
# KNOWLEDGE, ATTITUDE AND PRACTICE REGARDING OXYGEN THERAPY AMONG HEALTHCARE PROFESIONALS AT EMERGENCY DEPARTMENT IN TERTIARY GOVERNMENT HOSPITAL IN KELANTAN

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# LIST OF ABBREVIATIONS

| | |
|---|---|
| OT | Oxygen therapy |
| HRPZ | Hospital Raja Perempuan Zainab |
| HTM | Hospital Tanah Merah |
| HSIP | Hospital Sultan Ismail Petra |
| CME | Continuous medical education |
| CNE | Continuous nursing education |
| HCP | Healthcare profession |
| NMRR | National medical research register |

LIST OF TABLES

## ABSTRAK

**Objektif:** Kajian ini adalah untuk mengetahui tahap pengetahuan, sikap and amalan kerja berkaitan rawatan oksigen dikalangan kakitangan di jabatan kecemasan. **Kaedah:** Kajian ini adalah keratan rentas dikalangan kakitangan perubatan kecemasan di tiga hospital kerajaan di negeri Kelantan, Malaysia. Kertas soalan yang disahkan diedar kepada peserta semasa sesi CME/CNE. Kertas soalan mengandungi 38 soalan. Data kemudiannya dianalysis mengunakan aplikasi SPSS**. Keputusan**: Secara keseluruhannya, rata-rata peserta mempunyai tahap pengetahuan yang rendah berkaitan terapi oksigen. Manakala, doctor dan jururawat terlatih mempunyai sikap yang betul. Hanya doctor mempunyai amalan yang betul berkaitan terapi oksigen. Petugas kesihatan yang bertugas di HTM menpunyai 5.66 kadar kebarangkalian untuk mempunyai pengetahuan yang bagus berbanding HRPZ (95% CI 2.35, 13.65; P < 0.001). Selain itu, doctor mempunyai 4.18 kadar kebarangkalian untuk mempunyai pengetahuan yang bagus berbanding jururawat (95% CI 1.41, 12.43; P=0.010). **Kesimpulan**: Kebanyakan petugas kesihatan mempunyai tahap pengetahuan yang rendah. Tempat bertugas membawa kepada perubahan yang elok. Kadar pengetahuan, amalan and sikap petugas kesihatan mengenai terapi oksigen dapat ditambahbaik dengan adanya garis panduan



**Katakunci**: oksigen, terapi, jabatan kecemasan, petugas kesihatan

ABSTRACT

**Objective**: This study is aimed to assess the level of knowledge, attitude, and practice regarding oxygen therapy among healthcare workers in the emergency department. **Design**: A cross-sectional survey was conducted among healthcare workers in the emergency department at three tertiary government hospitals in Kelantan, Malaysia. **Material and Method**: A printed and validated questionnaire was distributed to participants during continuous medical education. It consists of 38 questions. Data were then analysed using SPSS using multiple regression analysis. **Results**: Overall, all professions showed poor oxygen therapy knowledge, whereas doctors and nurses demonstrated good practice. Doctors showed a positive attitude toward oxygen therapy. An emergency healthcare worker in HTM has 5.66 times odds of having good knowledge than HRPZ (95% CI 2.35, 13.65; $P < 0.001$).

On the other hand, doctor has 4.18 times the odds of having good knowledge as compared to nurse (95% CI 1.41, 12.43; P=0.010). **Conclusions**: Most HCP showed poor knowledge, with some having a positive attitude and practice. The hospital they are working in makes a difference. The guideline will further help improve HCP knowledge on oxygen therapy.

**Keywords**: oxygen, therapy, emergency department, healthcare worker

# 1. INTRODUCTION

Oxygen is a part of the air human breathe and it consists of 21 percent of overall gas. It is vital for our respiration—oxygen is inhaled in and exhaled as carbon dioxide. Oxygen is bound to hemoglobin and carried in our blood circulation. It is a vital component in producing energy in our human cells. Oxygen therapy has been used as part of therapeutic measurement in the medical field. Oxygen therapy is used to supplement a patient who has difficulties breathing.

Oxygen therapy is defined as the inhalation of oxygen aimed at restoring toward normal any pathophysiologic alterations of gas exchange in the cardiopulmonary system by the use of a respirator, nasal catheter, tent, chamber, or mask (1). Oxygen can be delivered via a few methods, namely nasal prong, simple face mask, venturi mask, and non-rebreathing mask. Appropriate device and flow should be chosen to give therapeutic effect to patients.

There are ways of detecting one's oxygen saturation level, namely by arterial blood gas and pulse oximetry. Pulse oximeter is a clip-like device placed on the fingertip that works by transillumination and detects the percentage of hemoglobin bound with oxygen. In contrast, a more accurate method, arterial blood gas, detects arterial oxygenation. However, taking arterial blood gas can be painful and unpleasant for the patient

A most common cause for patients requiring oxygen therapy is a pathology of the heart, lung or kidney disease, such as lung infection, heart failure, and kidney failure with inability to excrete excess fluid from the body. Providing the patient with oxygen therapy will increase oxygen saturation in the body and ease the symptoms

Oxygen has been one of the most widely prescribed treatments for a patient in emergency care. It has been prescribed so frequently that some even forget that oxygen therapy is to be treated the same way how a medication is given to a patient.

