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Survey of COPD Knowledge, Skills, And Attitudes Among Saudi Arabian Respiratory

Therapists

By

Ziyad Mubarak A. Alshahrani

A Thesis

Presented in Partial Fulfilment of Requirements for the

Degree of Master of Science in Health Sciences in the

Department of Respiratory Therapy

Under the supervision of Dr. Lynda T. Goodfellow, EdD, RRT, AE-C, FAARC

In

Byrdine F. Lewis College of Nursing and Health Professions

Georgia State University

Spring, 2021

ACCEPTANCE

This thesis, Survey of COPD Knowledge, Skills, And Attitudes Among Saudi Arabian Respiratory Therapists by Ziyad Alshahrani was prepared under the direction of the Master's Thesis Advisory Committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree Master of Science in the Byrdine F. Lewis College of Nursing and Health Professions, Georgia State University. The Master's Thesis Advisory Committee, as representatives of the faculty, certify that this thesis has met all standards of excellence and scholarship as determined by the faculty.

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Date

DEDICATION

I dedicate this thesis to my parents **Mubarak** and **Nuwda** for their endless love, support and encouragement.

ACKNOWLEDGEMENTS

I cannot express enough thanks to my professor **Dr. Lynda T. Goodfellow** for her patience, guidance, motivation, and support. My completion of this thesis could not have been accomplished without her backing and direction. It was my honor to work under her supervision.

Abstract

Chronic Obstructive Pulmonary Disease (COPD), a global health problem, is gradually increasing. It was predicted that by 2020, COPD would be the third cause of death, with 10% of the cases being in high-income countries. Worldwide, this disease affects 380 million people leading to 3 million deaths yearly. High mortality is attributed to late diagnosis, which decreases the chances of recovery and survival. COPD is highly prevalent in low-income countries than in developed countries. In Saudi Arabia, the prevalence rate is 14.5 % among current and ex-smokers. Smoking rates among Saudi population is 27.9%, and the dusty weather of Saudi Arabia are considered the major risk factors for COPD among the Saudi community. Respiratory therapists (RTs) would play a major role in managing COPD patients because of the shortage of pulmonologists. Therefore, **the purpose** of this descriptive research study was to examine knowledge, attitude, and awareness of COPD among Saudi Arabian RTs to increase their involvement of treating COPD patients. The study **method** was a convenient sample (n = 119) of Saudi RTs. **Findings** of descriptive analysis showed that 53.2% of RTs answered correctly on the scale of knowledgeability of COPD. Independent t-test analysis revealed no gender differences in RTs' knowledgeability about COPD and its global guidelines. Similarly, One-way ANOVA revealed no significant differences (p>0.05) in knowledge due to education level. Moreover, 52% of the RTs have the appropriate skills to treat COPD patients with no significant differences (p>0.05) in skills based on education level. Lastly, the RTs were moderately confident in implementing diagnosis and assessment according to guidelines/recommendations. The males ($\bar{x}$=6.9) were more confident than females ($\bar{x}$=6.11). However, based on the ANOVA test, there was no significant difference (p=0.306 >0.05) in confidence scores due to education level. Overalls, it can be concluded that gender and education level may impact the knowledge

levels, skills, and attitudes of Saudi Arabian respiratory therapists differently, and the Saudi ministry of healthy can rely on them in terms of mange, examine, and treat COPD patients.

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Definition of Terms

COPD: Chronic Obstructive Pulmonary Disease

RT: respiratory therapists

GOLD: Global Initiative for Chronic Obstructive Lung Disease

MENA: Middle East and North Africa

GBD: Global Burden Disease

DAYLs: Disability Adjusted Life Years

RTES: Respiratory Toxics Exposure Score

DS-COPD: Diagnosis Scale for COPD

QoL: Quality of Life

STS: Saudi Thoracic Society Initiative for Chronic Airway Diseases

SICAD: Saudi Initiative for Chronic Airway Diseases

ICSs: Inhaled corticosteroids

Chapter I

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a growing health concern globally. COPD is a chronic pulmonary disorder that is characterized by progressive and partially reversible airflow limitation. COPD is classified as preventable and treatable by various studies (GOLD, 2018). The disease is caused by an abnormal inflammatory response triggered by exposure to particles or gases (Al Ghobain et al., 2011). Currently, the condition is one of the leading causes of death globally, and the financial burden is growing with the disease presently ranked fifth (Vestbo et al. 2013). COPD is currently the fourth among the leading killers (GOLD, 2018). With only 10% of the deaths occurring in the high-income countries (Woldeamanuel et al., 2019). Currently, the disease is estimated to be affecting 380 million people globally, causing over 3 million deaths annually (Iheanacho et al., 2020). The high number of fatalities is due to failure of COPD patients to present to healthcare providers until the later stages of the condition, which reduces their chances of survival.

The diagnosis of COPD requires a comprehensive approach that comprises of spirometry and the assessment of symptoms and risk factors. In most cases, the disease is characterized by a wide range of respiratory symptoms. However, three symptoms (dyspnea, cough, and sputum production) tend to be prevalent (Woldeamanuel et al., 2019). Nevertheless, the community in general and COPD patients specifically usually ignore the clinical presentation of the disease because the community has a less awareness about the symptoms, risk factors, and treatments (Al Zaabi,2016). As a result, the disease still underdiagnosed, and data related to COPD prevalence rate are not accurate in most countries (Al Zaabi,2016).

Prevalence of COPD varies from one country to the other, with the low-income countries being affected the most. The current data shows Africa is the most affected continent in the world with an average prevalence rate of 13.4%, with men being more affected compared to women (Woldeamanuel et al., 2019). In Saudi Arabia, the COPD prevalence rate ranges between 2.4% and 14.2% (Alzaabi et al., 2019). On average, the prevalence rate in Saudi Arabia is higher compared to that of other countries in the Middle East and North Africa (MENA) region. The average for the region stands at 3.6%, with UAE having the lowest prevalence rate at 1.9% and Syria the highest at 6.1% (Alzaabi et al., 2019). The high cases in Saudi Arabia could be attributed to a lack of knowledge among physicians. This was highlighted by a study which surveyed 44 Saudi physicians, and measured the awareness and knowledge of guidelines for COPD. The results indicated that Saudi physicians were only aware of 65% of the GOLD guidelines (Alsubaiei et al., 2017). For this reason, measuring the knowledge among the Saudi RTs could be the first step to increase the quality of care to the COPD population.

Currently, cigarette smoking is thought to be the most encountered risk factor for COPD globally. It is estimated that there are 1.3 billion smokers in the world, with 80% living in low and middle-income countries (World Health Organization, 2020). In Saudi Arabia, cigarette smoking prevalent with 27.9% (Alsubaiei et al. 2015). However, 30% of COPD cases in Saudi Arabia are attributed to other factors rather than smoking (Lopez-Campos et al., 2016). Other factors are air pollution and dust given that a large part of the country is desert which is considered the main contributor to air pollution in Saudi Arabia and the MENA. However, other aspects such as energy production and continued use of biomass for cooking and heating contribute to air pollution. Air pollution from biomass is a risk factor for COPD not only in Saudi Arabia but also globally, with an estimated 3 billion people exposed to biomass smoke

(Woldeamanuel et al., 2019). Women from poor households are usually exposed to additional biomass from burning fuel during domestic activities.

Previously, awareness among the public was lacking, which made it challenging to fight the disease. However, the high number of COPD cases and related deaths attracted governments' attention leading to the establishment of the Global Initiative for Chronic Obstructive Lung Disease (GOLD) in 1997. GOLD intended to improve the diagnosis and treatment of COPD (Patel et al. 2019). Since its establishment, GOLD has provided an annual report that shows the analysis of the published studies to improve techniques used by physicians to treat COPD. The reports generated by the agency has been beneficial as the information collected is used as a reference tool, helping enhance practices used by physicians to treat patients. For instance, in 2017, the generated report led to the revision of guidelines. The definition of the disease was updated to encompass other factors that added to the disease pathophysiology (AJMC, 2017).

The role of RTs is growing and evolving in society. People have full right to live their life with their different respiratory problems such as COPD, and RTs play a key role in making that possible. The importance of RTs is growing in the community, with RTs present in COPD clinics, community health centers, and pulmonary rehab centers present in society. These days, more and more RTs are using their expertise and knowledge in the community with a concentration on support and treatment of people suffering from COPD (Rickards & Kitts, 2018).

Problem Statement

It's common practice for Respiratory Therapists (RTs) to treat COPD patients who suffer an acute exacerbation who received a late diagnosis. However, the outcome could have been different had the respiratory therapists been made aware of COPD. The high prevalence rates and the lack of awareness among most health care provider, primarily physicians, have led campaigns aimed at educating people about the disease to try to make the cases more manageable. RTs play a crucial role in the manageability of COPD. They are trained and adequately prepared to teach people about the disease and offer the treatment required.

Respiratory therapy is a relatively new profession compared to other professions such as physiotherapy. RTs should be more involved in terms of contributing more effectively in treating patients with COPD. It has become necessary for COPD patients to have access to RTs even after leaving the hospital because their health and condition needs to be monitored frequently. However, In the US, such services usually add to the financial burden of a patient, given that respiratory therapy services are not always paid for by the insurance. In the Saudi population, the prevalence rate of COPD is 4.2% among the public and 14.2% among smokers (Alsubaiei et al., 2015). Despite the high prevalence rate in the country, the physicians are not adequately equipped to handle COPD patients. Increasing awareness among RTs is crucial to the management and treatment of the disease in Saudi Arabia.

Purpose of the Study

The purpose of this study is to examine the knowledge, attitude, and awareness of COPD among Saudi Arabian RTs. This study will address the following questions:

1- To what extent are Saudi Arabian respiratory therapists knowledgeable of COPD and its global guidelines?

2- To what extent Saudi Arabian respiratory therapists have the appropriate skills to be more involved in treating COPD patients?

3- What are the attitudes of Saudi Arabian respiratory therapists about the COPD?

4- To what extent do gender and educational level impact knowledge, skills, and attitudes of COPD among Saudi Arabian respiratory therapists?

Significance of the Study

Currently, according to General Authority for Statistics the population of Saudi Arabia is estimated to be 32 million, with 67% (21 million) being people under the age of 34. The composition of the community demonstrates that most smokers in the country are youths. This addiction means that the country will be grappling with COPD cases, as more people are exposed to numerous COPD risk factors. Presently, the ratio of doctors and nurses in Saudi Arabia per 10,000 citizens is 11.6 and 28, respectively, which is substantially lower than other Middle Eastern and developed economies such as the U.S., which is 27 and 98 for every 10000 individuals (Alsubaiei et al. 2015). Given that Saudi Arabia has a severe shortage of physicians and nurses, RTs have an opportunity to be more involved in treating respiratory diseases such as COPD. Therefore, more RTs should be knowledgeable about COPD.

