Effectiveness of Structured Educational Program of Pulmonary Care for Coronavirus 19 on the Critical Care Unit Nurses Knowledge and Perception

Dissertation

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By

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بسم الله الرحمن الرحيم

﴿ الَّذِينَ آمَنُوا وَتَطْمَئِنُّ قُلُوبُهُم بِذِكْرِ
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صدَقَ الله العَظِيم

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Certification

We, members of the examining Committee, certify that the Dissertation which entitled " **Effectiveness of Structured Educational Program of Pulmonary Care for Coronavirus 19 on the Critical Care Unit Nurses Knowledge and Perception** " submitted by the student Ali Ahmed Zghair AL-Khafaji, and we have examined the student, in its contents, and what is related to it , so we decide that it is adequate for awarding the for the degree of doctorate of philosophy in nursing with specialty of Adult Health Nursing.

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Dedication

I dedicate this work for:

Dear father for his kindness, wisdom and continuous support.

Dear mother for her patience, generosity, and always believing in me.

My Brother and sister.

To my wife and children.

For everyone who help me.

Researcher

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Abstract

Coronavirus disease 2019 is a viral epidemic impacting one million individuals in 200 countries, firstly detected in Wuhan, China. In intensive care units, critically ill patients have substantial symptomatic loads and physiological functional limitations, therefore treatment depends on the nurse's comfort level, abilities, and knowledge. Objectives: Evaluate the effectiveness of structured educational program of pulmonary care for coronavirus disease 19 on the critical care unit nurse's knowledge and perception. Methods: A quantitative study quasi-experimental design selected as suitable method to evaluate the effectiveness of structured educational program of pulmonary care for coronavirus disease 19 on the critical care unit nurse's knowledge and perception from the period between 15th September 2020 to 20 May 2022, in Al-Hillah Teaching Hospitals. Non-probability (purposive) sample of (61) nurses out of (214) working in the critical care selected, divided to two groups, the first one is control group consist of (30) nurses, while the remining number (31) assigned as interventional group member. Special questionnaire form prepared which divided as the following: part one: demographical data sheet, it consists from, part two: employment information, and the third part extended to knowledge of pulmonary care for patients with coronavirus disease 19, includes four domains (oxygen supplement, chest physiotherapy, endotracheal intubation, and nursing care for tracheostomy). Finally, part four: consist nursing perception questionnaire includes (2) domains, the first domain talking about nurse's perception their working in intensive care unit about safety from coronavirus disease 19 and the second domain focused on communication and relationship between team members. Validity obtained by 12 experts, while reliability

which estimated as (0.874) for knowledge and (0.804) for perception which is statistically acceptable were obtained. Results: High significant differences founded between the pre and two post-test of the interventional group members related to their knowledge regarding pulmonary care for coronavirus disease 19 knowledge, while no significant differences recorded among control group members. Conclusion: The findings show positive effect of the educational program on the nurse's knowledge which act a strong reason to accept the alternative hypothesis. Recommendation: Continuous nursing education and inservice training programs of nurses should be organized within critical care units and equipped with the training facilities and resources needed to improve quality of nurses' knowledge and perceptions, which will improve nursing care, which offered to the patients' and positively on health services outcome.

Table of Contents

Appendices	
A protocol	Appendix 1
Ethical permission	Appendix 2, 3, 4
Assessment need	Appendix 5,6
Questionnaire	Appendix 7,8
Educational program	Appendix 9
Panel of expert	Appendix 10

List of Tables

List of Figures

List of Abbreviations and Symbols

Abbreviations	Meaning
ACE2	angiotensin converting enzyme 2
ADE	antibody dependent enhancement
ADH	antidiuretic hormone
AF	atrial fibrillation
ALI	acute lung injury
ALT/AST	alanine and aspartate aminotransferase
ANOVA	analysis of variance
ANS	autonomic nervous system
ASRs	atmosphere supplying respirators
BMI	body mass index
C.PAP	continuous positive airway pressure
CCNs	critical care nurses
CDC	centers for disease control and prevention
CMR	cardiac magnetic resonance imaging
COVID-19	coronavirus disease-2019
CRISPR	clustered regularly interspaced short palindromic repeats
CT	computerized tomography
DABK	des-Arg 9-Bradykinin
df	degree of freedom
ECG	electrocardiogram
Etc.	Et cetera
F	frequency
FFRs	Filtering Facepiece Respirators
F-HCWs	frontline healthcare workers
H. S	Highly Significant
HCP	Health care professionals
HCWs	healthcare workers

HIV	human immunodeficiency virus
HRCT	high-resolution computerized tomography
ICU	Intensive Care Unit
IgG	Immunoglobulin G
IgM	Immunoglobulin M
JAK	Janus kinases
KAP	Knowledge, attitude, and practice
LRT	lower respiratory tract
M	mean
MERS	middle respiratory syndrome
n	numbers of Samples
N. S	Non-Significant
NHCC	National Health Commission of China
No	number of study sample
NPV	Negative predicted value
NSVT	no sustained ventricular tachycardia
P- value	Probability value
PAPRs	Powered air purifying respirator
pH	power of hydrogen
PHEIC	a public health emergency of international concern
PICS	post intensive care syndromes
PPE	Personal protective equipment
PPV	Positive predicted value
PRRs	pattern recognition receptors
r	Pearson Correlation
RAS	Renin angiotensin system
RBD	receptor binding domain
RdRp	RNA-dependent RNA polymerase
RDTs	rapid diagnostic tests
RNA	Ribonucleic acid

RT-LAMP	Revers Transcription Loop-Mediated Isothermal Amplification
RT-PCR	reverse transcription polymerase chain reaction
RT-qPCR	Real-time quantitative polymerase chain reaction
SARS	Severe acute respiratory syndrome
SARS-cov-2	severe acute respiratory syndrome coronavirus 2
SHERLOCK	Specific High-sensitivity Enzymatic Reporter Unlocking
Sig	Significant
SPSS	statistics package program for social sciences
Std	stander deviation
Std. E	stander error
T 0	Time 0
T 1	Time 1
T 2	Time 2
TLR	Toll-like receptor
UK	United Kingdom
URT	upper respiratory tract
US	united states
Ver.	version
VTE	venous thromboembolic events
WHO	World Health Organization
χ^2	Chi-square Value
%	Percent
>	greater-than

Chapter One

Introduction

Chapter One

1.1. Introduction:

Most of persons who infected with the covid-19 will get moderate to severe pulmonary complication as a result of their infection that is curable without specific treatment. People who are older or who have underlying conditions such as diabetes, cancer, chronic lung disease, or circulatory disease are at a greater risk for developing serious diseases (Matos *et al,.* 2020).

