

AMERICAN UNIVERSITY OF BEIRUT

COPD PATIENT SYMPTOM MANAGEMENT: A
CONTINUING EDUCATION COURSE FOR MEDICAL-
SURGICAL NURSES

by
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A project
submitted in partial fulfillment of the requirements
for the degree of Master of Science
to the Department of Nursing
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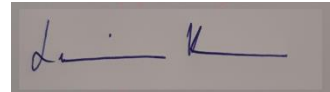
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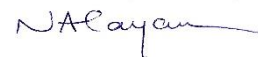
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ABSTRACT OF THE PROJECT OF

Ani Vahe Artinian

for

Master of Science

Major: Nursing Adult-Gerontology Clinical
Nurse Specialist

Title: COPD Patient Symptom Management: A Continuing Education Course for
Medical-Surgical Nurses

COPD is one of the top causes of mortality worldwide. The quality of life of the patient decreases with the progression of the disease and with time symptoms become aggravated with uncontrollable exacerbations. Patients who have lack of knowledge about self-management require hospital readmission, nurses can play a vital role in breaking the cycle of readmission and improving quality of life by providing proper patient education.

The literature supports the need for increasing nurse's knowledge regarding COPD symptom management while training them how to properly educate their patients to maximize quality of care leading to better patient outcomes.

This project aims to develop a continuing education course for nurses who work on medical-surgical units in Saint George Hospital (SGH) to better educate their COPD patients about proper disease management regarding exacerbation prevention measures, pharmacotherapy, proper inhaler technique, pulmonary exercises, balanced nutrition, smoking cessation and active lifestyle.

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CHAPTER I

INTRODUCTION AND BACKGROUND

Chronic obstructive pulmonary disease (COPD), is the leading cause of morbidity and mortality in the world (Global Initiative for Chronic Obstructive Lung Disease [GOLD], 2020). It is a common, preventable and treatable condition characterized by airflow limitation and persistent respiratory symptoms such as cough and sputum production. Airway limitation is due to alveolar and airway abnormalities usually correlated with exposure to noxious particles or gases. Previous reports have used the terms “emphysema” and “chronic bronchitis” for defining COPD, but these terms are not used in recent GOLD reports to define COPD (GOLD, 2020). Emphysema refers to the destruction of alveoli, whereas chronic bronchitis is characterized by the presence of cough and sputum production for a minimum of 3 months in two consecutive years (GOLD, 2020). It is important to note that the development of airflow limitation may not precede chronic respiratory symptoms, which may be associated with acute respiratory events. Airway limitation is measured by the use of the spirometer, considered as the most widely used tool to measure lung function. However, individuals who have normal spirometry can also experience chronic respiratory symptoms (GOLD, 2020).

It is estimated annually that COPD leads to the death of at least 2.9 million people and accounts for 4.7% of global disability (López-Campos et al., 2016). Under-diagnosis of COPD is one of the most faced challenges. Reports from Sweden revealed that only 20 to 30% of patients who meet the GOLD criteria have been correctly diagnosed with COPD (Tageldin et al., 2012), whereas in Spain, 73% of the individuals with irreversible airflow

obstruction were underdiagnosed, more so among woman than men (López-Campos et al., 2016). In Lebanon, the prevalence rate of COPD was 9.7% based on a 2011 study, 80% of which were underdiagnosed (Nohra et al., 2020).

Another reported challenge was the mismanagement of the disease, which was mostly due to the patients' lack of knowledge about their disease. Mismanagement was seen in countries such as Spain, Brazil, Poland and Korea, yet mostly attributed to the lack of patient education about self-management (López-Campos et al., 2016). Significant improvement of management was seen in the Spanish population after educating COPD patients about their condition, which was particularly supported by a survey done once in 2006 followed by another in 2011 (López-Campos et al., 2016).

In Lebanon, Waked et al.'s (2011) study aimed at encouraging awareness among health care professionals regarding COPD and its management. Data from 2201 participants in the study revealed that the prevalence rate of COPD in Lebanon was 9.7%, with the highest rate among smokers. It was also reported that older adults were at highest risk for developing COPD, and only 20% were properly diagnosed and aware of proper management (Waked et al., 2011).

Categorization of the severity of the disease is essential in order to plan the treatment regimen and regular follow-ups (Akiki et al., 2019). Accordingly, disease specific instruments can be used to collect information about the disease-specific health problems and symptoms (Akiki et al., 2019). Experts suggest to focus on the Medical Research Council dyspnea scale and COPD assessment test (CAT) as measurement scales upon the hospitalization of the patient and as post-hospitalization follow-up (Ramakrishnan et al., 2020).

Based on Waked et al.'s study (2011), a high number of COPD patients who presented to the emergency department and were hospitalized was due to acute exacerbation. Severe COPD exacerbation and hospital readmission is associated with decreased tolerance of physical activity, quality of life, and mental health (Waked et al., 2011). Risk factors that aggravate COPD symptoms such as indoor and outdoor air pollution, occupational exposures, and cigarette smoking should be avoided upon COPD diagnosis. It is recommended that early diagnosis, treatment plan, and smoking cessation programs are considered vital for positive patient outcome and for improvement in the quality of care (Waked et al., 2011).

Self-management improves the patient's quality of life, exercise tolerance, and reduced hospital readmissions due to COPD exacerbation (Nohra et al., 2020). To this date in Lebanon, there is no structured education plan for patients with COPD. This status quo leads to gaps in care, especially regarding patient adherence to treatment regimen and use of inhalers (Nohra et al., 2020). When admitting a COPD patient to a hospital in Lebanon, the focus will be on immediate care rather than on the chronicity of the disease and quality of life of the patient. Health care professionals tend to focus more on illness management (Nohra et al., 2020).

Targeted and proper interventions are paramount to avoid unplanned readmissions of COPD patients (Zhong et al., 2019). Patient-centered interventions need to be established according to risk levels; accordingly, appropriate interventions can be analyzed and put together by developing an analytical framework that helps quantify COPD patients' risk of readmission (Zhong et al., 2019).

Hospital readmission is highly related to heavy smoking, depression, underweight, low economic status, comorbidity, and non-compliance (Zhong et al., 2019). More attention has been given to unscheduled readmissions, as patient readmission is perceived to be related to poor quality-care provided by the hospital or to early discharge from hospital, to free up hospital bed capacity for other cases. A promising strategy to prevent acute readmissions after discharging patients is by implementing a prevention strategy once the patient is in a stable condition. Patient-centered planning is needed to educate the patient about self-management (Steiner, 2015).

Lack of knowledge about self-management in COPD patients leads to unplanned hospitalization and increased readmission (Fletcher & Dahl, 2013). Patients need proper education about their disease whereby a post-hospitalization plan for care can stabilize their condition. Nurses play an essential role in COPD patient education since nurse-led interventions provide positive impact on COPD management (Fletcher & Dahl, 2013). For this reason, it is vital for nurses to be well educated about the latest COPD guidelines, since these guidelines are updated on yearly basis (GOLD, 2020). By educating nurses about COPD self-management, they will be able to instruct their patients, thus improve their quality of life.

Before implementing an education plan it is important to assess and analyze the educational needs of the patient. By involving patients in formulating a patient-centered plan based on needs, they will feel more in-control, thus increase the chances of a successful recovery (Beagley, 2011). There are five assumptions related to adult learning: self-concept, experience, readiness to learn, orientation to learning and motivation (Beagley, 2011). As individuals grow, their perspective of self tends to shift from

dependence to self-direction. The individual gathers a growing reservoir of knowledge following readiness to learn, which in return orients the person towards developmental tasks with immediate application of acquired knowledge. The final assumption regarding adult learning is motivation, and this occurs when the benefits of learning is perceived as an internal enterprise motivating learner's interest (Beagley, 2011).

Significance of Project

COPD exacerbation deteriorates the patient's condition by decreasing the quality of life and increasing hospital readmission and mortality rate (Halpin et al., 2017). COPD patients who receive proper self-management education have improved aspects of health, specifically self-efficacy, quality of life, reduced feeling of helplessness, and matters related to dyspnea upon effort, and nutrition (Cannon, 2016). On the other hand, hospital readmission for COPD patients is highly linked to lack of knowledge about self-management (Terry et al., 2019). Nurses have an active role to play in patient education, as they are the front-liners who directly provide patient care around the clock (Berland & Bentsen, 2015).

Nursing-centered interventions like counseling and patient education for COPD patients have had positive impact on patients' quality of life and disease management (Staiou et al., 2020). Despite positive impacts that nurses have on their patients, there still seems to be gaps in nurses' knowledge regarding up-to-date COPD self-management (Staiou et al., 2020). Lack of knowledge about COPD patient management was noted by nurses in Norway, who felt helpless when taking care of a COPD patient experiencing

severe exacerbation. Only 11% of nurses knew how to properly demonstrate inhalation techniques to their patients (Berland & Bentsen, 2015).

Nurses need education regarding COPD exacerbation preventive measures, nutrition, proper administration and inhalation techniques, medication side effects and coping mechanism (Berland & Bentsen, 2015). In Australia, nurses working in health care facilities had low levels of knowledge regarding COPD patient management (Staiou et al., 2020). Educating nurses regarding COPD exacerbation prevention, therapy compliance and proper inhalation techniques was declared a priority in Staiou et al.'s (2020) study, where nurses' lack of knowledge was related to the lack of interdisciplinary collaboration of continuous education programs.

In Lebanon, with the 9.7% prevalence rate of COPD cases and the absence of a structured educational program in place (Nohra et al., 2020), it is crucial that nurses be knowledgeable about the latest COPD guidelines, to educate their patients and help break the cycle of hospital readmission and health deterioration. This project aims at developing a continuing education course for nurses about COPD management using the latest guidelines, and on enhancing patient self-management. The course will be administered to nurses working on the medical-surgical floor in Saint George Hospital, Beirut, Lebanon.

CHAPTER II

LITERATURE REVIEW

COPD exacerbations have an impact on patients' functional capacity, health status and lung function. According to Halpin et al. (2017), the severity of the exacerbation varies from one patient to another and those who survive severe exacerbations leading to hospitalization are at higher risk for further exacerbations and lower quality of life. It is important to understand the factors that aggravate COPD symptoms in order to prevent them and also optimize patient management, to reduce the risk of exacerbation and improve quality of life (Halpin et al., 2017).

COPD exacerbation is referred to as an acute episode of worsening of the patient's respiratory symptoms characterized by baseline dyspnea, increased sputum production, and cough (Halpin et al., 2017). Level 1 exacerbation is considered mild or moderate and can be managed at home, whereas cases requiring hospitalization refer to level 2 and level 3 exacerbations leading to respiratory failure (Halpin et al., 2017). In some cases, the patient may have limited respiratory reserves, thus less exacerbation events, yet would still need hospitalization. Factors taken into consideration upon deciding hospitalization are related to comorbidities the patient has such as heart failure, pneumonia, and arrhythmia or the onset of other clinical signs including peripheral edema and cyanosis (Halpin et al., 2017).

Severe COPD exacerbation leads to increased risk of mortality, cardiovascular comorbidities and increased health care costs. It is possible for patients who experience severe exacerbations, not to return to their pre-exacerbation state (Halpin et al., 2017).

Regarding mortality rates, 5% of patients hospitalized due to COPD exacerbation die while in the hospital (Halpin et al., 2017). A 17-year follow up of COPD patients showed that mortality rate peaked within the first week of hospitalization and stayed high during the first 3 months; however, less than half of patients were alive after 5 years (Halpin, et al. 2017). This result was consistent with prior reports that more than 50% of COPD patients experiencing severe exacerbation die within 5 years following hospitalization (McGhan et al., 2007).

Risk factors for mortality linked with severe exacerbations are: older age, male gender, prior hospitalization due to exacerbation, low body mass index, low quality of life, lung cancer, cardiovascular comorbidity, pulmonary hypertension, and the need for oxygen therapy (Halpin et al., 2017). Experts recognized that a substantial cause for morbidity and mortality is cardiovascular disease; thus cardiovascular exams such as EKG, troponin, BNP and echocardiogram are essential tests that must be done for COPD patients hospitalized for exacerbation (Ramakrishnan et al., 2021). Nonetheless, respiratory symptoms have more importance than cardiac signs during an exacerbation. In a Delphi study done by Ramakrishnan et al. (2021), smoking cessation and pulmonary rehabilitation were considered an essential part of the non-pharmacological treatment for COPD patients. As for hospitalization due to exacerbation, experts stated that treatment with antibiotics and systemic corticosteroid (30-50mg of prednisolone daily) over a course of 5-7 days with nebulized therapy for a maximum of 5 days, was the best treatment recommendation (Ramakrishnan, et al., 2021).

Reasons for Hospital Readmission and Self-Management Deficit in COPD Patients

Admission and readmission of COPD patients is very common. In fact, 80% of patients who were hospitalized for severe exacerbation got readmitted within one year (Chan et al., 2011). Unplanned readmissions have a great impact on the health care expense and hospital stay. Health care costs can be increased due to high hospitalization rates, and patients who have been readmitted usually stay hospitalized longer than their previous admission (Chan et al., 2011).

Unplanned readmission may be linked to previous hospital admission due to exacerbation, but with early discharge from hospital, lack of connectivity of care between the community and the hospital, and poor social service support (Chan et al., 2011). Social factors are important aspects that should be taken into consideration while planning to discharge patients. There are other reported conditions that increase the risk of readmission, such as the development of a new health problem, complication of initial disease, relapse of original condition, poor self-management, and lack of care-giver support (Chan et al., 2011).

According to Chan et al. (2011), a high level of unplanned readmissions may reflect poor quality of care and poor clinical management in hospitals and nursing homes, even those receiving public assistance due to financial difficulties. The reasons could be bifold. The first reason is that patients living in nursing homes are usually fragile, may experience complications more often, and suffer functional and cognitive decline in an unavoidable manner; whereas the second relates to the quality of care rendered to discharged patients in their nursing homes which may not be adequate due to lack of knowledge of nurses handling these patients or due to the lack of a social support system (Chan et al., 2011).

Incident rates of hospitalization due to exacerbation is higher among the male population, 65 years and above, and among smokers (Terry et al., 2019). Individuals who live in rural areas have a harder time accessing health care facilities, thus making it difficult for them to receive proper treatment and intervention during exacerbation (Terry et al., 2019). It has been acknowledged that COPD patients have inadequate knowledge about self-management and are not well equipped to manage their acute episodes. It was also shown that only a third of patients diagnosed with COPD were given an action plan by their physicians (Terry et al., 2019).