Assumptions

There are two main assumptions to this study. The first one is that the data available regarding COPD in Saudi Arabia is scarce and outdated, hence unreliable. The Second one is that COVID-19 may decrease the study samples as it is hard to recruit RTs due to the increase in workload and the psychological effects of COVID-19 on RTs.

Summary

This chapter presents the research questions to be examined and investigated. There is a need to know how RTs in Saudi Arabia can better manage COPD patients. The importance of examined RTs' Knowledge, skills, and attitudes are vital to COPD patients in Saudi Arabia in order to allow RTs to treat COPD patients autonomously and effectively.

Chapter II

REVIEW OF LITERATURE

Introduction

The literature review was written by searching in PUBMED, Cochrane, CINAHL, and EBSCO, Google Scholar databases. The terms which were typed into the databases are "COPD" or "chronic obstructive pulmonary disease" and "history". Moreover, the terms "COPD" or "obstructive pulmonary disease pulmonary disease" and "epidemiology" to determine the causes and risk factor as well as the prevalence of COPD. Additionally, "COPD" or "pulmonary obstructive pulmonary disease" and "Saudi Arabia" or "Middle East" or "MENA" to measure the situation of COPD at the MENA region in general and in Saudi Arabia specifically. Furthermore, the terms "COPD" , "morbidity and mortality" "diagnosis" or "risk factors" "management" and "treatment" were used to cover all the disease aspects. The objective of this literature is to address the following questions:

1- To what extent are the Saudi Arabian respiratory therapists knowledgeable of COPD and its global guidelines?

2- To what extent are the skills of Saudi Arabian respiratory therapists, appropriate in the treatment of COPD patients?

3- What are the attitudes of Saudi Arabian respiratory therapists about the COPD?

4- To what extent do gender and educational level impact knowledge, skills, and attitudes of COPD among Saudi Arabian respiratory therapists?

Knowledge, Skills, and Attitudes of Respiratory Therapists

In a study conducted by Taliercio & Chatburn (2010), the knowledge of Alpha-1 antitrypsin deficiency was checked among RTs and Internal Medicine House Officers. They conducted a web-based test consisting of 30 MCQs. The RTs and Internal Medicine House Officers were invited to take the test at the main campus hospital of the Cleveland Clinic. The RT(s) obtained a mean score of 52% and it was observed that RTs who had undergone a respiratory therapy program for 4 years had obtained a greater mean score when compared to those who graduated from the program based on 2 years (Taliercio & Chatburn, 2010).

(Taliercio & Chatburn, 2010) also found that RTs who had mentioned their self-assessment as 'somewhat knowledgeable' about their knowledge of alpha-1 antitrypsin deficiency obtained higher scores in comparison to any other knowledge level assessed by themselves. Thus, the authors concluded that normally a low level of knowledge was found among RTs and physicians about alpha-1 antitrypsin deficiency. Thus, further study was recommended by them because poor knowledge about this particular disease could be a contributor to its under-recognition.

In yet another study by (Rajan & Reddy, 2021), perception, skills, and knowledge of RTs as front liners in the management of COVID-19 cases were studied. Several challenges were imposed by a sudden outbreak of COVID-19 on healthcare professionals. The authors conducted a cross-sectional survey based on questions among respiratory therapists in India. In the total of 70.8% response from 68 RTs, it was reported that higher confidence was present in 96% of the respondents in performing essential clinical work while 60% of them had good knowledge. However, 98.5% of the total RT respondents suffered from a negative psychological impact. Thus, it was concluded that generally, RTs had good confidence, skills, and knowledge in

conducting procedures related to COVID-19 and it was perceived by most of them that the role of RTs is very critical in the scenario of COVID-19 (Rajan & Reddy, 2021).

RTs are very fundamental in overcoming many pandemics that have shown that they can disrupt human society to a great extent. However, some respiratory viruses such as MERS-CoV have pushed the RTs, showing a high level of stress due to the exposure and direct contact of the health workers when handling with the situation (Alruwaili, 2015). Based on research, the RTs can handle COPD patients' disease since they have some necessary training to handle this type of respiratory virus such as MERS-CoV. RTs should attend more training programs to improve their skills and abilities. According to Alruwaili (2015).

The results by (Alruwaili, 2015) proved a considerable positive correlation between knowledge of RTs and their readiness to work. With an enhancement in the knowledge of RTs, an increase was observed in their readiness to come to work. However, a low positive correlation existed between skills and readiness to work. This relationship is quite weak but with an enhancement in the skills of RTs, there is an increase in their readiness to work also. Knowledge and skills showed a significant positive correlation. Skills increase with an enhancement in knowledge.

However, Alruwaili's research shows that most Saudi Arabian RTs have a low attitude score on dealing with the respiratory virus (2015). In addition, there is a significance between the RTs total training levels and their total skills. The most important highlight in the study is that the RTs should focus on additional training to improve their readiness to work and the skills.

COPD In MENA Region

COPD remains to be one of the utmost shared chronic lung diseases among all MENA region countries. COPD is deemed the fourth leading of death globally (GOLD, 2018). It is a transmitted avertible, curable ailment, branded by consistent respiratory signs, symptoms, airflow restriction due to substantial exposure to toxic particles and gases. The Arab-speaking and associated countries mutually share similar global risk factors for COPD, such as biomass exposure and smoking cigarettes, as well as alternatives, such as waterpipe smoking (Khattab et al. 2012). The Arabian world's research activity is lagging in creating awareness and knowledge about COPD. Thus, it's a real challenge to get the precise and updated image of the condition and situation (Sweileh et al. 2014). Certainly, in overall analysis among the Arab nations, Egypt and KSA are ranked at number 39 and 40, respectively, globally for output of research on COPD.

COPD Historical Overview

The first breakthrough in the diagnosis and management of COPD was recorded in 1846 when Hutchinson developed the spirometer. However, despite this invention, many countries have failed to utilize the device to manage and treat COPD adequately. Initially, the spirometer measured vital components and it took a century afterward to make it useable in clinical settings because the first recognize and diagnosis for COPD was 1966 by Burrows et al. Furthermore, Burrows et al suggested a unified name for the American emphysema as well as Britain chronic bronchitis due to the two disease have the same features, thus, he unified the two disease under COPD. (Petty, 200). Further discoveries were made on COPD, with Osler suggesting that shortness of breath was result of pressure on the alveoli (Petty, 2002). The breakthrough in treatment for the emphysema came in 1956 when Barach and Bickerman when recognized the cause of the collapse (Petty, 2006). Over time, other scientists contributed to the management and treatment of shortness of breath.

Epidemiology

Even though cigarette smoking is a risk factor for COPD, it is preventable. It commonly remains underrecognized and underdiagnosed due to the limited awareness and access to medical care by individuals from medical practitioners (GOLD, 2018). The reported prevalence differs from one nation to the other since the exposure to toxic gases and fumes varies from one part of the globe to the other. In Lebanon, being one of the smallest countries in the Arab world, was conducted a national cross-section survey (2009–2010) to determine the prevalence of COPD among the Lebanese population and how the medical care providers were handling and offering therapeutic care to patients with this condition (Waked et al. 2011). The COPD diagnosis was conducted using spirometry after bronchodilation, according to the GOLD definition. The prevalence was found to be 9.7 percent. Approximately 80 percent of COPD patients were undiagnosed among the forty-year-old and above population. The study showed that among the Arab world, the Lebanese prevalence of COPD is much higher than in the United Arab Emirates, which had a 3.7 percent prevalence within the same cross-sectional design research (Al Zaabi et al. 2011).

According to the BREATHE research study, which covered ten Middle East countries and Northern Africa and Pakistan, a multinational population-based study to detect COPD among adults of 40 years and above, using a case definition, was conducted in 2010. The mean prevalence was 3.6 percent at arranging between 1.9 percent in UAE and 6.1 percent in Syria. In Kingdom of Saudi Arabia, the prevalence rate is 2.4 percent (Tageldin et al. 2012). In the BREATH study, COPD was more present in males than in females. Its findings were derivatives of more than sixty thousand respondents in the overall population (Tageldin et al. 2012).

Disease Burden

Mortality

According to WHO Global Burden Disease (GBD) (2017), more than 3.2 million people succumbed and died from COPD globally. This was an increase of 11.6 percent when compared to the 1990 mortality rate. The deaths witnessed or associated with COPD were eight times more common than for patient deaths due to asthma. There were no COPD related mortality data for the Arab world, until the BREATH study was published in 2012.

Morbidity

In 2015, COPD caused 2.6 percent of the world's Disability Adjusted Life Years (DALYs), whereby the age-standardized on the rates because of people in some nations in the high-income parts of Asia Pacific regions, Central Europe, the Caribbean, and Western Europe. Little data from the local publications exist on the morbidity associated with Arab countries COPD. Although, Polatli et al. (2012) revealed that the patients with COPD spent an average of 6.3 nights in the health centers and 3.9 emergency room visits in six months. In Saudi Arabia patients spent an average of 4.6 night in hospitals and 4.02 emergency visits within a period of six mouths. The doctor and physician consultations were the principal health care resources used in the Middle East and North African zones, followed by emergency room hospitalizations and visits. This was due to limited resources and knowledge of COPD by the health centers and physicians, respectively.

Economic Burden

It's challenging to estimate the total or general economic burden of COPD in the Arab nations. This is due to the significant discrepancies in the healthcare systems and setups and the reimbursement procedures and strategies applied, which could elaborate on the lack of standardized reports. The lack of credible data on the Arabic countries hinders the outline of the

measure or the levels at which the COPD has impacted different economies (Sweileh et al.

2014).

Many complex and differentiated approaches are utilized to estimate the costs and

expanses of chronic diseases such as COPD. The latter incurs high costs related to the patient's

care and the lost productivity of patients. Nevertheless, lowering COPD expenses is challenging

due to under-diagnosis and other co-existing illnesses. Moreover, despite the increased disease

burden in many countries, there lacks proper and adequate funds to help mitigate the disease in

many nations, whether in prevention, research, management, awareness creation, or even health

provider services.

Diagnosis

Among the many parts of the Arab world, spirometry is used, mostly depending on its

availability to confirm the COPD diagnosis (Mahboub et al. 2017). This is primarily associated

with the knowledge of the physicians on COPD. This contributes to the certainty of an actual

diagnosis of the COPD presence in the patient's health. Most physicians in Meddle East cannot

conduct diagnosis due to a deficiency of awareness and knowledge on the COPD diagnosis and

treatment (Waked et al. 2011). In MENA, the screening and COPD diagnosis remains a

significant challenge due to limited knowledge and a lack of advanced health diagnosis

machines. However, Salameh and coworkers developed a Respiratory Toxics Exposure Score

(RTES) to support and aid physicians in screening COPD patients in the absence of spirometry

(Salameh et al. 2011).

Management

COPD management aims and objectives are similar globally, including the Arab world:

management of symptoms, reducing risk factors, reduction of exacerbations, management of

comorbidities, reduction of mortality, limitation of disease progression, and improvement of QoL (GOLD, 2018).

