# CAREGIVER KNOWLEDGE ON CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) AMONG COPD PATIENT IN OUTPATIENT CLINIC, HOSPITAL UNIVERSITI SAINS MALAYSIA

**NURUL FARHANA BINTI MAZLAN**

**SCHOOL OF HEALTH SCIENCES**
**UNIVERSITI SAINS MALAYSIA**

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**by**

**NURUL FARHANA BINTI MAZLAN**

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**TABLE OF CONTENTS**

# LIST OF TABLES

# LIST OF FIGURES

# LIST OF ABBREVIATIONS

| | |
|---|---|
| COPD | Chronic Obstructive Pulmonary Disease |
| USM | Universiti Sains Malaysia |
| WHO | World Health Organization |
| SPSS | Statistical Package for Social Sciences |

# PENGETAHUAN PENJAGA PESAKIT MENGENAI CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) PADA PESAKIT COPD DI KLINIK PESAKIT LUAR, HOSPITAL UNIVERSITI SAINS MALAYSIA

## ABSTRAK

Penglibatan penjaga pesakit dalam rawatan langsung pesakit COPD adalah penting kerana mereka membantu dengan aktiviti kehidupan seharian pesakit COPD. Untuk membolehkan pesakit memperbaiki keadaan mereka, penjaga pesakit perlu berpengetahuan dalam menghadapi pesakit dengan COPD. Objektif umum kajian ini adalah untuk mengetahui pengetahuan penjaga pesakit mengenai COPD dalam kalangan pesakit COPD di Klinik Pesakit Luar, Hospital USM. Kajian rentas dilakukan terhadap 41 penjaga yang direkrut menggunakan persampelan rawak mudah. Data demografi penjaga pesakit COPD dianalisis oleh SPSS versi 27.0 menggunakan statistik deskriptif. Ujian Mann Whitney digunakan untuk mengkaji perbezaan antara jantina dan pengetahuan penjaga mengenai COPD. Perbezaan antara tahap pendidikan dengan pengetahuan penjaga pesakit mengenai COPD diperiksa menggunakan ujian Kruskal Wallis. Ujian korelasi Spearman digunakan untuk meneroka hubungan antara usia dan tahun pengalaman dalam merawat pesakit COPD dengan pengetahuan penjaga mengenai COPD. Dapatan kajian ini menunjukkan bahawa pengetahuan penjaga pesakit mengenai COPD dikategorikan sebagai pengetahuan yang lebih baik (M: 27.22). Selain itu, tiada hubungan yang signifikan antara jantina dengan pengetahuan penjaga pesakit mengenai COPD ($p = 0.658$). Namun begitu, terdapat hubungan yang signifikan antara tahap pendidikan dengan pengetahuan penjaga pesakit mengenai COPD ($p=0.010$). Lebih-lebih lagi, terdapat korelasi negatif yang sangat lemah antara usia dan pengetahuan penjaga

pesakit mengenai COPD (r = -0.07, p = 0.647), serta korelasi positif yang sangat lemah antara pengalaman bertahun-tahun dalam merawat pesakit COPD dengan pengetahuan penjaga pesakit pada COPD (r = 0.21, p = 0.195). Kesimpulannya, penjaga pesakit COPD di Klinik Pesakit Luar, Hospital USM mempunyai pengetahuan yang lebih baik mengenai COPD.

# CAREGIVER KNOWLEDGE ON CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) AMONG COPD PATIENT IN OUTPATIENT CLINIC, HOSPITAL UNIVERSITI SAINS MALAYSIA

## ABSTRACT

The involvement of caregiver in direct care of COPD patients is important as they help to assist them with the activity of daily living. For enabling the patients to improve their condition, caregivers need to be knowledgeable in facing patients with COPD. The general objective of the study was to determine caregiver knowledge on COPD among COPD patients in outpatient clinic Hospital USM. A cross-sectional study was conducted on 41 caregivers recruited using a simple random method. Demographic data of the COPD caregivers were analyzed by SPSS version 27.0 using descriptive statistics. Mann Whitney test was used to examine differences between gender and caregiver knowledge on COPD. Differences between the level of education with caregiver knowledge on COPD were examined using the Kruskal Wallis test. Spearman correlation test was used to measure the relationship between age and years of experience in taking care of COPD patients with caregiver knowledge on COPD. The findings of this study show that caregiver knowledge on COPD categorized as better knowledge (M: 27.22). Besides, there is no significant association between gender with caregiver knowledge on COPD (p=0.658). However, there is significant difference between level of education with caregiver knowledge on COPD (p=0.010). Moreover, there is a very weak, negative correlation between age and caregiver knowledge on COPD (r = -0.07, p = 0.647), as well as a very weak, positive correlation between years of experience in taking care of COPD patients with caregiver knowledge on COPD (r = 0.21, p = 0.195). In conclusion,

caregiver of COPD patients in outpatient clinic, Hospital USM has better knowledge on COPD.