Early statistics from various places indicate that the death rate ranges between 0.8% and 4.3%. As a consequence of covid-19 infections, the majority of patients with comorbidities such as hypertension, cancer, diabetes, coronary heart disease and cirrhosis are declared dead. These patients range in age from middle age to elderly. However, the existing evidence about covid-19 risk factors are yet preliminary (Ahmed *et al.,* 2020).

Mortality is related with advancing age, greater severity of illness scores, comorbidities (such as diabetes, lung disease, cancer, chronic hypertension, and cardiovascular disease), greater C-reactive protein and d-dimer concentrations levels, worse respiratory failure, secondary infections, and lower lymphocyte counts (Phua *et al.,* 2020).

Although elderly patients represent over than 80 percent of all fatalities, young patients are not exempt. Time average between the beginning of symptoms and mortality is about 2 to 8 weeks, while the median time between the beginning of symptoms and clinical recovery is 6 to 8 weeks. Predicting the course of a disease from the outset of symptoms is challenging, and prognosis techniques and markers were urgently required (Phua *et al.,* 2020).

During epidemic period of coronavirus illness 2019, certain symptomatic characteristics have been established. In a report of 44,672 cases

in China, the mortality rate for men was 2.8 percent, but it was just 1.7percent for women. It has been speculated that this may be due to the higher prevalence of comorbidity amongst men, including smoking, which is estimated to be 52.1percent among men and 2.7percent among women in China. In contrast, smokers have reduced amounts of the covid-19 virus's recognized host receptor, angiotensin converting enzyme 2 (ACE2) associated severe acute respiratory syndrome coronavirus and SARS-CoV-2) (Lippi & Henry, 2020).

On April 2, 2020, the count of patients confirmed with COVID-19 worldwide topped 1 million, with a case mortality rate of 5.2percent in 204 countries and territories. Between November 2002 and July 2003, the SARS pandemic occurs in 8096 individuals distributed among 29 county fatality rate (9.6%), while MERS epidemic infected nearly (2494) people over 27 countries, the fatality rate about (34.4%), between April 2012 and November 2019. This death rate should be interpreted with caution since it varies regionally, is greater in overburdened healthcare systems, and excludes undiagnosed persons with moderate illness who are not contributing to the population (Phua *et al.,* 2020).

After reviewing 55,924 cases, the laboratory test in china through china joint mission (6.1) cases recognized as serious (multiple organ damage or failure, shock, and respiratory failure) and 13.8 percent were categorized as intense acute pulmonary cases suffered from changing of respiratory rate 30 breath per minute, dyspnea, degrse partial pressure of arterial oxygen. In actually they admitted to the intensive care unit (ICU) (Bamford *et al.,* 2020).

Respiratory system plays a crucial role in sustaining important physical functions; thus, the control of the respiratory system is the first aspect in good intensive care unit patient care. Respiratory care consists of preserving the patency of the airways, oxygen treatment, respiratory monitoring, dental care,

and care linked to preventing ventilator-associated infections (Yazdannik *et al.,* 2018).

Hypoxia is prevalent in severe illness, and hypoxic brain injury is one of the most feared hypoxia-related consequences. Moreover, a large percentage of patients in intensive care units require ventilators, which typically involves the use of oxygen therapy above the level of oxygen in room air (21 percent). As a result, oxygen therapy is administered to the vast majority of patients in intensive care units (O'Driscoll & Smith, 2019).

1.2. Importance of Study:

Globally, healthcare institutions and government responses to covid-19 are undergoing fast evolution. It is estimated that nurses account for half of the 43.5 million health care professionals worldwide. Therefore, nurses are at the frontline of this outbreak and are using multidisciplinary teams to participate in pandemic preparation inside their healthcare institutions (Semerci *et al.,* 2021).

The function of nurses during the covid-19 epidemic is classified into five dimensions. Health education is the first domain, nosocomial infection identification and prevention is the second domain. The third domain is the use of planning and safety precautions in nursing care. Protection of individuals with immunological weaknesses or underlining disorders, including as chronic obstructive pulmonary disease and cancer, is the fourth. The fifth domain is caring for patients. Nurses should have enough disease awareness to fulfill their jobs and obligations (Semerci *et al.,* 2020).

Intensive care unit nursing is an occupation that involves specialized knowledge and abilities applicable to a range working in the intensive care units which may effected by nurses perception. To ensure that freshly graduated critical care nurses (CCNs) are adequately prepared, a specific

framework of academic concepts and an awareness of how this information is implemented in practice while caring for critically ill patients are required. In intensive care units (ICU), the critical care nursing position involves not only patient treatment, but also rehabilitation, teaching, and complication prevention (Hamdan *et al.,* 2010).

As they are at the patient's bedside 24 hours a day, intensive care nurses are in the greatest position to implement evidence-based recommendations and consequently play a key role in the prevention of issues. However, nurses must be aware of the issue and have understanding of the ventilator care bundle in order to adhere to these practices. Skilled and informed nurses are essential for making right judgments in patient care and minimizing patient risks. Knowledge of evidence-based procedures should empower critical care nurses to make sound judgments and minimize undesirable consequences in the recovery of patients using mechanical breathing (Chithra and Janula, 2017).

In ICU, critically ill patients have substantial symptom loads and physiological functional limitations. As a result, the amount of knowledge and abilities of the ICU nurse, as well as their comfort level, are crucial to the quality of treatment these patients get. Nurses work directly with patients who have serious and unstable physical problems; these patients need more regular nursing evaluations and the ability to apply life-saving medical equipment and medications (Arrar and Mohammed, 2020).

An intensive care unit may be seen as a sophisticated medical speciality designed to meet the different demands of patients with life-threatening diseases. Professional work in a high-risk intensive care unit setting demands solid specialized information, effective advanced abilities, appropriate clinical experience, and problem-solving skills to monitor, evaluate, and react

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effectively to the requirements of critically ill patients (Arrar and Mohammed, 2020).

Actually, caring for mechanically ventilated patients has become an integral component of nursing care in ICU, medical and surgical units, long-term care agancies, and at home. Nurses, physicians, and respiratory therapists must have a thorough understanding of each patient's respiratory needs and collaborate to set achievable objectives (Hammod and Mohammed, 2016).

Critically ill patients, particularly those on the brink of death, are cared for and kept on life support by nurses using their specific skills. Intensive care nurses are required to receive training on a variety of technologies and their applications, including ventilation system uses, continuous renal replacement tools, equipment hemodynamic parameter, ventricular support systems, intra-aortic balloon pumps, extracorporeal membrane oxygenation turning, cardiac monitoring systems, and numerous other lifesaving systems. Critical care nursing is the provision of specialist patient care with life-threatening diseases or severe injuries. These individuals could be unstable and have complicated demands, necessitating specialized nursing care. Thus, the nursing standards in critical care, including professional expertise and specialized knowledge, are stringent (Arrar and Mohammed, 2020).