The Saudi Thoracic Society (STS) created the Saudi Initiative for Chronic Airway Diseases (SICAD) to develop evidence-based guidelines that are suitable for local needs (Hanania, 2014). The guidelines aid in simplifying the approach by evaluating symptoms, comorbidities, and the risk of exacerbation; their categorization into three phases of COPD, targeting to guide pharmacological treatment based on GOLD guidelines. Class I is for fewer symptoms patients with a COPD assessment test score and low risk of exacerbation. Class II is for patients with more symptoms and a reduced risk of exacerbations. Class III is inclusive of patients with any particular level of symptoms and any CAT score but with a high risk of exacerbations or any hospitalization.

Pharmacological Interventions

In the Arab world, the usage of long and short-acting bronchodilators, together with ICSs, follow the recommendations outlined in GOLD. Nevertheless, the actual local application of particular treatments is dependent on cost, availability, and the levels of reimbursement for the specific drugs in the numerous distinctive nations (Mahboub et al. 2017). In Saudi Arabia, the vast majority of COPD patients do not receive enough treatment in alignment with these guidelines (Idrees et al., 2012). On the other hand, there exist several aspects that determine the Middle East rates of utilization of ICSs, long-acting bronchodilators, and influenza immunizations significantly less in reduced income conditions, as reported in the GOLD survey (Gnautic et al. 2015)

Nonpharmacological Interventions

Smoking cessation is a significant intervention in COPD management. It stands as an integrated strategy in the private practice of healthcare providers in the Arabic region. It's rare in the Arabian countries to find dedicated smoking cessation centers (Al Zaab, 2016); thus, there are no specified interventions to be implemented in the Arab countries.

Patient Education

Patient education is a significant segment in the management and treatment of COPD for both the physician and the patient. This is due to limited awareness and knowledge possessed by the physicians in the Saudi health system. Most patients rely on information leaflets, explanations of devices from nurses, or public awareness campaigns. According to Idrees et al. (2012), more than half of the COPD populace indicated that they were well informed concerning their disease, and two-thirds had acquired information from their physician. Nevertheless, the above three-quarters of the study subjects suggested a dire necessity in offering better education on persons with COPD. According to Uzaslan et al. (2012) the physicians' treatment satisfaction analysis, the study showed 80 percent of the population outlined they were not content with their physicians' disease management. This indicated low expectations in treatments because more than half of the populations were still reporting ongoing symptoms.

Prevention

COPD remains a common disease in the Arab nations, and there is room for improvement in its diagnosis, prevention, and management. There is a need for awareness at point of the health care professionals and for patients in the management of the disease. However, these measures are very far from being adopted or implemented to help medical health professionals enhance their knowledge. There is a great need to increase and elevate the

physician engagement in COPD management and control to help foster health benefits of treating and managing COPD (Alsubaiei et al., 2017).

Current research emphasizing on the knowledgeability, skills, and attitudes of Saudi respiratory therapists toward COPD is limited. More research needs to be done to come up with results that are more accurate.

The overall general approach to the management of COPD is featured in a stepwise increase in treatment, depending on its severity (GOLD, 2018). The treatments offered fall into three vast categories: management of stable disease, disease progression prevention, and exacerbations management. All these can only be carried out if there exists the required knowledge and committed health practitioners and physicians to help and support the patient in the recovery and treatment process. This requires the physician to have knowledge and awareness of respiratory therapy COPD management. No research has focused on addressing this issue the Saudi Arabia respiratory therapists' understanding and knowledge on COPD, which is an essential survey. Therefore, in the medium and short term, prospects for modern therapies to treat lung inflammation by respiratory therapists or COPD remain low. Thus, the overriding imperative should be to reduce the prevalence and the incidents of smoking among Saudi Arabians.

Chapter III

METHODS

This chapter will discuss the methods and the instrumentation used in this study in order to answer the following research questions:

1. To what extent are the Saudi Arabian respiratory therapists knowledgeable of COPD and its global guidelines?

2. To what extent are the skills of Saudi Arabian respiratory therapists, appropriate in the treatment of COPD patients?

3. What are the attitudes of Saudi Arabian respiratory therapists about the COPD?

4. To what extent do gender and educational level impact knowledge, skills, and attitudes of COPD among Saudi Arabian respiratory therapists?

Instrumentation

The instrument which used in this study was designed and structured by Dr. Desalu (2013) in Nigeria. His study assessed and measured the understanding, knowledge, and barriers to use GOLD guidelines among the Nigerian physicians. Permission to modify this survey was obtained from the investigator. As part of the GOLD review, the definition has been changed to include other factors which add to the disease pathophysiology (AJMC, 2017). The questionnaire included 41 questions (multiple choice and true/false), and eight sections: 1) definition and overview of COPD, 2) diagnosis and assessment of COPD, 3) principles of therapy of stable COPD, 4) pharmacotherapy of stable COPD and acute exacerbation, 5) non-pharmacotherapy of stable COPD and acute exacerbation, 6) prevention of COPD and comorbidity,7) barriers to adherence to guidelines, and 8) diagnosis and assessment.

Study Population

According to the Saudi Commission for Health Specialties (SCFHS), the total number of respiratory therapists is 3863. The Saudi RTs are 2345 out of the total RT population in Saudi Arabia of 3863. In addition, 1449 are males, and 896 are females. The vast majority of the Saudi RTs has a bachelor's degree, 1210 males, and 814 females. They are located in 13 Saudi provinces (SCFHS).

Sample and Study Design and Recruitment

A descriptive research design and a cross-sectional survey was used. The survey was distributed through an online link and a convenience sample was used for this study. A tweet on the Tweeter™ app was tweeted by the student investigator and got 30 retweets and 19 likes. RT celebrities retweet about the study during the first week and the following week of distributing the survey. A total of 70 messages were sent to Saudi RTs through WhatsApp™. It was a public invitation to any Saudi RTs who met the inclusion criteria. A total of 119 responses were able to be used in data analysis because 24 responses were excluded because they did not meet the inclusion criteria. The participants were recruited based on their willingness to participate. Their geographic location was any health facility in Saudi Arabia. The inclusion criteria were any Saudi RT with a minimum experience of 6 months. Exclusion criteria are any participant who was not willing to participate, Non-Saudi RTs, undergraduate respiratory therapy students, and Saudi RT with less than 6 months experience.

Data Collection

The questionnaire was created electronically via google forms and distributed via social media platforms (Twitter, and WhatsApp). The researcher supervised the process of distribution

in order to minimize bias. Participants have the right to withdraw from the study any time they want.

Protection of Human Subject

This research proposal was approved by the Georgia State University Institutional Review Board (H21193). Confidentiality is crucial in data collection; hence the researcher informed the participants that the data which they provide was secure. The participants' rights were reserved and safeguarded. Respondents to this survey remained anonymous.

Ethical Consideration

Participants have the right to withdraw from the study at any time. To ensure the security of the data collected, a password excel file in a secured server according to HIPPA, only the principal investigator and the student investigator had access to the file. Confidentiality is crucial in data collection; hence the researcher informed the participants that the data which they provide was secure. The participants' rights were reserved and safeguarded. Respondents to this survey remained anonymous.

Invitation letter and Informed Consent

Along with the survey an invitation letter was sent to the all participants in this study. The invitation letter was seen on first page of the survey.

Informed consent was provided to participants prior to the questionnaire began. Participants were asked to agree in order to proceed to the questionnaire; if the participant refused to be part of the study survey ends before any further steps are processed.

Data Analysis

After collection, the raw data were checked, cleaned, edited and analyzed by Statistical Package for the Social Sciences (SPSS) version 27.0, SPSS Inc. Chicago, IL was used to carry out all descriptive statistical such as mean, standard deviation, frequency a to describe the age and demography of the population. Knowledge about COPD guideline was compared using one-way ANOVA Analysis of variance (ANOVA) was used to compare the Respiratory therapists' mean scores on COPD awareness. A p value <0.05 were considered significant.

Twenty-Four responses were excluded from the analysis because they were outside the target sample. The frequencies, percentages, means and standard deviations were calculated to describe the profile of the respondents. One-way ANOVA test and t-test were used as appropriate to evaluate the statistical significance of the differences between the responses of the participants. Chi-square test was used as appropriate to evaluate the statistical relationship between two qualitative variables. A p-value < 0.05 was considered significant.

Chapter IV

RESULTS

The study answered three research questions. The first question examined the degree of knowledge possessed by Saudi Arabian respiratory therapists with respect to COPD and its global standards. The second question investigated the skill level of Saudi Arabian respiratory therapists in relation to being more engaged in treating COPD patients. The third question looked at the attitudes of Saudi Arabian respiratory therapists towards COPD. The fourth question examined the impact of gender and educational level on RTs' knowledge, skills and attitudes regrading COPD.

Demographic Characteristics of Respondents

A total of 119 questionnaires were collected. 69.7% of respondents were male, of whom 60.5% hailed from Riyadh province and 16.0% from Eastern Province. 64.7% had experience of 6 months to 4 years while 26.1% had experience of 4 to 10 years. 79.8% had a bachelor's degree, while 14.3% had a master's degree. See table 1 below.

Table 1: Demographic characteristics of participants.

		Frequency	*Percent*
Province:	Riyadh	72	60.5
	Eastern Province	19	16.0
	Makkah	15	12.6
	Al-Jouf	4	3.4
	Al Madinah	3	2.5
	Jizan	2	1.7
	Asir	2	1.7
	Hail	1	0.8
	Northern Borders	1	0.8
	Bachelor	95	79.8
Education level	Master	17	14.3
	Associate	7	5.9
Gender	Male	83	69.7
	Female	36	30.3
Experience	6 months to 4 years	77	64.7
	4 to 10 years	31	26.1

11 to 15 years	6	5.0
16 to 20 years	1	0.8
Above 21 years	4	3.4

To what extent are Saudi Arabian respiratory therapists knowledgeable about COPD and its global guidelines?

Knowledgeability of COPD includes three scores: The total knowledgeability of COPD scale, and subscales of definition and overview, diagnosis and assessment, and principles of therapy of stable COPD. Descriptive statistical analyses of means, standard deviations, and percentages were used to analyze this dimension.

The overall mean of knowledgeability for COPD was (M = 10.64), where 53.2% answered correctly on scale of knowledgeability of COPD. The mean score of diagnosis and assessment were (M = 3.97), where 44.1% answered correctly. The mean score of definition and overview was (M = 3.56), where 50.9% answered correctly. Finally, the mean score of principles of therapy of stable COPD was (M = 3.10), where 77.5% answered correctly (see Table 2).

Table 2: Saudi Arabian RTs' scores in COPD knowledge.