# CHAPTER 1

# INTRODUCTION

## 1.1 Background to the study

Chronic obstructive pulmonary disease (COPD) is a group of respiratory disease due to airway obstruction and alveoli destruction. It can be triggered by constant exposure to poisonous chemical substances. This group of respiratory disease mostly appeared with emphysema and chronic bronchitis. The main clinical presentation of this disease is breathlessness, which triggers other symptoms such as the formation of airway limitation, sputum formation, and coughing. Breathlessness due to breathing difficulties is present with increase breathing effort, chest heaviness and gasping. These symptoms will affect lung function, thus leading to decreased FEV1 value (Burgel, 2012).

The main risk factor that contributed to the major occurrence of COPD is due to tobacco smoke. The chemical substances that contain in tobacco will slowly damage the lungs due to constant exposure, affecting not only the smoker and the second-hand smoker but also the surrounding as its residue will attach to clothing and public property. Air pollution will also lead to COPD. Exposure to contaminated air will mostly affect individuals with existing respiratory disease at most, as it will affecting lung maturation. Besides that, biomass and coal usage will lead to COPD which mostly focuses on low-wage countries as they depended on these two in food preparation. It is stated that indoor air contamination due to the use of solid fuels contributed to about 3.8 million deaths (World Health Organization, 2018).

Exacerbation in COPD has a detrimental effect on the quality of life of patients as it will accelerate the progression of the disease. It is not treatable, but its symptoms can be treated, and its prognosis can be improved through better management. Spirometry

often used as a determination of the diagnosis, indicated by measurement of full lung expiratory volume. Treatment of this disease in terms of medication is either using only a short-acting bronchodilator or along with combination with antibiotics or oral corticosteroid (Rabe & Watz, 2017). Holding reputation as a chronic disease, most cases of COPD will require rehospitalization thus prolong the hospital treatment period in COPD patients. Constant hospitalization will eventually lead to the declination of patient's quality of life, as they mostly will depending on oxygen and medication to improve the prognosis of the disease.

This partly reversible yet preventable disease remains a greater threat to the world as it is still among the top five largest cause of death (Kaplan, 2013). Most cases of COPD occur in low and middle-wage countries, as reported 90% of dead coming from these countries, with recorded mortality of 3.17 million worldwide which still a huge number (World Health Organization, 2017). This number will only continue to increase over time if prevention and measures are not being taken into action in combating COPD.

Although it is life-threatening to senior citizen, this group of disease is mostly underdiagnosed in young adult (Lamprecht et al., 2015). However, senior citizen shows higher prevalence towards this disease. It is a matter of fact that these groups are incapable of taking care of themselves as the aging process decreased their capability to perform the activity of daily living. Some of them tend to neglect their health and daily needs, although they are aware that their health is declining. Lack of awareness among COPD patients constantly triggering acute episodes that worsen symptoms eventually restricting their daily living activities. This will reduce their quality of life hence they constantly need to be depending on others for fulfilling their needs.

Management of chronic disease not only depending on healthcare professionals but also involving self-management at home by the patient itself. Most patients will rely upon their self-management from their family and friends, but some people rely on paid caregiver with qualification. Self-management usually required both patient and caregiver to know risk factor and management of symptom, side effects and disease control (Ivziku, Clari, De Marinis, & Matarese, 2018). This helps in decreasing the amount of hospitalization, as well as the quality of life improvement and minimization of the symptom of dyspnea (Cruz, Marques, & Figueiredo, 2017).

The role of caregiver comes into play when this group of people needs help in performing their activities of daily living, including self-management of chronic disease. The caregiver can be described as people who offered unpaid care in their or their relative's home with COPD (Cruz, Marques, and Figueiredo, 2017; OECD, 2011). But, in this study, caregiver only included those who are primary family member or relatives who participate fully in care of those with COPD. Their role including providing direct care for the patient, acted as an advocate for treatment decisions, helping patients to understand more of their disease by providing information they missed, promoting adherence to treatment regimen and become their pillar of emotional and psychological being (Bryant et al., 2016).

The involvement of caregiver indirect care of the patient is important as they help to assist them with the activity of daily living. They also acted as an advocate, as they become their assistance in collaboration of care between various providers and environment as well as ensuring the security of the patient is obtained. The caregiver also helps the patient to shed light and strengthen every information provided regarding their disease especially in the knowledge of the disease, possible outcome of disease along the

choice of treatment available. This will helps them in making better decisions to perform for their treatment. The caregiver needs to ensure a systematic plan prescribed by the doctor is followed by the patient to ensure improvement in disease prognosis. Support in terms of emotion and psychosocial also necessary to be provided by the caregiver as they will improve rapport between patient and caregiver, by being compassionate and affirmative towards patient experience (Bryant et al, 2016).

For enabling the patients to improve their condition, the caregiver needs to be knowledgeable in facing patients with COPD. This ensures that the delivery of care at home can substitute hospital care thus reducing the rate of hospital admission. Lack of knowledge among caregiver in delivering self-management at home will eventually worsen patients' current state. Thus, this is the purpose of this study being conducted, as it helps in evaluating the current knowledge on COPD among caregivers, focusing on an outpatient clinic in Hospital USM.

## 1.2 Problem Statement

Healthcare keeps becoming more demanding by years, yet the allocation budget provided for care remain plateau (Coates, 2017). Thus, the hospital must provide an alternative way for delivery of care without consuming much cost. The role of caregiver become important especially for chronic patients as they contributed to help the patient with self-management at home. This is especially in COPD patient, as they have a declination of quality of life, allowing less self-care could be done by them independently. The prevalence of COPD worldwide is still high despite there is a report of declination occurs over the years (World Health Organization, 2017). It still contributed to the mortality rate each year, thus it remains a major concern for each country.