Patients' non-adherence to medicine regimen is one of the main reasons for hospital readmission (Sanduzzi et al., 2014). There are two types of non-adherence: intentional and non-intentional. In intentional non-adherence, the patient makes an active decision of discontinuing therapy; around 15% of patients intentionally discontinue therapy after six months. As for unintentional non-adherence, which is a passive process, patients discontinue their medication due to uncontrollable reasons such as old age, mental disability, forgetfulness, social conditions, etc. (Sanduzzi et al., 2014).

Regardless of severity, compliance to medical regimen by COPD patients is lower than the compliance rate for other diseases (Sanduzzi et al., 2014). Unless the patient comprehends that the first step of COPD management is smoking cessation, he/she will not understand the importance of following a strictly prescribed medication dosage (Sanduzzi et al., 2014).

A predisposition of unhealthy lifestyle behavior is correlated to poor compliance with medical therapy (Sanduzzi et al., 2014). Many times patients may be already taking many other medications, thus polypharmacy may increase the rate of noncompliance.

Noncompliance is also related to difficulty in handling devices which are complex to use such as inhalers, complexity of treatment regimen, cost of medications, physical and cognitive impairment of the patient, poor trust in therapy/physician, and underestimation of the severity of their disease (Sanduzzi et al., 2014).

According to Sanduzzi et al. (2014), the most common reason for non-compliance is improper explanation of medication use. During hospitalization, health care providers focus more on treating the acute problem rather than long term therapy; being a common mistake, they will reduce focus and time to explain certain procedures and concepts, such as proper medication usage (Sanduzzi et al., 2014).

More than 50% of the patients have difficulty using metered dose inhalers (Sanduzzi et al., 2014). Worsening COPD outcomes and reduced control is associated with poor inhaler techniques. Care givers and health care providers must be trained regarding correct inhaler preparation, loading/priming, and administration. In this manner, they can teach their patients about proper inhaler usage and thus increase compliance and perceived benefit (Sanduzzi et al., 2014).

Nurses' Role and Implications on COPD Patients

Self-management is referred to as the formal education plan for patients aiming at teaching basic care skills to personalize treatment regimen and provide guidance for health behavioral changes and emotional support while living functional lives (Scullion & Holmes, 2011). Self-management education for COPD patients is linked to improved quality of life and reduced hospital readmissions (Scullion & Holmes, 2011). One way of helping COPD patients in managing their treatment regimen is by developing action plans. Action plans (ACP) help patients realize whether their condition is deteriorating and thus

change their treatment quickly to reduce symptoms of exacerbations (Scullion & Holmes, 2011).

Accurately predicting the prognosis of COPD patients is quite difficult due to the disease's natural history which varies significantly among individuals. For this reason, it is vital for health care professionals encountering COPD patients to be familiar with health care planning as the disease progresses (Kelleher et al., 2020). Advanced care planning focuses on intervention and treatment while reflecting on the individual's goals. Attention is also given to intervention plans needed for future events especially when the patient starts to deteriorate (Kelleher et al., 2020). Action plans help patients prevent severe exacerbations. Such outcomes resulted in individuals who joined their nurse and physician in developing an individualized action plan (Scullion & Holmes, 2011). Generally, COPD patients want to discuss their disease and prognosis, and subjects engaging in ACP immediately after their diagnosis have shown to have better outcomes compared to those who were not involved in an ACP (Meehan et al., 2020).

An earlier study by Trappenburg et al. (2011) aimed at following up on 230 COPD patients over a course of six months and patients were randomized into two groups: one group was integrated in the individualized action plan, whereas the other received the usual care for COPD. Both groups were followed up by a case manager who was a respiratory nurse. The respiratory nurse educated both groups at the beginning of the study about COPD care which included medication, inhaler techniques, vaccination, nutritional aspect, smoking cessation, and management of exacerbation. Patients in the intervention group received an individualized action plan by the help of the case manager. A color coded table was created for each patient in the intervention group which reflected the health status of

the patient. Colors indicated progression level of COPD as such: green (stable), yellow (mild increase), orange (moderate increase), and red (threatening situation). For the control group it was optional for them to contact the case manager, whereas the intervention group was highly advised to contact the case manager upon experiencing any unusual symptom. Results showed that ongoing follow up with the case manager and individualized action plan had a significant impact on health status since it helped identify and decrease exacerbation symptom intensity and accelerate recovery after deterioration. Exacerbations in the interventional group were milder compared to the control group. It was also found that the interventional group contacted their healthcare provider earlier than the control group, thus were able to better control their symptoms.

Once COPD patients are properly educated and supported by well-informed health care providers, they will be able to stabilize their disease by taking the correct steps to prevent and manage exacerbations (Trappenburg et al., 2011).

Patients have lack of knowledge when it comes to prevention interventions for COPD exacerbation. Early initiation of preventive measure is the key for COPD symptom management (Scullion & Holmes, 2011). During the first encounter with COPD patients, education should be delivered regarding the nature of the disease, possible symptom exacerbation, and how to deal with it. This knowledge will help patients react promptly to any change (Scullion & Holmes, 2011). Ongoing support, reassurance, monitoring, and education are needed during the COPD treatment trajectory, especially when it comes to medication use and follow up. Patients should be reassessed upon every encounter to evaluate if they are adhering to treatment and if they know how to correctly take them (Scullion & Holmes, 2011).

In their study, Sayiner et al. (2012) focused on COPD prevalence, risk factors, disease characteristic and management in the Middle East and North Africa (MENA) region. Importance was also given to patient's knowledge about COPD; 83% of the 1085 subjects who answered the questionnaire identified a strong need for education about respiratory conditions, and 78% identified a strong need for better educated health professionals. Patients claimed having little knowledge about their condition and were very demotivated to adhere to their treatment plan, since they had low expectations of stabilizing their condition. Demotivation among patients was attributed to the continuous experience of dyspnea when performing daily activities. Sayiner et al. (2012) proposed emphasis to better the patient-health care worker dialogue regarding instruction on self-management and maintenance.

Educating patients about self-management is vital since it empowers COPD patients to rely on themselves more and recognize worsening symptoms and possible forthcoming exacerbations in which they can stabilize. It is shown that patients who have more frequent exacerbations have not received proper education and had a poorer understanding of the term 'exacerbation'. Action plans were shown to have helped patients with their self-management. Effective support for COPD patients who have experienced exacerbation revolved mostly around post discharge education and self-management advice (Scullion & Holmes, 2011).

Online Education of Nurses

Online learning has become a reliable method of educating learners before and during the surge of the COVID-19 pandemic. Online courses require group collaboration

and meaningful interaction in order to be productive (Haugen & Metcalf, 2019). Digital learning provides learners and educators more flexibility in preparing material for the lesson and for studying. Many people are speaking about a “new digital dawn” that focuses and takes advantage of the new ways of working and teaching to sustain the future health practice and education system (Georgsson, 2020).

Nurses need continuous professional education and training in order to meet up-to-date requirements and provide high quality care for their patients. Online continuing education sessions have become the new way for educating nurses. The many benefits of online learning include flexibility, convenience, and opportunity to work collaboratively (Karaman, 2011). Nurses may have difficulty attending face-to-face classes due to intensive workloads, conflicting schedules and personal responsibilities. Accordingly, online learning will help nurses update their knowledge with evidence-based practice (Karaman, 2011). Online learning has shown positive outcomes in terms of satisfaction, increased desire to learn, and achievement. Comparison between online learning and traditional classroom learning has shown that academic achievement and mentoring opportunities are similar and even enhanced by online education (Karaman, 2011).

Several studies revealed the effectiveness of online learning in terms of providing adequate registered nurse competency. Feng et al.’s study (2013) revealed that learners can successfully enhance their knowledge and performance through online education. This was supported by Philips et al.’s (2014) study where nurses developed their palliative pain assessment techniques through online learning, leading to a significant decrease in patient-reported pain ratings.

Nurses perceive online learning very beneficial since it is flexible and fits well with their work schedule and personal duties. It suits every age group, mostly individuals who are well informed of how to use the computer and access the internet (Karaman, 2011).

CHAPTER III

COURSE SYLLABUS

COPD PATIENT SYMPTOM MANAGEMENT

This chapter provides information about the syllabus for COPD patient symptom management course. Details about the course description, learning outcomes, course delivery method, target population, course purpose, and course outline is detailed in this chapter. The course content includes topics regarding COPD patient management and exacerbation prevention based on the latest GOLD guidelines. Instructions will be delivered online via PowerPoint presentation, online lectures, case studies and audiovisual media to demonstrate proper performance of procedures. Participants will be invited to attend through Zoom link

Course Description

This online continuing education course aims at educating nurses about prevention and management of COPD exacerbation. Emphasis will be on expanding and updating nurses' knowledge regarding COPD pharmacotherapy, life style changes to prevent exacerbations, and management based on latest GOLD guidelines for the prevention of disease deterioration and exacerbation aggravating factors. Among the discussed topics are pharmacological interventions rendered to COPD patients, techniques for inhaler device use, smoking cessation, pulmonary exercises, nutrition, and advanced stage care. Topics on improving the patient's self-management and on assessing the determinants of patient learning will be explored.

Course Purpose

The overall purpose behind offering the course is educating nurses about COPD patient self-management skills including exacerbation prevention measures, proper medication use, balancing diet, smoking cessation, active lifestyle, and pulmonary exercises. The course will provide nurses with up-to-date information regarding COPD management and equip them with principles on how and what to educate COPD patients.

Course Learning Outcomes

By the end of this course, learners will be able to:

1. Differentiate between the different GOLD stages of COPD in terms of manifestations and improvised management strategies.
2. Categorize the different measures that aim at preventing COPD exacerbation.
3. Justify the use of medication therapy in COPD exacerbation prevention.
4. Complete with confidence proper pulmonary exercises and inhaler technique in the care of patients with COPD.
5. Value the importance of palliative care in advanced stages of COPD patients.
6. Interpret importance of patient education for enhancing self-management.

Course Delivery Method

The course will be delivered using the online format. Interactive learning methodology aids learning, increases comprehension, and allows accessibility at all times. Subject-specific, custom-designed learning activities are integrated into the online learning environment to augment educational practice.

The total number of sessions allotted for this online course is six sessions. The duration of the course will be 3 weeks, 2 sessions per week. Nurses will log in to Zoom link sent to their emails by entering their hospital account username and password. The sessions will be synchronous, thus providing an interactive and enriching educational experience. All sessions will be recorded. Nurses who have difficulty attending the session synchronously will have access to the material at their own convenience.

Target Population

The program will target all registered nurses working on medical-surgical floors at Saint Georges Hospital, with special focus on nurses working on the pulmonary unit. It is estimated that around one hundred nurses will attend this course.

Instructional Approaches

The instructional approaches used in the course will include: online lectures, power point presentation material, audiovisual media, and discussion using clinical situations.

Assessment Approaches

At the end of the course, nurse's knowledge attainment will be assessed using an online exam and a group project. The online exam will constitute of multiple choice questions, open ended questions and a matching question. As for the group project, participants will be required to design and develop an educational pamphlet on COPD symptom management and prevention of exacerbation. A total of 60% will be assigned for the exam, and 40% for the project.

Course Outline

Extensive literature review on COPD knowledge and management was done to plan the modules of the course; identify the content and evidence-based information; develop

PowerPoint presentations; and select case studies, research articles, and audiovisual media for integration in the modules. A total of six modules will be presented. The first three modules will include information about pathophysiology, preventive measures, and pharmacological therapy related to COPD management. For the fourth module, it will be designed to teach nurses how to properly perform pulmonary exercises and use inhaler technique; whereas the fifth module will be devoted to discuss the importance of palliative care in advanced stages of COPD. As for the last module, it will revolve around instructing nurses on how to assess educational needs and readiness of patients to learn. The six modules are:

Module 1: Etiology and Pathophysiology of COPD

Module 2: Exacerbation Prevention Measures and Maintenance Measures as per the GOLD approach

Module 3: COPD Pharmacotherapy to Prevent and Control Exacerbation

Module 4: Proper Inhaler Technique and Pulmonary Exercises

Module 5: Palliative Care for Advanced Stage in COPD

Module 6 : Patient Education: Assessing the Determinants of Patient Learning

Module 1: Etiology and Pathophysiology of COPD

Module 1	Etiology and Pathophysiology of COPD
Outline	<ul style="list-style-type: none"> • Pathophysiology of COPD • Factors related to deterioration of the disease • Clinical manifestations • Classification of airflow limitation severity (based on GOLD guidelines)

Duration	60 minutes
Teaching Method	<ul style="list-style-type: none"> • Lecture format • Case Discussion
Learning Outcomes	<ul style="list-style-type: none"> • Classify reasons for airway limitation in COPD • Analyze symptoms of disease deterioration • Distinguish between the various levels of airflow limitation severity as per GOLD guidelines
Content	Appendix A

Module 1 Description:

The first session will be an introduction to the pathophysiology of the disease. Focus will be on airflow limitation and lung injury pathology, clinical manifestations and factors which aggravate symptoms. The 4 stages of COPD according to the latest GOLD guidelines will be discussed in depth.

Module 2: COPD Exacerbation Prevention Measures for Maintenance

Module 2	Prevention measures for maintenance
Outline	<ul style="list-style-type: none"> • Smoking cessation • Vaccination • Proper Nutrition • Active lifestyle
Duration	60 minutes
Teaching Method	<ul style="list-style-type: none"> • Lecture • Case study discussion
Learning Outcomes	<ul style="list-style-type: none"> • Formulate a balanced nutrition plan including necessary food groups. • Propose a smoking cessation program • Recommend attainable physical activities to perform on daily basis • Support importance of vaccination in COPD
Content	<ul style="list-style-type: none"> • Appendix B

Module 2 Description:

Preventive measures are needed to avoid abrupt deterioration of COPD. In this session focus will be given to life style modifications needed to prevent exacerbation of symptoms. Modifications include smoking cessation, awareness about required vaccinations that should be taken especially in elderly patients, physical activity and proper daily nutritional intake.