There are numerous cases that are admitted to hospitals every day, particularly in ICU, such as patients with respiratory and cardiovascular failures who require specialized, high-quality ICU nursing. Nurses require adequate training in monitoring principles, application of systems, use of devices, and implementation of nursing interventions. When providing thorough, competent, and appropriate nursing care, intensive care unit nurses must have extensive scientific knowledge to back their activities and vast clinical skills (Arrar and Mohammed, 2020).

All levels and categories of healthcare workers (HCWs) are engaged in the treatment of patients infected with this extremely contagious virus. Due of their frequent exposure to infected persons, COVID-19 has presented grave occupational health dangers for healthcare workers. Lack of information and misconceptions among HCWs result in delay diagnostic, illness transmission, and ineffective infection control practices. Multiple thousands of HCWs are already infected (Saqlain, *et al.,* 2020).

World Health Organization has produced many recommendations through online courses and training sessions to increase HCWs' knowledge and preparation with respect to the prevention and management of covid-19. A knowledge, attitude, and practice survey are an appropriate method for evaluating current programs and identifying successful tactics for societal behavior change (Saqlain, 2020).

Knowledge, attitude, and practice (KAP) about outbreak amongst healthcare professionals were reported inconsistently across research. Wuhan frontline healthcare workers (F-HCWs) were often infected with Covid-19 at the onset of the illness epidemic. However, the infection rate amongst F-HCWs sent from various provinces to battle COVID-19 was decreased to zero; the reason they reported illnesses in the start was due to carelessness and ignorance. Zhang et al. additionally found a lack of information in F-HCWs is the cause of transmission of disease and infection. Comparable study done in Greece reported that the health care personal were with high level of knowledge related to an optimistic outlook and the execution of prevention strategies (Tamang, *et al.,* 2020).

1.3. Problem Statement:

Coronavirus disease 19 is one of the pandemic diseases that affect the respiratory system and cause difficulty in gas exchange, so it requires those in health institutions to have knowledge and experience of how to deal with

patients properly. There are many studies that are concerned with knowledge and experiences of health care workers about coronavirus disease 19, but what distinguishes our study and our choice of this problem is that our study focuses on the effectiveness of the structured educational program on the knowledge and attitudes of nurses working in the intensive care unit, which makes the study of this problem unique and unrepeated in Iraq, but in the Arab world in general

1.4. Hypothesis:

- H0: there is no significant effectiveness of an educational program on critical care nurse's knowledge and perception toward pulmonary care - coronavirus disease 19.
- H1: there is significant effectiveness of an educational program on critical care nurse's knowledge and perception toward Pulmonary care - coronavirus disease 19.

1.5. Study objectives:

1. To assess the knowledge and perception of critical care nurses toward pulmonary care focus on coronavirus disease 19.

2. Administration of prepared structured education program regarding pulmonary care of coronavirus disease 19 for critical care nurse.

3. To evaluate the effectiveness of structured educational program of pulmonary care coronavirus disease 19 on the Critical Care Nurses Knowledge and Perception.

4. To identify the demographical and employment characteristics of the study sample.

5. To find out the association between critical care nurses knowledge and perception with certain related variables such as (age, gender, educational qualification, etc….).

6. To find out relationship between knowledge and perception of Critical Care Nurses of pulmonary care coronavirus disease 19.

1.6. Definition of the Terms:

1.6.a. Educational Program:
Theoretical:

Is sequence of educational activities designed and organized to achieve special learning objectives which focus on specific subject over particular period (International Standard Classification of Education, 2011).

Operational:

Is planned teaching session directed to improve critical care nurse's knowledge related to pulmonary care for patient with covid 19 virus.

1.6.b. Pulmonary Care:

Theoretical:

Is the specialty that concentrated on provided advance management for patient with pulmonary disorder who may need to respiratory support focuses on helping people with respiratory disorders involving the lungs and bronchial tubes (Urden, *et al., 2017*).

Operational:

Nursing activities directed to control or decrease the signs and symptoms of respiratory system disorder.

1.6.c. Coronavirus disease:

Theoretical:

Viral disease affected different people in different way people who exposed to this disease experience mild to moderate symptoms, which some become seriously ill which thread their life (World health organization, 2021).

Operational:

Viral disease which caused severe acute respiratory syndrome need special care

1.6.d. Nurses:

Theoretical:

A person who receive special educational program and prepared to provide care for sick or infirm patient (Stedman's Medical Dictionary 2016).

Operational:

A person trained to provide care for patient with life threating condition during his / her admission to the critical care unit.

1.6.e. Knowledge:

Theoretical:

Is understanding and transferring introduced idea through experience or education (Bartianu, 2015)

Operational:

Awareness or understanding of critical care unit nurses facts, skills toward pulmonary care for patient with COVID 19

1.6.f. Perception:

Theoretical:

Organization, identification of personal opinion based on how things seem (Schacter, 2011).

Operational:

Believes and opinion of critical care unit nurses toward COVID-19 patient.

1.6.g. Critical care unit:

Theoretical:

Is a special department designed to provide comprehensive care to patients with severe or life threating illness to maintain normal body function by support devises and medication (Smith, 2013).

Operational:

Is un area designed receive patients with complicated condition or life-threating illnesses which mainly caused respiratory and cardiovascular complications.

Chapter Two

Review of Literature

Chapter Two

Review of Literature

2.1 Historical overview

The World Health Organization (WHO) announced on March, 2020 that the Coronavirus Disease 2019 (COVID-19) has been designated a pandemic. This decision was primarily made owing to the rapidity and widespread nature of the disease's spread. Prior to that, it was originally reported as an epidemic in mainland China, with the primary emphasis initially being in the city of Wuhan, which is located in the province of Hubei on February 26. It was determined that a new coronavirus was the causative agent of COVID-19 after it was isolated and studied. Later on, when it was genetically shown that the virus was connected to the coronavirus outbreak that was responsible for the Severe acute respiratory syndrome (SARS)epidemic in 2003, the virus was given the name severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) by the International Committee for the Taxonomy of Viruses (World Health Organization 2020).

In the beginning of December, a doctor from Wuhan, reported in a group chat that he noticed a number of patients showing signs of a severe acute respiratory syndrome that looks like SARS-like illness, which was subsequently reported to the WHO Office in China on December 31, 2019. Approximately 8000 cases and 800 fatalities were reported at the time that the WHO ordered a team in Berlin to utilize that information to produce a diagnostic test for active infection, which was completed and released four days later, on January 12 (Lango, 2020).

