INR _____ ☐ 2.അറിയില്ല
4.6	കഴിഞ്ഞ 3 മാസത്തിൽ ഇൻഹേലർ മരുന്നുകൾക്കായി ചെലവഴിച്ച ശരാശരി ചെലവ് എത്രയാണ്?	☐ 1.INR _____ ☐ 2.ഒന്നും ചിലവായില്ല ☐ 3.അറിയില്ല
4.7	കഴിഞ്ഞ ഒരു വർഷത്തെ ശ്വാസകോശ സംബന്ധമായ അസുഖവുമായി ചെലവഴിച്ച ഐപി അഡ്മിഷന്റെ ചെലവ്	☐ 1.INR _____ ☐ 2.ഒന്നും ചിലവായില്ല ☐ 3.അറിയില്ല
4.8	നിങ്ങൾക്ക് എന്തെങ്കിലും ആരോഗ്യ ഇൻഷുറൻസ് ഉണ്ടോ? ഉത്തരം "ഇല്ല" അല്ലെങ്കിൽ "അറിയില്ല" ആണെങ്കിൽ, 5.1 ലേക്ക് പോവുക	☐ 1.ഉണ്ട് ☐ 2.ഇല്ല ☐ 3.അറിയില്ല
4.8.1	നിങ്ങൾക്ക് ഏത് ആരോഗ്യ ഇൻഷുറൻസ് ഉണ്ട്?	☐ 1.പിഎംജെ (ആയുഷ്മാൻ ഭാരത്) ☐ 2.സംസ്ഥാന ആരോഗ്യ

		ഇൻഷുറൻസ് പദ്ധതി ☐ 3.ഇ യെസ് ഐ ☐ 4.സ്വകാര്യ ഇൻഷുറൻസ് ☐ 5.മറ്റുള്ളവ
4.8.2	ഉണ്ടെങ്കിൽ, ആരോഗ്യ ഇൻഷുറൻസിൽ നിന്ന് തിരികെ നൽകിയ മൊത്തം തുക എത്ര ?	☐ 1.INR_____ ☐ 2.അറിയില്ല

5.പെരുമാറ്റവുമായി ബന്ധപ്പെട്ട ഘടകങ്ങൾ

5.1	നിങ്ങൾ പുകവലിക്കാറുണ്ടോ അതോ എപ്പോഴെങ്കിലും പുകവലിച്ചിട്ടുണ്ടോ? "ഇല്ല, ഞാൻ ഒരിക്കലും പുകവലിച്ചിട്ടില്ല" എന്നാണ് ഉത്തരമെങ്കിൽ 5.2 ലേക്ക് പോവുക "അതെ, ഞാൻ ഇപ്പോൾ പുകവലിക്കാറുണ്ട്" എന്നാണ് ഉത്തരമെങ്കിൽ, 5.1.1 ൽ നിന്ന്.	☐ 1.അതെ, ഞാൻ ഇപ്പോൾ പുകവലിക്കാറുണ്ട് ☐ 2.അതെ, ഞാൻ മുമ്പ് പുകവലിച്ചിട്ടുണ്ട്. ☐ 3. ഇല്ല, ഞാൻ ഒരിക്കലും പുകവലിച്ചിട്ടില്ല
5.1.1	ഒരു ദിവസം നിങ്ങൾ എത്ര സിഗരറ്റ് വലിക്കുന്നു?	
5.1.2	നിങ്ങളുടെ ആശുപത്രിയിൽ സന്ദർശിക്കുന്ന ഓരോ തവണയും പുകവലി	☐ 1.ഉണ്ട് ☐ 2.ഇല്ല

	നിർത്തൽ കൗൺസിലിംഗ് ലഭിച്ചിട്ടുണ്ടോ?	
5.2	നിങ്ങൾ നിലവിൽ ഏതെങ്കിലും ആൽക്കഹോളിക് പാനീയങ്ങൾ കഴിക്കുന്നുണ്ടോ?	☐ 1.ഉണ്ട് ☐ 2.ഇല്ല
5.3	നിങ്ങൾ പതിവായി പാചകം ചെയ്യാറുണ്ടോ അല്ലെങ്കിൽ മുൻകാലങ്ങളിൽ പതിവായി പാചകം ചെയ്തിട്ടുണ്ടോ ഉത്തരം "ഇപ്പോൾ പതിവായി പാചകം ചെയ്യും എന്നാണെങ്കിൽ", 5.3.1 ൽ നിന്ന് . ഉത്തരം "ഒരിക്കലും പതിവായി പാചകം ചെയ്തിട്ടില്ല എന്നാണെങ്കിൽ "5.4 ലേക്ക് പോവുക	☐ 1.ഇപ്പോൾ പതിവായി പാചകം ചെയ്യും ☐ 2.മുൻകാലങ്ങളിൽ പതിവായി പാചകം ചെയ്തിരുന്നു ☐ 3.ഒരിക്കലും പതിവായി പാചകം ചെയ്തിട്ടില്ല.
5.3.1	ഒരു ദിവസം പാചകത്തിനായി നിങ്ങൾ എത്ര മണിക്കൂർ അടുക്കളയിൽ ചെലവഴിക്കുന്നു	
5.3.2	നിങ്ങളുടെ വീട്ടിൽ പ്രത്യേകം അടുക്കള ഉണ്ടോ?	☐ 1.ഉണ്ട് ☐ 2.ഇല്ല