Awareness often linked with knowledge and when there is evidence that it is lacking, it shows that knowledge about it still low. In Asia, there is a lack of awareness regarding COPD among patients as in this region, COPD remains insufficiently diagnosed and treated (Lim et al., 2015; Rhee, Chau, Yunus, Matsunaga, & Perng, 2019). There is a lack of insufficient study regarding its prevalence in Malaysia. It is reported that this disease remains underdiagnosed as the detection of this disease only be made when it entering the advanced stage (Ismail & Mohamad, 2010; Loh et al., 2016). These findings proved how often COPD been neglected despite its constant occurrence, thus not much about this disease is well known.

Caregiver comprises of family member and relatives, only a few of them who preferred trained caregiver. Unlike these trained caregivers, a family caregiver or informal caregiver has lacked specialized training in patient self-management thus increasing their workload. Although most of the caregiver and patient is provided with knowledge from a healthcare professional, some of them tend to have a misconception regarding the proper care of COPD patient. They know about medication side effects, required dose, and its indication, but at times they gave medication with a dose more than prescribed only because they skipped a few times or were less aware of the medication regime. For those who unaware of this disease, a misconception occurs between asthma and COPD as they often thought that both them are the same (Wong et al., 2014).

Most caregivers along with COPD patient practiced self-management at home as recommended by health professionals and most of the time, this pre-requisite knowledge was taught to them is sufficient for them to carry out self-management. However, there are still among them with restricted knowledge of COPD. There is a study mentioning both patients and caregivers have restricted knowledge on COPD (Ivziku et al., 2018),

while findings of a study that focuses on age variable stated that elderly caregivers have lower knowledge in COPD management compared to the younger caregiver (Hsiao, Chu, Sung, Perng, & Wang, 2014). Therefore, it is necessary to investigate the efficacy of self-management to COPD patients by caregiver by identifying knowledge show evidence of lacking.

## 1.3 Research Question

i. What is the knowledge on COPD among caregivers of COPD patients in outpatient clinic Hospital USM?

ii. Is there any relationship between gender with knowledge on COPD among caregiver of COPD patient in outpatient clinic Hospital USM?

iii. Is there any relationship between level of education with knowledge on COPD among caregiver of COPD patient in outpatient clinic Hospital USM?

iv. Is there any association between age and years of experience in taking care COPD patient with knowledge on COPD among caregiver of COPD patients in outpatient clinic Hospital USM?

## 1.4 Research Objectives

### 1.4.1 General Objective

The general objective of this study is to determine caregiver knowledge on COPD among COPD patient in outpatient clinic Hospital USM.

### 1.4.2 Specific Objective

The specific objectives of this research are:

1. To identify caregiver knowledge on COPD among COPD patients in outpatient clinic Hospital USM.

2. To measure the differences between gender with caregiver knowledge on COPD among COPD patient in outpatient clinic Hospital USM.

3. To measure the differences between level of education with caregiver knowledge on COPD among COPD patient in outpatient clinic Hospital USM.

4. To measure the relationship between age and years of experience taking care COPD patient with caregiver knowledge on COPD among COPD patients in outpatient clinic Hospital USM

## 1.5 Research Hypothesis

**Hypothesis 1:**

$H_0$: There is no significant difference between gender with caregiver knowledge on COPD of COPD patient in outpatient clinic Hospital USM.

$H_1$: There is a significant difference between gender with caregiver knowledge on COPD of COPD patient in outpatient clinic Hospital USM.

**Hypothesis 2:**

$H_0$: There is no significant difference between level of education with caregiver knowledge on COPD of COPD patient in outpatient clinic Hospital USM.

$H_1$: There is a significant difference between level of education with caregiver knowledge on COPD of COPD patient in outpatient clinic Hospital USM.

**Hypothesis 3:**

$H_0$: There is no significant association between age and years of experience in taking care COPD patient with caregiver knowledge on COPD of COPD patient in outpatient clinic Hospital USM.

$H_1$: There is a significant association between age and years of experience in taking care of COPD patient with caregiver knowledge on COPD of COPD patient in outpatient clinic Hospital USM.

## 1.6 Significance of the Study

Role of caregiver in promoting better quality of care among chronic patients is undoubtedly important, however, most of caregiver consists of their family members rather hiring trained caregiver. This is because they need to be prepared with possibilities of long-term management of later phases of the disease that exhaust them physically, mentally, and emotionally.

By evaluating knowledge among caregiver, it helps in determining whether they can fulfil their role as caregiver as required by COPD patient. This is important as the possibility of this disease progressing with exacerbation is high. It also helps in determining factors that influence their knowledge in caring their receivers of care, as informal caregivers especially might be among their young children. Although they might be expert in self-managing COPD, they need to ensure their care receivers understand its rationale in terms of delivery of care with proper and enough knowledge.