Although the early cases were linked to the Huanan South China Seafood Market, where snakes, birds, and other animals like as bats were traded, the origin and source of SARS-CoV-2 remain unclear. In contrast to the exported cases, many of the early patients worked in or frequented the market, suggesting either a human-to-human transmission or a more widespread animal source. On January 22nd, 2020, following a visit to Wuhan by a WHO team, the evidence of human to human transmission was highly supported (Li et al., 2020)

severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is an enveloped virus with a positive-sense, single-stranded Ribonucleic acid (RNA) of 29,891 bases that belongs to the Coronaviridae family's beta subgroup. The genome contains the genes for 29 proteins that are involved in infection, replication, and virion assembly. The appearance of crown-like spikes on their surface distinguishes them from other coronaviruses. The receptor binding domain (RBD) of the SARS-CoV-2 spike S protein interacts to the human angiotensin-converting enzyme 2 (ACE2), promoting membrane fusion and viral absorption into human cells through endocytosis. The RBD in the spike protein is the coronavirus genome's most changeable region. In comparison to previous SARS-CoV viruses, structural and biochemical analyses reveal that RBD from SARS-CoV-2 binds to ACE2 with a high affinity. However, the high binding affinity might be due to human ACE2 protein polymorphism (Dos Santos, 2020).

2.2 Epidemiology

2.2.1 Geographic distribution

In September 2019, forest instances were recorded in Wuhan, Hubei Province, China. With the exception of Antarctica, cases have been scattered internationally since then. More than 237,267,684 verified COVID-19 cases

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were recorded by October 12th, 2021. With a worldwide death-to-cases ratio of 5.61 percent, about 232,418,601 cases were treated and more than 4,843,083 diseased persons died (Johns Hopkins University & Medicine, 2021).

2.2.2 Pathophysiology

Against infections, one's own immunity is a great protection. Immune function imbalance occurs when an individual's immune system is less active or overactive than usual in response to an illness (Bohn, et al., 2020).

When COVID-19 enters a cell, it does so via a specific receptor. An in-depth look into SARSCoV-2 viral entrance has already been provided elsewhere. All in all, SARS-CoV-2 comprises of four major glycoproteins: the nucleocapsid, spike, membrane and envelope (N). S protein is necessary for viral binding and entrance into host cells, whereas M, E and N proteins are critical for viral particle formation (Bohn, et al., 2020).

severe acute respiratory syndrome coronavirus 2 uses angiotensin converting enzyme receptor 2 (ACE 2) act as a host cell receptor, which is similar to how SARS CoV uses SARS CoV. S1 and S2 subunits make up the S protein. Receptor-binding domain (RBD)-bound S1 subunit thereafter undergoes proteolytic activation and causes the fusion of the viral membrane with the host cell membrane. Airway cells such as alveolar, ciliated, and goblet cells are strongly expressed in ACE2. These cells serve as a gateway for viruses to enter the human body. It explains why COVID-19 often manifests as pneumonia. COVID-19 may have gastrointestinal and cardiovascular problems since ACE 2 is expressed in the intestinal

epithelium, heart cells, and vascular endothelium (Sungnak, et al.,2020) (Xu, et al.,2020).

Monocytes and macrophages exhibit the angiotensin converting enzyme receptor 2, which might provide SARS CoV-2 with a pathway into immune cells (Zhang, et al., 2020).

Detection and evasion by the immune system of viral recognition: Immune cells detect viral infection from the early beginning by recognizing virus-derived pathogen associated molecular patterns (PAMPs), such as viral RNA. In response to PAMPs, immune cells are activated via the binding and activation of pattern recognition receptors (PRRs). For example, Toll-like receptor 3 and 7 (TLR-3) or retinoic acid-inducible gene I (RIG-I) or melanoma differentiation-associated protein 5 (MDA5) may identify RNA viruses at the endosomal level, whereas RIG-I or MDA5 can detect viruses at the cytoplasmic level, such as RIG-I or MDA5 (MDA-5). Interferon regulatory factor 3 (IRF 3) and other proinflammatory cytokines, such as IL-1, IL-6, and TNF-, are activated by these factors, resulting in an increase in the production of type 1 interferon (TI IFN). By suppressing the activity of a mitochondrial antiviral signaling protein, SARS CoV-2 avoids detection by the immune system. Additionally, it inhibits TNF receptor associated factors (TRAF) 3 and 6, which are critical for the activation of IRF 3/7 in response to TLR 3/7 and possibly RIG-I and MDA-5 (Prompetchara et al., 2020) (De Wit, et al., 2016).

The phosphorylation of the STAT transcription factor family may be inhibited by new corona viruses, which can also interfere with T1IFN signaling in cells. This is how new coronaviruses elude the immune system and spread throughout the body without being detected by the body's built-in antiviral defenses. An innate inflammatory response is initiated when infected

cells die and release viral particles and intracellular components. Adaptive immune responses are triggered as a host's defense against viruses as a consequence of this. It relies heavily on CD4+ T cell cytokines, CD8+ T cell cytotoxicity, and B cell antibody generation (Yi, et al.,2020).

Humoral response: A new cohort analysis of COVID-19 patients revealed the kinetics of the immune response. Antiviral Ig G and M took an average of 13 days to develop following the onset of symptoms, whereas IgG took an average of 19 days to develop in all patients. An exact response in asymptomatic, moderate, and severe COVID-19 individuals has yet to be seen. A mechanism known as antibody dependent enhancement (ADE) may lead to a detrimental and excessive inflammatory response when antibodies are used in the host defense against coronaviruses (Long, et al., 2020) (Murrell, et al., 2011).

It was recently shown in a preclinical study that antibodies against S protein can activate FcYR in M2 macrophages in the lung, leading to a hyper-inflammation with the release large amounts and recruitment of inflammatory cells to the lung, resulting in acute lung injury (ALI), spread alveolar damage and death (Liu, et al., 2019).

Cytokine storm: Researchers in Wuhan found a correlation between illness severity and a poor result with cytopenia and/or considerably increased inflammatory markers. (Wu, et al., 2020).

Like middle respiratory syndrome (MERS) and SARS, increased innate immune activation in COVID-19 includes increased expression of T1IFN, IL-1, IL-6, and TNF. A mechanism called ADE occurs when virions suppress type 1 IFN signaling in infected macrophages while allowing proinflammatory IL-1, IL-6, and TNF an expression, which may lead to hyper inflammation and cytokine storm syndrome. Cytokine receptor signaling is

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aided by Janus kinases (JAK). Activation of STAT family transcription factors, which play a role in the production of pro-inflammatory cytokines, is the primary function of these proteins. Bradykinin storm: The function of bradykinin in COVID-19 pathology has recently been hypothesized. The higher expression of genes for bradykinin receptors in the lung fluid of COVID-19 patients lent credence to this hypothesis (Garvin, et al., 2020).