5.3.3	നിങ്ങളുടെ വീട്ടിൽ ഏത് തരം പാചക ഇന്ധനമാണ് ഉപയോഗിക്കുന്നത്?	☐ 1.മരം ☐ 2.ബയോഗ്യാസ് ☐ 3.എൽപിജി ☐ 4.കരി ☐ 5.മണ്ണെണ്ണ ☐ 6.വൈദ്യുതി ☐ 7.മറ്റുള്ളവ(വ്യക്തമാക്കുക)
5.4	വാഹനങ്ങൾ പതിവായി പോകുന്ന റോഡ് നിങ്ങളുടെ വീട്ടിൽ നിന്ന് എത്ര അകലെ ആണ്	_____കിലോമീറ്റർ

6.രോഗവുമായി ബന്ധപ്പെട്ട ഘടകങ്ങൾ

6.1	നിങ്ങൾക്ക് ആദ്യമായി COPD ഉണ്ടെന്ന് കണ്ടെത്തിയിട്ട് എത്ര കാലമായി?	_____ (വർഷങ്ങളുടെ എണ്ണത്തിൽ)
6.2	COPD-യ്ക്കായി നിങ്ങൾ എത്ര കാലമായി ഇൻഹെയ്ലർ എടുക്കുന്നു?	_____ (വർഷങ്ങളുടെ എണ്ണത്തിൽ)

7.ചികിത്സാ രീതി

7.1	7.1.1	7.1.2	7.1.3	7.1.4
ഇൻഹേലർ മരുന്നിന്റേ / മരുന്നുകളുടെ പേര്	ഇൻഹെയിലറിന്റേ തരം (ഒന്നിലധികം ഓപ്ഷനുകൾ തിരഞ്ഞെടുക്കാം)	ഉപയോഗിച്ച ഇൻഹേലറുകളുടെ ആകെ എണ്ണം (ഓരോ തരവും)	ഇൻഹേലറിന് ഡോസ്	ആവൃത്തി (ഒരു ദിവസം)
	☐ 1.മീറ്റർ ഡോസ് ഇൻഹേലർ (സ്പെയ്ലറിനോടൊപ്പം)	☐ ഉപയോഗിച്ച ഇൻഹേ	☐ 1.മീറ്റർ ഡോസ്	☐ 1.മീറ്റർ ഡോസ്

	☐ 2.മീറ്റർ ഡോസ് ഇൻഫേലർ(സ്പെയസർ ഇല്ലാതെ) ☐ 3.ഡ്രൈ പൗഡർ ഇൻഫേലർ ☐ 4.മറ്റുള്ളവ (വ്യക്തമാക്കുക)	ലറുകൾ ടെ ആകെ എണ്ണം-	ഇൻഫേലർ (സ്പെയ്സിംഗ് നോട്ടേഷൻ) ☐ 2.മീറ്റർ ഡോസ് ഇൻഫേലർ(സ്പെയസർ ഇല്ലാതെ) ☐ 3.ഡ്രൈ പൗഡർ ഇൻഫേലർ ☐ 4.മറ്റുള്ളവ- (വ്യക്തമാക്കുക)	ഇൻഫേലർ (സ്പെയ്സിംഗ് നോട്ടേഷൻ) ·2.മീറ്റർ ഡോസ് ഇൻഫേലർ(സ്പെയസർ ഇല്ലാതെ) ·3.ഡ്രൈ പൗഡർ ഇൻഫേലർ ·4.മറ്റുള്ളവ 5.പ്രതിദിനം പഠിക്കുകയുടെ എണ്ണം
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8.ദീർഘകാലമായി അനുഭവപ്പെടുന്ന ശ്വാസംമുട്ടൽ അഥവാ സീ ഓ പീ ഡീ തീവ്രത വിലയിരുത്തൽ

രോഗി പൂരിപ്പിക്കേണ്ടതാണ്

8.1പരിഷ്കരിച്ച ആരോഗ്യഗവേഷണ ഉപദേശകസമിതി ശ്വാസന ബുദ്ധിമുട്ട് അളവുകോൽ

ദയവായി നിങ്ങൾക്കനുയോജ്യമായ കോളത്തിൽ ശരിയടയാളം രേഖപ്പെടുത്തുക (ഒരു കോളത്തിൽ മാത്രം)