Module 3: COPD Pharmacotherapy

Module 3	Pharmacotherapy
Outline	<ul style="list-style-type: none">• Overview of COPD medication: classification, indications, mode of actions, and nursing implications for each:<ul style="list-style-type: none">➤ Beta2- agonists: short acting (SABA) and long acting (LABA)➤ Anticholinergics: short acting (SAMA) and long acting (LAMA)➤ Combination short acting beta2-agonist and anticholinergic (SABA/SAMA)➤ Combination Long acting Beta2 agonist and anticholinergic (LABA/LAMA)➤ Combination of LABA and corticosteroid (ICS): (LABA/ICS)➤ Triple combination: (LABA/LAMA/ICS)➤ Methylxanthines➤ Phosphodiesterase➤ Mucolytic agents➤ Anti-inflammatory therapy
Duration	60 minutes
Teaching Method	<ul style="list-style-type: none">• Lecture
Learning Outcomes	<ul style="list-style-type: none">• Outline the difference between beta2-agonist and anticholinergics regarding mechanism of action

	<ul style="list-style-type: none"> • Recognize benefits of combination therapy in reducing exacerbation in COPD patients • Assess the signs requiring initiation of ICS • Recognize adverse effects of medications • Appreciate the importance of individualized treatment regimen to ensure patient adherence to treatment regimen
Content	<ul style="list-style-type: none"> • Appendix C

Module 3 Description:

Pharmacotherapy is an important factor in COPD management. The aim of this session is to make familiar common medications used for COPD patients, their mechanism of action , benefits and side effects. Attention will also be given to combination therapy and when to add or remove medication.

Module 4: Proper Inhaler technique and Pulmonary Exercises

Module 4	Proper Inhaler technique and Pulmonary Exercises
Outline	<ul style="list-style-type: none"> • Types of inhalers • Correct way to use inhalers • Pulmonary exercises: <ul style="list-style-type: none"> ○ Pursed lip breathing ○ Diaphragmatic breathing ○ Coughing Exercise
Duration	60 minutes
Teaching Method	<ul style="list-style-type: none"> • Lecture • Audiovisual media
Learning Outcomes	<ul style="list-style-type: none"> • Outline different types of inhalers and terms of usage in COPD patients • Identify correct way to perform breathing exercises for maximum result • Show dexterity of inhaler technique
Content	<ul style="list-style-type: none"> • Appendix D

Module 4 Description:

There is no use to prescribing a medication if it will be taken in the wrong manner. This session will focus on correct inhaler device technique so that the patient can receive maximum benefit from his/her medication. Attention will also be given to pulmonary exercises, since it is a non-pharmacological intervention that benefits COPD patients but may not be of any benefit if done incorrectly.

Module 5: Palliative Care for Advanced COPD

Module 5	Palliative Care for Advanced Stages in COPD
Outline	<ul style="list-style-type: none">• Definition of Advanced stage COPD holistic care• Symptom control• Increase quality of life during end of life
Duration	45 minutes
Teaching Method	<ul style="list-style-type: none">• Lecture• Class discussion
Learning Outcomes	<ul style="list-style-type: none">• Recognize importance of end of life care among COPD patients• Identify interventions that will provide end-of-life comfort to COPD patients• Plan end-of-life care to COPD patients to decrease suffering• Advocate for COPD patient's end of life requests
Content	<ul style="list-style-type: none">• Appendix E

Module 5 Description:

This session will focus on recognizing COPD patient's end of life needs and on how to maximize patient satisfaction and improve quality of life during late stages of the disease. Attention will be given to symptom management and patient need assessment.

Module 6: Patient Education: Principles and Practice

Module 6	Patient Education: Principles and Practice
Outline	<ul style="list-style-type: none">• Effective form of patient education• Assessing patient's level of understanding
Duration	45 minutes
Teaching Method	<ul style="list-style-type: none">• Lecture
Learning Outcomes	<ul style="list-style-type: none">• Justify effective ways to maximize patient education• Construct an education plan for COPD patients regarding identification of symptom deterioration
Content	<ul style="list-style-type: none">• Appendix F

Module 6 Description:

Proper patient education and evaluation of their level of understanding is as important as preparing up-to-date evidence-based courses. This session will inform nurses how to properly assess learning needs of patients and their readiness to learn with focus on learning styles.

CHAPTER IV

COURSE IMPLEMENTATION AND EVALUATION

The nursing education department at Saint Georges Hospital (SGH) seeks to assess the educational needs of nurses and to conduct high quality education based on evidence-based practice, underpinned by the aim of providing high quality and safe nursing care to patients at the hospital. To ensure alignment with the department's mission, the course will be presented and discussed with the department officials, thus informing them about the aim of this online education course. Once approval to conduct the course is secured, the sessions will be scheduled accordingly. The online education course will also be sent to the Order of Nurses to assess the possibility to provide the course at a national level.

Each session will be administered twice per week to create a flexible schedule for nurses so they can attend all modules. The duration of the course will be three weeks (two sessions a week), and each session will be scheduled over one hour. Nurses will be able to access the course by Zoom link sent to their emails. Each session will be synchronously delivered, thus ensuring interaction and involvement of the participants in the discussion. All sessions will be recorded and posted to participants, thus allowing access by those who cannot attend the session synchronously. The course syllabus will be shared with the nurse managers prior to course delivery and a poster (see Appendix G) will be presented at the nurses' station containing information regarding the course.

A mixture of learning activities will be used to provide the information including case studies, PowerPoint presentation, and audiovisual media. The information provided in

the sessions will be evidence-based and extracted from peer-reviewed articles which are relevant to the sessions.

Case studies will include real-life scenarios to which nurses will use their experience and habits of thought to answer matters pertaining to the case under discussion. Case studies promote active learning, encourage development of critical thinking and aid problem solving (Popil, 2011). The case study used in this education course (see Appendix H) intends to capture the attention of the nurses to help them link the material to real-life scenarios viewed at work. The case study is divided into triggers to tackle concepts of the course sessions.

As for the acquisition of skills, such as proper pulmonary exercises and inhaler techniques, these will be delivered by observing audiovisuals that address the skills. Observational learning promotes retention and imitation of the observed behavior, thus helping individuals perform the task accurately and confidently (Andrieux & Proteau, 2016). Audiovisuals will be played by the shared link in the session. All nurses will have access to the instructor's screen thus they will be able to view the audiovisual clearly.

Permission from the nursing department will be taken for nurses on duty to hand over their pending work to the assistant head nurse, who will cover for them until they finish the session. However, all sessions will be recorded and posted for nurses to watch at their convenience.

Evaluation

Evaluation of this project is bifold: learner and course. Learner evaluation revolves around assessing learners' achievement of the course's learning outcomes. Important though is the acquisition of knowledge and skills as per the GOLD guidelines, to educate

COPD patients to prevent exacerbation events and readmission. As for course evaluation, it will focus on determining areas of strengths and weaknesses in both the delivery approach and implementation of the course, thus setting the groundwork for future improvement in the course offering. The course can be offered to nurses in other hospitals in Lebanon.

Evaluating Learning

One week after the last session, nurses will take an exam constituting of multiple choice questions and essay questions based on the content covered in the sessions. They will also be evaluated on their group project. The online exam includes both selected and constructed-response questions (see Appendix I), two attempts are allowed. A total of 60% will be allotted for the exam. As for the project, it will be marked using a rubric and will be assigned 40% of the course grade (see Appendix J). For the successful completion of the course and to grant a certificate for participation, learners must have a cumulative grade of 80%.

Course evaluation

Two strategies will be employed to evaluate course effectiveness: (1) course evaluation and (2) patient evaluation of nurse's instruction. Course evaluation will commence immediately after the last session when participating nurses will give their feedback about the course. This is done by answering a questionnaire composed of a 4-point Likert scale and open-ended questions. Questionnaire items will analyze material presentation and clarity of the information, delivery approach, adequacy of content, accessibility to the course, and ability to interact online. A qualitative section is included for comments and suggestions (see Appendix K for questionnaire).

Another way to assess course effectiveness is by obtaining feedback from COPD patients prior to their discharge from the hospital regarding the quality of care and appropriateness of instruction delivered to them by nurses who completed the course requirements. Assessment of patient satisfaction and level of understanding of the instruction will aid in evaluating nurse's ability to educate their patients and integrate acquired knowledge in the provided care and delivered instruction (see appendix L for questionnaire). The questionnaire will be translated to Arabic by the hospital's concerned department to enhance patient understanding and avoid language barriers. The questionnaire will be distributed by the nurse manager of the floor prior to discharge of the patient.

CHAPTER V

CONCLUSION

Nurses have to keep up with new approaches in the management and care of COPD patients. The GOLD guidelines are updated annually, yet keeping nurses abreast of these guidelines is highly recommended. The aim of this continuing education course is updating nurses' knowledge about COPD, and building their confidence to educate patients regarding disease management and exacerbation prevention measures. Advancing nurse's knowledge about COPD pharmacotherapy, proper use of inhalers, types of pulmonary exercises, balanced nutrition, smoking cessation, and active lifestyle are deemed essential for safe practice.

APPENDICES

APPENDIX A

Etiology and Pathophysiology of COPD

ANASTASIA VELICH

Definition

- COPD is a common preventable and treatable disease that is characterized by persistent respiratory airflow limitation resulting from airway and/or alveolar abnormalities.
- Significant comorbidity, have an impact on morbidity and mortality
- Chronic airflow limitation in COPD is caused by a mixture of small airway disease and parenchymal destruction
- Common symptoms are dyspnea, cough and sputum production

Learning Outcomes

- Analyze the pathophysiological changes underlying airflow limitation in COPD.
- Distinguish between the various levels of airflow limitation severity as per GOLD guidelines.

Factors that influence disease development and progression

- Environment risk factor: cigarette smoking
- Genetic (alpha 1-antitrypsin deficiency of alpha 1-antitrypsin (AATD))
- Age and sex
 - Age-related
 - Men/women
- Socioeconomic status
- Factors affecting lung growth during gestation and childhood
- Severe childhood respiratory infection

Outline

- COPD definition as per GOLD
- Risk factors influence COPD development and progression
- Physiologic mechanism of COPD
- Pathogenesis related to COPD development and modification
 - Genetic factors
 - Tobacco and biomass inhalation
 - Inflammation-related
 - Alveolar destruction
 - Emphysema and small airway disease
- Pathophysiological alterations in COPD
 - Airway irritation and goblet hyperplasia
 - Small airway disease
 - Mucus hypersecretion
 - Reinforcement
- Spirometry and classification as per GOLD
- Tools for COPD symptom assessment

Physiologic mechanism

Inflammation in the small airways of individuals can be caused by cigarette smoking and other noxious irritations.

An epithelial barrier provides a physical blockade to foreign molecules entering the body through the lungs.

Mucociliary clearance removes many inhaled particles that make it past the cilia and mucus.

An acute inflammatory response to these foreign molecules removes pathogens from causing further damage and repairs any remaining.

The fibrotic and cellular components of this response slowly develop, slowly but produce memory to these previous injuries.

The tissue healed through microscopic change and adding of connective tissues.

Physiologic mechanism cont'

Both the lung parenchyma and airways are typically affected by the inflammation and remodeling.

Differing mechanisms of injury and recovery may lead to:
chronic bronchitis
emphysema, and bronchiolitis

Protease-antiprotease imbalance

- There is evidence for an imbalance in the lung of COPD patients between proteases that break down connective tissue components and antiproteases that cause tissue protection.
- Increased levels of several proteases, derived from inflammatory cells and epithelial cells, have been observed in COPD patients.
- Protease mediated destruction of elastin (a major connective tissue component in lung parenchyma) is believed to be an important feature of emphysema.

Pathogenesis

Reasons for pathological change in COPD:

- Oxidative stress
- Protease-antiprotease imbalance
- Inflammatory cells
- Inflammatory mediators
- Peribronchovascular and interstitial fibrosis

Inflammatory cells

- COPD is characterized by increased numbers of macrophages in peripheral airways, lung parenchyma and pulmonary vessels, together with increased activated neutrophils and increased lymphocytes that include Tc1, Th1, Th17 and BCC.
- In some patients there may also be increase in eosinophils, Th2 or BCC cells.
- All these inflammatory cells together with epithelial cells and other structural cells release multiple inflammatory mediators.
- Loss of IgA deficiency is associated with bacterial translocation, small airway inflammation and airway remodeling.

Oxidative stress

- Some of oxidative stress: hydrogen peroxide, thioproteins are increased in the exhaled breath condensate, sputum and systemic circulation of COPD patients.
- It is further increased during exacerbations.
- Oxidants are generated by cigarette smoke and other inhaled particles, and released from activated inflammatory cells such as macrophages and neutrophils.

Inflammatory mediators

- Wide variety of inflammatory mediators attract inflammatory cells from the circulation (chemotactic factors).
- Amplify the inflammatory process (proinflammatory cytokines).
- Induce structural changes (growth factors).

Peribronchiolar and interstitial fibrosis

- Peribronchiolar and interstitial opacities are present in COPD patients who are asymptomatic smokers.
- Excessive production of growth factors can be found in smokers or those with preceding airway inflammation.
- Inflammation may precede the development of fibrosis or repeated injury of the airway wall itself may lead to excessive production of muscle and fibrous tissue.
- This will contribute to the development of small airways limitation.

Gas exchange abnormalities

- Gas exchange abnormalities result in hypoxemia and hypercapnia.
- Gas transfer for oxygen and carbon dioxide worsens as the disease progresses.
- Reduced ventilation may also be due to reduced ventilator drive or increased dead space ventilation. This may lead to carbon dioxide retention when it is combined with reduced ventilation, due to increased airway resistance because of airway limitation and hyperinflation coupled with ventilator muscle impairment.
- The abnormalities in altered ventilation and a reduced pulmonary vascular bed further worsen the ventilation-perfusion ratio (V/Q) abnormalities.

Pathophysiology

- Airflow limitation and gas trapping
- Gas exchange abnormalities
- Mucus hypersecretion
- Emphysema



Mucus hypersecretion

- Mucus hypersecretion resulting in a chronic productive cough is a feature of chronic bronchitis and is not necessarily associated with airflow limitation.
- Not all patients with COPD have symptomatic mucus hypersecretion.
- Hypersecretion is due to increased number of goblet cells and enlarged submucosal glands, both because of chronic airway irritation by cigarette smoke and other noxious agents.
- Several mediators and proteases stimulate mucus hypersecretion and many of them exert their effect through the activation of epidermal growth factor receptor (EGFR).

Airflow limitation and gas trapping

- The extent of inflammation, fibrosis and limiting alveoli in the small airways correlates with the reduction in the FEV1 and FEV1/FVC ratio and with the accelerated decline in FEV1.
- The peripheral airway limitation progressively traps gas during expiration, resulting in hyperinflation.
- Hyperinflation reduces respiratory capacity and it commonly coexists with dynamic hyperinflation during exercise leading to increased dyspnea and limitation of exercise capacity.
- These factors contribute to impairment of the intrinsic contractile properties of respiratory muscles.



Exacerbation

- Exacerbation of respiratory symptoms can be triggered by:
 - Respiratory infections with bacterial virus
 - Environmental pollutants
 - Unknown factors
- During exacerbation there is increased hyperinflation and gas trapping with reduced expiratory flow thus accounting for increased dyspnea.
- There is worsening of V/Q abnormalities that can result in hypoxemia.
- There is also increased airway inflammation.