This theory is further supported by the presence of fluid and inflammation in the lungs in COVID-19 patients. Many COVID-19 patients have a dysfunctional kinin system, which activates in the context of blood clotting. When triggered by Hegeman factor, a clotting factor, plasma kallikrein and associated peptides are created by two different pathways: the plasma route and the tissue kallikrein pathway (activated by plasmin). Derived from Bradykinin, des-Arg 9-Bradykinin is produced (DABK). Fluid leaks from blood arteries when bradykinin and DABK engage their respective receptors, B2R andB1R, respectively. Kinin system is controlled by the Renin angiotensin system (RAS). Bradykinin is degraded by ACE, while DABK is degraded by ACE2. In the kinin system, both ACE and ACE2 serve as regulatory breaks. However, the bradykinin cascade goes into overdrive after SARS CoV-2 infection because ACE2 is absorbed into the cell (Garvin, et al., 2020).

Hypercoagulability in COVID-19: In COVID-19 patients, coagulopathy is a frequent problem (The Lancet Haematology, 2020).

The available research seems to point to a connection between RAS and coagulopathy. Because it blocks fibrinolysis, the Ang 1-9 peptide, which is elevated in COVID-19 patients, is a factor in the development of thrombosis. ACE contributes to an increase in fibrinolysis and is responsible for the degradation of the antifibrotic peptide N-acetyl-seryl-aspartyl-lysyl-proline

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(AcSDKP), which is generated from thymosin beta-4 (Khan & Siddiqui, 2021).

Responses caused by the SARS-CoV-2 infection are within two-phased. Bacterial infection triggers the body's natural defenses, which include activation of the innate immune system. Immune response priming of adaptive T and B cells is necessary to increase viral clearance. Even in mild to moderate stages of illness, this approach is usually sufficient to clear the infection. When a virus interferes with the body's natural defenses, it may be able to bypass the body's acquired immune response. As a consequence of the immune system's malfunction, viruses are able to reproduce and tissues are damaged (The Lancet Haematology, 2020).
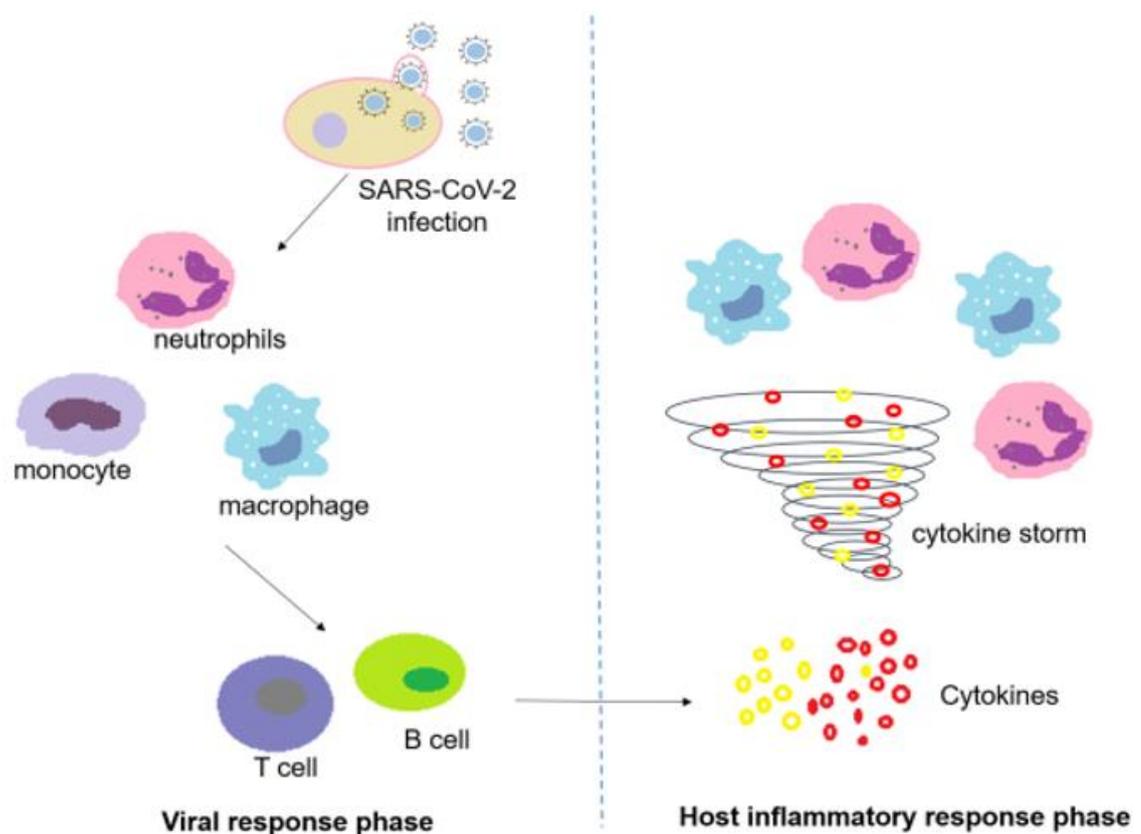
Figure 2.1. the viral response phase and host inflammatory response phase during SARS-COV-2 infection.

According to a study published by Xu et al. CD4 and CD8 T cell numbers in a patient with severe immunological damage induced by COVID-19 were decreased, but their condition was hyperactive, (Xu, et al., 2020).

In a few instances, Zhang et al. detected a decrease in the number of immune cells CD3, CD4, CD8, CD19, and CD16+56 as the infection progressed. When the patient's health improved, the number of cytotoxic natural killer cells (CD19+ and CD16+56+) rose, demonstrating that CD19+ and CD16+56+ play a predictive role in infection progression (Zhang, et al., 2020).

Pro-inflammatory macrophages and granulocytes are the primary regulators of the host inflammatory response to SARS-CoV-2 infection in the lungs. Cytokine storms are life-threatening when they occur because of a person's overactive immune system's reaction to an infection (Huang, et al., 2020).

According to Huang et al., the severity of the illness in SARS-CoV-2 infection was strongly associated with the intensity of the cytokine storm. IL1B, IL1Ra, IL8, IL9, IL10, basic FGF, Gcsf and Gmcsf, IFN and IP10 were all found in greater amounts in infected patients than in healthy controls, as were plasma levels. Patients in the intensive care unit (ICU) had greater levels of IL2, IL7, IL10, GCSF, IP10, MCP1, MIP1A, and TNF in plasma compared to patients who were not in the ICU. (Huang, et al., 2020).