ശ്രേണി	ഡിസ്ക്നിയ സംബന്ധിച്ച പ്രവൃത്തി	പ്രതികരണം
0	ശ്വാസതടസ്സം കുറയ്ക്കുന്നതിനായി മാത്രം	
1	തലത്തിലോ അല്ലെങ്കിൽ ഒരു ചെറിയ കൂന്നോ കയറുമ്പോൾ മാത്രം ശ്വാസതടസ്സം	
2	തലത്തിൽ നടക്കുമ്പോൾ സമപ്രായക്കാരായ ആളുകളോടൊത്ത് വേഗം കുറയ്ക്കുന്നതിന് കാരണം ശ്വാസം മുട്ടലോ അല്ലെങ്കിൽ സ്വന്തം വേഗതയിൽ നടക്കുമ്പോൾ ഇടയ്ക്കിടെ ശ്വാസമെടുക്കാൻ നടപ്പ് നിർത്തേണ്ടി വരുന്നു	
3	തലത്തിൽ കുറച്ച നിമിഷങ്ങൾ നടക്കുമ്പോൾ അല്ലെങ്കിൽ ഏകദേശം 100 അടി (90 മി) നടക്കുമ്പോൾ ശ്വാസം മുട്ടുന്നു	
4	വീട്ടിൽനിന്നിറങ്ങുമ്പോഴോ അല്ലെങ്കിൽ വസ്ത്രം ഉടുക്കുമ്പോഴോ അഴിക്കുമ്പോഴോ അതിയായ ശ്വാസതടസ്സം അനുഭവപ്പെടുന്നു	

8.2 പെട്ടെന്നുണ്ടാവുന്ന രോഗതീവ്രതയുടെ (എക്സർസർബേഷൻ) ചരിത്രം (പ്രതിവർഷം)

മിതമായ രീതിയിൽ, പെട്ടെന്നുണ്ടാവുന്ന രോഗതീവ്രത, രണ്ടോ അതിൽ കൂടുതലോ തവണ / പെട്ടെന്നുണ്ടാവുന്ന രോഗതീവ്രത ഒന്നോ അതിൽ കൂടുതലോ തവണ ആശുപത്രി വാസത്തിലേക്ക് നയിക്കുന്ന രീതിയിൽ	
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മിതമായ രീതിയിൽ, പെട്ടെന്നുണ്ടാവുന്ന രോഗതീവ്രത ഒരു തവണ അല്ലെങ്കിൽ ഒന്നും ഉണ്ടായിട്ടില്ല (ആശുപത്രിയിൽ കിടക്കേണ്ടതായി വന്നിട്ടില്ല)	
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8.3 രോഗി ഇനിപ്പറയുന്നവയിൽ ഉൾപ്പെടുന്നു:

ഗോശ്ഡ് എ	
ഗോശ്ഡ് ബി	
ഗോശ്ഡ് ഇ	

9.കോമോർബിഡിറ്റികൾ

9.1	വേറെ വല്ല അസുഖവുമുണ്ടോ?	☐ 1.ഉണ്ട് (specify _____) ☐ 2.ഇല്ല
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ഉത്തരം "ഇല്ല" എന്നാണെങ്കിൽ, 10 ലേക്ക് പോവുക

9.1.1

Sl.no	മറ്റ് രോഗങ്ങൾ	തുടർ ചികിത്സ	
1.	പ്രമേഹം	☐ 1.ഉണ്ട്	☐ 2.ഇല്ല
2.	ഉയർന്ന രക്തസമ്മർദ്ദം	☐ 1.ഉണ്ട്	☐ 2.ഇല്ല
3.	ഹൃദ്രോഗം	☐ 1.ഉണ്ട്	☐ 2.ഇല്ല
4.	ശ്വാസകോശ അർബുദം	☐ 1.ഉണ്ട്	☐ 2.ഇല്ല
5.	വിഷാദം / ഉത്കണ്ഠ	☐ 1.ഉണ്ട്	☐ 2.ഇല്ല
6.	ഉറക്കമില്ലായ്മ	☐ 1.ഉണ്ട്	☐ 2.ഇല്ല
7.	വായയിലെ രോഗം	☐ 1.ഉണ്ട്	☐ 2.ഇല്ല

8.	ഓസ്റ്റിയോപൊറോസിസ്	☐ 1.ഉണ്ട്	☐ 2.ഇല്ല
9.	മറ്റുള്ളവ (വ്യക്തമാക്കുക)	☐ 1.ഉണ്ട്	☐ 2.ഇല്ല