For health professional, by performing this study, it allows them to identify which knowledge that shows evidence of lacking among caregiver especially. This will eventually serve as guide for them to improve their content of health education in terms of management involving medication, risk of exacerbation, and other parts of knowledge of COPD that shows low percentage of knowing. It also helps them to evaluate the effectiveness of self-management at home carried out by their caregiver in terms of adherence to treatment regimen and improvement of patient from time to time.

## 1.7 Conceptual and Operational Definition

**Knowledge**

In terms of operational definition, this study it is referring to understanding COPD, specifically Epidemiology, etiology, symptoms, breathlessness, phlegm, chest infections, exercise, smoking, vaccination, bronchodilators, antibiotics, oral steroids, and inhaled steroids.

**COPD**

In terms of operational definition, it is referring to performing a study regarding knowledge of this disease.

**Caregiver**

In terms of operational definition, it is referring to the primary family members or relative who is taking care patient with COPD.

**Outpatient**

In terms of operational definition, it is referring to the patient that attending treatment without staying in the hospital as appointed by the doctor.

**Caregiver knowledge on COPD among COPD patients**

Caregiver knowledge on COPD among COPD patient refers to understanding towards COPD, specifically on its disease definition, risk factor, symptoms, management, and medication along with its influences that contribute to the knowledge of caregiver focusing on participants who taken care their family member or relatives with COPD who attending the doctor appointment for daily treatment. Instrumentation that being used is for this study is Bristol COPD Knowledge Questionnaire (BCKQ), adapted from (White, Walker, Roberts, Kalisky, & White, 2006). It is a dichotomous question of 65 questions from 13 topics. with ‘True’, ‘False’ and ‘Don’t Know’ as choice of answer.

# CHAPTER 2

# REVIEW OF LITERATURE

## 2.1 Introduction

This chapter delivers a review of literature related to knowledge of chronic obstructive pulmonary disease (COPD) among caregiver of COPD patient in outpatient clinic Hospital USM. The resulting literature review is organized into six sections covering topics that are most relevant in meeting its objectives. This will helps in answering the research question as well as the relatable argument of its hypotheses. This chapter will cover the theory of COPD, theory on knowledge then will provide more detail regarding knowledge on COPD among caregivers. Measurement that being used in past studies along with related factors that influence its knowledge will also be covered. The final section will cover the theoretical and conceptual framework of the study, which based on the Open System Model.

## 2.2 Theory on Knowledge

Accurate belief or understanding of a matter that based on fact is simply referring to knowledge. Knowledge is important for every single person to help them gain a better view on the matter they need to know ensuring better implementation and application to their daily life. Better development in the medical science and technology field help in raising public consciousness and enhancing economic status, at the same time raising the perception of the public on health services. Although this fact is well known, the quality of services is still weak and unfavorable no matter how big the amount of spending budget was allocated by the government on healthcare every year (Grimshaw, Eccles, Lavis, Hill, & Squires, 2012).

The knowledge that is evidence-based and associated with patient diagnosis helps in delivering effective health services as well as enhancing quality of life (Eid AbuRuz, Abu Hayeah, Al Dweik, & Yousef Al Akash, 2017). Implementation of evidence-based knowledge not only applicable to health professional while delivering health intervention on the patient, but also to patient and caregiver to help them performing self-management after experiencing hospitalization. By delivering health-related knowledge to patients, they will able to understand better thus more concerning about their health and provide better awareness (Marcus, 2014).

Health professionals provide patient and their caregiver knowledge regarding their health status as well as encouraging them to participate in treatment decision-making and intervention of disease can be improved inthe patient through health education (Fereidouni et al., 2019). The purpose of health education is it helps in providing sufficient and appropriate clinical knowledge related to their diagnosis, so they more alert with their problem hence triggering their health-promoting behavior (Seyedin, Goharinezhad, Vatankhah, & Azmal, 2015).

## 2.3 Theory on COPD

COPD is part of obstructive pulmonary disease along with asthma, bronchiectasis, and cystic fibrosis. Although all of these diseases have a clinical presentation that resembles each other, the characteristics of inflammation in COPD are different than others. In theory, characteristics of this disease comprise airway obstruction along with the destruction of lung parenchyma. When the airway was obstructed, it will cause narrowing of the blood vessel, causing inflammation of the lung that affected the value of FEV1 along with FEV1/FVC. Destruction of lung parenchyma will be affecting alveoli, contributing to airway limitation thus decreasing the rate of gas exchange (Global Initiative for Chronic Obstructive Pulmonary Disease, 2020).

Chronic bronchitis and emphysema were widely used in explaining the term COPD as it is a group of respiratory diseases with either these two or a combination of them. However, the latest study shows that the definition of COPD is oversimplified since this disease has more complexity in terms of pathophysiology (Rabe & Watz, 2017). This also discussed in newest GOLD report, as it is stated that when these two acts as stand-alone definition from each other, it is not fully describing the actual burden of this disease (Global Initiative for Chronic Obstructive Pulmonary Disease, 2020).

The main risk factor associated with COPD is tobacco smoke. In terms of prevalence, it is stated by WHO that the number of smokers is declining globally, in Malaysia, the number of smokers going unchanged for more than a decade (Ministry of Health Malaysia, 2019). The government of Malaysia already initiated a plan in combating tobacco like National Strategic Plan on Tobacco Control 2015-2020, but still 39.9% of adult smokers still at risk of contributing to respiratory disease especially COPD (American Cancer Society, 2019).