There is also inconsistency in providing oxygen therapy due to lack of knowledge, health care worker beliefs or even patient expectations. General assumption is these inconsistency can be improved with education and proper guideline.

## 1.1 JUSTIFICATION OF STUDY

The reason for conducting this research is to evaluate the knowledge, attitude, and practice of health care workers in the emergency department in prescribing and providing oxygen to patients. Ideally, oxygen should be given to patients who need it, proper justification. In contrast, much research has been published in other countries on this subject matter, but no data is available for Malaysia.

## 1.2 PROBLEM STATEMENT AND STUDY RATIONALE

Oxygen is freely and widely used in hospitals, especially in the emergency department. Even though oxygen has been used as part of medical therapy for centuries, errors and mistakes still occur in oxygen therapy. Health staff in the emergency department still appears to be confused with oxygen therapy indication and contraindication. Many foreign countries have made local guidelines to enhance knowledge of oxygen therapy. However, many studies have shown that emergency staff have insufficient knowledge and are incompetent in prescribing oxygen, but no research has been done in Malaysia.

Multiple research has shown that healthcare workers have poor knowledge, negative attitude, and poor practice regarding oxygen therapy. This research's outcome can be used to develop local oxygen guidelines further. A previous study has pointed out that poor outcome is because of no proper teaching or policy to refer to when in doubt. Current practice by healthcare workers is to ask seniors whenever in doubt, which can be worry-some as seniors tend to share what they know; which could be wrong. Besides, there is no Malaysian data regarding oxygen therapy. By doing this study, we will gauge the current level of understanding of oxygen therapy among healthcare workers.

Thus, we are interested in assessing the knowledge, attitude, and practice of oxygen therapy among healthcare workers of emergency department in the tertiary government hospital in Kelantan.

The outcome of this study can be further used to know our staff's level of understanding of oxygen therapy. It can be used to arrange proper courses and encourage staff to practise the

correct way of oxygen administration. Besides, it can help in creating our local guidelines on oxygen therapy. If it has proven beneficial, it is then can be shared nationwide. With that, we can create emergency professionals who are competent in oxygen usage.

## 1.3 RESEARCH QUESTIONS

(a) What is the prevalence of good knowledge of oxygen therapy among the healthcare workers in the emergency department in Kelantan

(b) What is the prevalence of positive attitude among emergency healthcare workers on oxygen administration to the patients in the emergency department?

(c) What is the prevalence of good practice in oxygen administration among the emergency healthcare workers in the emergency department?

(d) What factors are associated with good knowledge, positive attitude and good practice of oxygen therapy among the emergency healthcare workers?

**NULL HYPOTHESIS**

There are no significant associated factors with good knowledge, attitude and practice of oxygen therapy.

## 1.4 OBJECTIVES

### 1.4.1 General Objective

- To determine the knowledge, attitude and practice of oxygen therapy among the emergency healthcare workers in the emergency department in general hospital in Kelantan and their associated factors

### 1.4.2 Specific Objectives

- To determine the prevalence of knowledge, attitude and practice on oxygen therapy among emergency healthcare workers in Kelantan
- To determine factors associated with good knowledge, positive attitude and good practice in oxygen therapy among emergency healthcare workers in Kelantan

## 1.5 LITERATURE REVIEW

In providing oxygen therapy to a patient, healthcare workers must have a positive attitude, know the indication for oxygen, and practice as per guidelines.
Generally, everyone assumes healthcare personnel knows what they are doing, including prescribing oxygen. However, a recent study by Ganesha et al. proved that doctors often fail to prescribe oxygen correctly and are left unsupervised (2)

Emergency department paramedics are usually well-versed in cardiopulmonary resuscitation and oxygenation. It was shown that almost 15% of healthcare workers could not identify and operate beg-valve-mask ventilation. Many of them were not sure of the oxygen flow used in resuscitation.(2)

Kelly et al had explained that despite a deeper understanding of oxygen in the medical field, there is still conflicting advice about oxygen therapy (3). Healthcare professionals believe that oxygen alleviates breathlessness. Oxygen is often miss-used by palliative care physicians who prescribe oxygen for their palliative patients. There are still wide discrepancies and uncertainty in the oxygen prescribing attitude by a physician. It is believed that it could be due to a failure to understand basic physiology. On the other hand, a group of nurses prescribes oxygen, hoping that it gives psychological relief to the patients.

Most public doesn't believe that oxygen is a medication and is unaware that it leads to serious side effects and complications. A study by Ronan et al. concluded that the general public and some clinicians are not aware of the dangers and complications brought by the usage of oxygen. The same Audit shows that a higher concentration of oxygen is still been given to COPD patients, which can lead to hypercapnia and further complicate to cardiorespiratory arrest (4).