10. തെറാപ്പിയും ആരോഗ്യ സംവിധാനവുമായി ബന്ധപ്പെട്ട ഘടകങ്ങളും

10.1	എവിടെയാണ് നിങ്ങൾ ചികിത്സ തേടുന്നത്?	☐ 1.സർക്കാർ സംവിഭാഗം ☐ 2.സ്വകാര്യ സംവിഭാഗം ☐ 3.ഇഎസ്ഐ ആശുപത്രി ☐ 4.മറ്റുള്ളവ (വ്യക്തമാക്കുക)
10.2	ഒരു പ്രത്യേക ആരോഗ്യ കേന്ദ്രം തിരഞ്ഞെടുക്കുന്നതിനുള്ള കാരണങ്ങൾ എന്തൊക്കെയാണ്?	☐ 1.ദാതാവിന്റെ മേൽ വിശ്വാസം ☐ 2.ജീവനക്കാരോടുള്ള വിശ്വാസം ☐ 3.വീടിനടുത്ത് ☐ 4.ചിലവ് താങ്ങാനാവുന്നത് ☐ 5.ജീവനക്കാരുടെ ലഭ്യതയും സഹകരണവും ☐ 6.നിലവാരമുള്ള ചികിത്സ ☐ 7.കുറഞ്ഞ കാത്തിരിപ്പ് സമയം
10.3	ശ്വാസ് പ്രോഗ്രാമിന് കീഴിൽ നിങ്ങൾ രജിസ്റ്റർ ചെയ്തിട്ടുണ്ടോ?	☐ 1.ഉണ്ട് ☐ 2.ഇല്ല ☐ 3.അറിയില്ല
10.4	ശ്വാസകോശ പുനരധിവാസ പദ്ധതിയുടെ ഭാഗമായി നിങ്ങൾ	☐ 1.ഉണ്ട് ☐ 2.ഇല്ല

	എപ്പോഴെങ്കിലും വ്യായാമ പരിശീലനം നേടിയിട്ടുണ്ടോ? ഉത്തരം "ഇല്ല" ആണെങ്കിൽ 10.5 ലേക്ക് പോവുക	
10.4.1	ആരാണ് പരിശീലനം നൽകിയത്?	☐ 1.ഡോക്ടർ ☐ 2.നേഴ്സ് ☐ 3.വേറെ,വ്യക്തമാക്കുക
10.5	നിങ്ങളുടെ ഭക്ഷണക്രമത്തിൽ മാറ്റം വരുത്തുന്നതിനെക്കുറിച്ച് നിങ്ങൾക്ക് എന്തെങ്കിലും ഉപദേശം ലഭിച്ചിട്ടുണ്ടോ?	☐ 1.ഉണ്ട് ☐ 2.ഇല്ല
10.6	നിങ്ങളുടെ പതിവ് ചികിത്സയ്ക്കുള്ള മരുന്നുകൾ എങ്ങനെ ലഭിക്കുന്നു? "സർക്കാർ സൗജന്യ വിതരണം" എന്നാണ് ഉത്തരമെങ്കിൽ 10.7 ലേക്ക് പോവുക	☐ 1.സർക്കാർ സൗജന്യ വിതരണം ☐ 2.സ്വന്തമായിട്ടുള്ള ചിലവിൽ മെഡിക്കൽ സ്റ്റോറിൽ നിന്ന് വാങ്ങൽ (ഫാർമസി)
10.6.1	നിങ്ങളുടെ മരുന്നുകൾ എവിടെ നിന്നാണ് വാങ്ങുന്നത്?	☐ 1.പ്രാദേശിക മെഡിക്കൽ ഷോപ്പ് ☐ 2.സർക്കാർ മരുന്ന് സ്റ്റോർ (കാരുണ്യ, നീതി, ഇൻഹൗസ് ഡ്രഗ് ബാങ്ക്) ☐ 3.ജൻ ഔഷധി മെഡിക്കൽ സ്റ്റോർ ☐ 4.മെഡിക്കൽ പ്രതിനിധികൾ ☐ 5.കമ്മ്യൂണിറ്റി ഫാർമസി ഔട്ട് ലെറ്റുകൾ