Besides tobacco smoke, exposure to outdoor air pollution along with biomass also included as risk factors of COPD. Most of the pathophysiology of COPD often linked with its main factor that is tobacco smoke, while other risk factors such as biomass might give a different perspective on the physiological process of the disease (Rabe & Watz, 2017). Among smokers, the knowledge of tobacco as a cause of COPD is low, with Suthar et. al. only emphasizing lack of knowledge on senior citizens (Mun et al., 2015; Suthar, Patel, & Shah, 2015). They are also a public study that suggests the presence of low knowledge of tobacco connecting to COPD (Soriano et al., 2012).

Exposure to outdoor air contamination even in a short time also increase the risk for exacerbation of COPD, leading to impairment of lung function. Some studies

supported the evidence of outdoor air pollution contributing to COPD, although the actual reason remains unknown (Li et al., 2016). There is no study found discussing knowledge of community on outdoor air contamination relating to COPD, however, as for biomass, there is evidence showing insufficient knowledge it is linked to COPD among participants (KalagoudaMahishale et al., 2016).

COPD is among respiratory disease that often being underdiagnosed worldwide. People more tend to die of COPD itself rather than other cardiovascular diseases and cancer in the United States (Martinez, 2016). Even when this disease is viewed into smaller scope like in Asia and specifically in Malaysia, there are shreds of evidence that justify that prevalence is high (Lim et al., 2015). However, despite its high occurrence, underdiagnosis is still occurring among patients in worldwide and Asia (Diab et al., 2018; Ho, Cusack, Chaudhary, & Satia, 2019; Lamprecht et al., 2015; Lim et al., 2015).

Usage of spirometry in disease detection becoming the main indicator of diagnosis of COPD on the patient, which helps to indicate the effectiveness of lung function in conducting gas exchange throughout the respiration process. It is stated that underdiagnosis of COPD contributed due to spirometry, linking to its lack of proper practice and improper estimation of the result leading to late detection to more advanced stage of COPD (Diab et al., 2018; Ho et al., 2019; Lim et al., 2015).

## 2.4 Caregiver Knowledge on COPD

### 2.4.1 Review of Caregiver Knowledge on COPD

In the previous study, most of the studies evaluate COPD knowledge among patients and the population. Only a few of the studies discussing the relationship between COPD knowledge among caregiver of COPD patient itself. Besides identifying knowledge among patients, evaluation of knowledge among caregiver need to be put into

attention as the most patient that experiencing COPD were mostly older adult and loss their tendency of taking care of themselves. Thus, the role of the caregiver in delivering self-management to the patient is a huge responsibility in improving the health status of the patient.

Ivziku et al. (2018) carried out a comparative study between patient and caregiver in a university hospital in Italy regarding knowledge of COPD. It was indicated that the caregiver possessed higher COPD knowledge compared to the patient itself. In this study, most of the patient has the most knowledge on a topic related to clinical manifestation, tobacco, phlegm and exercise, with least knowledge on medication topics and chest infection. It was also found out in the study that there is no similarity of knowledge possessed by patients and caregiver thus suggested for more detailed study needed on it.

Another comparative study that was conducted in Taiwan, China by Hsiao et al. (2014) evaluating caregiver knowledge based on age. The findings suggested that younger caregivers have better knowledge of COPD compared to older caregiver, linking these elders with poor memory related to the aging factor. It is assumed that younger caregiver has better access to various sources of knowledge regarding COPD. The study contributed to a new hypothesis that older caregiver has lower knowledge on medication compared to the younger caregiver.

Wang et al. performed a study on the influence of family caregivers on self-care attitude with including evaluation of knowledge of patient and caregiver after receiving health education. The findings of this study are consistent to the later study by Ivziku et al., that caregiver also possessed greater knowledge of COPD as compared to patient (Wang, Sung, Yang, Chiang, & Perng, 2012). As the study evaluating self-care attitude, there is an inverse correlation between self-care attitude with a questionnaire on knowledge's score, referring to Bristol COPD Knowledge Questionnaire (BCKQ).

### 2.4.2 Measurement Review

Development of questionnaire regarding knowledge of COPD was performed by various researcher, such as Chronic Obstructive Pulmonary Disease knowledge Questionnaire or COPD-Q (Maples, Franks, Ray, Stevens, & Wallace, 2010), Lung Information Needs Questionnaires or LINQ (Hyland, Jones, & Hanney, 2006) and Bristol Knowledge COPD Questionnaires or BCKQ (White et al., 2006). From all of these questionnaires, BCKQ stands out among most studies as it widely used in evaluating knowledge among caregiver (Hsiao et al., 2014; Ivziku et al., 2018; Wang et al., 2012) as well as patients (Choi, Chung, & Han, 2014; Hsiao et al., 2014; Li-Cher & Choo-Khoon, 2016; Loh & Ong, 2017; Wang et al., 2012; Wong & Yu, 2016).

BCKQ comprises dichotomous question on evaluating specific knowledge on COPD. It comprises 13 topics including epidemiology, etiology, symptoms, breathlessness, phlegm, infections, smoking, vaccination, inhaled bronchodilators, antibiotics, oral steroid, and an inhaled steroid. Besides a dichotomous question, it responded to 'don't know' indicated a knowledge gap in which specific health education should be administered. It was suggested that this questionnaire better used in a cross-sectional study, clinical audit also for health education of COPD in terms of effectiveness and various teaching methods (White et al., 2006).