Diagnosis and Classification

- ▶ The patient should undergo a spirometry test to confirm the presence of persistent airflow limitation
- ▶ Patients with FEV₁/FVC (Forced expiratory volume to the first expiration over vital capacity) ratio of less than 0.7 are considered to have chronic obstruction
- ▶ Testing is also done after the administration of short-acting bronchodilator and needs a minimum of three spirometry measurements to minimise variability
- ▶ Based on the measured values, the patient is then classified into one of four categories: GOLD 1, GOLD 2, GOLD 3, and GOLD 4

The modified Medical Research Council (mMRC) scale

Grade of dyspnoea/symptoms

Grade 0	Not troubled by breathlessness except on strenuous exercise
Grade 1	Short of breath when hurrying or walking up a slight hill
Grade 2	Walks slower than contemporaries on the level because of breathlessness or has to stop for breath when walking at own pace
Grade 3	Stops for breath after walking 100 m or after a few minutes on the level
Grade 4	Too breathless to leave the house or breathless when dressing or undressing

Measures the degree of disability that breathlessness causes on daily activities

Diagnosis and Classification cont'd

CLASSIFICATION OF AIRFLOW LIMITATION SEVERITY IN COPD

FEV₁/FVC < 0.7

GOLD Class	Severity	FEV ₁ % predicted
I	Mild	FEV ₁ ≥ 80%
II	Moderate	50% ≤ FEV ₁ < 80%
III	Severe	30% ≤ FEV ₁ < 50%
IV	Very Severe	FEV ₁ < 30%

COPD Assessment Tool (CAT)

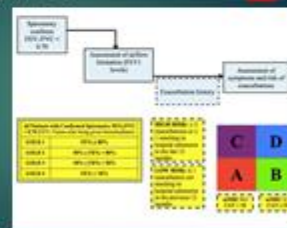
- ▶ Measure COPD impact on the patient's life, and how change about overtime

Tools for symptom assessment

- ▶ The modified Medical Research Council (mMRC) scale
- ▶ COPD Assessment Tool (CAT)
- ▶ ABCD assessment tool

ABCD assessment tool

- Determine the final classification of the patient based on the patient's:
 - FEV₁ post-bronchodilator result
 - Symptom assessment score
 - Exacerbation history



The Case of Mr. Ziad

Background

- Mr. Ziad is a 40-year-old male living alone in Akkar. He has two girls and one boy, all who live in Beirut. His wife passed away eight months ago due to breast cancer. Mr. Ziad socializes mostly with his friends at church whom he sees once per week, usually on Sundays after church.
- He used to work in a wood factory in Ras-Naikub, Beirut, but currently is a farmer in Akkar. His income is low but able to make ends meet. He is a smoke, raw produce per day and has been smoking for the past 40 years. He enjoys planning and harvesting his own food including fruits and vegetables.

Laboratory Test Results of Mr. Ziad

- Arterial blood gas:
 - PH: 7.26 (pH 7.35-7.45)
 - PaCO₂: 40 (PaCO₂ 35-45)
 - PaO₂: 52 (PaO₂ 80-100)
 - HCO₃: 24 (HCO₃ 22-26)
- Lab result:
 - Hem: 54% (H 40-60)
 - Hgb: 17.0 gm/dl (H 12-16)
 - WBC: 14 × 10⁹/L (W 4.5-10 × 10⁹/L)

The Case of Mr. Ziad cont'd

History

- Mr. Ziad has been dyspneic for the past 4 months, and dyspnea increases upon effort and especially when he is working in the field. The past 3 months he has been experiencing a persistent cough and two weeks ago he noticed he started developing a productive cough of white color sputum.
- His children discussed Mr. Ziad's condition with each other and decided to take action. They booked an appointment with a physician and after discussing the need to see a doctor, Mr. Ziad agreed to get a checkup.

Mr Ziad's Follow up Assessment

- Mr. Ziad was advised to perform a preliminary self-checks for airflow limitation. Spirometry results after bronchodilation showed:
 - FVC: 1.45L
 - FVC/FVC: 0.63
- The patient was advised to be admitted to the hospital.
 - He was started on the following management:
 - Oxygen therapy nasal cannula 2L
 - M Inx 250mg 850 PS over 24 hours (oral)
 - Azithromid 2.5mg (Zithro) by mouth every 24 hours combined with Sildenafil (Pampran) by mouth every 4 hours
 - Salmeterol 40 mg (Sere) inhaler
 - Levofloxacin (Levacin) 500mg 2x intravenous route

Clinic Assessment

- Vital signs: Blood pressure: 120/70mmHg, HR: rate 112 bpm, Respiratory rate: 22, SpO₂: 90% on room air, temperature: 37.2°C, afebrile.
- Height: 173cm
- Weight: 70 kg
- Upon physical exam, Mr. Ziad was sitting on the edge of the desk, leaning forward, he looked pale and anxious. Findings included:
 - Use of accessory muscles
 - Mild wheezing upon expiration
 - Decreased or absent crackles
 - Prolonged expiration
 - Breathing through lips pursed
 - Discreet heart sounds
 - Pulse palpated upon exertion: regular rhythm, force 4+

Mr Ziad's Follow up Assessment cont'd

- ABGs were repeated 4 days later, results showed:
 - PH: 7.30 (pH 7.35-7.45)
 - PaCO₂: 48 (PaCO₂ 35-45)
 - PaO₂: 44 (PaO₂ 80-100)
 - HCO₃: 31 (HCO₃ 22-26)
- A minute walk test was performed to which Mr. Ziad experienced desaturation (SpO₂: 84%) after 3 minutes of walking. Chest X-ray showed: pleural effusion in bilateral lower lobes.

Questions

1. Which factors throughout Mr. Zed's lifetime have triggered him to develop COPD?
2. Which GOLD grading criteria apply to Mr. Zed? Justify your answer.
3. Analyze Mr. Zed's first ABG result and then compare it to his second ABG result.
4. What intervention would better help the lung function of Mr. Zed and improve his ABG result?

References

- ▶ Patel, A. R., Patel, A. R., Singh, S., Singh, S., & Khosla, I. (2019). Global Initiative for chronic obstructive lung disease: the change made. *Cureus*, 11(4).
- ▶ Global Initiative for Chronic Obstructive Lung Disease, Inc. (2020). *Global Strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease*. Accessed December 2020 via the Web at <https://goldcopd.org/wp-content/uploads/2019/11/GOLD-2020-FULL.pdf>

APPENDIX B

EXACERBATION PREVENTION MEASURES AND MAINTENANCE MEASURES

An Update: BSM201

GOLD Approaches to COPD Management

Stage I (mild obstruction): Reduction of risk factors (influenza vaccine); short-acting bronchodilator as needed.

Stage II (moderate obstruction): Reduction of risk factors (influenza vaccine); short-acting bronchodilator as needed; long-acting bronchodilator (L); oral pulmonary rehabilitation.

Stage III (severe obstruction): Reduction of risk factors (influenza vaccine); short-acting bronchodilator as needed; long-acting bronchodilator (L); oral pulmonary rehabilitation; inhaled glucocorticoids (I) if repeated exacerbations.

Stage IV (very severe obstruction or moderate obstruction with evidence of chronic respiratory failure): Reduction of risk factors (influenza vaccine); short-acting bronchodilator as needed; long-acting bronchodilator (L); oral pulmonary rehabilitation; inhaled glucocorticoids (I) if repeated exacerbations; long-term oxygen therapy (if criteria met); consider surgical options such as LVRS and lung transplantation.



Outline

- COPD exacerbation management: Exacerbation is defined as periods of acute worsening of respiratory symptoms (GOLD, 2012)
- Nutrition
 - Nutrition assessment/needs
 - Pharmacological needs
 - The 2 A's for smoking cessation
- Daily activities
- Vaccination

COPD Exacerbation

- Exacerbation of COPD is defined as an acute worsening of respiratory symptoms that result in need for additional therapy.
- Immediate intervention is needed since exacerbations negatively impact the patient's health status, rate of hospitalization and admission, and disease progression.
- COPD exacerbations are complex events usually associated with increased airway inflammation, increased mucus production and mucus gas trapping.
- These changes lead to increased hyperinflation (the acute variation of hyperinflation).
- Exacerbations can also be associated with:
 - Increased sputum production and volume
 - Increased cough
 - Affective distress

Learning Outcomes

- Formulate a balanced nutrition plan intended for COPD patients including necessary food groups to maintain proper energy level.
- Propose a smoking cessation program to help COPD patients stop smoking.
- Recommend attainable physical activities to perform on daily basis to improve activity tolerance.
- Support importance of vaccination in COPD to decrease risk of respiratory infections.

COPD Exacerbation cont'd

- Exacerbation triggers
 - Respiratory viral or bacterial infections
 - Pollen-related factors, pollen-related seasonal hypersensitivity
 - Exposure to the polluted weather
- Exacerbation are classified as
 - Mild (associated with mild swelling, bronchodilation, etc., SMDs)
 - Moderate (associated with SMD plus redness and/or oral candidiasis)
 - Severe (hyperinflation needed)

COPD Exacerbation Management

- Goals of treatment for COPD exacerbation are to minimize the negative impact of the current exacerbation and prevent the development of subsequent events.
- Depending on the severity of an exacerbation and/or severity of the underlying disease, an exacerbation can be managed either in the **outpatient or hospital** setting.
- Indications for hospitalization
 - Severe symptoms and/or sudden worsening of breathing symptoms, high respiratory rate, decreased oxygen saturation, confusion, delirium.
 - Acute respiratory failure.
 - Onset of new medical signs (e.g., chest pain, prolonged cough).
 - Failure of outpatient therapy to fully resolve symptoms.
 - Presence of various comorbidities (heart failure, newly occurring pneumonia).
 - Inadequate home support.

Key points for the management of exacerbation (GOLD Guideline)

- Short-acting inhaled beta-2 agonist, with or without short acting anticholinergic are recommended as the initial bronchodilator to treat an acute exacerbation.
- Systemic corticosteroids can improve lung function (FEV1), oxygenation and shorten recovery time and hospitalization duration. Therapy duration **must not be more than 10-14 days**.
- Antibiotics when indicated can shorten recovery time, reduce risk of early relapse, treatment failure and hospitalization. Therapy for duration **should not exceed 5-7 days**.
- Methylxanthines are not recommended due to increased side effects.
- Non-invasive mechanical ventilation should be first mode of ventilation used in COPD patients with acute respiratory failure who have no absolute contraindication.

Respiratory failure (non-life threatening vs life threatening)

- No respiratory failure: Respiratory rate < 20-30 breaths/minute, no use of accessory respiratory muscles, no change of mental status, hypoxemia improved with oxygen therapy.
- Acute respiratory failure (non-life threatening): respiratory rate > 30 breaths per minute, using accessory respiratory muscles, no change in mental status, hypoxemia improved with supplemental oxygen.
- Acute respiratory failure (life threatening): respiratory rate > 30 breaths per minute, using accessory respiratory muscles, acute changes in mental status, hypoxemia not improved with supplemental oxygen.

Oxygen Therapy and Hypoxemia

- COPD is associated with progressive hypoxemia.
- Oxygen administration improves pulmonary hemodynamics.
- Continuous-flow nasal cannula is the standard means of oxygen delivery for stable hypoxic patients.
- It is simple, reliable, and generally well tolerated.
- Each liter of oxygen flow adds 3-4% to the fraction of inspired oxygen (FIO₂).

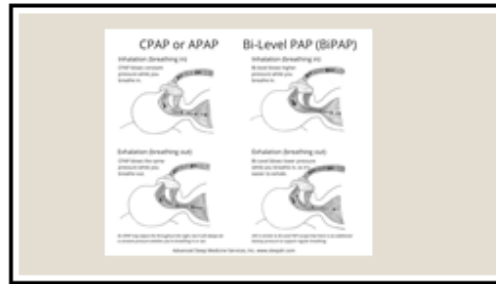


Management of severe but not life threatening exacerbation (GOLD Guideline)

- Administer supplemental oxygen therapy, obtain arterial blood gas, venous gas and pulse oximetry measurements.
- Bronchodilators
 - Increase dose of short acting beta2 agonists.
 - Combine short acting beta2 agonists and anticholinergics.
 - Consider use of long acting bronchodilators when patient becomes stable.
- Consider oral corticosteroids.
- Consider antibiotics when signs of bacterial infection are present.
- Consider non-invasive mechanical ventilation.
- Monitor fluid balance.

Non-Invasive Mechanical Ventilation (NIMV)

- Non-invasive mechanical ventilation improves:
 - Oxygen exchange.
 - Reduces work of breathing.
 - Prevents intubation.
 - Decreases hospitalization duration.
 - Improves survival.
- There are two types of NIMV:
 - CPAP
 - BiPAP



Causes of malnutrition in COPD

Table 1. Causes of malnutrition in COPD	
Disease effects	Patients with COPD have increased nutritional requirements due to a high energy expenditure caused by pulmonary inflammation and increased requirements during breathing (Bord et al., 2005)
Medication effects	The use of oxygen, inhalators and steroids can indirectly result in weight loss for patients. In addition, steroids may also lead to bone density (Mannan of Eastern Ontario, 2016)
Psychological factors	The disease may cause patients to suffer from lack of motivation, anxiety and depression
Social factors	Patients may suffer from social isolation (Bordman, 2005)
Environmental factors	Patients living conditions may not be ideal to assist with food preparation

Nutrition in COPD patients

- One of the common problems for people living with COPD is low body weight, which can weaken heart and lung function and impact on their ability to exercise
- Assessing and managing malnutrition + Ensuring good nutritional care = better outcome for patients
- Weight loss, fatigue and anorexia are common symptoms in people with severe COPD
- Muscle mass decline in patients who are underweight is associated with worse health status, and mortality is higher where there is muscle or fat mass decline (Walker, 2017)
- It is important to calculate body mass index (BMI) for patients with COPD. This should be done at least annually at review appointments, but more frequently with severe COPD
- If the patient has a BMI that is abnormally high or low, or if it is changing over time, referral to a dietician is needed

Managing malnutrition

Malnutrition is essentially an 'imbalance' of energy, protein and other nutrients that cause adverse effects on the body (shape, size and composition)

Oral nutritional supplements (ONS)

- When nutritional requirements cannot be met by diet alone, COPD patients with a low BMI will benefit from oral nutritional supplements (ONS)
- ONS, such as powders, puddings or liquids can be used with support from a dietician
- ONS in malnourished patients with COPD have been shown to significantly improve
 - Hand grip strength
 - Respiratory muscle strength
 - Respiratory performance (e.g. 6-minute walk test)
 - Body weight (including fat mass and fat-free mass)

Nutrition

- Inadequate nutritional status associated with low body weight in patients with COPD is associated with impaired pulmonary status, reduced diaphragmatic mass, lower exercise capacity, and higher mortality rates.
- Nutritional support is an important part of comprehensive care in patients with COPD.