Basic content of the GOLD statements	Total	
	RTs Score	
	%	M SD
Definition and overview	50.9	3.56 (1.31)
Diagnosis and assessment	44.1	3.97 (1.48)
Principles of therapy of stable COPD	77.5	3.10 (0.81)
Total	53.2	10.64 (2.49)

Definition and overview of COPD

This dimension of the first part of the questioner includes six sub-questions, as shown in table 4.Descriptive statistical analyses of means, standard deviations, and percentages were used to analyze this dimension. The mean of the level of knowledge of definition and overview of COPD were ranked by respiratory therapists from the most knowledge to the least knowledge about the definition and overview of COPD. As shown in Table 4, the most knowledgeable aspect was *Smokers are the only people who may develop chronic airflow limitations* (M = 0.90), where 89.9% answered correctly. The second aspect was *COPD is not reversible either spontaneously or with treatment* (M = 0.6), where 60.5% answered correctly. The last aspect was *What is not a risk factor for COPD?* (M = 0.16), where 16.0% answered correctly. The overall mean was (M = 3.56), where 50.9% answered correctly.

Table 4: RT knowledge of COPD definition and overview.

Item	Right	Wrong	M	SD	Rank
Smokers are the only people who may develop chronic airflow limitations.	89.9	10.1	0.90	0.302	1
COPD exacerbations are commonly caused by Klebsiella and Pseudomonas infection.	61.3	38.7	0.61	0.489	2
COPD is not reversible either spontaneously or with treatment.	60.5	39.5	0.61	0.491	3
COPD is a chronic inflammatory disease due to noxious particles or gases and is characterized by progressive airflow limitation that is fully reversible.	53.8	46.2	0.54	0.501	4
COPD is a common preventable and treatable disease.	37.8	62.2	0.38	0.487	5
If optimal care is provided, lung function does not decline over time.	37.0	63.0	0.37	0.485	6
Total	50.9	49.1	3.56	1.306	

Diagnosis and assessment of COPD

This dimension of the first part of the questioner includes nine sub-questions, as shown in table 5. Descriptive statistical analyses of means, standard deviations, and percentages were used to analyze this dimension. The mean of the level of knowledge of diagnosis and assessment of COPD was ranked from the most knowledge to the least knowledge of diagnosis and assessment of COPD by respiratory therapists. As shown in Table 5, the most known aspect was *A clinical diagnosis of COPD should be considered in any patient who has dyspnea, chronic cough or sputum production, and a history of exposure to risk factors for the disease* (M = 0.82), where 81.5% answered correctly. The second aspect was *Spirometry is required to confirm the diagnosis of COPD* (M = 0.81), where 80.7% answered correctly. The last aspect was *Patients' physical signs such as hyperinflation and abnormal chest radiograph can help to confirm the diagnosis of COPD* (M = 0.04), where 40.2% answered correctly. The overall mean was (M = 3.97), where 44.2% answered correctly.

Table 5: RT knowledge of COPD diagnosis and assessment of COPD.

Item	Right	Wrong	M	SD	Rank
A clinical diagnosis of COPD should be considered in any patient who has dyspnea, chronic cough or sputum production, and a history of exposure to risk factors for the disease.	81.5	18.5	0.82	0.390	1
Spirometry is required to confirm the diagnosis of COPD.	80.7	19.3	0.81	0.397	2
A 65-year old lorry driver has been coughing more frequently over the last 3 years, and this has been associated with sputum expectoration. He has a smoking history of 25 pack-years. The FEV1/FVC ratio was 70% and FEV1 was 55%. In which group of COPD would you classify this patient?	58.8	41.2	0.59	0.494	3

Chronic cough or sputum expectoration is always diagnostic of COPD.	51.3	48.7	0.51	0.502	4
Which of the following data sets is most diagnostic of COPD as a primary diagnosis? (Each FEV1, and FVC, values is % predicted, respectively).	41.2	58.8	0.41	0.494	5
In an adult aged below 45 years, screening for one of the following is helpful in the diagnosis of COPD?	36.1	63.9	0.36	0.482	6
Arterial blood gas measurements are routinely required in COPD diagnosis.	25.2	74.8	0.25	0.436	7
Measurement of lung volume is recommended during an exacerbation to determine the severity of the illness.	18.5	81.5	0.18	0.390	8
Patients' physical signs such as hyperinflation and abnormal chest radiograph can help to confirm the diagnosis of COPD.	4.2	95.8	0.04	0.201	9
Total	44.2	55.8	3.97	1.481	

Principles of therapy of stable COPD

This dimension of the first part of the questioner includes four sub-questions, as shown in table 6. Descriptive statistical analyses of means, standard deviations, and percentages were used to analyze this dimension. The mean of the level of knowledge of diagnosis and assessment of COPD was ranked from the most knowledge to the least knowledge about principles of therapy of stable COPD by respiratory therapists. As shown in Table 6, the most known aspect was *The use of a spacer (holding chamber) improves drug delivery, increases lung deposition, and may reduce local and systemic side effects* (M = 0.91), where 90.8% answered correctly. The second aspect was *In patients with COPD who smoke, smoking cessation is essential* (M = 0.91), where 90.8% answered correctly. The last aspect was *Which of the following is not a goal of COPD treatment?* (M = 0.46), where 46.2% answered correct. The overall mean was (M = 3.97), where 44.2% answered correctly.

Table 6: RT knowledge of principles of therapy of stable COPD.

Item	Right	Wrong	M	SD	Rank
The use of a spacer (holding chamber) improves drug delivery, increases lung deposition, and may reduce local and systemic side effects	90.8	9.2	0.91	0.291	1.5
In patients with COPD who smoke, smoking cessation is essential.	90.8	9.2	0.91	0.291	1.5
Dry powder inhalers (DPI) require higher inspiratory flow rates than metered dose inhalers (MDI).	82.4	17.6	0.82	0.383	3
Which of the following is not a goal of COPD treatment?	46.2	53.8	0.46	0.501	4
Total	77.5	22.5	3.10	0.807	

To what extent do Saudi Arabian respiratory therapists have the appropriate skills to be more involved in treating COPD patients?

Appropriate skills needed to be more involved in treating COPD patients scale includes subscales of pharmacotherapy of stable, non-pharmacotherapy, and prevention of COPD and comorbidity. Descriptive statistical analyses of means, standard deviations, and percentages were used to analyze this dimension. The overall mean of the appropriate skills to be more involved in treating COPD patients was (M = 8.84), where 52.0% answered correctly on scale of the appropriate skills to be more involve in treating COPD patients. The mean score of non-pharmacotherapy was (M = 2.73), where 34.1% answered correctly. The mean score of pharmacotherapy of stable was (M = 4.46), where 63.7% answered correctly. Finally, the mean score of prevention of COPD and comorbidity was (M = 1.65), where 82.5% answered correctly (see Table 7).

Basic content of the GOLD statements	Total		
	RTs Score		
	%	M SD	
Pharmacotherapy of stable	63.7	4.46 (1.27)	
Non-pharmacotherapy	34.1	2.73 (0.82)	
Prevention of COPD and comorbidity	82.5	1.65 (0.66	
Total	52	8.84 (2.12)	

Table 7: Total RTs' scores in COPD skills.

Pharmacotherapy of stable COPD and acute exacerbation

Descriptive statistical analyses of means, standard deviations, and percentages were used to analyze this dimension which includes seven sub-questions. The mean of the level of skills of pharmacotherapy of stable of COPD was ranked from the most available to the least available by respiratory therapists. As shown in Table 9, the most known aspects were *Inhaled long-acting inhaled B2-agonists are more effective and convenient than short acting B2-agonists in stable COPD* (M = 0.88), where 88.2% answered correctly, and *Antibiotics are not routinely required unless there are signs of pneumonia or purulent and increased sputum production if the patient is on a mechanical ventilator* (M = 0.87), where 87.4% answered correctly. The last aspect was *Prolonged inhaled glucocorticosteroids are recommended for COPD patients in which group?* (M = 0.40), where 40.3% answered correctly. The overall mean was (M = 4.46), where 63.7% answered correctly.

Table 8: RTs skills of pharmacotherapy of stable COPD.

pharmacotherapy of stable COPD and acute exacerbation.

Item	Right	Wrong	M	SD	Rank
Inhaled long-acting inhaled B2-agonists are more effective and convenient than short acting B2-agonists in stable COPD.	88.2	11.8	0.88	0.324	1
Antibiotics are not routinely required unless there are signs of pneumonia or purulent and increased sputum production if the patient is on a mechanical ventilator.	87.4	12.6	0.87	0.333	2
Inhaled short-acting B2-agonist is the preferred bronchodilator of choice for acute exacerbation of COPD.	82.4	17.6	0.82	0.383	3
Low-dose theophylline is weaker and less effective than a low dose of inhaled glucocorticosteroids in reducing the long-term decline in lung function.	58.8	41.2	0.59	0.494	4
Long-acting inhaled B2-agonists should be used as monotherapy in COPD, as these medications appear to influence the airway inflammation.	47.9	52.1	0.48	0.502	5
Which of the following medications is recommended for stable COPD?	41.2	58.8	0.41	0.494	6
Prolonged inhaled glucocorticosteroids are recommended for COPD patients in which group?	40.3	59.7	0.40	0.493	7
Total	63.7	36.3	4.46	1.268	

Non-pharmacotherapy

Descriptive statistical analyses of means, standard deviations, and percentages were used to analyze this dimension which includes six sub-questions. The mean of the level of skills of non-pharmacotherapy of COPD was ranked from the most available to the least available by respiratory therapists. As shown in Table 10, the most known aspects were *An optimal pulmonary rehabilitation program should include:* (M = 0.91), where 90.8% answered correctly and *Pulmonary rehabilitation is a recommended treatment option in COPD* (M = 0.85), where 84.9% answered correctly. The last aspect comprised four items, 2, 4, 5 and 6, (M = 0.00), where 0.0% answered correctly. The overall mean was (M = 2.73), where 34.1% answered correctly.

Table 9: RTs skills of non-pharmacotherapy for COPD.

Item	Right	Wrong	M	SD	Rank
An optimal pulmonary rehabilitation program should include:	90.8	9.2	0.91	0.291	1

Item	Right	Wrong	M	SD	Rank
Pulmonary rehabilitation is a recommended treatment option in COPD.	84.9	15.1	0.85	0.360	2
It is recommended to give vaccinations to all COPD patients.	73.9	26.1	0.74	0.441	3
Long-term Oz therapy is indicated in COPD except for:	23.5	76.5	0.24	0.426	4
100% O2 (7–10 l/min) is required for hypoxia in acute exacerbations of COPD.	0	100.0	0.00	0.000	6.5
A Venturi mask is not more effective than a nasal prong/cannula in delivering controlled oxygen in COPD.	0	100.0	0.00	0.000	6.5
Pulmonary rehabilitation is indicated only for patients with COPD in Group C: Severe and Group D: Very severe.	0	100.0	0.00	0.000	6.5
Surgery is often beneficial in COPD patients.	0	100.0	0.00	0.000	6.5
Total	34.1	65.9	2.73	0.820	

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Prevention of COPD and comorbidity

Descriptive statistical analyses of means, standard deviations, and percentages were used to analyze this dimension which includes two sub-questions. The mean of the level of prevention of COPD and comorbidity was ranked from the most available to the least available of prevention of COPD and comorbidity by respiratory therapists. As shown in Table 10, the most known aspects were *Avoiding or controlling the risk factors after the development of COPD is not necessary* (M = 0.86), where 85.7% answered correctly, and *Pulmonary rehabilitation is a recommended treatment option in COPD* (M = 0.79), where 79.0% answered correctly. The overall mean was (M = 1.65), where 82.4% answered correctly.