During the development of this instrument, it has an internal consistency of 0.73, with a revised from Lee et al. (2014) to 0.82, measured by using Cronbach's alpha. Compared to the other two questionnaires, LINQ has an internal consistency of 0.62 while COPD-Q recorded as 0.72 during its development. Besides its difference in its consistency, the scale of the question also shows its effectiveness in evaluating the knowledge of COPD. LINQ instrument is more linked to the efficacy of healthcare to the patient which focusing on information of COPD while BCKQ, on the other hand, focused

on the pathology of COPD (Hyland et al., 2006). As for COPD-Q, the recommendation for using this questionnaire is for assessing patient with weak health literacy (Maples et al., 2010), thus it is less suitable to be used in this study as the most caregiver have at least some knowledge regarding COPD to be applied on their older adult with this disease.

There are limited studies on evaluation knowledge among caregiver of COPD and every research that assess caregiver's knowledge, all of them are using the BCKQ instrument. However, for Hsiao et al. (2014), the modification was made of the BCKQ instrument, namely the COPD-related knowledge scale (CRKS). It was done by suggestion after review of their experts, adding topic on nutrition and removing 8 topics from the original questionnaire, including epidemiology, sputum, an inhaled bronchodilator, inhaled steroid, antibiotic therapy, exercise, smoking termination, and vaccines. It was found that the Cronbach alpha of this instrument is better which is 0.76, indicating good internal consistency.

### 2.4.3 Review on Related Factors that Influence Knowledge of COPD

De Queiroz et al. (2014) investigating the relation of gender, age, smoking status, and level of education into the evaluation of knowledge among consumers of health care facilities. Its result shows dissimilarity when compared across gender and age, but found with providing health education, knowledge can be increased among the population. Besides that, the status of smoking and level of education also did not shows any difference in knowledge regarding COPD.

Predictor of age in one study specifically mentioning the influence of caregiver knowledge across age factor. The findings were expected, as positive correlation was found across age. It is found that older caregivers possessed low knowledge on medication-related topics compared to young caregiver. Older caregivers tend to score lower in epidemiology, smoking, vaccination, bronchodilators, antibiotics, and inhaled

steroid. Other than age factors, it is also found that caregiver knowledge score also influenced by gender, marital status, level of education, socioeconomic status, level of responsibility among family and caregiver-patient relationship (Hsiao et al., 2014).

In comparison study between patient and caregiver by Ivziku et al. (2018), factors that were investigated in its relation to knowledge level are on demographic data such as gender, age, number of people in residency and level of education, as well as disease characteristics on length of disease by year, the severity of the disease, disease consequences on health status, number of hospitalization and exacerbations by year. From all the factors that were studied, it was found among caregiver that only age factor, level of education, and years of disease influence their knowledge on COPD, as the results of the study were influenced by these three factors. There is no significant difference in terms of length of disease and its disease severity. Knowledge of COPD also affected the duration of hospitalization, as the knowledge that was given depending on the priority of treatment.

## 2.5 Conceptual / Theoretical Framework

The conceptual framework used in this study was adapted from Open System Model, (Jennet, 1999). It was developed based on Ludwing von Bertalanffy's General System Model.

The open system involved various interaction through constant feedback interchange with the external environment. Its concept was formalized within a structure that allowed the theory of the organism, thermodynamics, and evolutionary theory to be correlated, expanded upon the emergence of information theory and system theory. In the modern world, it is now being applied to natural and social sciences (Luhmann, 1995). The outcome of this framework is described in terms of knowledge, behavior as well as attitudes, values, and conditions (McNamara, 2006).

The researcher applied this biological framework to determine knowledge on COPD among caregivers. This was achieved by the interaction between the researcher and the caregiver of a patient who has COPD.

The key concepts of Kenny's open system model are input, throughput, and output. In this framework, the definition of input refers to details on matter, energy and data which enter the system through its barriers. Throughout refers to processing where energy-matter and information act as the system transforms are and output refers to matter, energy, and data that are processed. After processing input, the matter, energy, information returns to the environment in an altered state through this system (Sahoo, 2013).

In the context of this study, input referring to factors that influence knowledge among caregiver of COPD patient. Throughput refers to the collection of data using a close-ended questionnaire used in performing this study on sociodemographic data and knowledge of COPD among caregiver of COPD patient. Output is the analysis performed from data collection for evaluation of knowledge either poorer or better knowledge.