10.6.2	3 മാസ കാലയളവിലേക്ക് സിംപിഡി ഇൻഫോലർ മരുന്നുകൾക്ക് എത്ര പണം ചിലവാകും?	INR _____
10.7	കഴിഞ്ഞ ഒരു മാസത്തിനിടെ നിങ്ങളുടെ അവസ്ഥ മോശമായതിനാൽ നേബുലെസേഷൻ ചെയ്തിട്ടുണ്ടോ? ഉത്തരം "ഇല്ല" ആണെങ്കിൽ, 10.8 ലേക്ക് പോവുക	☐ 1.ഉണ്ട് ☐ 2.ഇല്ല
10.7.1	എത്ര തവണ ചെയ്തു?	വ്യക്തമാക്കുക ____
10.8	നിങ്ങളുടെ മെഡിക്കേഷൻ ഡെലിവറി ഉപകരണം എങ്ങനെ ഉപയോഗിക്കണം എന്നതിനെക്കുറിച്ചുള്ള പരിശീലനം നിങ്ങൾക്ക് ലഭിച്ചിട്ടുണ്ടോ? ഉത്തരം "ഇല്ല" ആണെങ്കിൽ, 10.9 ലേക്ക് പോവുക	☐ 1.ഉണ്ട് ☐ 2.ഇല്ല
10.8.1	ആരാണ് പരിശീലനം തന്നതെന്നു വ്യക്തമാക്കുക	☐ 1.ഡോക്ടർ ☐ 2.നഴ്സ് ☐ 3.ഫാർമസിസ്റ്റ്
10.9	നിങ്ങളുടെ ഇൻഫോലർ മരുന്നുകൾ നേടുന്നതിന് നിങ്ങൾക്ക് എപ്പോഴെങ്കിലും ബുദ്ധിമുട്ട് അനുഭവപ്പെട്ടിട്ടുണ്ടോ?	☐ 1.ഉണ്ട് ☐ 2.ഇല്ല
10.10	കഴിഞ്ഞ 1 മാസത്തിൽ നിങ്ങൾക്ക് ഇൻഫോലർ മരുന്ന് തീർന്നതുകൊണ്ട് അതിനു പകരം ആശുപത്രിയിൽ പോയി നേബുലെസേഷൻ ചെയ്തേണ്ടി വന്നിട്ടുണ്ടോ	☐ 1.ഉണ്ട് ☐ 2.ഇല്ല

11. പിന്തുണയുമായി ബന്ധപ്പെട്ട ഘടകങ്ങൾ

11.1	നിങ്ങളുടെ ഡോക്ടറുടെ സന്ദർശന വേളയിൽ ആരെങ്കിലും നിങ്ങളുടെ കൂടെ വരാറുണ്ടോ? ഉത്തരം "ഇല്ല" ആണെങ്കിൽ, 11.2 ലേക്ക് പോവുക	☐ 1.ഉണ്ട് ☐ 2.ഇല്ല
11.1.1	നിങ്ങളുടെ ഡോക്ടറുടെ സന്ദർശനത്തിന് ആരാണ് നിങ്ങളെ അനുഗമിക്കുന്നത്?	
11.2	നിങ്ങളുടെ ഇൻഹെയിലർ മരുന്നുകൾ ദിവസവും കഴിക്കാൻ ആരെങ്കിലും നിങ്ങളെ ഓർമ്മിപ്പിക്കുന്നുണ്ടോ? ഉത്തരം "ഇല്ല" ആണെങ്കിൽ 12.1 ലേക്ക് പോവുക	☐ 1.ഉണ്ട് ☐ 2.ഇല്ല
11.2.1	നിങ്ങളുടെ ഇൻഹെയിലർ മരുന്നുകൾ എടുക്കാൻ ആരാണ് നിങ്ങളെ ഓർമ്മിപ്പിക്കുന്നത്?	

12.രോഗിയുമായി ബന്ധപ്പെട്ട ഘടകങ്ങൾ

12.1	ഇൻഹെയിലർ മെഡിക്കേഷൻ ഫലപ്രദമായി ഉപയോഗിക്കാൻ നിങ്ങൾക്ക് ബുദ്ധിമുട്ടുണ്ടോ? ഉത്തരം "ഇല്ല" എന്നാണെങ്കിൽ, 12.2 ലേക്ക് പോവുക	☐ 1.ഉണ്ട് ☐ 2.ഇല്ല
12.1.1	ഇൻഹെയിലർ മരുന്ന് വലിക്കുമ്പോൾ നിങ്ങൾ എന്ത് ബുദ്ധിമുട്ട് നേരിടുന്നു?	☐ 1.ബുദ്ധിമുട്ടുള്ള കൈ-വായ ഏകോപനം ☐ 2.ഇൻഹെയിലർ പിടിക്കാൻ പ്രയാസമാണ്