There is a gap between our professional's knowledge, attitude and practice. Knowledge can be taught however; it takes one's ability to improve attitude and practice. Aloushan et al noted moderate to poor knowledge and attitude among paramedics in Riyadh when it comes to providing oxygen therapy to patients. A few reasons were identified, namely high workload and lack of local guidelines. Absent of proper national guidelines creates the opportunity for them to learn wrong information and no reliable source to identify. This is proven when 11% of respondents did not know that oxygen is indicated for carbon monoxide poisoning(5)

While many hospitals trying to advocate the usage of prescriptions for oxygen, there is a vast number of healthcare professionals who think that oxygen is not a medication, thus not requiring a prescription. This is proven when 41% of head nurses in Greece see oxygen therapy as mere gas that helps improve a patient's breathing without the need for a medical prescription(6). The author also strongly recommends a protocol for oxygen therapy to educate healthcare workers and to reduce errors.

In interview-based research by G.M Eastwood et al, it was noted that nurses at times upgrade or downgrade oxygen based on many factors; one of them being patient's compliance and comfort(7)**.** Device comfort has a direct impact on compliance. While treating physicians prescribe oxygen based on patients' needs, patients prefer oxygen devices that won't hinder their vision, and the ability to talk or eat freely.

Often, a patient's saturation level is decided based on using pulse oximetry. Most HCPs are familiar with pulse oximetry. However, a clinical audit revealed that most trained nurses and medical staffs are not aware of pulse oximeter's limitations, mainly on clinical conditions that give rise to false readings such as hypotension, hypovolemia and hypothermia(8). This turns out to be shocking as any device used on the patient without knowing the limitation can give rise to wrong treatment, in this case, the wrong indication of oxygen prescription.

Considine et all have conducted a study on oxygen administration attitude by nurses following an educational program. It showed post-education program, nurses' decision on initiating oxygen has changed, however, author was unsure if the improvement will be translated into an improvement in actual clinical practice(9).

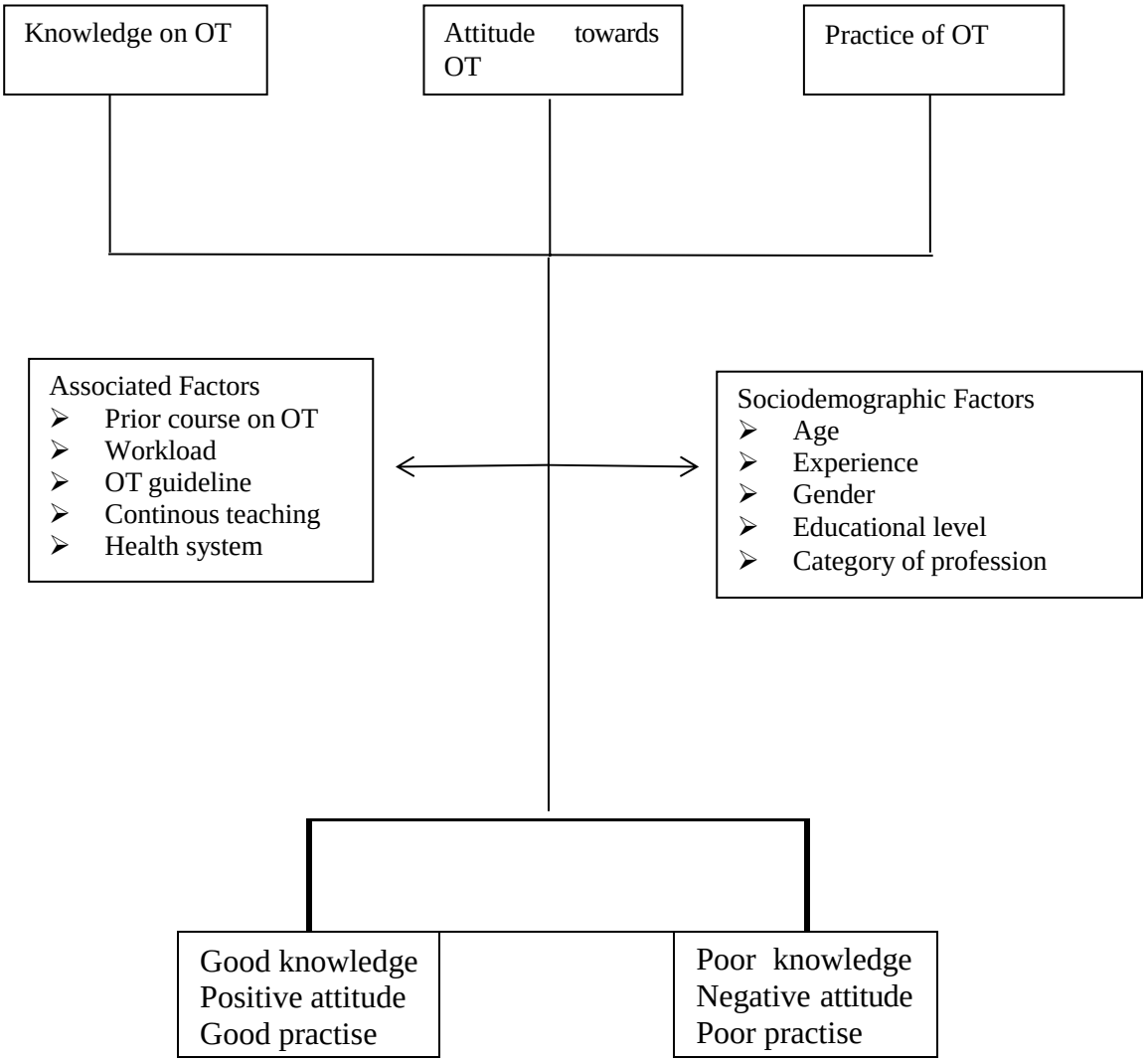
Many factors involved in knowing if a patient received adequate oxygen therapy, such as the correct mask, the right flow, correct fitting, and is worn properly. Health care personnel's responsibility is not only in prescribing the correct device and flow, but also to make sure it is worn correctly by the patient. Failure of the adequate fitting device is concerning as it can lead to poor compliance or non-beneficial and leads to complications of hypoxemia(10).