What we don't know is how the body recognizes and reacts to the infection, which leads to the production of cytokines. Why and how may elevated cytokine levels lead to worsening health and even death? Which cytokines and the pathways they operate on might be used as therapeutic targets in the near future. Overactivation of the immune system may lead to a cytokine storm, which is why the host must efficiently mobilize the immune

system in the event of a viral infection. Virus-induced cytokine storms and the immune system-virus balance are still poorly understood. We still have a long way to go in order to solve these issues (Peng, 2020).

2.3 Transmission route

Respiratory droplets, aerosols, and direct or indirect contact are the primary routes of novel coronavirus transmission. There have been a number of epidemiological studies that show that new coronaviruses may be spread from person to person, including within families, hospitals, and even across cities. Human-to-human transmission patterns included family aggregation (Chan, et al., 2020).

As previously stated, the three-phase outbreak was consistent with prior observations. Pandemic super-spreaders might appear. SARS-CoV-2 may be transmitted asymptomatically by infected people who do not show symptoms throughout the incubation period. Because of silent transmission by certain individuals with very severe symptoms, this virus has spread at an unprecedented rate (Rothe, et al., 2020).

In recent years, evidence has accumulated to show that this virus may spread through a number of different channels. One-step real-time RT-qPCR technique targeting the S protein to detect the self-collected saliva, a non-invasive specimen. It is possible that the positive findings obtained from nasopharyngeal or sputum specimens are related to infection of salivary gland epithelial cells or to salivary and nasopharyngeal and lung secretions. As a result, saliva may be able to transmit a virus by coughing or speaking (To, et al., 2020).

For the first time, viral nucleotides were found in anal swabs and blood. The quantity of viral RNA in anal swabs was greater in the latter stages of infection than in blood, indicating the potential of various channels of virus transmission, including oral-fecal or bodily fluid route, during the later stages of infection (Zhang, et al., 2020).

Although gastrointestinal tracts seem to be free of viruses, studies have demonstrated that viral RNA may be detected in feces (Xiao, et al., 2020).

Additionally, data showed that the beginning symptom of diarrhea and the fecal-oral transmission pathway should not be overlooked or taken lightly. (Song, et al., 2020).

Real-time PCR was used by Chen et al. to examine viral RNA levels in pharyngeal swabs, blood, and anal swabs. Blood and anal viral RNA concentrations were linked with the severity of COVID-19 infection. To validate viral replication beyond the lungs, viral RNA was found in digestive tracts in which ACE2 is highly expressed. This was due to the new coronavirus spike protein's interaction with the ACE2 receptor on the host. It may be possible to anticipate the course of COVID-19 based on early viral RNA detection in the digestive system and blood (Chan, et al., 2020).

Non-diarrheal feces have been shown to contain live viruses, suggesting that SARS-CoV-2 might be spread by feces. The presence of SARS-CoV-2 in stool samples from a patient who did not have diarrhea, but who had positive stool samples for the virus, supports the idea that fecal viral shedding may be a factor in the spread of the disease. Saliva has also been shown to contain live viruses. SARS-CoV-2 might be spread by saliva, even in individuals who don't have a cough or other respiratory symptoms, since saliva can be discharged during coughing and the influenza virus can be found in respiratory droplets even during normal breathing. Asymptomatic carriers

of SARS-CoV-2 have been shown to propagate the virus (Gautret, et al., 2020).

When dealing with COVID-19 patients in Wuhan, a doctor wearing a N95 mask but no safety goggles became infected with SARS-CoV-2, indicating that mucous membranes in the eyes might be a route of transmission. Despite the fact that additional investigations found no detectable viral RNA in conjunctival swabs taken from infected individuals, Using the rhesus macaque model, Deng et al. have shown that SARS-CoV-2 may be transmitted through the ocular conjunctival channel, highlighting the need of eye protection in preventing the transmission of the virus. If an aerosol is inhaled, SARS-CoV-2 may stay alive for up to three hours. After being applied to plastic and stainless steel for 72 hours, the SARS-CoV-2 virus was still detectable. After four hours on copper and twenty-four hours on cardboard, no functional SARS-CoV-2 could be detected. SARSCoV-2 can be transmitted through aerosols and fomites, therefore this is a possibility. It has been hypothesized that the fast spread of SARS-CoV-2 may have been facilitated by transmission through fomites (bathroom taps, elevator buttons) or by viral aerosolization in enclosed public settings (such as elevators, shopping malls and bathrooms) (Gautret, et al., 2020), (Peng, 2020).

A total of nine pregnant women confirmed COVID-19 infection have been reported to have the potential for vertical transmission. Infant throat swabs, cord blood, breastmilk, and amniotic fluid samples were all tested for the novel coronavirus after caesarean delivery shows negative results. As of yet, there is no solid proof that mothers with COVID-19 in the late stages of pregnancy may transmit the disease to their unborn children by vertical transmission. A limited number of instances and pregnant women in the late pregnancy are the only subjects of this inquiry. COVID-19 may still infect

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babies and pregnant women, so it's important to keep this in mind. Preventing newborn infections in mothers who have been exposed to COVID-19 requires extra attention (Chan, et al., 2020).

Although direct transmission is the most prevalent mode of infection, contaminated surfaces that often come into touch with patients in healthcare facilities may be a source. In an intensive care unit and a regular ward at Wuhan Huoshenshan Hospital, a thorough environmental research was conducted. Computer mouse, trash bins, and railings for patients' beds all had SARS-CoV-2 nucleic acids; they were also identified in the flooring and on the sleeve cuffs and gloves of medical workers. Also found in the air from a patient's room were nucleic acids with an estimated transmission distance of around 4 m from the SARS-CoV-2 virus. But since nucleic acid testing does not reveal the quantity of active virus and the lowest infectious dosage is unknown, aerosol transmission distance cannot be precisely calculated. Medical professionals and anyone in close proximity may be at danger of infection based on these findings. Since no members of the hospital staff were infected with SARSCoV-2 as of March 30, 2020, proper precautions and attention to hand and environment cleanliness may successfully avoid infection (Guo, et al., 2020) (Gautret, et al., 2020).

Generally, the studies previously caution that virus may spread by a variety of pathways, including the respiratory system, the gastrointestinal system, the nasolacrimal route, oral-fecal, body fluid routes, and the possibility of maternal-fetal vertical transmission should not be overlooked. The great infectiousness of SARS-CoV-2, as shown by viral shedding before symptoms develop and through many channels, poses a significant challenge in preventing disease transmission (Peng, 2020).