Table 10: RTs skills of prevention of COPD and comorbidity.

Item	Right	Wrong	M	SD	Rank
Avoiding or controlling the risk factors after the development of COPD is not necessary.	85.7	14.3	0.86	0.351	1
Tobacco cessation therapy does not have a significant role in the management of COPD once the lung is damaged.	79.0	21.0	0.79	0.409	2
Total	82.4	17.6	1.65	0.659	

What are the attitudes of Saudi Arabian respiratory therapists towards COPD?

The measurements of Saudi respiratory therapists' attitudes towards COPD Included a confidence scale from one to ten scores. Ten means extremely confident while one was not confident at all. The question was: My confidence regarding implementing diagnosis and assessment according to guidelines/recommendations at the moment is: (please circle the number). The overall means was $\bar{x} = 6.66$ on a scale of 10. As shown in Table 11.

Table 11: RTs confidence related to COPD.

Confidence level	Total		P
	N (%)	MeanSD	
1	2	1.7	
2			
3	3	2.5	
4	6	5.0	
5	18	15.1	6.66 (1.79)	.026
6	23	19.3	
7	30	25.2	
8	20	16.8	
9	10	8.4	
10	7	5.9	

Are gender and educational levels impact knowledge, skills, and attitudes of Saudi Arabian respiratory toward COPD?

Impact of gender on Knowledgeability

From Table 12, the *t*-test revealed that there were no significant differences ($p>0.05$) in scores of diagnosis and assessment, principles of therapy of stable COPD due to gender; in other words, gender did not appear to make a variation in scores of diagnosis and assessment, principles

of therapy of stable COPD. There are significant differences ($p<0.05$) in scores of definition and overview due to gender in favor of males; this means that gender appears to make variation in scores of definition and overview.

Table 12: Saudi Arabian RTs' scores in COPD knowledge by gender.

Basic content of the GOLD statements	Maximum total score	Male		Female		Total		P
		%	MSD	%	M SD	%	M SD	
Definition and overview	7	53.6	3.75 (1.33)	44.9	3.14 (1.15)	50.9	3.56 (1.31)	0.019
Diagnosis and assessment	9	43.1	3.88 (1.48)	46.6	4.19 (1.49)	44.1	3.97 (1.48)	0.289
Principles of therapy of stable COPD	4	78.5	3.14 (1.78)	75.0	3.00 (0.86)	77.5	3.10 (0.81)	0.371
Total	20	53.6	10.72 (2.41)	52.2	10.44 (2.69)	53.2	10.64 (2.49)	0.577

Impact of educational level on Knowledgeability

One-way ANOVA revealed that there were no significant differences ($p>0.05$) in scores of knowledge due to education level; this means that the education level did not appear to make a difference in scores of knowledge. A one-way ANOVA revealed that there was no significant difference ($p>0.05$) in scores of definition and overview due to education level, i.e., the education level did not appear to make a variation in scores of definition and overview. The one-way ANOVA also revealed that there was significant difference ($p<0.05$) in scores of diagnosis and assessment. The level of education appears to make a variation in scores of diagnosis and assessment due to education level. A Scheffé post hoc test was used to determine which group of education is significantly different from other groups. The results revealed that the mean for the bachelor's education group (M = 3.82) was significantly lower than the master's education group (M = 4.94).

There was a significant difference ($p<0.05$) in scores of principles of therapy for stable COPD. The level of education appears to make variation in scores of principles of therapy of

stable COPD. A Scheffé post hoc test was used to determine which level of education was significantly different from other levels. The results revealed that the mean for the associate education group (M = 2.14) was significantly lower than the master's education group (M = 3.88) and bachelor (M = 3.03). The mean for the bachelor's education group (M = 3.03) was significantly lower than the master's education group (M = 3.88) (see table 13).

Table 13: RT knowledge of COPD by level of education.

Basic content of the GOLD statements	Maximum total score	Bachelor		Master		Associate		Total		p
		%	MSD	%	M SD	%	M SD	%	M SD	
Definition and overview	7	51.0	3.57 (1.30)	53.8	3.76 (1.35)	42.9	3.0 (1.29)	50.9	3.56 (1.31)	0.429
Diagnosis and assessment	9	42.5	3.82 (1.5)	54.9	4.94 (1.14)	41.3	3.71 (1.11)	44.1	3.97 (1.48)	0.013
Principles of therapy of stable COPD	4	75.8	3.03 (0.78)	97.1	3.88 (0.33)	53.6	2.14 (0.38	77.5	3.10 (0.81)	0.000
Total	20	53.3	10.67 (2.57)	52.0	10.4 (2.27)	53.5	10.7 (1.98)	53.2	10.64 (2.49)	0.921

Impact of gender on RTs skills

Table 14 shows that one-way ANOVA revealed that there was no significant difference ($p>0.05$) in scores of (skills) due to gender; in other words, the gender did not appear to make variation in scores of skills.(see table 14)

Table 14: Saudi Arabian RTs' scores in COPD knowledge test by gender.

Basic content of the GOLD statements	Maximum total score	Male		Female		Total		P
		%	MSD	%	M SD	%	M SD	
Definition and overview	7	53.6	3.75 (1.33)	44.9	3.14 (1.15)	50.9	3.56 (1.31)	0.019

Diagnosis and assessment	9	43.1	3.88 (1.48)	46.6	4.19 (1.49)	44.1	3.97 (1.48)	0.289
Principles of therapy of stable COPD	4	78.5	3.14 (1.78)	75.0	3.00 (0.86)	77.5	3.10 (0.81)	0.371
Total	20	53.6	10.72 (2.41)	52.2	10.44 (2.69)	53.2	10.64 (2.49)	0.577

Impact of educational level on RTs Skills

A One-way ANOVA revealed that there was a significant difference ($p<0.05$) in scores of pharmacotherapy of stable due to education; in other words, the level of education appears to make variation in scores of pharmacotherapy of stable. A Scheffé post hoc test was used to determine which education group is significantly different from other groups. The results revealed that the mean for the bachelor's education group (M=4.36) and associate education group (M = 3.86) were significantly lower than the master's education group (M = 5.29), as represented in Table 15.

One-way ANOVA revealed that there was no significant difference ($p>0.05$) in scores of non-pharmacotherapy due to education level. The education level did not appear to make variation in scores of non-pharmacotherapy.

One-way ANOVA revealed that there was no significant difference ($p>0.05$) in scores of preventions of COPD and comorbidity due to education level. The education level did not appear to make variation in scores of preventions of COPD and comorbidity.

Table 15 indicates that education level was not a sign of prevention.

Table 15: RTs skills by education level.

Basic content of the GOLD statements	Maximum total score	Bachelor		Master	Associate	Total	P
		%	MSD	% M SD	%M SD	%M SD	

Pharmacotherapy of stable	7	62.3	4.36 (1.21)	75.6	5.29 (1.36)	55.1	3.86 (1.07)	63.7	4.46 (1.27)	0.007
Non-pharmacotherapy	8	33.7	2.69 (0.84)	38.2	3.06 (0.66)	30.4	2.43 (0.79)	34.1	2.73 (0.82)	0.146
Prevention of COPD and comorbidity	2	81.1	1.62 (0.66)	94.1	1.88 (0.49)	71.4	1.43 (0.98)	82.5	1.65 (0.66	0.215
Total	17	52.6	8.95 (2.1)	47.8	8.12 (2.0)	53.8	9.14 (2.67)	52	8.84 (2.12)	0.311

Impact of gender on RTs attitudes

The means for males $\bar{x} = 6.9$ were less than for females $\bar{x} = 6.11$. There was significant difference ($p=0.026 <0.05$) in confidence score due to gender and favored towards females (see Table 16).

Table 16: RTs confidence in implementing COPD GOLD guidelines by gender.

Confidence level	Male		Female		Total		P
	N (%)	MeanSD	N (%)	MeanSD	N (%)	MeanSD	
1	1 1.2		1 2.8		2 1.7		
2	0 0		0 0				
3	0 0		3 8.3		3 2.5		
4	3 3.6		3 8.3		6 5.0		
5	15 18.1	6.9(1.73)	3 8.3	6.11(1.83)	18 15.1	6.66	.026
6	15 18.1		8 22.2		23 19.3	(1.79)	
7	18 21.7		12 33.3		30 25.2		
8	17 20.5		3 8.3		20 16.8		
9	7 8.4		3 8.3		10 8.4		
10	7 8.4		0 0		7 5.9		

Impact of educational level on RTs attitudes

The bachelor group was the least confident ($\bar{x} = 6.56$), followed by the master's group $\bar{x} = 6.88$ and associate group $\bar{x} = 7.57$. However, based on the ANOVA test, there was no significant

difference (p=0.306 >0.05) in confidence scores due to education level (see Table 17). Education level was not a sign of attitudes and confident level regards COPD.

Table 17: confidence in implementing COPD GOLD guideline by educational level.

Education Level	Bachelor		Master		Associate		Total		
	N (%)	Mean SD	N (%)	Mean SD	N (%)	Mean SD	N (%)	Mean SD	P
1	2 (2.1)						2 (1.7)		
2	0		0		0		0		
3	3 (3.2)						3 (2.5)		
4	4 (4.2)	6.56	2 (11.8)	6.88		7.57	6 (5.0)	6.66	
5	17 (17.9)	1.84		1.45	1 (14.3)	1.72	18 (15.1)	1.79	.306
6	18 (18.9)		4 9 (23.5)		1 (14.3)		23 (19.3)		
7	24 (25.3)		5 (29.4)		1 (14.3)		30 (25.2)		
8	14 (14.7)		4 9 (23.5)		2 (28.6)		20 (16.8)		
9	7 (7.4)		2 (11.8)		1 (14.3)		10 (8.4)		
10	6 (6.3)				1 (14.3)		(5.9)		

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Saudi Arabian respiratory therapists' acknowledgment of barriers to adherence to guidelines

Table 18 demonstrates the barriers to adhering to COPD guidelines generally and by gender, where most barriers to adherence were *Believe patients cannot adhere to guideline recommendations* (26.9% of 119 responses), which was the most chosen by males, *Lack of awareness* (69 (58.0%)) and then *Lack of equipment and resources* (spirometry cessation expert) (49 (41.2%)). It is noted from Table 18 that the barriers are more common in males, such as *Lack of motivation and poor dissemination by physician to colleagues* as shown in Figure 1. In other words, there are different selections between male and female respondents.