Besides, some health care workers prescribe oxygen, with the mentality of "more is better". This has been proven to lead to devastating outcomes for patients. This is closely followed by the culture where oxygen is given to an ill looking patients and relative's expectation of the patient being given oxygen simply because of septic looking(11).

A proper oxygen prescription should consist of the preferred device, flow, duration of oxygen and accepted oxygen saturation. However, an observational study in a single institution in Saudi Arabia noted that 70% do not have complete detail in documentation, and only 30% stated the expected saturation level. Hajed et al suggested an oxygen prescription slip as a way to reduce oxygen therapy error(12).

## CONCEPTUAL FRAMEWORK

This conceptual framework shows the possible factors associated with the daily practice of oxygen therapy among emergency healthcare workers in the emergency departments in tertiary hospitals in Kelantan. The factors are knowledge of oxygen therapy, the attitude toward oxygen therapy, sociodemographic factors (age, gender, race, category of profession, years of working in emergency) and associated factors (prior training on OT, adequate supply of oxygen, the average number of patients seen in a day, availability of oxygen guideline, workload effects, stress, health system and work-related factors). The explored independent variables have different effect on knowledge, attitude and practice. Not all factors involved or have same effect on knowledge, attitude and practice


Knowledge on OT
Attitude towards OT
Practice of OT
Associated Factors
Prior course on OT
Workload
OT guideline
Continous teaching
Health system
Sociodemographic Factors
Age
Experience
Gender
Educational level
Category of profession
Good knowledge
Positive attitude
Good practise
Poor knowledge
Negative attitude
Poor practise

# 2.0 STUDY PROTOCOL

## 2.1 METHODOLOGY

### 2.1.1 Study Design

-This is a cross-sectional study

### 2.1.2 Study Period

-This study will be conducted from 1/1/2021 until 31/12/2022

### 2.1.3 Study Location

-This study will be conducted at the Emergency Department in three tertiary government hospitalsin the state of Kelantan. The hospital are Hospital Raja Permaisuri Zainab 2 (HRPZ), HospitalTanah Merah (HTM) and Hospital Sultan Ismail Petra (HSIP)

### 2.1.4 Study Population

#### 2.1.4.1 Reference Population

-All emergency healthcare workers in Malaysia

#### 2.1.4.2 Study Population

-All healthcare workers in the Emergency department in HRPZ, HTM and HSIP. These three hospitals are the only tertiary center in Kelantan with specialists. As these are big centers and have a larger number of staff, therefore overall, it should be able to reflect on the Kelantan emergency healthcare workers population. It is convenient as all these hospitals come under CRC-HRPZ for NMRR approval.

#### 2.1.4.3 Sampling Frame

-All emergency department medical officers and paramedics (assistant medical officers and staff nurses)

#### 2.1.4.4 Inclusion Criteria

-All clinical staff, consisting of medical officers, registered nurses and assistant medical officer who works in the emergency department at the point of the study
-Staff that can comprehend English
-Worked more than 6months in emergency department

#### 2.1.4.5 Exclusion Criteria

-Staff who is on leave during the study period either study leave or maternity leave
-Emergency physician
-Non clinical staff

### 2.1.5 Sample Size Calculation

The formula:

$$n = \left( \frac{Z_{\alpha}}{\Delta} \right)^2 * P(1 - P)$$

n - Sample size

Z- statistic for a level of confidence, conventional value taken as 1.96

P - expected prevalence or proportion

Δ- precision is 0.07.

**Objective 1**

The single proportion sample size was calculated using Sample Size Calculator Version 2.0

| OBJECTIVES | P | n | n (including 10% drop out) | REFERENCE |
|---|---|---|---|---|
| **(a) Knowledge** | 0.41 | 188 | 207 | Grebhemichael et al, 2019 |
| **(b) Attitude** | 0.32 | 170 | 187 | Aloushan *et al.*, 2019) |
| **(c) Practice** | 0.43 | 191 | 210 | Lemma, 2015 |

**Objective 2**

The associated factors with good knowledge, attitude and practice on oxygen therapy calculated using two independent proportion

| **Associated Factors** | **$P_0$** | **$P_1$** | **n** | **2n + 10% (drop out rate)** | **Literature review** |
|---|---|---|---|---|---|
| 1. Adequacy of oxygen supply and delivery system | 0.47 | 0.67 | 100 | 200 | (Ghebremichael. et al. 2019) |
| 2. Years of experience | 0.78 | 0.54 | 65 | 130 | (Ghebremichael. et al. 2019) |
| 3. Workload on OT | 0.24 | 0.48 | 66 | 132 | Aloushan et al 2019 |
| 4. Training on OT | 0.19 | 0.38 | 93 | 186 | Aloushan et al 2019 |

Highest number of sample is chosen, giving a total number of samples to be collected would be 210 after including 10% dropout rate.