2.4 Incubation period

The time between when a person is infected and when the sickness manifests is known as the incubation period. In order to prevent the transmission of infectious illnesses, the incubation duration is an important epidemiological parameter. It is the time interval between pathogen infection/virus exposure and the manifestation of clinical symptoms. The incubation time must be known for case characterization, emerging threat management, estimating the length of follow-up for contact tracing and secondary case identification, and establishing public health interventions targeted at minimizing local transmission (Rai, et al 2021).

Measures of quarantine, isolation, and antiviral treatment may be made more effective if the incubation time and virus shedding length can be estimated. Currently, the incubation period for COVID-19 is estimated to be 1–14 days, with a median duration of 3–7 days and a maximum time of 24 days in a small minority of cases from exposure to the beginning of symptoms, based on epidemiological studies (Lauer, et al., 2020).

Two to three days prior to the onset of the first symptom, viral shedding may occur. Researchers have observed that the viral RNA in non-survivors may be detectable until death, but the viral RNA in survivors can last for up to 37 days on average. The median length of viral shedding in patients with severe COVID-19 has been shown to be 31.0 days (He, et al., 2020).

It is unknown how long a patient with COVID-19 stays infectious. During the first symptomatic phase of the illness, oropharyngeal secretions have the highest viral load. The patient may continue to release the virus after the remission of symptoms. In a research conducted in China, the median length of viral shedding among survivors was 20 days (IQR = 17.0–24.0). An examination of the viral dynamics in moderate and severe instances found that mild cases had a tendency to remove the viruses quickly, but severe cases

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might have extended viral shedding. Even if respiratory samples are negative, virus shedding may remain in feces for more than four weeks, according to studies that compared respiratory and fecal samples. variables that increase the chance of viral shedding include male sex, delayed admission following sickness, and mechanical breathing with infusions (Xu, et al., 2020) (Zhou, et al., 2020).

Transmission has also been recorded in the asymptomatic period. According to a research from Singapore, transmission during the asymptomatic phase of the illness was responsible for 6.4 percent of the 157 locally acquired cases of COVID-19 (Oommen, 2020).

2.5 Preventive measures for COVID-19 disease

Virus spread through intimate contact and droplets, not airborne transmission, according to the existing information. Close contact with a COVID-19 patient or caring for a COVID-19 patient puts both care personals at greatest risk for infection (Stewart, et al., 2020).

In both the clinical and community contexts, preventive and mitigating strategies are critical. The most effective community-based preventative interventions that the World Health Organization has suggested for 2020 includes:

- Keeping hands clean by using an alcohol-based hand rub if hands aren't obviously filthy or soap and water if they are.
- Keep hands away from eyes, nose, and mouth.
- if respiratory problems occurs, donning a medical mask and washing hands after removing it.

- Keeping a social distance of at least one meter from those who have respiratory problems.
- Coughing or sneezing into an elbow or tissue, and then disposing of the tissue, is a kind of respiratory hygiene.

Healthcare professionals must take further efforts to protect themselves and avoid transmission in the workplace. Personal protective equipment (PPE) should be used correctly by healthcare professionals caring for patients with COVID-19 illness, which includes choosing the right PPE and being taught in how to put it on, remove it, and dispose of it (Stewart, et al., 2020).

According to WHO Infection prevention and control of epidemic- and pandemic-prone acute respiratory diseases in health care, the PPE is simply one part of a package that includes administrative, environmental, and engineering measures. (World Health Organization [B] 2014).

The World Health Organization (WHO) has recommended these measures in document A 2020:

• Adequate infrastructure, clear infection control regulations, easy access to lab testing, proper patient triage and placement, and staff training are all examples of administrative controls that ensure resources are available for infection control and prevention strategies.

• In an effort to reduce the spread of diseases and the contamination of surfaces, environmental and engineering controls are used. Maintaining at least a one-meter social barrier between patients and healthcare professionals, as well as providing well-ventilated isolation rooms for patients with suspected or proven infectious diseases with COVID-19.

This virus is a respiratory illness that is not the same as the Ebola virus, which is spread via contaminated body fluids. COVID-19 and Ebola virus illness have differing PPE needs because of the variations in transmission. When caring for COVID-19 patients, coveralls (also referred to as Ebola PPE) are not necessary (World Health Organization [A] 2020).

2.5.1 Personal protective equipment and supporting data

In addition to surgical face masks and nonpowered filtering facepiece respirators (FFRs), other PPE options include powered air-purifying respirators, surgical gowns, gloves, and eye protection. Below, will find a detailed explanation of each of these issues.

2.5.1.A Eye Protection

Dr. Wang Guangfa of Peking University First Hospital reported having COVID-19 on January 23, 2020, and believes it was spread via his conjunctiva even though he was wearing a N95 mask (Lu, et al., 2020).

Conjunctivitis in patients with COVID-19 has not been reported, and no virus was found in the aqueous humor of the eyes of 114 individuals with confirmed pneumonia caused by COVID-19, despite evidence that ACE2 receptors are present in the eye's aqueous humor (Deng, et al., 2020).

Laboratory research also suggest that influenza may reach the nasopharynx by ocular exposure, but that wearing goggles has little effect on influenza transmission rates. Non - infected SARS-CoV healthcare professionals, on the other hand, were more likely to use goggles, according to another research. As a result, there is minimal evidence that COVID-19 may be transmitted via the mucosal membranes of the eyes, or that eye

protection beyond what is currently standard is effective in preventing transmission (Huh, 2020).

Nonetheless, the united states (US) Centers for Disease Control and Prevention (CDC) recommends using eye protection while caring for a patient with known or suspected COVID-19 infection, in Korea in a variety of patient care circumstances, and in Hong Kong for high-risk patient encounters (Cheng, et al., 2020).

2.5.1.B Gloves and Gowns

Because droplets are assumed to be the primary mode of transmission for COVID-19, there are less studies examining the efficacy of personal protective equipment (PPE) such as gowns and gloves in preventing the virus' spread. Handwashing has long been recognized as a critical step in reducing the spread of infectious diseases via direct contact (Verbeek, et al., 2020).

The American National Standards Institute classify gowns into four levels, with level 4 providing the most virus protection. During the SARS pandemic in Hong Kong, two studies indicated that uninfected healthcare professionals used gowns as part of their PPE more often than infected healthcare workers, and one of these studies also identified a significant difference in the use of gloves. Uninfected healthcare workers were more likely to wear complete prescribed PPE, according to both studies. Aerosolized SARS-CoV-2 has a median half-life of 5 hours on stainless steel and 6 hours on plastic in a laboratory environment and has also been discovered on surfaces in patient rooms (Cheng, et al., 2020).