<http://youtu.be/UH7sqAB9o>

Managing malnutrition cont'

Vitamin D

- Vitamin D and antioxidant vitamins (A, C and E) can be depleted in people with COPD
- Vitamin D is important for bone health and also has a role in anti-inflammatory, antitumour, neuromuscular and anti-tumour activities within the body. It can be measured with a simple blood test
- The level of vitamin D within the body is dependent upon the capacity of the skin to synthesise it, hours of sunlight, genetic variation and intake in food
- People with COPD often have smoke-induced skin ageing, a reduced amount of time outdoors and a low dietary intake, leaving them at risk of vitamin D deficiency

Managing malnutrition cont'

- Advise patients to:
 - Eat well early in the day when energy levels are higher
 - Eat frequent small energy-dense meals spread throughout the day
 - Choose foods that are easy to eat and prepare to reduce the fatigue
 - Mix well-balanced diet with plenty of fruit and vegetables, as well as considering the introduction of ONS
 - Choose softer, moist foods for patients with a dry mouth
- Patients who achieve a 2kg weight gain can expect to see functional improvements

Nicotine replacement products cont'd

- E-cigarettes were originally promoted as a form of nicotine replacement therapy although the efficacy to aid smoking cessation remains controversial
- Severe acute lung injury, watery eye, pneumonia, alveolar haemorrhage, respiratory bronchiolitis and other forms of lung abnormality have been linked to E-cigarette use



Smoking cessation for COPD patients

- Smoking cessation has the greatest capacity to influence COPD
- Effective resource and dedication to smoking cessation -> long-term quit success up to 25% can be achieved

Pharmacotherapies for smoking cessation:

```

  graph TD
    A[Pharmacotherapies for smoking cessation] --> B[Nicotine replacement products]
    A --> C[Pharmacological products]
  
```

Pharmacological products

- Varenicline
- Bupropion
- Nortriptyline

} have shown to increase long term quit rates

They should always be used as a component of a supportive intervention program rather than a sole intervention for smoking cessation.

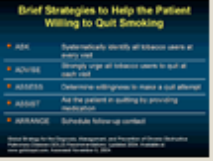
Nicotine replacement products

- Nicotine replacement therapy: nicotine gum, lozenge, nasal spray, transdermal patch, sublingual tablet, lozenge increase long term smoking abstinence rate and is more effective than placebo
- Medical contraindication to nicotine replacement therapy include:
 - Recent myocardial infarction
 - Stroke
- The contraindication to nicotine replacement after acute coronary syndrome remains unclear and evidence shows that this treatment should be started >2 weeks after cardiovascular event
- Continuous chewing of nicotine gum produce secretions that are swallowed resulting in little absorption and potentially causing nausea
- Alcoholic beverages: coffee, juice and soft drinks interfere with the absorption of nicotine



The 5 A's

A five step program for intervention provides helpful strategic framework to guide healthcare providers interested in helping their patients stop smoking.



Daily activities

- Reduced daily physical activity (DPA) is a multifactorial deficit in chronic obstructive pulmonary disease
- Reduced DPA is a key contributor to cardiovascular morbidity, recurrent hospital admissions related to exacerbations, disease progression and reduced health-related quality of life, thus

Engaging in a regular physical activity could **reduce** the risk of cardiovascular disease, hospitalization rate and death related to COPD

Assessment tests

The 6-minute walk test (6MWT)

The test measures the distance that a patient is able to walk quickly on a flat, hard surface in a period of 6 min back and forth around a course.

- Evaluates the global and integrated response of all systems involved during exercise, including:
 - Pulmonary
 - Cardiovascular system
 - Neuro-muscular system
 - Musculoskeletal
- Assesses the sub-maximal level of functional capacity
- The 6-min walking distance (6MWD) seems to better reflect the functional exercise level for daily physical activities than maximal incremental tests.
- Oxygen desaturation during the 6MWT may also reflect oxygen desaturation during the patients' activities of daily living.

Pulmonary Rehabilitation



<http://www.webmd.com/lung/diseases/living-with-copd>

Activity of daily life for COPD patients

- There is significant relationship between activity of daily life and disease stage, hospitalization rate, exercise capacity, reported activity restrictions and dyspnea during daily activities.
- Resistance training as an adjunct to endurance is recommended in all patients, especially those with peripheral muscle weakness.
- A combination of resistance training with interval endurance training can be a useful alternative training strategy in patients severely restricted in their ability to perform endurance training due to marked ventilatory limitation.
- Participation in physical activity equivalent to **walking cycling** for at least **1 to 2 weeks** was associated with a 30-40% reduction in the risk of COPD-related hospital admission and mortality.

Assessment tests

- Exercise tolerance can be assessed by:
 - **Cardiopulmonary exercise test**, using either cycle ergometry or a treadmill, measuring a number of physiological variables, including peak oxygen uptake, peak heart rate and peak work performance.
 - A less complex approach is to use a self-paced, timed walking test called **6-minute walk test (6MWT)**.

Inspiratory muscle training

- As a consequence of COPD, strength and endurance of the diaphragm can also be reduced and contribute to hypercapnia, dyspnea and reduced walking capacity.
- Inspiratory muscle training may enhance the dysfunction of the diaphragm and improve some of its consequent burden.
- Inspiratory muscle training can improve inspiratory muscle strength and endurance, as well as reduce dyspnea.
- Most commonly used inspiratory muscle training technique is the one of "threshold loading" devices. These devices generally have a spring-loaded valve requiring the patient to inhale strongly enough to open the valve and to breathe in against an individualized load. Resistance should then be increased stepwise as tolerated.

HOW TO USE THRESHOLD DMT

Martin-Sanchez C, et al. (2020). How to use threshold DMT [Image]. Retrieved from <https://www.researchprotocols.org/2020/1/e19211/>

Pneumococcal vaccine

- Pneumococcal vaccinations: PCV13 and PPSV23 are recommended for all patients > 65 years old
- PPSV23 is also recommended for younger COPD patients with significant comorbid conditions including chronic heart or lung disease
- PPSV23 reduces incidence of community-acquired pneumonias in COPD patients < 65 years old with an FEV1 < 40% predicted
- PCV13 has greater immunogenicity than the PPSV23 (up to 2 years after vaccination)
- Reduce likelihood of exacerbation

Vaccination

- Vaccination reduces serious illness and death in COPD
- 2 important vaccines advised
 1. Influenza vaccine
 2. Pneumococcal vaccine

The Case of Mr. Ziad cont'd

Tipover 3

- Mr. Ziad thought his dyspnea may be due to cigarette smoking thus he has decreased smoking to half a pack a day. His son visited him recently and showed concern about his weight loss since he has seen his father Mr. Ziad's chest's dyspnea, and fatigue were causing him difficulty to work in his field thus unable to harvest his plants and eat well.

1. Would you consider Mr. Ziad moribund? Verify your answer and provide suggestions to help him.
2. What intervention would better help the lung function of Mr. Ziad?
3. How would you help Mr. Ziad to stop smoking?

Influenza vaccine

- Prevents serious complications such as lower respiratory tract infection requiring hospitalization and death in COPD patients
- Reduce exacerbations
- Decreases risk of ischemic heart disease
- Adverse effect is generally mild and transient
- Vaccines containing either killed or live inactivated viruses are recommended as they are more effective in elderly patients

COPD Patients and COVID-19 Prevention (as per GOLD guidelines)

- Patients with COPD presenting with respiratory symptoms, fever, or other symptoms suggesting SARS-CoV-2 infection, even if mild, should be treated for possible infection
- Patients with COPD should follow basic infection-control measures to help prevent SARS-CoV-2 infection, including social distancing and washing hands
- The American College of Chest Physicians, American Lung Association, American Thoracic Society, and the COPD Foundation have issued a joint statement on the importance of patients with chronic lung disease wearing facial coverings during the COVID-19 pandemic.

COPD Patients and COVID-19 Prevention (as per GOLD guidelines)

- Wearing a tight-fitting N95 mask introduces additional inspiratory breathing. Respiratory rate, peripheral oxygen saturation, and exhaled CO₂ levels were adversely affected in patients with COPD wearing an N95 mask for 10, **however wearing a surgical mask does not appear to affect ventilation even in patients with severe airflow limitation.**
- Shielding, or sheltering-in-place, is a way to protect people who are extremely vulnerable from coming into contact with coronavirus.
- If patients with COPD are asked to shield, it is important to educate them about keeping active and exercising while shielded. Plans should be made to ensure supplies of food, medications, oxygen, supportive health services, and other basic necessities can be maintained.

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APPENDIX C

COPD Pharmacotherapy to Prevent and Control Exacerbation

Art Arntsen, PhD, MSc

Pharmacological therapy

Pharmacological therapy for COPD is used to:

- Reduce symptoms
- Reduce frequency and severity of exacerbation
- Improve exercise tolerance and health status

Learning Outcomes

- Analyse the different types of medications prescribed to manage COPD in terms of action, indications, and side effects
- Recognise benefits of combination therapy in reducing exacerbation in COPD patients
- Appreciate the importance of individualised treatment regimen to ensure patient adherence to treatment regimen

Bronchodilators

- Increase FEV₁
- Act by altering airway smooth muscle tone
- Improve expiratory flow
- Reduce dynamic hyperinflation at rest and during exercise
- Improve exercise performance
- Provides benefit in acute episodes
- Prescribed on a regular basis to prevent or reduce symptoms
- Using short acting bronchodilator on a regular basis is not generally recommended

Outline

- Beta₂-agonist short acting (SABA) and long acting (LABA)
- Anticholinergic short acting (SAMA) and long acting (LAMA)
- Combination short acting / long acting
- Triple combination (LABA/LAMA/ICS)
- Methylxanthine
- Prostaglandinase
- Mucolytic agents
- Reference

Bronchodilators: Beta₂-agonist

- Principle action of beta₂ agonist is to relax airway smooth muscle by stimulating beta₂-adrenergic receptors
- This will increase the cyclic AMP and produce functional antagonism to bronchoconstriction
- There are
 - Short acting bronchodilators (SABA)
 - Long acting bronchodilators (LABA)

Beta2-agonist

- Effects of SABA wear off within 4-6 hours
- Effects of LABA wear after 12 hours or more
- **Examples of LABA : (formoterol and salmeterol)**
- LABAs improves:
 - FEV1 and lung volumes
 - Dyspnea
 - Health status
 - Exacerbation rate
 - Number of hospitalization

Anti-muscarinic drugs

- Short acting muscarinic antagonist alone provide small benefits over short acting beta2-agonist in terms of lung function and health status
- LAMA treatment improves symptoms and health status, effectiveness of pulmonary rehabilitation and reduces exacerbation and related hospitalization
- Inhaled anticholinergic drugs are poorly absorbed which limits the troublesome systemic effects observed with atropine
- **Adverse effects:**
 - Urinary symptoms
 - Bitter, metallic taste
 - Cardiovascular events
 - Acute glaucoma (for solutions used with a facemask)

Adverse effects of beta2-agonist

- Resting sinus tachycardia
- Somatic tremor
- Hypokalemia (especially when treatment is combined with furoside diuretics)

Methylxanthines

- There is controversy about the exact effect of xanthine derivatives
- They may act as non-selective phosphodiesterase inhibitors
- **Theophylline** is the most commonly used methylxanthine
 - **Adverse effects:**
 - Headache
 - Nervousness
 - Insomnia
- Addition of methylxanthine to oral steroid produce a greater improvement in FEV1 and bronchospasm than steroid alone

Bronchodilators: Anti-muscarinic drugs

- Block bronchoconstricting effect of acetylcholine on M3 muscarinic receptors expressed in smooth muscles.
- **Types**
 - Short acting anti-muscarinic (SAMA)
 - Long acting anti-muscarinic (LAMA)
- **SAMA (ipratropium and oxitropium)** block inhibitory neuronal receptor M2, which causes vagally induced bronchoconstriction
- **LAMA (tiotropium , aclidinium, and glycopyrronium bromide)** bind to M3 muscarinic receptors with faster dissociation from M2 muscarinic receptors, thus prolonging the duration of bronchodilator effect

Adverse effects of Methylxanthines

- Toxicity is dose related. The issue is that most of the benefits occur when near toxic doses are administered
- Tachycardia (atrial and ventricular arrhythmias)
- Grand mal convulsion
- Headache
- Insomnia
- Nervousness
- Methylxanthines may predispose the patient to an increased risk of overdose

Combination Bronchodilator Therapy

- Combining bronchodilators with different mechanisms and action duration increase the effect of bronchodilator with a lower risk of side effects vs increasing the dose of a single bronchodilator
- Combination of SABA and SAMA improve FEV1 more than administering either medication alone
- LABA and LAMA combined improve lung function which is more consistently greater than LABA monotherapy
- Greater improvement in quality of life, symptoms and health status is seen by administering LABA/LAMA combination
- Studies also found that inhaled corticosteroid (ICS) + LABA has a greater effect in decreasing exacerbations than LABA + LAMA

Adverse effects of ICS

- Oral candida
- Hoarse voice
- Skin bruising
- Pneumonia
- Decreased bone density
- Risk of diabetes/poor control of diabetes

Inhaled corticosteroids (ICS)

- Regular treatment of ICS alone does not modify the long term decline of FEV1 nor mortality on the contrary it increases the risk of pneumonia
- Patients with moderate to very severe COPD and exacerbation can benefit from ICS combined with LABA
- ICS + LABA improves health status and reduces exacerbation

FACTORS TO CONSIDER WHEN INITIATING ICS TREATMENT

Factor to consider when initiating ICS treatment in combination with one or two long acting bronchodilators (not the criteria to follow when considering ICS withdrawal)

INDICATOR	CONSIDER ICS	AVOID ICS
<ul style="list-style-type: none"> History of exacerbations FEV1 FEV1 decline FEV1 FEV1 FEV1 	<ul style="list-style-type: none"> FEV1 FEV1 FEV1 FEV1 FEV1 	<ul style="list-style-type: none"> FEV1 FEV1 FEV1 FEV1 FEV1

Always consider ongoing exacerbations, symptoms, health status, and quality of life when recommending ICS treatment. ICS should be discontinued if the patient has no exacerbations, symptoms, or health status improvement on LABA or LABA/LAMA.

Revised and updated from the GOLD 2019 Report. For more information, visit www.goldcopd.com.