Conclusion: sample size is 210

## 2.1.6 Sampling Method

-In this study, all consented staffs are included. As all respondent has completed basic education up to "Sijil Pelajaran Malaysia" (SPM) and obtained a diploma or degree in relevant field, they are presumed to be competent in English. Basic diploma course for paramedic is done in English language. Questionnaire contain simple English and no scientific terms. In the event of participant inability to understand certain question, they can ask researcher for clarification as PIwill be there until the end of the session. Emergency physician are excluded from the researches, as they being a specialist has undergone intensive care as part of their specialist training. The questionnaire was initially developed with intention of assessment for nurses. Therefore, emergency physician is excluded to avoid bias, as questionnaire assessment of knowledge content is intermediate and physician may find the questions to be easy for their knowledge level

### 2.1.7 Method for Data Collection

-Data collection is the systematic process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes.

-Number of emergency healthcare workers were obtained from head of department of emergency department prior to the research. The number of respondents in each category has been ascertained. The names of all staff who fulfilled the inclusion criteria will be listed based oninclusion criteria. Stratified sampling method will be applied. Then, every even number will be chosen, until sample is adequate. If a chosen participant refuse, then the following even number will be chosen.

-Research will be conducted during the continues medical education (CME) and continues nurse education (CNE). This is to ensure the critical care and service is not disrupted. Most of the CME/CNE attendee will not be working on that shift.

-Researcher will obtain date of clinical teaching (CME and CNE) for the department. The session will be embedded as part of the slot for the CME and CME. The presentation will be short and concise. Prior to it, permission will be obtained from the head of department. It will not interrupt the teaching hours or clinical works on floor. The teaching session is used to facilitate gathering of participants. This is to ensure adequate number of participants could be approached.

Attendee of the CME/CNE, whom don't consent to join, may just sit through the session and return back the empty questionnaire.

-Participants will be briefed regarding the study details for about 5 minutes, consent will be obtained and a self- administered questionnaire will be given to them. No conflict of interest to those who do not volunteer to involve.

-The written consent form and questionnaire will be in English language as all eligible participants have good English proficiency skills as part of their academic requirement and training.

-Duration of answering questionnaire will be 30 minutes.

-After collecting the questionnaires, on the same day, a brief CME/CNE session will be held on the topic of oxygen therapy. Every staff are welcome to join the teaching session.

### 2.1.8 Research Tool

- Data collection will be done using a questionnaire from a validated survey, adapted from (Aloushan et al 2019) with Cronbach alpha 0.72, on assessment of knowledge, attitude and practice regarding oxygen therapy at emergency departments in Riyadh in 2017. The questionnaire comprises of 38 questions and they are divided into 5 sections, namely demographic, knowledge, attitude, practice (KAP) and associated factors of KAP regarding oxygen therapy.

- There are 38 questions in the questionnaire.
- First section includes the demographic data of the respondents which is gender, age, race, category of profession, total duration of work and years of training in emergency department.
- Second section consist of 10 questions about knowledge assessment. Each question will contribute to 1 mark, making a total of 10 marks for knowledge assessment.

- Respondents are considered to have good knowledge if they score ≥ 80%. Poor knowledge is score less than 80%

- In Section three, There are 7 questions in the attitude section. A five-point Likert scale (Strongly Agree = 5 / Agree = 4 / Neutral = 3 / Disagree = 2 / Strongly Disagree = 1) is used. The responses were summed up and a total score was obtained for each respondent. The mean score was calculated and those scored above the mean and the mean score had positive attitude and scores below the mean meant negative attitude towards oxygen administration. The highest score was expected to be 35 and the lowest score to be 7.

- Section Four about practice of oxygen therapy and consist of 9 questionnaires. Participant with scoreof >4, is considered as good practice.

- Last section is regarding the associated factors of knowledge, attitude and practice towardoxygen therapy.

- For item 30, the questionnaire is to assess the practice of checking the oxygen tank prior to usage. As manufacturer states, the actual amount of gas is not as per label on the tank.
- Both Uwineza Didi, 2017 and Aloushan 2019 were made using similar questionnaire developed by Girda Lemma 2015. However, the original author did not specific the value used to describe good knowledge, positive attitude and good practise. However, Aloushan edited the questionnaire and revalidated it with Cronbach score of 072. However, Aloushan didn't not state the cut off point for good knowledge and attitude. There the cut-off point was taken from both the author's research.
- This questionnaire has good reliability score, based on Cronbach Alpha score of 0.72. Besides it is also able toadequately assess knowledge, attitude and practice of healthcare worker. The content ofthe tool is relevant and appropriate to our local setting.
- As the questionnaire has been validated by author Aloushan, we adopt the questionnaire with permission. Previous research has been conducted using this same tool. Each question is to gauge participant's level of knowledge, attitude and practise towards oxygen therapy.