Table 18: Frequencies and percentages of Saudi Arabian respiratory therapists' acknowledgment of barriers to adherence to guidelines by gender.

| Barrier	Male n (%)		Female n (%)		Total	
Believe patients cannot adhere to guideline recommendations	55	(66.3)	15	(41.7)	70	(58.8)
Lack of awareness	55	(66.3)	14	(38.9)	69	(58.0)
Lack of educational material/support	46	(55.4)	15	(41.7)	61	(51.3)
Lack of equipment and resources (spirometry cessation expert)	37	(44.6)	12	(33.3)	49	(41.2)
Lack of time (lengthy and difficult to remember)	33	(39.8)	14	(38.9)	47	(39.5)
Believe guidelines will not improve the outcome of COPD	24	(28.9)	8	(22.2)	32	(26.9)
Lack of motivation and poor dissemination by physician to colleagues	3	(3.6)	5	(13.9)	8	(6.7)
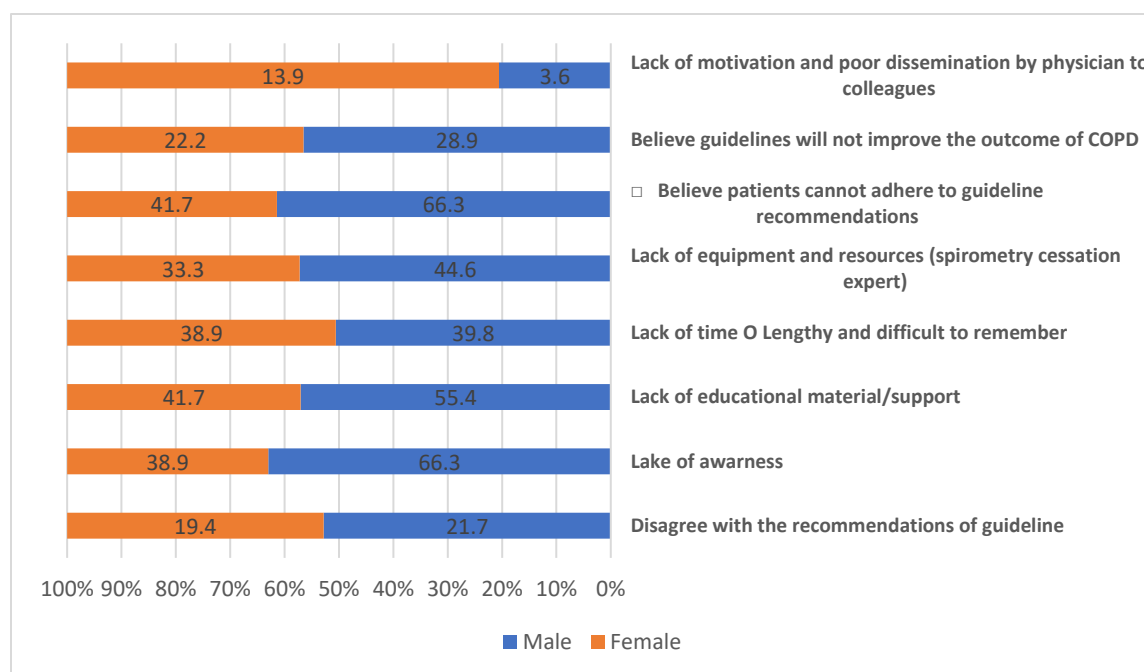
Figure 1

Saudi Arabian respiratory therapists' acknowledgment of barriers to adherence to guidelines by education in Table 19 depicts the barriers to adherence to guidelines generally and by gender. It is noted that the barriers are more prevalent in the associate education level

group with exceptions –as shown in Figure 2. In other words, there were different selections

between three groups: bachelor's, master's and associate.

Table 19: Frequencies and percentages of RTs' acknowledgment of barriers to adherence to guidelines by education level.

| Barrier	Bachelor n (%)		Master n (%)		Associate n (%)		Total	
Believe patients cannot adhere to guideline recommendations	59	(62.1)	5	(29.4)	6	(85.7)	70	(58.8)
Lack of awareness	60	(63.2)	4	(23.5)	5	(71.4)	69	(58.0)
Lack of educational material/support	50	(52.6)	9	(53.0)	2	(28.6)	61	(51.3)
Lack of equipment and resources (spirometry cessation expert)	40	(42.1)	6	(35.3)	3	(42.9)	49	(41.2)
Lack of time/Lengthy and difficult to remember	34	(35.8)	8	(47.1)	5	(71.4)	47	(39.5)
Believe guidelines will not improve the outcome of COPD	25	(26.3)	2	(11.8)	5	(71.4)	32	(26.9)
Disagree with the recommendations of guideline	19	(20.0)	2	(11.8)	4	(57.1)	25	(21.0)
Lack of motivation and poor dissemination by physician to colleagues	5	(5.3)	3	(17.7)	0	(0.0)	8	(6.7)
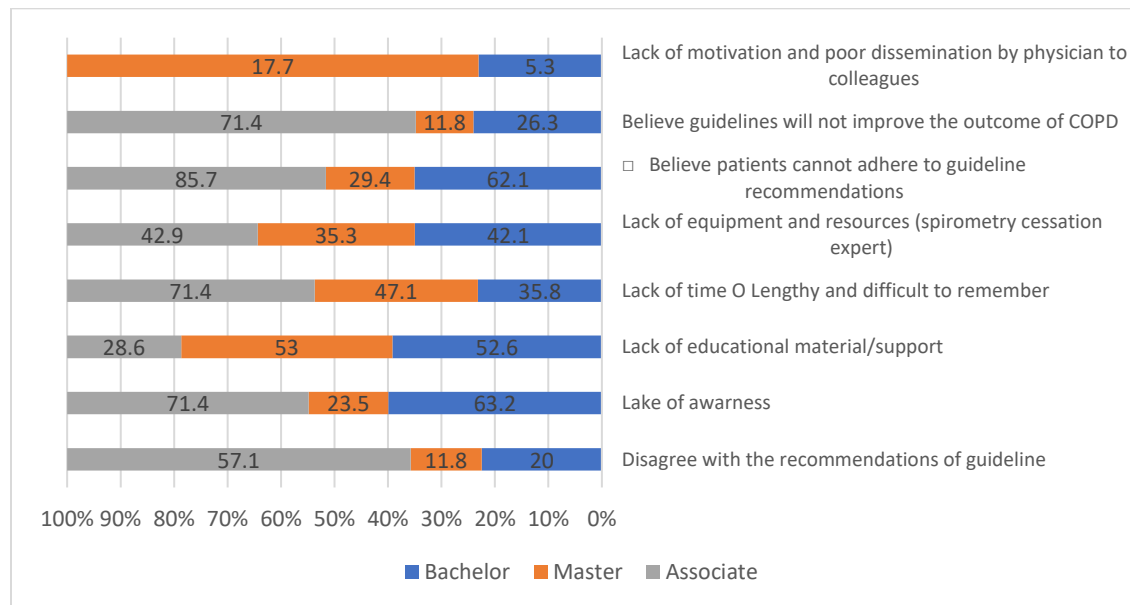
Figure 2

Diagnosis and assessment

statements regarding guidelines/recommendations for the use of diagnosis and the assessments of COPD were agreed. Due to by thirty-five respondents (29.4%), the recommendation *I intend to use these recommendations, but I am not confident about using them* was the most selected, followed by *I am not familiar with these recommendations* with thirty-two selections (26.9%), and *I have recently used these recommendations* with fifteen (12.6%) selections.

Twenty-seven (30.5%) male respondents chose *I am not familiar with these recommendations* while twenty-three (27.7%) chose *I intend to use these recommendations, but I am not confident about using them. I intend to use these recommendations, but I am not confident about using them* was the most chosen by females, followed by the I have been using these recommendations for the past 6 months and intend to keep using them with ten (27.8%) selections. The results of the chi-square test revealed that there was no association between gender and recommendations. In other words, the selections are independent from male and female genders.

Table 20: RTs of recommendations by gender and chi-square test.

Recommendations	Male	Female	Total	P
	n (%)	n (%)	n (%)	
I intend to use these recommendations, but I am not confident about using them.	23 (27.7)	12 (33.3)	35 (29.4)	
I am not familiar with these recommendations.	27 (32.5)	5 (13.9)	32 (26.9)	.200
I have been using these recommendations for the past 6 months and intend to keep using them	14 (16.9)	10 (27.8)	24 (20.2)	
I have recently used these recommendations.	9 (10.8)	6 (16.7)	15 (12.6)	
I intend to use these recommendations in the next month.	10 (12.0)	3 (8.3)	13 (10.9)	

Education level

Twenty-nine (30.5%) bachelor's level RTs chose the recommendation *I intend to use these recommendations, but I am not confident about using them* while twenty-eight (29.5%) went with *I am not familiar with these recommendations* (see Table 21). *I have been using these recommendations for the past 6 months and intend to keep using them* was the most chosen recommendation by respondents in the master's group, with five responses (29.4%). For the associate level group, *I am not familiar with these recommendations* was the most chosen recommendation, with four (57.1%) respondents. Still, the result of chi-square revealed there was no association between gender and recommendations. This means that the selections are independent of education level – bachelor's, master's and associate.

Table 21: Frequencies and percentages of RTs' recommendations by education level.

Recommendations	Bachelor N (%)	Master N (%)	Associate N (%)	Total N (%)	P
I intend to use these recommendations, but I am not confident about using them.	29 (30.5)	4 (23.5)	2 (28.6)	35 (29.4)	
I am not familiar with these recommendations.	28 (29.5)		4 (57.1)	32 (26.9)	
I have been using these recommendations for the past 6 months and intend to keep using them	18 (18.9)	5 (29.4)	1 (14.3)	24 (20.2)	.073
I have recently used these recommendations.	11 (11.6)	4 (23.5)		15 (12.6)	
I intend to use these recommendations in the next month.	9 (9.5)	4 (23.5)		13 (10.9)	

Summary

The general inference from the three research questions was that gender and education level impact the knowledge levels, skills, and attitudes of Saudi Arabian respiratory therapists differently. RTs ranked definition and overview of COPD, diagnosis and assessment of COPD, and principles of therapy of stable COPD, pharmacotherapy of stable COPD, non-pharmacotherapy, and prevention of COPD and comorbidity. Gender was not statistically significant in the following areas: scores of definition and overview, diagnosis and assessment, principles of therapy of stable COPD, principles of therapy of stable COPD, pharmacotherapy of stable COPD, non-pharmacotherapy, and prevention of COPD and comorbidity according to individual performance. Education level was not statistically significant in the following areas: scores of definition and overview, non-pharmacotherapy, and prevention of COPD and comorbidity. Education was significant in the following areas: scores of diagnosis and assessment, principles of therapy of stable COPD, and pharmacotherapy of stable COPD. That means the master's group can be involved in treating COPD patients. The results also indicate tasks associated with diagnosis and assessment, therapeutic principles, and pharmacotherapy of COPD of the associate group require specialized knowledge and skills that can only be obtained through education. Gender affects confidence, as illustrated by the fact that there was a major change in confidence scores owing to gender; female respiratory therapists were more confident.