Corticosteroids: Inhaled Form

Generic Name	Brand Name
Budesonide	QVAR
Budesonide	Pulmicort Nebule, Pulmicort
Budesonide	Kixada
Budesonide	Revvent
Budesonide	Airmoex Nebule
Budesonide	Airmoex

- Information plays a significant role in pathogenesis of COPD
- Systemic and inhaled corticosteroids attempt to remove this inflammation and positively alter the course of disease

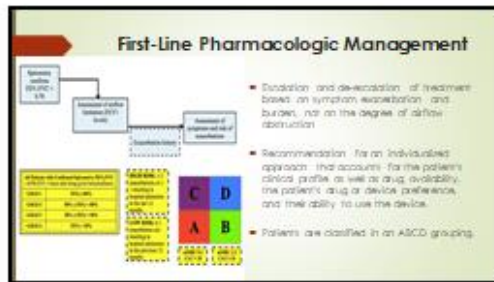
Triple inhaled therapy

LABA + LAMA + ICS

- Improves lung function
- Prevents exacerbation
- Reduces mortality

Targeted for patients with:

- Increased respiratory symptoms
- History of frequent and/or severe exacerbation
- Moderate to severe airflow limitation



Phosphodiesterase-4 (PDE4) inhibitors

- Principal action of PDE4 inhibitor is to reduce inflammation by inhibiting the breakdown of intracellular cyclic AMP.
- Roflumilast is a once daily oral medication with no direct bronchodilator activity.
- Reduces moderate and severe exacerbations treated with systemic corticosteroids.
- When added to long acting bronchodilator positive impact is shown on lung function.
- **Roflumilast** has a greater effect on patients with prior history of hospitalization for an acute exacerbation.

Group A	Group B	Group C	Group D
Low or no smoking Low or no risk for cardiovascular symptoms (e.g., hypertension, coronary or cerebrovascular disease)	Long acting bronchodilators with therapy with a long acting corticosteroid agent or quaternary ammonium anticholinergic agent or combination of long acting corticosteroid agent and quaternary ammonium anticholinergic agent	Low or no smoking or no or low risk for long acting medication or quaternary ammonium anticholinergic agent but low likelihood benefits over additional costs for long acting corticosteroid addition over quaternary ammonium anticholinergic agent	High or no smoking or high or low risk for long acting medication or quaternary ammonium anticholinergic agent but low likelihood benefits over additional costs for long acting corticosteroid addition over quaternary ammonium anticholinergic agent
Low or no smoking Low or no risk for cardiovascular symptoms (e.g., hypertension, coronary or cerebrovascular disease)	High or no smoking High or low risk for long acting corticosteroid agent and long acting quaternary anticholinergic agent	High or no smoking or high or low risk for long acting medication or quaternary ammonium anticholinergic agent but low likelihood benefits over additional costs for long acting corticosteroid addition over quaternary ammonium anticholinergic agent	High or no smoking or high or low risk for long acting medication or quaternary ammonium anticholinergic agent but low likelihood benefits over additional costs for long acting corticosteroid addition over quaternary ammonium anticholinergic agent
Additional advantages in reducing hospitalizations and exacerbations			Additional advantages in reducing hospitalizations and exacerbations

Adverse effects of PDE4 inhibitors

- Diarrhea
- Nausea, reduces appetite
- Weight loss
- Abdominal pain
- Sleep disturbance
- Headache

Second-Line Pharmacologic Management

- Theophylline not recommended unless access to or affordability of bronchodilators is an issue
- Combination of inhaled corticosteroids with a long-acting beta-agonist agent as an escalation alternative for a patient in Group C.
- Mucolytic agents to improve secretion but not outcome
- Systemic moderate dosing of glucocorticosteroids for 5 days

Antibiotics

- Continuous use of antibiotics has no effect on the frequency of exacerbation
- Azithromycin (250mg/day or 500mg three times per week) for one year reduces the risk of exacerbation compared to usual care
- Azithromycin effects → bacterial resistance, QT prolongation impaired hearing

Mucolytics

- In patients not receiving inhaled corticosteroids, regular treatment with mucolytics is advised.
- Examples of mucolytics:
 - Budesonide
 - Carbocysteine
 - N-acetylcysteine
- Mucolytics reduce exacerbation and modestly improve health status.

COPD and COVID-19 Pharmacotherapy (as per GOLD guidelines)

- GOLD recommends that patients with COPD and COVID-19 should be treated with the same strategy of care as patients with COVID-19.
- There are no known drug interactions between Remdesivir and inhaled COPD treatments.

Summary of COPD Medication Therapy

Global Initiative for Chronic Obstructive Lung Disease (GOLD), 2020. www.goldonline.org

COPD and COVID-19 Non-pharmacological therapy (as per GOLD guidelines)

- Patients with COPD should continue with their regular non-pharmacological therapy.
- Patients should receive their annual influenza vaccination.
- There is no reason to modify palliative care approaches because of COVID-19.
- Many pulmonary rehabilitation programs have been suspended during the pandemic. In order to reduce the risk of spreading SARS-CoV-2, when available, on-site, exercise-based rehabilitation is not appropriate.
- Patients should be activated at home and can be supported by home-based rehabilitation.


COPD and COVID-19 Pharmacotherapy (as per GOLD guidelines)

- The use of inhaled and systemic corticosteroids has been controversial.
- ICS have an overall protective effect against exacerbations in patients with COPD and a history of exacerbations. However, there is an increased risk of pneumonia associated with ICS use, raising concerns that immune suppression with ICS could increase the risk of COVID-19 infection.
- Aerosol therapy increases the droplet generation and risk of COVID-19 transmission.
- If possible, pressurized metered-dose inhalers, dry powder inhalers, and soft mist inhalers should be used for all delivery instead of nebulizers.
- Nebulizers may be needed in patients who are critically ill with COVID-19 receiving mechanical ventilatory support. In this case, it is important to keep the circuit intact and prevent the transmission of the virus.

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- <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/operational-update-on-covid-19>

APPENDIX D



PROPER INHALER TECHNIQUE AND PULMONARY EXERCISES

2nd Edition 179, 652N

TYPES OF INHALERS

1. Metered Dose Inhalers (MDI)
2. Dry Powder Inhalers (DPI)
3. Soft Mist Inhalers (SMI)



OUTLINE

- I. Learning outcomes
- II. Types of inhalers
 1. Metered Dose Inhalers (MDI)
 2. Dry Powder Inhalers (DPI)
 3. Soft Mist Inhalers (SMI)
- III. Breathing exercises
 1. Diaphragmatic
 2. Coupling
 3. Pursed Lip Breathing
- IV. References

METER-DOSE INHALER

*A metered-dose inhaler (MDI) delivers topical medications to a patient's respiratory tract, producing local and systemic effects

*The mucosal lining of the respiratory tract absorbs the inhalant almost immediately.

Examples of common inhalants include:

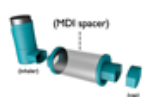
- Bronchodilators -> Improve airway patency and facilitate mucus drainage
- Mucolytics -> Attain a high local concentration to liquefy tenacious bronchial secretions
- Corticosteroids -> Decrease inflammation in the respiratory tract

LEARNING OUTCOMES

1. Outline different types of inhalers and terms of usage in COPD patients
2. Identify correct way to perform breathing exercises for maximum result

STEPS FOR ADMINISTERING MDI

1. To obtain a baseline for comparison, assess the patient's respiratory status, including respiratory rate, breath sounds, and accessory muscle use.
2. Insert the metal stem of the prescribed MDI into the small hole on the flattened portion of the mouthpiece.
3. Shake the prescribed MDI to mix the medication and aerosol propellant.
4. Prime the prescribed MDI (spraying one or more puffs into the air before use)



STEPS FOR ADMINISTERING MDI CONT'D

- Remove the mouthpiece cap.
- Attach the prescribed MDI to the spacer as indicated. Make sure not to touch the mouthpiece, to ensure that some MDIs come back in spacers.
- Instruct the patient to exhale fully.
- Place the prescribed MDI or spacer into the patient's mouth and tell the patient to close the lips around it using a closed-mouth technique.
- Alternatively, if directed by the practitioner, use an open-mouth technique by holding the prescribed MDI 1" to 2" (2.5 to 5 cm) in front of the patient's mouth.



CONSIDERATIONS

When administering inhaled corticosteroids, such as:

- Beclomethasone
- Budesonide
- Ciclesonide
- Fluticasone
- Triamcinolone.

Instruct the patient to **rinse and gargle with water** and then to expectorate using an emesis basin after each dose to help prevent an infection in the mouth.

When administering inhaled quick-relief medications, such as beta₂-adrenergic agonists, wait about 15 to 30 seconds between inhalations.

MDIs with spacers may help provide greater therapeutic benefit for patients who have difficulty with coordination.

INSTRUCTIONS FOR PROPER MDI USAGE

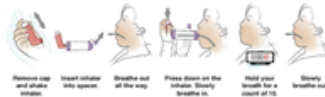
- *Instruct the patient to press down on the prescribed MDI once as the patient starts breathing in slowly through the mouth.
- *If the patient is using a spacer, instruct the patient to press down on the prescribed MDI first and then to begin to breathe in slowly within 5 seconds.
- *Instruct the patient to continue breathing in slowly and as deeply as possible. (This action helps draw the medication into the patient's lungs.)
- *Remove the mouthpiece from the patient's mouth, and instruct the patient to hold the breath and count to 10 slowly to allow the medication to reach the patient's chest.

MDI USE

<https://www.youtube.com/watch?v=V3u0EzQ2M>

INSTRUCTIONS FOR PROPER MDI USAGE CONT'D

- *Instruct the patient to inhale slowly through pursed lips to keep the distal bronchioles open, enabling increased absorption and diffusion of the medication and better gas exchange.
- *After administration of all the prescribed inhalations, remove the spacer (if used) from the prescribed MDI and wash it and the mouthpiece.
- *Put the cap back on the MDI after each use.




DRY POWDER INHALER USE

- *A dry powder inhaler (DPI) is a breath-actuated device that produces local and systemic effects by delivering topical medications to the respiratory tract.
- *A DPI requires sufficient inspiratory flow to inhale the medication from the device.
- *The patient's inspiratory flow disperses the dry particles and draws them from the device into the lower airways. Patients who can't demonstrate sufficient inspiratory flow for the inhaler may not use a DPI reliably.



COMMONLY USED DPI DEVICES



Single-Dose Inhalers
Typically, these are designed to have the capsule, containing the medication, in a holder. The capsule is held in place by a spring. The capsule is held in place by a spring. The capsule is held in place by a spring.

Multi-Dose Inhalers
These devices are designed to have the medication in a holder. The medication is held in place by a spring. The medication is held in place by a spring.

The nozzle or mouthpiece
The nozzle or mouthpiece is designed to have the medication in a holder. The medication is held in place by a spring. The medication is held in place by a spring.

DPI USE

<https://www.youtube.com/watch?v=...>

INSTRUCTIONS FOR DPI USE

- For a single-dose DPI, insert and load the medication capsule or blister pack into the device.
- The device usually loads the inserted medication by twisting the inhaler, pushing a lever, or pulling a trigger.
- For a multi-dose DPI, with the mouthpiece toward you, slide the lever away from you only once until it clicks into position. Each time the lever is pushed back, a dose is ready to be inhaled.

SOFT MIST INHALER


The main goals of developing the RespiMat SMI is to:

- Avoid the use of propellants
- Reduce the requirements for patient inspiratory effort
- Enhance drug delivery
- Improve patient usability



STEPS FOR DRY POWDER INHALER USE

1. Have the patient exhale fully while holding the mouthpiece away from the mouth.
2. Instruct the patient to place the mouthpiece in the mouth, close the lips around it, and inhale over 2 to 3 seconds through the mouthpiece.
3. Advise the patient to avoid breathing through their nose.
4. Tell the patient to remove the mouthpiece from the mouth, hold the breath for about 10 seconds or for as long as comfortable, and then breathe out slowly.
5. Have the patient rinse their mouth with water to remove medication in the mouth.



SOFT MIST INHALER BENEFITS

- To avoid the use of propellants, the effective aspects of nebulizer technology were applied to generate an aerosol inhalant or "soft mist," from liquid.
- RespiMat SMI uses an extremely fine nozzle system, the UniBlock, to aerosolize a metered dose of drug solution into tiny particles suitable for inhalation.
- The mechanics of the device are designed to optimize aerosol velocity, particle size, and internal resistance in order to enhance drug delivery into the airways.
- SMI actively generates an aerosol independent of the patient's inhalation effort, with a slow velocity and prolonged duration, which facilitates the coordination of activation and inhalation.
- Because the aerosol generated by SMI has a high fine-particle fraction delivered at a slow velocity, lung deposition is maximized and oropharyngeal deposition minimized, even at low inhalation flows.

STEPS FOR SMI USE

1. Check the carriage or capsule and hold the inhaler in the upright position.
2. Turn the base in the direction of the arrows until it clicks.
3. Open the cap and exhale completely and away from the inhaler.
4. Close lips around the mouthpiece of the inhaler.
5. Hold the inhaler in a horizontal position so that it is pointing to the back of throat.
6. Press the dose release button while taking a slow and deep inhalation.
7. Continue to inhale slowly and deeply through the mouth.
8. Hold breath up to 10 seconds.
9. Remove the inhaler from the mouth and breathing out and close the cap.



DIAPHRAGMATIC BREATHING

The goals of diaphragmatic breathing exercises are to:

- Strengthen the diaphragm
- Help the patient improve gas exchange by using a more effective breathing pattern.

Diaphragmatic breathing exercises emphasize the movement of the diaphragm during inspiration and expiration, using the abdominal muscles to elevate the diaphragm to empty the lungs.



SMI USE

<https://www.youtube.com/watch?v=UJNV1Q8uV6Y>

STEPS FOR DIAPHRAGMATIC BREATHING

1. Have the patient rest the palms of the hands on the front of the lower ribs with the fingertips positioned against the lower chest to feel the movement of the diaphragm.
2. Instruct the patient to breathe out gently and fully. Encourage the patient to make the way in which the ribs sink down and to reward the patient during exhalation.
3. Instruct the patient to take a deep breath through the nose or mouth, feeling the abdomen rise as the lungs fill with air. (Diaphragmatic breathing occurs when the diaphragm contracts and relaxes, as observed by the movement of the abdomen)
4. Encourage the patient to hold this breath for 5 seconds.
5. Have the patient exhale, letting all the air out through the nose and mouth.
6. Advise the patient to repeat this exercise 15 times in three cycles, with a short rest after each group of five breaths.

BREATHING EXERCISES

Breathing exercises expand lung tissue, prevent alveolar collapse, and promote efficient use of respiratory muscles, thereby loosening and eliminating secretions that can cause atelectasis, which can result in pneumonia.