## 2.2 OPERATIONAL DEFINITION

A) Oxygen therapy

- Oxygen therapy is defined as the administration of oxygen at concentrations greater than those found in ambient air (Dorland's Medical Dictionary)

B) Good knowledge

- Emergency healthcare workers who scored the correct response or answer to knowledge questions above 80% (Uwineza Didi, 2017)

C) Positive attitude

- Emergency healthcare workers who scored the correct response or answer to attitude questions above 80% (Uwineza Didi, 2017)

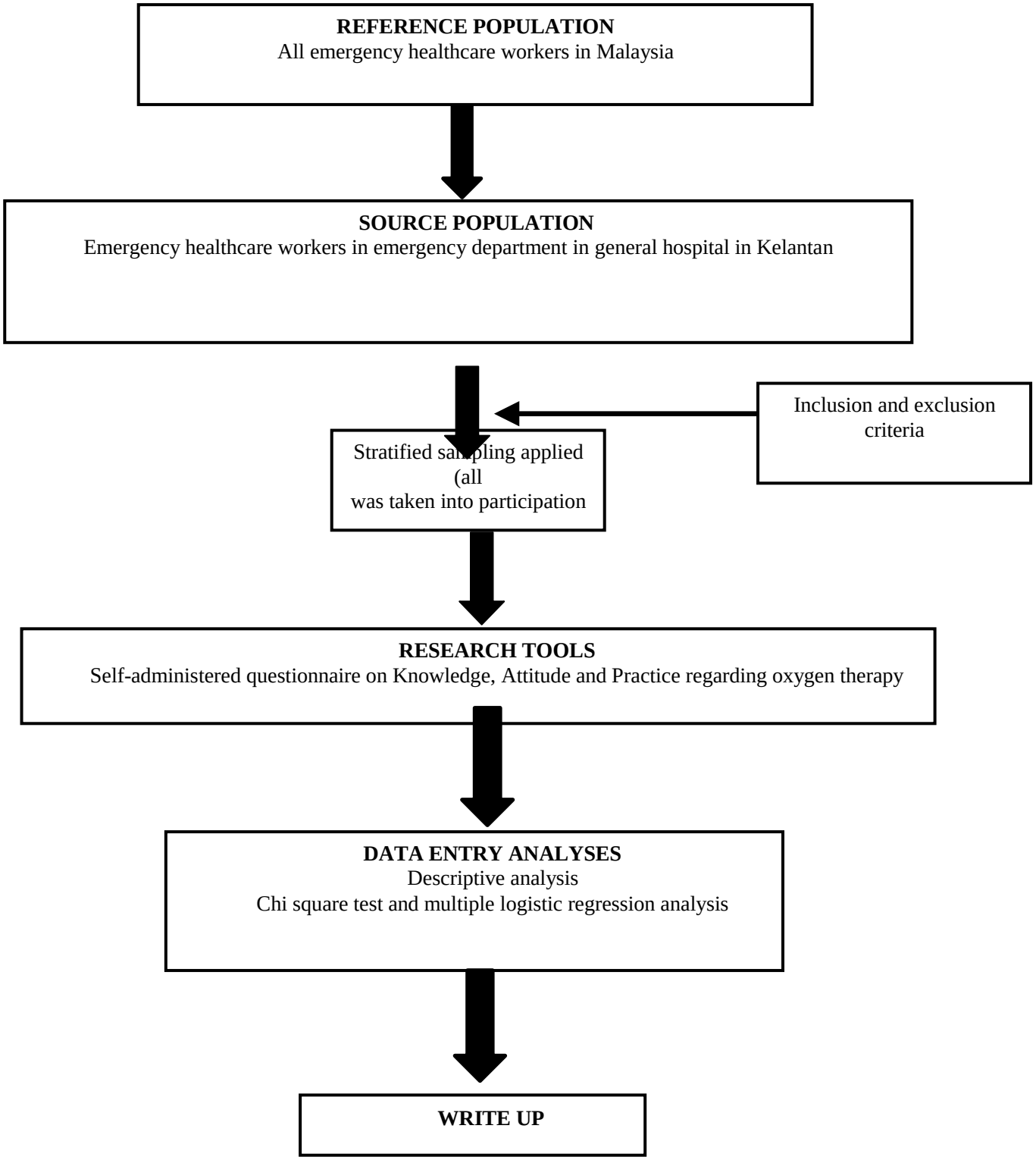
D) Good practice

- Emergency healthcare workers who scored the correct response or answer ≥ 4 points to practice questions (Aloushan et al 2019)

E) Healthcare worker.