Chapter V

DISSCUSION

This chapter elaborates the findings around the research questions which were discussed in the previous chapter. Furthermore, this chapter contains limitations, and conclusions. The three research questions were:

1- What extent are the Saudi Arabian respiratory therapists knowledgeable of COPD and its global guidelines?

2- What extent are the skills of Saudi Arabian respiratory therapists, appropriate in the treatment of COPD patients?

3- What are the attitudes of Saudi Arabian respiratory therapists about the COPD?

4- To what extent do gender and educational level impact knowledge, skills, and attitudes of COPD among Saudi Arabian respiratory therapists?

Saudi RTs Knowledge

This question measured the overall knowledgeability of Saudi Arabian respiratory therapy (n=62, 52.2%), which means more than half of Saudi RTs were knowledgeable about COPD and aware of its global guidelines. Based on the results aforementioned, Saudi RTs have less knowledge about COPD compared to physicians in Saudi Arabia 65.5 %; according to the study of Alsubaiei et al. In this aspect, there are three subcategories: definition and overview, diagnosis and assessment, and the principle of therapy of stable COPD. In the first dimension, Saudi RTs got a score of (n=61,50.9%) while physicians got a score of 62.5%. (Alsubaiei et al., 2017). However, the master's group results were almost equal with physicians in Saudi Arabia in the second division of knowledgeability, the diagnosis and assessment of COPD (n=9, 54.9%). In comparison, physicians in Saudi Arabia scored 56%, according to Alsubaiei et al. The

master's group shows a higher score third of the aspect of knowledgeability of the principle of therapy of stable COPD, which was (n=16, 97.1%) followed by bachelor's group (n=72, 75.8%). In comparison, physicians in Saudi Arabia in this dimension got 56 % (Alsubaiei et al., 2017). On the other hand, the associate's group had the lowest score on the three aspects mentioned above, which was (n=4, 53.3%). Therefore, Saudi RTs have sufficient and enough knowledge in comparison to the medical doctors in Saudi Arabia.

Saudi RTs Skills

This question measured the skills and abilities to handle COPD patients. The overall results were (n=62, 52%), which means half of the Saudi RTs have the appropriate skills and abilities to treat COPD patients. There are three subscales: pharmacotherapy of stable, non-pharmacotherapy, and prevention of COPD and comorbidity. In the first dimension, the master's group got a score of (n=13, 75.6%) while the Saudi physicians got 76.6% according to Alsubaiei et al., which means Saudi RTs and doctors in the same level in terms of pharmacotherapy of stable. Non- pharmacotherapy, the Saudi RTs scored (n=41,34%) less than physicians in Saudi Arabia 68% (Alsubaiei et al., 2017). The last dimension was the prevention of COPD and comorbidity; the Saudi RTs had a higher score (n=98,82.5%) compared to doctors (73%), which means that Saudi RTs have a great background in preventing COPD and its comorbidity.

Overall, Saudi RTs have the appropriate skills and abilities to manage COPD patients, especially the master's level group. Therefore, Saudi RTs can play a crucial role in treating COPD patients.

Saudi RTs Attitudes

This question measured the attitudes and level of confidence in terms of implementing the GOLD recommendations. A scale of 1-10 was used, with ten means extremely confident

while one was not confident at all. The overall mean score for Saudi RTs was 6.66. In comparison, the physician's level of confidence was $\bar{x} = 5.6$ (Alsubaiei et al., 2017). It seems that Saudi RTs are confident to implement the GOLD guidelines more than the medical doctors in Saudi Arabia.

Impact of Gender and educational level

This question measure if there is an impact of gender and educational level on COPD knowledge, skills, and attitudes among Saudi Arabian RTs. Generally, there is no impact of gender and educational level on knowledge and skills. However, in the first aspect of knowledgeability, which was the definition and overview, male RTs show a higher score ($p<0.5$), which means that male RTs have a good background about COPD definitions and overview better than females. Additionally, the master's group showed excellent scores on the second and third aspect of knowledgeability score: diagnosis and assessment, and principles of therapy of stable COPD ($p<0.05$), which means the master's group are the most knowledgeable educational group about COPD. Gender did not appear to make a variation in the score of skills. Simultaneously, educational level seemed to make a variation in the first aspect of skills score, which was pharmacotherapy of stable of COPD. Master's group were scored higher ($p<0.05$), $\bar{x} = 5.29$, followed by bachelor's $\bar{x} = 4.36$ and associate which was the lowest group by $\bar{x} = 3.86$. The latter means that master's group have enough and efficient skill more than other educational groups. Females were more confident than males in implementing GOLD guidelines. In other words, gender appeared to make a variation in favor of females ($p<0.05$). The educational level did not appear to make a variation in RTs attitudes toward COPD.

Implications for practice

This study elaborated on Saudi Arabian RTs' knowledge, skills, and attitudes toward COPD diseases. It is believed that the RT community in Saudi Arabia has not been studied in such a disease. This study and its result would help the ministry of health in Saudi Arabia enhance and improve the role of RTs and give them a more significant role in managing COPD patients. It is a quick and effective solution to overcome the issue of the shortage of pulmonologists.

Policy makers in ministry of health could train expert and highly educated RTs and enable them treating COPD patients under pulmonologists' supervision in the beginning. Afterward, those pioneers would pave the way for other RTs to work effectively and autonomously by giving advanced courses in COPD by virtue of their experience. The latter would contribute to increase quality of care to COPD patients.

Limitations

The study experienced several limitations, first was COVID-19 because it reduced the sample size due to the RTs were the first responders to the pandemic like their colleagues around the globe, while the time of sending the survey was the peak of COVID-19 in Saudi Arabia. The RTs were burned out, and it was not easy to recruit participants to the study. Secondly, it was hard to find RTs who were on Social media in four Saudi provinces (Al Baha, Al Qassim, Tabuk, and Najran).The most sample was hailed from Riyadh city. The Major flaw of using social media to recruit the sample is that hard to identify the response rate. Finally, there were just only one article to compare with; the study conducted on physicians in Saudi Arabia and they were only 44 respondents 15 of which were non-Saudi and it took place in Eastern province not the across country.

Recommendations for Future Studies

A future and bigger size sample study which combine physicians and respiratory therapist about the COPD is highly recommended to measure the knowledge, skills, and attitudes of physicians and RTs. Such a study will increase the quality of care given to COPD patients.

A major community-based study should be conducted to determine the COPD prevalence in Saudi Arabia because the prevalence rate of COPD is outdated and not accurate because of lack to community based epidemiological research (Al Ghobain, 2011).

Conclusion

This study has investigated knowledge, skills, and attitude among Saudi respiratory therapists toward COPD. No research has focused on addressing this issue, the Saudi Arabia respiratory therapists' understanding and knowledge on COPD. This study illustrated that Saudi RTs have enough and sufficient knowledge, skills, and abilities to be more involved in treating COPD patients, particularly the RTs with a master's degree. Saudi RTs' attitudes toward COPD were acceptable. Therefore, with more education, experience, and trust, the ministry of health in Saudi Arabia can rely on RTs in treating COPD patients. A considerable lack of pulmonologists and a vast shortage in the next 10 to 15 years are projected because of the young community currently in Saudi will aging, which will need more hospitals, health care, and medical staff. Additionally, COPD's risk factors such as the smoking prevalence among the young community and the nature of dusty weather in Saudi Arabia will increase the RTs services' demand.

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APPENDIX A: IRB APPROVAL

Georgia State University

October 16, 2020

Principal Investigator: Lynda T Goodfellow

Key Personnel: Alshahrani, Ziyad M; Goodfellow, Lynda T

Study Department: Respiratory Therapy

Study Title: COPD Knowledge among Saudi Arabian Respiratory Therapists

Submission Type: Exempt Protocol Category 2

IRB Number: H21193

Reference Number: 362652

Determination Date: 10/13/2020

Status Check Due By: 10/12/2023

The above-referenced study has been determined by the Institutional Review Board (IRB) to be exempt from federal regulations as defined in 45 CFR 46 and has evaluated for the following:

1. Determination that it falls within one or more of the eight exempt categories allowed by the institution; and
2. Determination that the research meets the organization's ethical standards

If there is a change to your study, you should notify the IRB through an Amendment Application before the change is implemented. The IRB will determine whether your research continues to qualify for exemption or if a new submission of an expedited or full board application is required.

A Status Check must be submitted three years from the determination date indicated above. When the study is complete, a Study Closure Form must be submitted to the IRB.
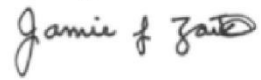
This determination applies only to research activities engaged in by the personnel listed on this document.

It is the Principal Investigator's responsibility to ensure that the IRB's requirements as detailed

in the Institutional Review Board Policies and Procedures For Faculty, Staff, and Student Researchers (available at gsu.edu/irb) are observed, and to ensure that relevant laws and regulations of any jurisdiction where the research takes place are observed in its conduct.

Any unanticipated problems resulting from this study must be reported immediately to the University Institutional Review Board. For more information, please visit our website at www.gsu.edu/irb.

Sincerely,

Jamie Zaikov, IRB Member

APPENDIX B: INFORMED CONSENT AND INVITATION LETTER

Georgia State University

Informed Consent

Title: COPD KNOWLEDGE AMONG SAUDI ARABIAN RESPIRATORY THERAPIST

Principal Investigator: Lynda Goodfellow

Student Principal Investigator: Ziyad Alshahrani

Dear Respiratory Therapist:

You are invited to take part in a research study. It is up to you to decide if you would like to take part in the study. The purpose of this study is to examine knowledge, attitude, and awareness of COPD among Saudi Arabian respiratory therapists. Your role in the study will last for 20 minutes.

You will be asked to do the following: knowledge, attitude, and awareness of COPD among Saudi Arabian respiratory therapists. Participating in this study will not expose you to any more risks than you would experience in a typical day.

This study is not designed to benefit you. Overall, we hope to gain information about knowledge, attitude, and awareness of COPD among Saudi Arabian respiratory therapists.

Purpose

The purpose of the study is to examine knowledge, attitude, and awareness of COPD among Saudi Arabian respiratory therapists. You are invited to take part in this research study because you are a Saudi respiratory therapist with minimum experience of 6 months.

Procedures

If you decide to take part, you will fill out a survey with 41 questions. Confidentiality is crucial in data collection; hence the researcher will inform the participants that the data which they provide is secure, so they do not have a fear of victimization. The participants' rights are always reserved and safeguarded. Respondents to this survey will remain anonymous.

If you decide to agree to participate, you will be asked to click the link and check the agree button. After that you will be asked to fill out the questionnaire.

- A total of 41 questions will be asked.
- The questions are true/false and multiple-choice.
- Please select/ check the best option in favor of each question.
- This survey will take about 15-20 minutes to complete.

Risks

In this study, you will not have any more risks than you would in a normal day of life. No injury is expected from this study, but if you believe you have been harmed, contact the research team as soon as possible.