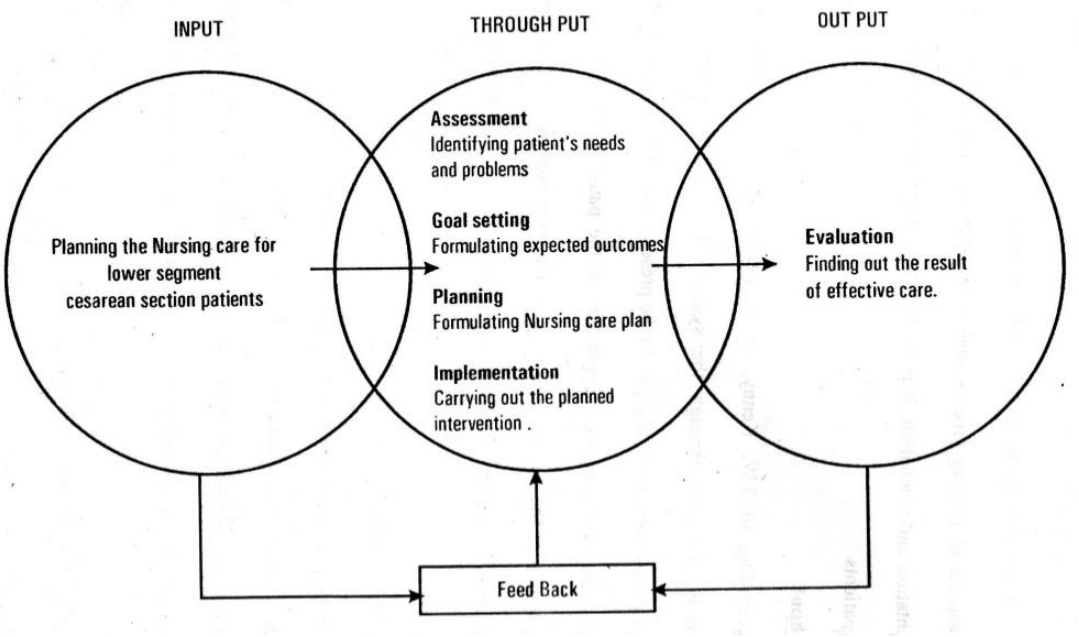


***Figure 2.1*** *J.W. Kenny's Open System Model (1999)*

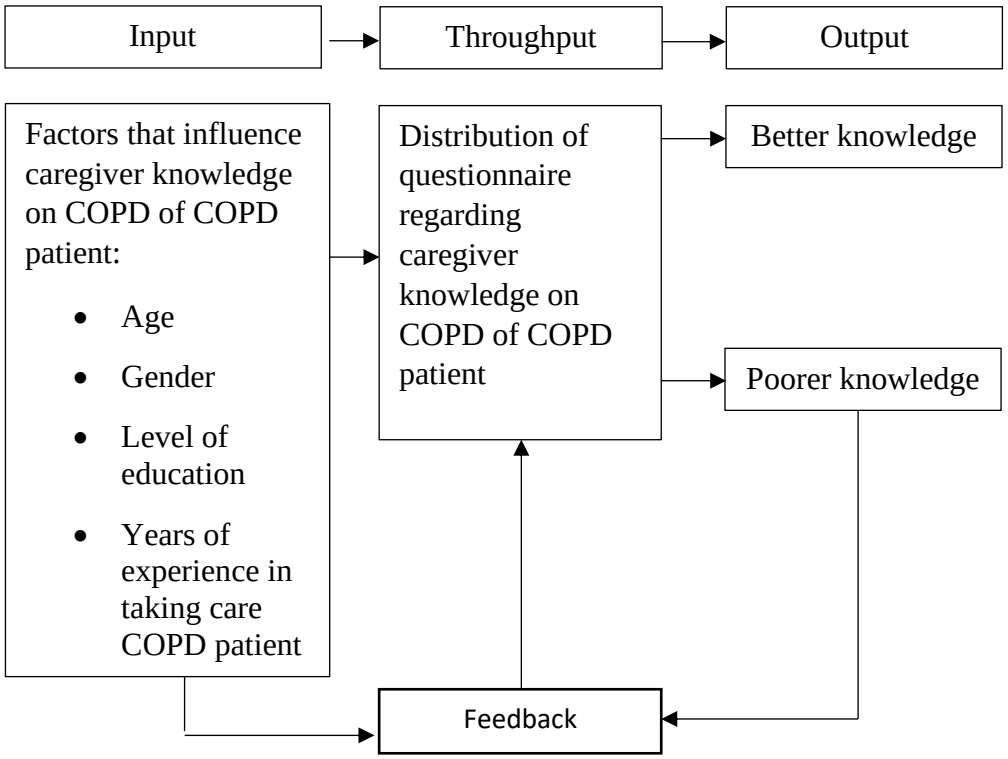


***Figure 2.2*** *Caregiver Knowledge on COPD of COPD Patient in Outpatient Clinic Hospital USM adapted from J.W. Kenny's Open System Model 1999*

# CHAPTER 3

# METHODOLOGY

## 3.1 Introduction

This chapter explains the approach and rationale in providing support for the chosen research methodology. Determining and understanding a suitable research design is crucial for achieving the aims of the study. This chapter begins with a description of a cross-sectional study and justification for using this approach. This is followed by a description of the study location, duration, population, criteria of the participant, sampling plan, instrumentation of study, variable, right through to data collection plan, and data analysis along with its expected outcome. The final section of this chapter explains the ethical consideration of the study.

## 3.2 Research Design

The study is quantitative and descriptive. It was conducted through a cross-sectional survey. This approach will be considered to give a detailed description of knowledge on chronic obstructive pulmonary disease (COPD) and its factor that influenced knowledge on COPD among caregiver of COPD patient in the outpatient clinic in Hospital Universiti Sains Malaysia (USM).