	(ഒന്നിലധികം ഉത്തരങ്ങൾ തിരഞ്ഞെടുക്കാം)	☐ 3.ഭാഗിക സ്പ്രേ വായയ്ക്ക് പുറത്തേക്ക് പോകുന്നു ☐ 4.ഇൻഹെയിലർ തരം ഉപയോഗിക്കാൻ എളുപ്പമല്ല ☐ 5.ഇത് എങ്ങനെ ഫലപ്രദമായി ഉപയോഗിക്കാം എന്നതിനെക്കുറിച്ച് അറിവില്ല ☐ 6.മറ്റ് കാരണങ്ങൾ, വ്യക്തമാക്കുക
12.2	ഇൻഹെയിലർ മരുന്ന് ഉപയോഗിക്കുന്നത് കൊണ്ട് നിങ്ങൾക്ക് എന്തെങ്കിലും പാർശ്വഫലങ്ങൾ ഉണ്ടായിട്ടുണ്ടോ? ഉത്തരം "ഇല്ല" ആണെങ്കിൽ, 12.3 ലേക്ക് പോവുക	☐ 1.ഉണ്ട് ☐ 2.ഇല്ല
12.2.1	ഏതൊക്കെ പാർശ്വഫലങ്ങളാണ് നിങ്ങളു്ക്ക് ഉണ്ടാകുന്നത്? (ഒന്നിലധികം ഉത്തരങ്ങൾ തിരഞ്ഞെടുക്കാം)	☐ 1.ക്ഷോഭം ☐ 2.ചുമ ☐ 3.ദുർഗന്ധം വമിക്കുന്നു ☐ 4.വായിൽ വൃണം ഹൃദയമിടിപ്പ് ☐ 5.പരിഭ്രമം / ഉത്കണ്ഠ ☐ 6.വിറയൽ ☐ 7.തലവേദന ☐ 8.അലർജിക്ക് പ്രതിപ്രവർത്തനങ്ങൾ ☐ 9.തൊണ്ടയിലെ അസ്വസ്ഥത ☐ 10.മരുന്നിനോട് കൂടുതൽ ആശ്രയം

		☐ 11.മറ്റുള്ളവ (വ്യക്തമാക്കുക)
12.3	നിങ്ങൾ വീട്ടിൽ ഇല്ലാത്തപ്പോൾ ഇൻഫെയിലർ മരുന്ന് എടുക്കുന്നത് നിങ്ങൾക്ക് ബുദ്ധിമുട്ടാണോ? ഉത്തരം "ഇല്ല" ആണെങ്കിൽ, 12.4 ലേക്ക് പോവുക	☐ 1.ഉണ്ട് ☐ 2.ഇല്ല
12.3.1	നിങ്ങൾ വീട്ടിലില്ലാത്തപ്പോൾ ഇൻഫെയിലർ മരുന്നുകൾ എടുക്കുന്നത് നിങ്ങൾ എന്ത് ബുദ്ധിമുട്ട് നേരിടുന്നു? (ഒന്നിലധികം ഉത്തരങ്ങൾ തിരഞ്ഞെടുക്കാം)	☐ 1.സ്വകാര്യതയുടെ അഭാവം ☐ 2.അപമാനത്തിന്റെ ഭയം ☐ 3.സൂക്ഷിക്കാൻ ഉള്ള ബുദ്ധിമുട്ട് ☐ 4.മറവി ☐ 5.മറ്റുള്ളവ(വ്യക്തമാക്കുക)
12.4	നിങ്ങളുടെ രോഗാവസ്ഥയെ കുറിച്ച് നിങ്ങൾക്ക് എത്രത്തോളം അറിവുണ്ട്?	☐ 1.നല്ല അറിവ് ☐ 2.മിതമായ അറിവ് ☐ 3.ചെറിയ അറിവ്

അനുസരണ അളക്കുക

13. മോനിസ്റ്റീ ഗ്രീൻ ലവിന് സ്ക്കെയിൽ (4-ഇനം)

		ഉണ്ട്	ഇല്ല
1.	നിങ്ങൾ എപ്പോഴെങ്കിലും നിങ്ങളുടെ സി.ഒ.പി.ഡി		

	ഇൻഫോലർ മരുന്നുകൾ വലിക്കാൻ മറക്കാറുണ്ടോ?		
2.	നിങ്ങൾ നിങ്ങളുടെ സി.ഒ.പി.ഡി ഇൻഫോലർ മരുന്നുകൾ വലിക്കുന്നതിൽ അശ്രദ്ധാലു ആണോ?		
3.	നിങ്ങൾക്ക് ഭേദപ്പെട്ടു എന്ന് തോന്നുമ്പോൾ നിങ്ങൾ നിങ്ങളുടെ സി.ഒ.പി.ഡി ഇൻഫോലർ മരുന്നുകൾ വലിക്കുന്നത് നിർത്താറുണ്ടോ?		
4.	നിങ്ങൾക്ക് അവസ്ഥ മോശമായി എന്ന് തോന്നുമ്പോൾ നിങ്ങൾ നിങ്ങളുടെ സി.ഒ.പി.ഡി ഇൻഫോലർ മരുന്നുകൾ വലിക്കുന്നത് നിർത്താറുണ്ടോ?		