- A healthcare worker is the one who delivers care and service to the sick and ailing either directly as doctor as nurses or indirectly as aides, helpers.[13)]

## 2.3 STUDY FLOWCHART



## 2.4 STATISTICAL ANALYSIS AND DATA ENTRY

Data will be entered and analysed using SPSS version 24. Descriptive statistics will be used to summarise the socio-demographic characteristics of subjects. Numerical data will be presented as mean (SD) and median (IQR) based on their normality distribution. Categorical data will be presented as frequency (percentage). The data will be tested by simple and multiple logistic regression analyses. The data will be run into three regression analyses for good knowledge, positive attitude and good practice. This is as a good outcome in one component, does not guarantee the same finding in another component. Previous study by Girma Lemma had shown that HCP have poor knowledge but with positive attitude [12]. Therefore, the individual outcome for each may varies independently with associated factors. By running three regressions, we would be able to see the correlation between the associated factors with good knowledge, positiveattitude and good practice.

## 2.5 EXPECTED RESULTS

Table 2.5.1: Independent variability

Demograhic characteristic of participants

| Variables | Frequency (n) | Percentage (%) |
|---|---|---|
| **Age** | | |
| **20-25 years** | | |
| **26-30 years** | | |
| **31-35 years** | | |
| **36-40 years** | | |
| **41-45 years** | | |
| **46-50 years** | | |
| **≥ 51 years** | | |
| **Gender** | | |
| **Male** | | |
| **Female** | | |
| **Race** | | |
| **Malay** | | |
| **Chinese** | | |
| **Indian** | | |
| **Others** | | |
| **Category of profession** | | |
| **Medical Officers** | | |
| **Paramedics** | | |

**Duration of work**
- **≤ 1 year**
- **2-5 years**
- **6-9 years**
- **10-13 years**
- **≥ 14 years**

**Years of training in emergency department**
- **≤ 5 year**
  - **5 years**

**Hospital name**
- **HRPZ**
- **HSIP**
- **HTM**

HRPZ: Hospital Raja Permaisuri Zainab II, HSIP: Hospital Sultan Ismail Petra, HTM: Hospital Tanah Merah

Table 2.5.2: Participant's knowledge toward OT

| Knowledge | Good knowledge, *n* (%) | Poor knowledge, *n* (%) |
|---|---|---|
| **Oxygen indication** | | |
| **Oxygen contraindication** | | |
| **Normal $SpO_2$ at rest for adults <70-year-old** | | |
| **Oxygen therapy is not indicated** | | |
| **The term used to describe movement of air into and out of the lungs** | | |
| **The term used to describe passive process in respiratory physiology** | | |
| **Normal breathing rates in a child >2-year-old** | | |
| **Can oxygen therapy be harmful?** | | |
| **Giving oxygen to patients with STEMI and $SpO_2$ ≥90% on room air** | | |
| **Giving oxygen to patients with head injury and normal $SpO_2$** | | |

*n* : number; % :percentage; $SpO_2$ : oxygen saturation; STEMI : ST-elevation myocardial infarction

Table 2.5.3: Participant's attitude towards OT

| Attitude | Positive attitude, *n* (%) | Negative attitude, *n* (%) |
|---|---|---|
| **Oxygen is given when ordered by a medical professional, or a registered nurse-initiated order in an emergency department** | | |
| **Oral and nasal hygiene and normal saline drops as necessary should be done when giving OT in children** | | |
| **Continuous oxygen administration is more beneficial than intermittent OT** | | |
| **Humidification is the best practice to prevent dryness of mucus membrane of upper respiratory tract** | | |
| **Persons with severe lung disease need to be maintained at the prescribed $SpO_2$ range** | | |
| **Administration of oxygen to patients is not safe and it is very dangerous** | | |
| **A person on OT indicates that the patient is at the end stage of life** | | |

Table 2.5.4: Participant's practice towards OT

| Practice | Good practice, *n* (%) | Poor practice, *n* (%) |
|---|---|---|
| **Conditions that do not affect pulse oximetry readings** | | |
| **The best practice on pulse oximetry** | | |
| **Benefits of attaching humidification devices** | | |
| **Effects of water collection in the tubing during oxygen administration** | | |
| **Strategies to optimize oxygen travel through wet secretions** | | |
| **Nasal cannula** | | |
| **Tolerating oxygen mask device** | | |
| **Using non-rebreathing oxygen mask in trauma patient** | | |
| **Applying petroleum jelly to minimize inflammation of lips and nose** | | |

Table 2.5.5: Associated factors with knowledge, attitude and practice

| Associated factors | Response | *OR (95% CI)* | p value |
|---|---|---|---|
| **Training on OT** | Yes | | |
| | No | | |
| **Adequate supply of oxygen and delivery system** | Yes | | |
| | No/ I don't know | | |
| **Workload effects on OT** | Yes | | |
| | No/ Unknown | | |
| **Presence of guideline** | Yes | | |
| | No/Unkown | | |

# 3 GANTT CHART AND MILESTONE

| | 2021 | | | | 2022 | | | |
|---|---|---|---|---|---|---|---|---|
| | Jan - March | Apr - June | July- Sept | Oct - Dec | Jan - Mar | Apr - June | Jul- Sep | Oct- Dec |
| Data collection | → | → | → | | | | | |
| Data Entry | | | | → | | | | |
| Data Analysis | | | | | → | | | |
| Report writing | | | | | | → | | |
| Project completion | | | | | | | → | |
| Research Submission | | | | | | | | → |