Benefits

This study is not designed to benefit you personally. Overall, we hope to gain information about knowledge, attitude, and awareness of COPD among Saudi Arabian respiratory therapist

Voluntary Participation and Withdrawal

You do not have to be in this study. If you decide to be in the study and change your mind, you have the right to drop out at any time. You may skip questions or stop participating at any time. The participants' rights are always reserved and safeguarded. Respondents to this survey will remain anonymous.

Contact Information

Please Contact Dr. Lynda Goodfellow at LtGoodfellow@gsu.edu or 404-413-1000 in case any of the following occur:

- If you have questions about the study or your part in it.
- If you have questions, concerns, or complaints about the study.

The IRB at Georgia State University reviews all research that involves human participants. You can contact the IRB if you would like to speak to someone who is not involved directly with the study. You can contact the IRB for questions, concerns, problems, information, input, or questions about your rights as a research participant. Contact the IRB at 404-413-3500 or irb@gsu.edu.

Consent

Your completion and submission of the survey implies that you agree to participate in this research. Please note that you may withdraw at any time by not completing or by clicking the disagree button.

Thank you in advance for your cooperation

Sincerely,

Lynda T. Goodfellow, EdD, RRT, AE-C

Ziyad Mubarak Alshahrani, BSc,RT

Please note: If you agree to participate in this research, please continue with the survey. You can print a copy of the form for your records.

- ○ I Agree

- I Disagree

APPENDIX C: PERMISSION

regarding your great work (Guideline-based COPD management in a resource-limited setting – physicians' understanding, adherence and barriers: a cross-sectional survey of internal and family medicine hospital-based physicians in Nigeria)

reached out to my advisor about obtaining your questionnaire, she gave me the green light. Additionally, I am going to mention that it is your work, and I just modify it.

Thank you in advance

Best Regards

Note: there is a website link (thepcrj.org) in the study for the full version, but it does not work.

Sincerely

Ziyad Mubarak Alshahrani

Master of Respiratory Therapy Graduate Student, Georgia State University

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desalu olufemi <femuy1967@yahoo.co.uk>
Fri 9/25/2020 2:02 PM
To: Ziyad Alshahrani

📄 COPD GUIDELINE.pdf
832 KB
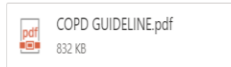
Good morning Ziyad
Thanks for writing me to use the questionnaire. You request is granted on behalf of the authors
Regards
Asso. Professor O.O. Desalu

ZA Ziyad Alshahrani
Great, thank you so much! Get Outlook for iOS   Fri 9/25/2020 2:03 PM

APPENDIX 1

Section I: Definition and overview of COPD.

Please answer the following questions:

1. COPD is a chronic inflammatory disease due to noxious particles or gases and is characterized by progressive airflow limitation that is fully reversible.

True ☐ <u>False</u> ☐

3. Smokers are the only people who may develop chronic airflow limitations.

True ☐ <u>False</u> ☐

4. COPD is a common preventable and treatable disease.

<u>True</u> ☐ False ☐

5. If optimal care is provided, lung function does not decline over time.

True ☐ <u>False</u> ☐

6. COPD is not reversible either spontaneously or with treatment.

<u>True</u> ☐ False ☐

7. COPD exacerbations are commonly caused by *Klebsiella* and *Pseudomonas* infection.

True ☐ <u>False</u> ☐

8. What is not a risk factor for COPD? (Please tick all of the boxes that apply)

☐ Passive tobacco smoke
☐ Occupational dusts, organic and inorganic
☐ Indoor air pollution from heating and cooking with biomass
☐ Outdoor air pollution
☐ Sex and age
☐ <u>Rhinitis</u>
☐ Low socio-economic status and poor nutrition or Asthma

Section 2: Diagnosis and assessment of COPD.

Please answer the following questions:

9. A clinical diagnosis of COPD should be considered in any patient who has dyspnoea, chronic cough or sputum production, and a history of exposure to risk factors for the disease.

True ☐ false ☐

10. Chronic cough or sputum expectoration is always diagnostic of COPD.

True ☐ <u>false</u> ☐

11. Spirometry is required to confirm the diagnosis of COPD.

<u>True</u> ☐ false ☐

12. Patients physical signs like hyperinflation and abnormal chest radiograph can help to confirm the diagnosis of COPD.

True ☐ <u>false</u> ☐

13. Arterial blood gas measurements are routinely required in COPD diagnosis.

True ☐ <u>false</u> ☐

14. Measurement of lung volume is recommended during an exacerbation to determine the severity of the illness.

True ☐ <u>false</u> ☐

15. Which of the following data sets is most diagnostic of COPD as a primary diagnosis? (Each FEV_1, FCV, and Post-bronchodilator FEV_1/FCV values is % predicted, respectively).

	FEV_1	FVC	Post-bronchodilator FEV_1/FCV
☐	80	85	78
☐	<u>65</u>	<u>70</u>	<u>64</u>
☐	69	67	80
☐	50	80	75

16. A 65-year old lorry driver has been coughing more frequently over the last 3 years, and this has been associated with sputum expectoration. He has a smoking history of 25 pack-years. The FE*V1/F*VC ratio was <70% and FEV1 was 55%. In which group of COPD would you classify this patient?

☐ Group A: Mild
☐ <u>Group B: Moderate</u>
☐ Group C: Severe
☐ Group D: Very severe

17. In an adult aged below 45 years, screening for one of the following is helpful in the diagnosis of COPD?

- ☐ <u>Alpha anti-trypsin deficiency</u>
- ☐ Cigarette smoking
- ☐ Carbon monoxide diffusing capacity (DLCO)
- ☐ Rheumatoid factor

Section 3: Principles of therapy of stable COPD. Please answer the following:

18. Dry powder inhalers (DPI) requires higher inspiratory flow rates than metered dose inhalers (MDI).

- ☐ <u>True</u>
- ☐ False

19. The use of a spacer (holding chamber) improves drug delivery, increases lung deposition, and may reduce local and systemic side effects.

- ☐ <u>True</u>
- ☐ false

20. In patients with COPD who smoke, smoking cessation is essential.

- ☐ <u>True</u>
- ☐ False

21. Which of the following is not a goal of COPD treatment?

- ☐ Relieve symptoms
- ☐ Prevent disease progression
- ☐ Improve exercise tolerance
- ☐ <u>Control or cure the disease</u>
- ☐ Prevent and treat complications and exacerbations

Section 4: Pharmacotherapy of stable COPD and acute exacerbation. Please answer the following questions:

22. Inhaled long-acting inhaled B2-agonists are more effective and convenient than short acting B2-agonists in stable COPD.

- ☐ <u>True</u>
- ☐ False

23. Long-acting inhaled B2-agonists should be used as monotherapy in COPD, as these medications appear to influence the airway inflammation.

- ☐ True
- ☐ <u>False</u>

24. Low-dose theophylline is weaker and less effective than a low dose of inhaled glucocorticoid in reducing the long-term decline in lung function.

☐ <u>True</u>
☐ False

25. Inhaled short-acting B2-agonist is the preferred bronchodilator of choice for acute exacerbation of COPD.

☐ <u>True</u>
☐ False

26. Antibiotics are not routinely required unless there are signs of pneumonia or purulent and increased sputum production if the patient is on a mechanical ventilator.

☐ <u>True</u>
☐ False

27. Which of the following medications is recommended for stable COPD?

☐ Mucolytics
☐ Cough syrups
☐ Antibiotics
☐ Vitamins E and C
☐ <u>None of the above</u>

28. Prolonged inhaled glucocorticosteroid are recommended for COPD patients in which grade?

☐ Group A: Mild
☐ Group B: Moderate
☐ Group C: Severe
☐ Group D: Very severe
☐ Group A: Mild and Group B: Moderate
☐ <u>Group C: Severe and Group D: Very severe</u>

Section 5: Non-pharmacotherapy of stable COPD and acute exacerbation. Please answer the following questions:

29. It is recommended to give vaccinations to all COPD patients.

☐ <u>True</u>
☐ False

30. Pulmonary rehabilitation is indicated only for patients with COPD in Group C: Severe and Group D: Very severe.

- ☐ True
- ☐ <u>False</u>

31. Pulmonary rehabilitation is a recommended treatment option in COPD.

- ☐ <u>True</u>
- ☐ False

32. Surgery is often beneficial in COPD patients.

- ☐ True
- ☐ <u>False</u>

33. 100% O2 *(7–10 l/min)* is required for hypoxia in acute exacerbations of COPD.

- ☐ True
- ☐ <u>False</u>

34. A *V*enturi mask is not more effective than a nasal prong/canula in delivering controlled oxygen in COPD.

- ☐ True
- ☐ <u>False</u>

35. Long-term O_2 therapy is indicated in COPD except for:

- ☐ SaO2 <88 or PaO2 <55 mmhg + hypercapnia
- ☐ SaO2 <88 or PaO2 <55 mmhg + pulmonary hypertension, PCV (premature ventricular contraction) > 55%
- ☐ Peripheral oedema and right ventricular failure
- ☐ <u>FEV_1= 70*%* predicted</u>

36. An optimal pulmonary rehabilitation program should include:

- ☐ Exercise only
- ☐ Education only
- ☐ <u>Exercise and education</u>
- ☐ None of the above

Section 6: Prevention of COPD and comorbidity. Please answer the following questions:

37. Avoiding or controlling the risk factors after the development of COPD is not necessary.

- ☐ True

☐ <u>False</u>

38. Tobacco cessation therapy does not have a significant role in the management of COPD once the lung is damaged.

☐ True
☐ <u>False</u>

Section 7: Barriers to adherence to guidelines. Please answer the following questions:

39. Which of the following barriers are main causes preventing you from adhering to the COPD protocols or guidelines? (Please tick all of the boxes that apply).

☐ Disagree with the recommendations of guideline
☐ Lack of awareness
☐ Lack of familiarity of its recommendations
☐ Lack of educational material/support
☐ Lack of time O Lengthy and difficult to remember
☐ Lack of equipment and resources (spirometry, cessation expert)
☐ Believe patients cannot adhere to guideline recommendations
☐ Believe guidelines will not improve the outcome of COPD
☐ Lack of motivation and poor dissemination by physician to colleagues
☐ Others: please specify_____

Section 8: Diagnosis and assessment

40. Which statement regarding guidelines/recommendations for the use of diagnosis and the assessment of COPD do you agree with most?

☐ I am not familiar with these recommendations.
☐ I intend to use these recommendations, but I am not confident about using them.
☐ I intend to use these recommendations in the next month.
☐ I have recently used these recommendations.
☐ I have been using these recommendations for the past 6 months and intend to keep using them.

41. My confidence re implementing diagnosis and assessment according to guidelines/recommendations at the moment is: (please circle the number)

1	2	3	4	5	6	7	8	9	10

| Not confident at all | | | | | | | Extremely confident |

Knowledge, Awareness, and Attitudes toward COPD; Survey

Hospital name/ City: _____

Education level: _____

Sex: Male   ☐   Female   ☐

Number of years of COPD patient-related experience: _____