ഉണ്ട്- 1

ഇല്ല-0

അനുസരണ നില

ഉയർന്ന അനുസരണ = 0

ഇടത്തരം അനുസരണ = 1-2

കുറഞ്ഞ അനുസരണ = 3-4

14. അനുസരണ അളക്കൽ

14.1	മീറ്റർ ഡോസ് ഇൻഹാലർ ആണെങ്കിൽ, കഴിഞ്ഞ ഇൻഹാലർ	
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	എത്ര ദിവസം നിങ്ങൾ ഉപയോഗിച്ചു?	
14.2	മീറ്റർ ഡോസ് ഇൻഹാലർ ആണെങ്കിൽ, ഡോക്ടറുടെ നിർദ്ദേശപ്രകാരം ഉപയോഗിച്ചാൽ ഒരു ഇൻഹാലർ നിലനിൽക്കേണ്ട ദിവസങ്ങളുടെ എണ്ണം	
14.3	ഡ്രൈ പൗഡർ ഇൻഹാലർ ആണെങ്കിൽ, എത്ര ഗുളികകൾ കഴിഞ്ഞ 30 ദിവസത്തിൽ ഉപയോഗിച്ചു?	
14.4	ഡ്രൈ പൗഡർ ഇൻഹാലർ ആണെങ്കിൽ, ഡോക്ടറുടെ നിർദ്ദേശപ്രകാരം 30 ദിവസത്തിൽ ഉപയോഗിക്കേണ്ട ഗുളികകളുടെ എണ്ണം	

13.1 ഇടത്തരം അല്ലെങ്കിൽ കുറഞ്ഞ അനുസരണ ഉള്ള പങ്കാളികൾക്ക് മാത്രം

രോഗി റിപ്പോർട്ട് ചെയ്ത ഫലങ്ങൾ

എന്റേ ഇൻഹെയിലർ മരുന്നുകൾ ഞാൻ പതിവായി
വലിക്കാറില്ല, കാരണം:

Sl.no		1.ശരി	2.അല്ല
1.	എനിക്ക് ചിലവ് താങ്ങാൻ കഴിഞ്ഞില്ല	☐	☐
2.	എനിക്ക് ഗതാഗത ബുദ്ധിമുട്ടുകൾ ഉണ്ട്	☐	☐
3.	എന്റെ മരുന്ന് തീർന്നു പൊക്കുന്നതു കൊണ്ട്.	☐	☐
4.	എന്റെ ആരോഗ്യ പരിരക്ഷാ ദാതാവിൽ നിന്നുള്ള നിർദ്ദേശങ്ങളെക്കുറിച്ച് എനിക്ക് വ്യക്തതയില്ല.	☐	☐
5.	എന്റെ ചികിത്സാ രീതി വളരെ സങ്കീർണ്ണമാണ്	☐	☐
6.	പാർശ്വഫലങ്ങളെക്കുറിച്ച് എനിക്ക് ഭയമുണ്ട്	☐	☐
7.	ഇത് ഫലപ്രദമാണെന്ന് ഞാൻ വിശ്വസിക്കുന്നില്ല	☐	☐

നിങ്ങളുടെ സഹകരണത്തിന് നന്ദി.

ANNEXURE VII

IEC Approval Letter

	श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौद्योगिकी संस्थान, त्रिवेन्द्रम तिरुवनन्तपुरम - ६९५०११, केरल, इंडिया
	SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY, TRIVANDRUM Thiruvananthapuram - 695 011, Kerala, India (An Institute of National Importance under Govt. of India)
Grams : Chitramet, Phone : +91-471-2443152, Fax : +91-471-2550728 / 2446433, E-mail : sct@sctimst.ac.in, Website : www.sctimst.ac.in	

Institutional Ethics Committee CDSCO Registration No: ECR/189/Inst/KL/2013/RR-24 DHR Registration No: EC/NEW/INST/2022/2775	
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SCT/IEC/2349/DECEMBER/2024	15.01.2025
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Dr. U Krishnapriya
MPH Student, AMCHSS
SCTIMST, Thiruvananthapuram

Dear Dr. Krishnapriya,

The Institutional Ethics Committee held on 30th December, 2024, reviewed and discussed your application to conduct the study titled "**ASSESSMENT OF INHALER THERAPY ADHERENCE RATES AND ITS INFLUENCING FACTORS AMONG COPD PATIENTS IN RURAL THIRUVANANTHAPURAM**" (IEC /2349) .

Principal Investigator	Dr. U Krishnapriya, MPH Student, AMCHSS, SCTIMST
Co-Principal Investigator(s)	Dr. Jeemon, Additional Professor, AMCHSS, SCTIMST
Duration of the study	6 months

The following members of the Ethics Committee were present at the meeting held on 30th December, 2024