Types of breathing exercises:

1. Diaphragmatic breathing exercise
2. Coughing exercise
3. Pursed lip breathing

DIAPHRAGMATIC BREATHING TECHNIQUE

<https://www.youtube.com/watch?v=3HhG5Z7z7wI>

COUGHING EXERCISE

1. Instruct the patient to lean forward slightly to facilitate a strong cough.
2. If the patient has a chest incision or an abdominal incision:
 - Instruct the patient to place a pillow or folded blanket over the incision site to support chest coughing.
 - Encourage the patient that coughing may cause some discomfort but won't harm the incision.
3. Advise the patient to flex the knees and hips to promote relaxation and reduce abdominal strain while coughing.



PURSED LIP BREATHING

The benefits:

1. Improves ventilation
2. Releases trapped air in the lungs
3. Keeps the airways open longer and decreases the work of breathing
4. Prolongs exhalation to slow the breathing rate
5. Improves breathing patterns
6. Relieves shortness of breath
7. Causes general relaxation

COUGHING EXERCISE CONT'D

5. Instruct the patient to inhale slowly with the mouth slightly open. Encourage use of the diaphragm to promote a full inhale.
6. Tell the patient to breathe out sharply for three short breaths.
7. Instruct the patient to keep the mouth open, take a deep breath, and immediately cough strongly once or twice to mobilize secretions.
8. Tell the patient to cover the mouth and nose with a tissue while coughing to contain respiratory secretions and prevent the spread of infection, if present.

STEPS FOR PURSED LIP BREATHING

- ◆ Instruct patient to relax neck and shoulder muscles.
- ◆ Tell the patient to breathe in (inhale) slowly through his nose for two counts, keeping his mouth closed. Advise not to take a deep breath.

- ◆ Advise patient to pucker or "purse" his lips
- ◆ Tell the patient to breathe out (exhale) slowly and gently through his pursed lips while counting to four.

Important reminders:

- *Do not force the air out.
- *Always breathe out for longer than you breathe in



COUGHING EXERCISE TECHNIQUE

<https://www.youtube.com/watch?v=7sQv8P3teak&list=PL60>

PURSED LIP BREATHING TECHNIQUE

<https://www.youtube.com/watch?v=7kpJQJl8e6>

APPENDIX E

Palliative Care for Advanced Stages in COPD

Ani Artinian, RN, MSN

Overview of Palliative Care

- ❖ Palliative care encompasses approaches to **symptom control and management**
- ❖ The goal of palliative care is to provide best possible **quality of life** for patients while preventing and relieving suffering.
- ❖ According to the World Health Organization (WHO) definition, palliative care should be initiated in an early phase and not be restricted to terminal care
- ❖ Palliative care focuses on improving the symptoms and psychosocial needs of the patient
- ❖ It actively engages the family and caregivers in training and support
- ❖ Families of patients are an essential part of palliative care; their presence is vital for both the patient and themselves.

Learning Outcomes

- Recognize importance of end of life care among COPD patients
- Identify interventions that will provide end-of-life comfort to COPD patients
- Plan end-of-life care to COPD patients to decrease suffering
- Advocate for COPD patient's end of life requests.

COPD and Death

Death in COPD patients may be due to lung cancer, cardiovascular disease, progressive respiratory dysfunction, or a systemic complications of respiratory dysfunction.

Healthcare workers taking care of patients dying with severe COPD need to consider the physiological changes as the patients become progressively closer to death and thus reassess the risks and benefits of treating comorbidities.

Outline

- ❑ Overview of Palliative Care
- ❑ COPD and Benefit of Palliative Care
- ❑ Palliative Therapy Components
 - Symptom
 - Nutritional Support
 - Pain, Anxiety and Depression
 - Hospice
- ❑ Pulmonary Rehabilitation

COPD and Benefit of Palliative Care

COPD trajectory : Gradual decline of disease with unpredictable acute exacerbations followed by -> improvement back towards, but not exactly reaching pre-exacerbation baseline.

Understanding this trajectory and discussing it with patients and their families may offer an opportunity to adapt palliative care services to meet the proper needs of the **patients and their families.**

Healthcare providers should not assume that poor health status is linked to high likelihood of refusing life sustaining treatment.

Accomplishing this goal will solve one of the major challenges in improving end of life care in COPD patients.

Symptoms of COPD and Palliative care Benefit

Symptoms of COPD include: fatigue, dyspnea, depression, anxiety insomnia -> these symptoms require symptom-based palliative treatment.

Palliative care will help COPD patients:

- Enhance their quality of life
- Improve end-of-life care
- Overcome difficult decision making
- Provide spiritual and emotional support to both patients and their families.

Oxygen Therapy and Hypoxemia

- ❖ COPD is associated with progressive hypoxemia.
- ❖ Oxygen administration improves pulmonary hemodynamics.
- ❖ Continuous-flow nasal cannula is the standard means of oxygen delivery for stable hypoxic patients.
- ❖ It is simple, reliable, and generally well tolerated.
- ❖ Each liter of oxygen flow adds 3-4% to the fraction of inspired oxygen (FIO₂).



Palliative therapy relevant to all patients with COPD

Even if patients receive optimal medical therapy, they may still experience breathlessness, anxiety, depression, fatigue and impaired exercise capacity. Some of these symptoms may improve with palliative therapies. Which include:

- Palliative treatment of dyspnea
- Nutritional support
- Panic attack, anxiety and depression
- Fatigue

Nutritional Support

- Low BMI and low fat free mass is linked to negative outcomes in COPD patients.
 - Nutritional supplementation promotes weight gain and leads to significant improvement in respiratory muscle strength and quality of life
- Recommended supplements include:
- | | | |
|-----------|---|--|
| Vitamin C | } | Improve antioxidant status, maintains strength, less fatigue |
| Vitamin E | | |
| Zinc | | |
| Selenium | | |
- It is important to keep in mind that only in malnourished patients, nutritional supplementation provide significant improvement

Palliative Treatment of Dyspnea

- ❖ Electrical stimulation, chest wall vibration, opiates, neuromuscular electrical stimulation and fans blowing air onto the patient's face can help relieve breathlessness.
- ❖ Even if patient is not hypoxic, oxygen therapy can still help relieve dyspnea.
- ❖ Pulmonary rehabilitation is highly advised
- ❖ Use of non-invasive ventilation reduces breathlessness.
- ❖ The only drug with a proven effect on dyspnea is morphine, but not when it is delivered with a nebulizer

Panic, Anxiety and Depression

- ❖ Behavioral, social and biological factors can all be related to the cause of depression and anxiety in COPD patients.
- ❖ Pulmonary rehabilitation is recommended to control anxiety
- ❖ Some physicians prescribe anti-depressants, but the efficacy is still inconclusive
- ❖ Mind-body intervention and cognitive behavioral therapy reduce anxiety and panic attacks. Examples include: yoga and relaxation
- ❖ Mind-body interventions also aid in positive physical outcomes such as improved exercise capacity, lung function, dyspnea and fatigue

Fatigue

- ◆ Fatigue is a subjective feeling of tiredness or exhaustion.
 - ◆ It is the second most experienced symptom in patients with COPD.
 - ◆ Physical, psychological, systemic and behavioral factors all perpetuate fatigue in patients with COPD.
- Fatigue can have a negative impact on the patient's:
- General health status
 - Exercise performance
 - Daily basic activities
 - Sleep quality
 - Mood status (can cause anxiety and/or depression)

Pulmonary Rehabilitation



<http://www.webmd.com/lung/video/living-with-copd>

Factors to Reduce Fatigue

- ◆ Mind-body intervention
- ◆ Self-management education provided by healthcare workers
- ◆ Nutritional support
- ◆ Physical activity (as tolerated)
- ◆ Pulmonary Rehabilitation
- ◆ Improving breathing technique
- ◆ Participation in social support groups. This helps patients cope with the mental burden by learning useful tips from each other.

Pulmonary Rehabilitation Interventions

Pulmonary rehabilitation programs include:

- Clinical assessment
- Education about pharmacological therapies, non-pharmacological therapies and smoking cessation
- Psychological support
- Exercise including pulmonary exercises
- Dietary support and advice

Pulmonary rehabilitation is typically delivered to groups of patients.

The American Association of Cardiovascular and Pulmonary Rehabilitation recommends a staff-to-participant ratio of 1:4.

Pulmonary Rehabilitation

- ◆ Pulmonary rehabilitation (PR) is one of the key approaches in the treatment of COPD.
- ◆ It is a proactive approach to minimize COPD symptoms, improve health-related quality of life and increase physical and emotional involvement in everyday life.
- ◆ PR is usually composed of an interdisciplinary team including: a physician, respiratory nurses, dietitian, physiotherapist, occupational therapist, psychologist and social worker
- ◆ Improvements are seen in different domains of health-related quality of life, including:
 - ☐ Dyspnea
 - ☐ Fatigue
 - ☐ Emotional status

How Pulmonary Rehabilitation Interventions Benefit COPD Patients?

- PR focuses on the systemic aspects of the disease that are common among patients with COPD.

➤ The exercise components of PR:

1. Reduce dynamic hyperinflation
2. Increase inspiratory volume

} Both help reduce dyspnea when the patient is performing tasks.

Exercise also increases muscle function, delays fatigue and increases exercise tolerance.

Pulmonary Rehabilitation Interventions cont'd

- Educational component of PR focuses on collaborative self-management and behavioral change
- It helps patients build skills such as goal setting, problem solving and decision making
- **PR behavioral change focuses on:**
 - Modifying nutritional intake and smoking patterns
 - Adhering to medication and regular exercise
 - Utilizing effective breathing techniques and energy-saving strategies

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Create a COPD friendly home

<https://www.wiley.com/doi/10.1111/ancp.12100>

The case of Mr. Ziad cont'd

Tragedy 2

After being discharged from the hospital, Mr. Ziad's friends at church noticed he is looking unhappy for the past 2 months. He has not been attending church the past three Sundays, which was unusual of him. Mr. Ziad seems isolated and is not performing acts that he once enjoyed. He recently told his daughter that he is constantly worried about feeling dyspnoeic and fatigued thus would rather sit at home.

1. Is Mr Ziad a candidate for palliative care? What interventions would be integrated in his care?
2. In what mood status does Mr. Ziad seem? Give suggestions to improve his mood

APPENDIX F

Patient Instruction: Assessing the Determinants of Patient Learning
Ari Arslan, RN, MSN

Introduction

- Educating patients about their disease and proper way to cope with it is crucial to promote self-management and patient determination of health state.
- Each individual has his own style of learning.
- There are many different learning styles which are based on how we receive and process environmental stimuli.
- By identifying learning style of the patient, nurses can offer education in the most effective approach.

Learning Outcomes

- Justify effective ways to maximize patient education by considering learning styles.
- Construct an education plan for COPD patients regarding prevention of exacerbation and symptom determination.


Learning Styles

Different learning styles include:

- Visual
- Auditory
- Kinesthetic

• Patient nurses may gravitate towards the instructional approach which is most suited to their learning style.

• To avoid frustration and poor outcomes due to unmatched learning styles, patient nurses should assess and detect characteristics which would give them insight about the patient's learning style.




Outline


- Introduction
- Types of learning styles
 - Visual
 - Auditory
 - Kinesthetic
- Adult Learning Style
- Considerations

Identifying Visual Learners

- Such learners prefer to learn by the means of pictures, images, and facial expressions.
- They like to see what they're learning.
- They often close their eyes to visualize or remember something.
- They take detailed notes.
- They benefit from illustrations that use color.
- They prefer learning through observing, example, plotting, how to correctly perform, diagrammatic, mapping.



Auditory Learners



Learn through
Listening

Identifying Auditory Learners

- Auditory learners need to hear but not necessarily look at the instructional material in order to learn
- They may prefer to read out loud and remember by verbalizing lessons to themselves
- They focus more on what they hear and discuss

Adult Learning

3. Adults learn when they perform or practice with new knowledge.
(Example: Using a MDI with filled placebo to train them about proper inhaler technique)
4. Adults are practical. They are not too interested about the background information, they only want to know what they need to know.

Identifying Kinesthetic Learners

- Kinesthetic learners prefer to learn through activities.
- They learn through what they can directly experience
- They speak with their hands
- They often remember what was done rather than what was said
- They prefer learning things by performing them hands-on (example: actually holding and placing the capsule in the dry powder inhaler device)



Learn
Feeling, Doing & Touch

General considerations

1. For instructions to be effective, they should be in the language the patient understands.
2. Elderly patients may have visual and auditory challenges. Deeper instructions are needed to effectively instruct them.
3. Some patients may act as though they are understanding the provided situation out of the desire to be courteous.

Ways to assess whether the patient truly understood the material:

- Open ended questions
- Teach back method

Adult Learning

Adult learning is directed by the following guidelines:

1. Adults are goal-oriented -> They need to be provided with the practical reason to why they should pay attention to the instruction (Example: "Using an inhaler the right way will help you breathe better than I am going to teach you how to use it.")
2. Adults are relevancy-oriented -> They need to understand the importance of performing an act (Example: The reason to use a spacer with MDI inhaler is to help the medicine get into your lungs rather than stay in the back of your throat)

Visual considerations for Older Adults

- Face the patient directly when instructing
- Ensure there is plenty of light
- Minimize distractions and interruptions
- When given written material:
 - Use large type size and thicker font
 - Dark ink on light colored paper
 - Use double space

Auditory Considerations for Older Adults

- Keep your face visible
- Speak in a clear, slow and low pitched voice
- Use short sentences
- Repeat and rephrase important parts of instruction
- Eliminate background noise

“Teach-back” technique

- “Teach-back” technique can be used as a teaching intervention in patient education
- This technique requires patients to explain or demonstrate a certain skill back after instruction is given
- The aim is to ensure that the patients understood the message or instruction provided
- If the patient fails to properly explain or demonstrate the skill then he/she will need to be re-educated until they master the technique
- Example: Teach-back technique can be used for assessing patient knowledge about proper use of inhaler

References

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APPENDIX G

Poster

Saint George Hospital
invites you to enroll in the course titled

**“COPD Patient Symptom Management: A Continuing
Education Course for Medical-Surgical Nurses”**



Presented by

Ani Artinian RN, MSN

From June 1- June 27

2 sessions per week over 3 weeks

Those who attend will earn 9 CEU upon completion

Through Zoom



In Partial fulfillment of the
requirements for the degree of
Master of Science in Nursing at
American University of Beirut

APPENDIX H

The Case of Mr. Ziad with COPD

Purpose: Role of nurses in the management of and exacerbation prevention in COPD patients.