## 3.3 Study setting and population

Hospital USM offers a variety of specialties, with 10 departments, 15 outpatient clinics, 9 daily care centers, and 39 wards. The outpatient clinic that being offered in this hospital including Psychiatric Clinic, Orthopaedic Clinic, Surgery Clinic, Otorhinolaryngology Clinic, Ophthalmology Clinic, Obstetrics and Gynaecology Clinic, Family Treatment Clinic, Paediatric Clinic, Medical Specialist Clinic, Nuclear, Oncology and Radiotherapy Clinic, Resident USM Clinic, Audiology Clinic, Dental Services

Clinic, Dietetic Clinic and USAINS Executive Clinic. This study will take place at Medical Specialist Clinic or Klinik Pakar Kesihatan (KPP) of Hospital USM, Kubang Kerian, Kelantan, Malaysia.

This study was conducted between October 2020 until July 2021. Data collection was taken between January until March 2021.

The study was conducted among caregiver of COPD patient who attending the outpatient clinic of Medical Specialist Clinic in Hospital USM, Health Campus, Kubang Kerian, Kelantan, Malaysia. Medical Specialist Clinic of Hospital USM operated from Monday to Friday, from 8.30 am to 5 pm. The sample size was obtained from Medical Record Unit Hospital USM for 3 months, between September to November 2020, which is 93.

## 3.4 Sampling Plan

The criteria subject of the study need to follow the inclusion criteria and exclusion criteria that are being set.

### 3.4.1 Inclusion Criteria

The specific inclusion criteria of this study that each participant must have are:

1. An adult female or male, a primary family member or relatives of COPD patient.
2. Family member or relatives that provides some physically and socially care need to COPD patient more than 24 hours
3. A primary family member or relative who is mentally and physically competent to participate in the study,
4. Able to speak, read and understand Malay language.

### 3.4.2 Exclusion Criteria

An individual was excluded to participate in this study if they are having these criteria:

1. A paid person such as private nurse attending need of older adult with COPD.
2. The person who only attending need for COPD patient temporarily.

### 3.4.3 Sample Size Estimation

From first objective to the fourth objective, the calculation of population sample size was estimated by using simple proportion formula.

Single proportion formula:

$$n = \left(\frac{z}{\Delta}\right)^2 p\,(1 - p)$$

n, required sample size

z, value to estimate the 95% CI = 1.96

p, anticipated population proportion

Δ, desired level of precision = 95% confidence level (0.05)

For first objective, caregiver knowledge on COPD of COPD patient in outpatient clinic Hospital USM), single proportion formula was used to calculate, with p-value used is 0.59 (Ivziku et al., 2018) as below:

$$n = \left(\frac{1.96}{0.05}\right)^2 0.59\,(1 - 0.59)$$

$$= 371.7 \approx 371$$

For second objective, the differences between gender with caregiver knowledge on COPD among COPD patient in outpatient clinic Hospital USM is measured using

single proportion formula, with p-value is obtained from Hsiao et.al. (2014), which is 0.078 as below:

$$n = \left(\frac{1.96}{0.05}\right)^2 0.078\,(1 - 0.078\,)$$

$$= 110.51 \approx 111$$

For third objective, the differences between level of education with caregiver knowledge on COPD among COPD patients in outpatient clinic Hospital USM is measured using single proportion formula, with a p-value is obtained from Ivziku et. al (2018) with a p-value of 0.18. Calculation as below:

$$n = \left(\frac{1.96}{0.05}\right)^2 0.18(1 - 0.18)$$

$$= 226.80 \approx 227$$

For fourth objective, the association between age and years of experience in taking care COPD patient with caregiver knowledge on COPD of COPD patient in outpatient clinic Hospital USM was measured using single proportion formula, with 0.048 serves as proportion for age (Wang et al., 2012). Calculation as below:

$$n = \left(\frac{1.96}{0.05}\right)^2 0.048(1 - 0.048)$$

$$= 70.218 \approx 70$$

Total population: 70 participants

Drop out of 10%:

= 10% drop out x number of sample size (n)

= (10 x 70) ÷100

= 7

Sample size estimation after dropout 10%:

= 70 + 7

= 77 participants

The total population available is 93, taken from Medical Record Unit at Hospital Universiti Sains Malaysia. Since only objective 4 fulfilling the criteria of number of the population available, thus 77 participants were used for this study after 10% drop out were counted.

### 3.4.4 Sampling Method

The sampling method that was used in obtaining participants for this study is by using purposive sampling. This sampling method was done by obtaining data from Klinik Pakar Perubatan's (KPP) database on weekly appointment, and using list name of patients who will be attending the clinic, specifically chest clinic of KPP since COPD patients will have their appointment there. The sampling was aimed at caregivers of COPD patients who usually attending the clinic together with the patients, who fulfilled the inclusion criteria.

## 3.5 Instrumentation

### 3.5.1 Instrument

The questionnaire that was used in this study is a self-administered questionnaire. Bristol COPD Knowledge Questionnaire is adapted from White et. al. (2006). It consists of two parts, part A consists of socio-demographic data, and part B consists of knowledge of COPD.

**Part A: Socio-demographic data**