SL. No.	Member Name	Highest Degree	Gender	Scientific /Non Scientific	Affiliation with Institution(s)
1.	Dr. Manoj Murhekar	MD (Preventive & Social Medicine)	Male	Social Scientist	No
2.	Dr. Annapurna.Y	MD	Female	Basic Medical Scientist	No
3.	Adv. Priya Kaimal	LLM, MBL	Female	Legal Expert	No
4.	Dr. Indu PV	MBBS, DPM, MPhil, PhD	Female	Clinician	No
5.	Dr. Rejnish Kumar	MBBS, MD, DNB	Male	Clinician	No
6.	Smt. Rekha Radhakrishnan	M.A (Eng.); B.Ed	Female	Lay person	No
7.	Dr. Biju Soman	MBBS, MD, DPH, MSc, DLSHTM	Male	Basic Medical Scientist	Yes
8.	Dr. Syam K	MBBS, MD, DM	Male	Clinician	Yes
9.	Dr. Srinivas G	PhD	Male	Basic Medical Scientist (Member Secretary)	Yes

1

The following documents were reviewed:

Original submission

1. IEC Application Form
2. Funding details and Budget
3. Covering letter addressed to the Chairperson, IEC, SCTIMST dated 09.12.2024 forwarded by HOD
4. Interview schedule in English and Malayalam
5. Informed Consent Forms in English and Malayalam
6. Participant Information Sheets in English and Malayalam
7. Checklist Form
8. Proposal
9. Declaration Form
10. CV of PI and Co-PI

Revised submission

1. IEC Recommendation letter dated 09.01.2025
2. Covering letter addressed to the Member Secretary, IEC, SCTIMST dated 13.01.2025 with response to IEC comments
3. Proposal
4. Participant Information Sheets in English and Malayalam
5. Consent Forms in English and Malayalam
6. Interview schedule in English and Malayalam

IEC Decision

The IEC approved the conduct of the study in the present form.

Remarks:

The Institutional Ethics Committee expects to be informed about the progress of the study, any SAE occurring in the course of the study, any changes in the protocol and patient information/informed consent and asks to be provided a copy of the final report.

There was no member of the study team / Guide who participated in voting / decision making process. The ethics committee is organized and operated according to the requirements of Good Clinical Practice and the requirements of the Indian Council of Medical Research (ICMR).

Sincerely,



Dr. G. Srinivas
Member Secretary, IEC

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE (IEC)
SCTIMST, THIRUVANANTHAPURAM



ANNEXURE VIII

Permission letter from DMO

DMOH-TVM/1083/2024-C4

I/441216/2025

PROCEEDINGS OF THE DISTRICT MEDICAL OFFICER OF HEALTH, THIRUVANANTHAPURAM

Sub: HSD – DMO(H) – Dr.U Krishnapriya MPH student, Achutha Memon Centre for Health Science and Technology, the public health unit of Sree Chitra Tirunal Institute for Medical Science and Technology, Thiruvananthapuram - data collection from various Government hospitals in connection with NPH Thesis work – Sanctioned –Orders issued

- Read: 1. Request from Dr,Biju Soman, Professor and Head Achutha Memon Centre for Health Science and Technology, Thiruvananthapuram
2. Minutes of The Ethical Committee clearance from Sree Chitra Tirunal Institute for Medical Science and Technology, Thiruvananthapuram, dated 15.01.2025
3. Study Approval Committee for research activities held on 24.02.2025, at DMO (H), TVM, with District Medical Officer (Health) as Chairman

ORDER NO.C4-1083/2024/DMO(H)/DATED, 12-03-2025

The Professor and Head Achutha Memon Centre for Health Science and Technology, Thiruvananthapuram has requested permission for MPH student Dr.U Krishnapriya for data collection from various Government hospitals in connection with the thesis study "*Prevalence and Factors influencing Adherence to Inhaler Therapy in COPD Patients in Rural Thiruvananthapuram*". The study approval committee examined the matter and decided to give permission for this student.

Hence sanction is hereby accorded to conduct study subject to the condition that

1. The personal identification details of patients or bystanders will not be collected.
2. The proposed Data Collection must be completed before 2025 March.
3. The Health Services department have the right to terminate the sanction granted without notice if the Ethics is not maintained in the study.
4. The data after the study should be shared to the Director of Health Services, Thiruvananthapuram. Any result/data related to the project will not be published without the permission of Director of Health Services.
5. Study should be conducted without causing any interference to the day-to-day activities of the institution and should comply with the instructions of the head the institution.

Signed by
Bindu Mohan

DR. BINDHU MOHAN, DMO, DMOHTVPM, O/o DMO

DMOHTVM

District Medical Officer (Health)

To

The Superintendent/Medical Officer in Charge
THQH, Chirayinkeehu/Malayinkeezhu, Community Health Centre,
Anjuthengu/Vilappil/Poovar/Vellarada/Andoorkonam/Kallara,RHC
Vakkom/FamilyHealthCentre Kalliyoor/ Kulathoor/Karode/Kallikkad//Azhoor/
Manikkal/Peringamala

Copy to :

- 1 Professor and Head Achutha Memon Centre for Health Science and
Technology, Thiruvananthapuram
- 2) File/SF

ANNEXURE IX

Plagiarism Report

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Summary Report

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By: U Krishnapriya

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