Learning outcomes:

1. Interpret symptoms of disease deterioration and reasons for airflow limitation in COPD patients
2. Develop a program including exacerbation preventive measurements
3. Design a palliative care plan for Mr. Ziad

Content

- Factors that influence COPD development and progression
- Pathophysiology principles underlying COPD
- Management of COPD using GOLD guideline
- COPD exacerbation prevention and management
- Palliative Therapy Components

Background

Mr. Ziad is a 60-year-old male living alone in Akkar. He has two girls and one boy all who live in Beirut. His wife passed away eight months ago due to breast cancer. Mr. Ziad socializes mainly with his friends at church whom he sees once per week usually on Sundays after church.

He used to work in a wood factory in Ras Maska, Barsa, but currently is a farmer in Akkar. His income is low but able to make ends meet. He is a smoker, one packet per day and has been smoking for the past 40 years. He enjoys planting and harvesting his own food including fruits and vegetables.

Trigger 1

Mr. Ziad has been dyspneic for the past 6 months, and dyspnea increases upon effort and especially when he is working in the field. The past 2 months he has been experiencing a persistent cough and two weeks ago he noticed he started developing a productive cough of white color sputum.

Trigger 2

Mr. Ziad thought his dyspnea may be due to cigarette smoking thus he has decreased smoking to half a pack a day. His son visited him recently and showed concerns about his weight loss since he last saw his father, which was 2 months ago. Mr. Ziad claimed his dyspnea and fatigue are causing him difficulty to work in his field thus unable to harvest his plants and eat well.

Trigger 3

His friends at church noticed Mr. Ziad is looking unhappy and tired for the past 2 months. He has not been attending church the past three Sundays, which was unusual of him. MR. Ziad seems isolated and is not performing acts that he once enjoyed. He recently told his daughter that he is constantly worried about feeling dyspneic and fatigued thus would rather sit at home.

His children discussed Mr. Ziad's condition with each other and decided to take action.

They booked an appointment with a physician and after discussing the need to see a doctor,

Mr. Ziad agreed to get a checkup.

In the clinic:

Vital signs: Blood pressure: 120/70mmhg, Hear rate:112 bpm, Respiratory rate: 25, Spo2:

90% on room air, temperature: 37.2°C orally.

Height: 173cm

Weight : 52 Kg

Upon physical exam Mr. Ziad was sitting on the edge of the chair, leaning forward, he

looked pale and anxious. Findings included

- Use of accessory muscles
- Bilateral wheezing upon expiration
- Decreased air entry bilaterally
- Prolonged expiration
- Breathing through lips pursed
- Distant heart sounds
- Pulses palpated upon extremities: regular rhythm, force +3

Arterial blood gas:

PH: 7.26 (N:7.35-7.45)

PaCo2: 60 (N: 35-45)

Po2: 52 (N: 80-100)

HCO3: 26 (N: 22-26)

Lab results showed:

Hct: 54% (N: 40-48)

Hgb: 15.8 gm/dl (N 12-16)

WBC: $14 \times 10^9/L$ (N $4.5-10 \times 10^9/L$)

Mr. Ziad was advised to perform a spirometry test to check for airflow limitation.

Spirometry results after bronchodilator showed:

FEV1: 45%

FEV1/FVC: 0.65

The patient was advised to be admitted to the hospital.

He was started on the following management:

- Oxygen therapy nasal cannula 3 L
- IV line 250ml NSS 0.9% over 24 hours 10ml/h
- Albuterol 2.5mg (Duolin) by nebulizer every 6 hours combined with Budesonide (Pulmicort) by nebulizer every 6 hours
- Solumedrol 40 mg IV push
- Levofloxacin (Tavanic) 500mg/ 24h intravenous route

ABGs were repeated 4 days later, results showed:

PH: 7.30 (N:7.35-7.45)

PaCo₂: 68 (N: 35-45)

Po₂: 64 (N: 80-100)

HCO₃: 31 (N: 22-26)

6-minute walk test was performed to which Mr. Ziad experienced desaturation (Spo₂: 86%) after 3 minutes of walking. Chest X-ray showed: pleural effusion in bilateral lower lobes.

1. Which factors throughout Mr. Ziad's lifetime have triggered him to develop COPD?
2. Which GOLD staging criteria applies to Mr Ziad? Justify your answer
3. Would you consider Mr. Ziad malnourished? Verify your answer and provide suggestions to help him.
4. Analyze Mr. Ziad's first ABG result and then compare it to his second ABG result.
5. Is Mr. Ziad a candidate for palliative care? What interventions would be integrated in his care?
6. What intervention would better help the lung function of Mr. Ziad and improve his ABG result?
7. In what mood status does Mr. Ziad seem? Give suggestions to improve his mood.

After 2 weeks of hospitalization, Mr. Ziad was stabilized and ordered to be discharged from the hospital. He will continue DPI therapy and oxygen therapy at home. He was advised to enroll in a pulmonary rehabilitation program, but Mr. Ziad seemed hesitant

about the idea and claimed he does not think he would benefit from it. He was also advised to completely stop smoking.

1. What education must be provided to Mr. Ziad upon discharge to manage his condition and prevent future exacerbations?
2. State the steps for proper DPI technique.
3. How would you advise Mr. Ziad to stop smoking?
4. What information would you give attention to while discussing benefits of pulmonary rehabilitation with Mr. Ziad

APPENDIX I

Name: _____ I.D. _____

Please choose one correct answer (1 point each):

1. _____ is essential for the diagnosis of COPD
 - A) Chest X-RAY
 - B) Chest CT Scan
 - C) Spirometry
 - D) ABGs

2. How many GOLD stages of COPD classification are there?
 - A) 2
 - B) 3
 - C) 4
 - D) 5

3. Salbutamol (Ventolin) is a _____
 - A) Short acting Beta-1 agonist
 - B) Long acting Beta-2 agonist
 - C) Short acting Beta-1 antagonist
 - D) Short acting Beta-2 agonist

4. Which type of combination therapy has a greater effect on exacerbation reduction and prevention of hospitalization:
 - A) SABA/SAMA
 - B) LABA/LAMA/ICS
 - C) LABA/ICS
 - D) LABA/LAMA

5. A spacer is used for which type of inhaler:
 - A) Metered dose inhaler
 - B) Dry powder inhaler
 - C) Soft mist inhaler
 - D) Inhaled corticosteroids

6. If the patient uses Meter dosed inhalers (MDI) he/she should hold in the medication for:
 - A) 5 second
 - B) 6 seconds
 - C) 10 seconds
 - D) 15 seconds

7. Noninvasive mechanical ventilation:
 - A) Improves gas exchange
 - B) Increases activity tolerance
 - C) Prevents respiratory infections
 - D) Has no effect on patient survival rate

8. It is recommended for COPD patients to perform:
 - A) 30 minutes walk once per week
 - B) 1 hour of weight training daily
 - C) 2 hours of cycling on daily basis
 - D) 2 hours of walking/cycling per week

9. An exacerbation of respiratory symptoms can be triggered by:
 - A) Viral or bacterial respiratory infection
 - B) Inadequate sleeping hours
 - C) Physical activity intolerance
 - D) Imbalanced nutritional intake

10. The primary goal of palliative care in COPD patients is to:
 - A) Improve quality of life while preventing and relieving suffering.
 - B) Educate about proper inhaler technique and pulmonary exercises
 - C) Focus on patients' needs without integrating any of their families.
 - D) Help patients improve the function and structure of their lungs

11. The nurse is providing education to a newly diagnosed COPD patient. Which statement shows that the patient has understood the condition?
 - A. "I only need to decrease cigarette smoking to 1 packet/week"
 - B. "I have to follow my treatment regimen properly to prevent exacerbations"
 - C. "Exercise and adequate nutrition will cure my condition"
 - D. "I should only seek treatment when my symptoms worsen"

12. While educating Mrs. G about inhaler technique, she asks you to demonstrate the technique, and provide her with pictures of how to properly use her inhaler. What type of learner is Mrs. G?

- A) Auditory
 - B) Visual
 - C) Kinesthetic
 - D) Global
13. Respiratory infections are major health risks for someone with COPD. Which of the following steps helps prevent these infections?
- A. Increasing consumption of herbal tea
 - B. Receiving a booster dose of DPT vaccine
 - C. Immunizing against the influenza virus
 - D. Adhering to corticosteroid therapy
14. What is one of the most prevalent symptoms in patients with COPD?
- A. Fatigue
 - B. Dyspnea
 - C. Malnutrition
 - D. Depression
15. Aminophylline (theophylline) is prescribed for a client with COPD. A nurse administers the medication, knowing that the primary action of this medication is to:
- A. Relax smooth bronchial muscles
 - B. Prevent respiratory infection
 - C. Suppress the cough reflex
 - D. Improve activity intolerance
16. A nurse teaches a client about the use of a respiratory inhaler. Which action by the client indicated a need for further teaching? The patient:
- A. Does not use a spacer for his dry powder inhaler.
 - B. Presses down the canister as he breathes in.
 - C. Inhales the medication and exhales 5 seconds later.
 - D. Washes the mouth immediately after inhaler use
17. The goal of pursed lip breathing is to:
- A. Strengthen diaphragmatic muscles
 - B. Relieve events of shortness of breath
 - C. Prevent respiratory tract infections
 - D. Use abdominal muscles in breathing
18. _____ is a type of inhaler used to reduce the requirements for patient inspiratory effort and enhance drug delivery.
- A. Dry powder

- B. Soft mist
- C. Metered dose
- D. Corticosteroid

19. Hypersecretion in COPD is due to:

- A. Airflow limitation
- B. Increased number of goblet cells
- C. Decreased alveolar gas exchange
- D. Decreased air entry

20. Which of the following diets would be **most** appropriate for a client with COPD?

- A. High fat, low salt, soft diet
- B. High fat, high protein, regular diet
- C. Low sodium, low protein, regular diet
- D. High protein, high calorie, soft diet

21. Which of the following health promotion activities should the nurse include in the discharge teaching plan for a client with COPD?

- A. Use sedatives to ensure uninterrupted sleep.
- B. Incorporate physical activity as tolerated.
- C. Limit food intake to two small meals a day.
- D. Contact healthcare provider when symptoms worsen

22. The **best** method of at home oxygen administration for client with COPD is by using the:

- A. Face mask
- B. Nonrebreather mask
- C. Nasal cannula
- D. Venture mask

23. Define COPD based on the GOLD guideline (2 points)

24. Mr. M was diagnosed with COPD 6 months ago. He smokes 1 packet/day. One of the recommendations for COPD exacerbation prevention was to stop smoking. His trials were unsuccessful, thus by following the 5 step program (5 A's), how would

you provide a helpful strategy for smoking session to your patient Mr. M. Write your response in no more than 20 lines. (5 points)

25. Match each of the clinical situations in Column I with the tool that may be used to assess or manage the situation in Column II. (6 points)

Answer	Column I	Column II
	Blows constant pressure while patient breathes in during inhalation	A. CAT
	Required for COPD diagnosis	B. BiPAP
	Measures COPD impact on the patient's life, and how changes occur overtime.	C. Spirometry
	Measures the degree of disability that breathlessness causes on daily activities	D. mMRC scale
	Blows higher pressure while patient breathes in during inhalation	E. ABCD assessment tool
	Determines the final classification of the patient based on the patient's: FEV1 Post bronchodilator result, symptom assessment score and exacerbation history	F. CPAP
		G. Chest Xray

APPENDIX J

Pamphlet Evaluation Rubric	
<p>Message Content 4 marks</p> <p>... Have you limited your messages to three to four messages per document (or section)?</p> <p>... Have you taken out information that is “nice to know” but not necessary?</p> <p>... Is the most important information at the beginning of the document?</p> <p>... Have you identified action steps or desired behaviors for your patient?</p>	<p>Layout and Design 6 marks</p> <p>... Is information presented in an order that is logical to your patient?</p> <p>... Is technical or scientific language explained?</p> <p>... Have you used concrete nouns, an active voice, and short words and sentences?</p> <p>... Is the style conversational?</p> <p>... Is information chunked, using headings?</p> <p>... Have you eliminated as much jargon and technical language as possible?</p> <p>... Are the language and content culturally appropriate?</p>
<p>Text Appearance 5 marks</p> <p>... Does your document have lots of white space?</p> <p>... Are margins at least 1/2 inch?</p> <p>... Is the print large enough (at least 12 points)?</p> <p>... Have you used bold, italics, and text boxes to highlight information?</p> <p>... Have you avoided using all capital letters?</p>	<p>Visuals 5 marks</p> <p>... Is the cover attractive to your intended audience?</p> <p>... Does it include your main message?</p> <p>... Are your visuals simple and instructive rather than decorative?</p> <p>... Do visuals help explain the messages found in the text?</p> <p>... Are your visuals placed near related text?</p> <p>... Do they include captions?</p>

APPENDIX K

Course Evaluation

The course is intended to educate nurses about proper COPD self-management skills regarding exacerbation prevention, correct inhaler therapy technique, pulmonary exercises, smoking cessation, adequate nutrition and active lifestyle. This evaluation tool will be filled by nurses to give feedback about the course and instructor, evaluation will include: material presentation, clarity of information, delivery approach, accessibility of the course, adequacy of content and interaction method online. The evaluation's overall aim is to improve the course for future use.

	Strongly Agree	Agree	Disagree	Strongly Disagree
The instructor demonstrated adequate knowledge of the course material				
The instructor was well prepared and organized				
The learning outcomes for each part of the course were clear and precise				
The course description accurately reflects the content of the course				

The course has significantly advanced my knowledge and understanding about COPD				
The learning material was relevant and useful				
The pace of the course was appropriate				
The content was clear and understandable				
Interaction during the class discussion was smooth				
Online learning is more accessible and flexible than face-to-face learning				

1. Do you recommend the course to others?
2. What were some of the strengths of the course? What new information did you learn from the course?
3. Please add suggestions to better improve the course. What changes do you recommend to improve the course?

APPENDIX L

Patient Evaluation of Nurses' Instruction

Patient feedback questionnaire. 4-point scale

	Completely	Mostly	A little	Not at all
The nurse listened to what you had to say				
The nurse explained your problem to you				
You and the nurse discussed your respective roles				
The nurse explained the treatment plan				
The nurse showed his/her concern				
The nurse acted in a structured way				
The nurse gave you new or better insight into your problem				

The nurse explored how manageable the treatment would be for you				
The nurse gave you clear treatment advice				
The nurse gave you clear information and explanation				
The nurse invited you to ask all the questions you wanted to ask				
How well do you think your nurse understood you?				
How satisfied were you with the discussion of your problem?				

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