- Data collection :1st Jan 2021 till 31st Sept 2021
- Data entry :1st Oct 2021 till 31st Dec 2021
- Data analysis :1st Jan 2022 till 31st Mar 2022
- Report writing :1st Apr 2022 till 30th June 2022
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## CHAPTER 3.0 MANUSCRIPT

**Knowledge, Attitude, And Practice Regarding Oxygen Therapy Among Healthcare Professionals In Emergency Departments at Government Tertiary Hospital in Kelantan**

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**3.1 ABSTRACT**

**INTRODUCTION**: This study aims to evaluate the knowledge, attitude, and practice of oxygen therapy among emergency department healthcare professionals. **MATERIAL AND METHOD**: A cross-sectional survey was conducted among emergency department personnel at three tertiary government hospitals in Kelantan, Malaysia. During continuing medical education, a printed and validated questionnaire was administered to participants. It includes 38 questions. The data were then analysed using multiple regression analysis. **RESULT**: all professions exhibited poor oxygen therapy knowledge, whereas physicians and nurses exhibited excellent practice. The physicians' attitude toward oxygen therapy was positive. A healthcare worker in Hospital Tanah Merah is 5.66 times more likely to have good knowledge than a worker in Hospital Raja Perempuan Zainab (95 per cent confidence interval: 2.35 to 13.65; P 0.001).

In comparison, the likelihood of a doctor having good knowledge is 4.18 times that of a nurse (95 per cent confidence interval: 1.41 to 12.43; P=0.010). **CONCLUSION**: Most health care professionals demonstrated poor knowledge, while a few showed positive attitudes and practices. The hospital in which they work makes a difference. The guideline will assist in enhancing health care professional’s knowledge of oxygen therapy.

Keywords: oxygen, therapy, emergency department, health personnel

## 3.2 INTRODUCTION

Oxygen has been one of the most widely prescribed treatments for a patient in emergency care. Oxygen is part of the airhuman breathe consisting of 21 percent of overall gas.[1] It has been prescribed so frequently that some even forget that oxygen therapy is to betreated the same way medication is given to the patient.[4]

It is vital for respiration as oxygen binds to haemoglobin and need to be carried in our blood circulation. Oxygen therapy has been used as part of therapeutic measure in the medicalfield and as a supplement for patients who has difficulties in breathing.

There are gap among our professional on knowledge, attitude, and practice regarding oxygen therapy. Knowledge can be taught; however, it takes one's ability to improve attitude and approach. Aloushan et al. noted moderate to poor knowledge and attitude among paramedics in Riyadh when providing oxygen therapy to patients. A few reasons were identified: high workload and lack of local guidelines. Absent of proper national guidelines causes them to learn wrong information and have no reliable source to rectify. This is proven when 11% of respondents did not know oxygen is indicated for carbon monoxide poisoning [5]

Besides, some health care workers prescribe oxygen with the mentality of "more is better." The above culture has been proven to lead to devastating outcomes for patients. This is closely followed by the culture where oxygen is given to ill-looking patients, and relatives expect the patient to be given oxygen simply because of septic looking.[3] Ideally, oxygen should be given to patients who need it, with proper justification. Research has shown that healthcare workers have poor knowledge, negative attitudes, and practice regarding oxygen therapy[5]

### 3.3 METHODOLOGY

This study was conducted at three emergency departments in Kelantan: Hospital Raja Permaisuri Zainab 2, Hospital Sultan Ismail Petra, and Hospital Tanah Merah. These are the three tertiary hospitals operated and governed by Ministry of health in Kelantan. The study was done betweenJanuary and December of 2021. A validated questionnaire with Cronbach alpha score of 0.72 by Aloushan et al was used to collect data[5]. The questionnaire comprises 38 questions, divided into five sections: demographic, knowledge, attitude, practice (KAP), and associated factors of KAP regarding oxygen therapy. The study involved healthcare professionals (HCP) in the emergency department. Raosoft sample size calculator was used tocalculate the sample size. The required sample size was 210, with a 5% margin of error and 95% confidence level. A name list of staff was obtained from each hospital's department and a stratified sampling method was applied. Then, every even number was chosen until the sample was adequate. Participants include staff nurses, assistant medical officers (AMO), and doctors. The questionnaire was distributed during the department's continuous medical education session and collected at the end of the session. The researcher was involved throughout the session to assist the participants answering the questionnaire. Ethical approval was obtained from Universiti Sains Malaysia (USM/JEPeM/20070371) and the National medical research register (NMRR) Malaysia (NMRR-20-1470-55442 IIR).Data were compiled and analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0 (SPSS, Inc., Chicago, IL, USA), which was licensed to the School of Medical science, Universiti Sains Malaysia. Descriptive statistics will be used to summarise the socio- demographic characteristics of subjects. The numerical data will be presented as mean (SD) and median (IQR) based on their normality distribution. Categorical data will be presented asfrequency (percentage).