In order to avoid transmission of fomites to healthcare workers' mucosal membranes, gowns and gloves should be worn at all times. When caring for a patient with COVID-19, the CDC advises using both gowns and

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gloves. In past bloodborne viral outbreaks, full body protective suits have been employed (e.g. Ebola virus), however the authors discovered no evidence on their usage for SARS-CoV and COVID-19 (Centers for Disease Control and Prevention [A]. 2020).

2.5.1.C Surgical Face Masks

Based on their permeability to synthetic blood, germs, particles, and flammability, surgical masks in the United States are classified as level 1, 2, or 3 by the American Society for Testing and Materials. Filtration effectiveness for germs and air particles 0.1 to 5.0 mm must be more than 95% in Level 1 masks. This rises to >98 percent at levels 2 and 3. Level 3 surgical masks haven't any improved filtering efficiency, while they have a higher synthetic blood resistance (Radonovich, et al., 2020).

Many publications and recommendations fail to differentiate between the many kinds of surgical masks. In addition, the materials utilized in the production process are included in these evaluations. Inhaling all airborne particles is not completely prevented by surgical masks, although they do aid to some extent. For particles less than one millimeter in diameter, a level 1 mask decreased their passage by 27-fold (Derrick & Gomersall, 2005).

surgical masks seem to have a positive impact on influenza, SARS-CoV, and COVID-19 transmission rates. In two randomized controlled studies, surgical masks (level 3) or undefined N95 masks were compared to N95 masks in terms of influenza transmission to medical personnel. According to the findings, there was no significant difference in influenza infection rates between the surgical mask and N95 groups (Radonovich, et al., 2020).

Researchers from Yen et al. conducted another research in which they examined hospitals with and without SARS-CoV infections in healthcare workers. The authors discovered that surgical masks were more likely to be used at entry to the hospital, in the wards, and in outpatient clinics in facilities where no healthcare workers were infected. Taiwan, Hong Kong, and Singapore, have all adopted this strategy (Yen, et al., 2011).

No transmissions were found in a study of 41 Singaporean healthcare workers who were in close touch with a severely sick COVID-19 patient in the recent past. 35 of the 41 healthcare personnel (85%) were using surgical masks to protect their airways. Since surgical face masks filter particles bigger than 0.1 to 5 millimeters, and droplets carrying Sars-CoV-2 are larger, it follows that there should be enough protection against transmission of COVID-19 in low-risk situations, based on this reasoning. For this reason, several institutions now recommend for the use of surgical face masks in lower-risk patient encounters, and argue for the usage of N95 respirator masks in times of shortage (Ng, et al., 2020).

A surgical face mask should be used in the absence of an accessible respirator for patients with known or suspected infectious diseases, according to the Centers for Disease Control and Prevention (CDC) (Centers for Disease Control and Prevention [A]. 2020).

2.5.1.D. Nonpowered Filtering Facepiece Respirators

In order to protect the wearer from inhaled particulates, Filtering Facepiece Respirators (FFRs) are used. An FFR that does not need electricity (nonpowered) is the most often utilized. In testing, they are categorized by the proportion of challenge particles larger than 0.3 mm that are filtered out (95 %, 99 %, 99.9%) and the sort of particles that are filtered. For the most part,

R-rated FFRs are oil-resistant; however, the P-rated FFRs are even more oil-resistant; yet, the N-rated FFRs are not oil-resistant. It is estimated that FFRs may lower the aerosol concentration in the air to one hundredth of the ambient air's concentration (ie, blocking 90 percent of airborne particles) (D'Alessandro& Cichowicz, 2020).

Ultrafine virus particles (0.02–0.5 mm) have been tried in this mask. N95 penetration ranged from 0.23 percent to 1.68 percent, and N99 penetration ranged from 0.96 percent to 1.03 percent, with nonstrenuous breathing airflow rates. Notably, viral penetration increased by roughly 5% for N99 and N95 FFRs with moderate airflow (simulating heavy breathing). While N95 mask penetration was 5%, a research comparing N95 masks to surgical masks found that level 2 surgical mask penetration was 21% and level 1 surgical mask penetration was 86% with moderate airflow. But this extrapolation may be erroneous since in a non-experimental situation, droplets that transmit SARS-CoV-2 virus particles are much bigger (10–100 mm) (Eninger, et al., 2008).

Several researches have looked at the usage of N95 in relation to SARS-CoV and SARS-CoV-2 transmission. During the SARS-CoV pandemic in Taiwan, Yen et al analyzed hospitals with and without infected healthcare workers and found that 100% of hospitals with zero SARS-CoV healthcare worker infections utilized N95 masks in zones of danger. A case-matched research of SARS-CoV-infected healthcare workers compared their PPE usage to that of uninfected healthcare workers. Nearly all of the participants wore either a surgical mask or a N95 mask, and there was no difference between infected and noninfected healthcare professionals in terms of mask type. A study of critical care nurses revealed no difference in

infection rates while wearing a surgical mask vs a N95 mask (Yen, et al., 2011).

None of the 278 workers who used N95 masks were sick, according to a study published in Wang et al 2020. There were 10 from 215 (4.6 percent) surgery floor doctors and nurses who were sick after not wearing masks because they did not interface with COVID-19 patients, who were deemed low-risk (Wang, et al., 2020).

When caring for a patient with known or suspected COVID-19, the CDC advises using a N95 mask if one is available, as well as a N95 or higher respirator when conducting or being present for aerosol-generating operations (Centers for Disease Control and Prevention [A]. 2020).

2.5.1.E. Powered Filtering Facepiece Respirators (Air purifying Respirators)

Powered air purifying respirator (PAPRs) and atmosphere supplying respirators (ASRs) use fans to circulate filtered air while keeping the user's head completely enclosed, providing an extra layer of protection. PAPRs may be used by people with facial hair or those who fail regular fit tests for FFR, which is a special benefit. Low-resistance breathing and a lack of contact with the face may make them more comfortable for those who prefer not to wear one (Matos & Chung, 2020).

2.6 Signs and symptoms of COVID 19

A mild to severe pulmonary disease is the most common symptom of infection and does not need specialized care for the majority of those affected. However, certain people will get extremely unwell and will need medical care. Critical illnesses are more likely to strike the elderly and those with preexisting medical disorders such as heart or circulation problems, diabetic, chronic pulmonary disease, or even cancer. At any age, anybody may get COVID-19 and become extremely ill or even die (Wu & McGoogan, 2020).

2.6.1 Most common symptoms:

- Cough, loss of taste or smell, fever, and tiredness.

2.6.2 Less common symptoms:

- Headache, irritated eyes, sore throat red, pains, discoloration of toes or finger, skin rash and diarrhea

2.6.3 Serious symptoms:

- chest pain, shortness of breath, difficulty breathing, loss in mobility or speech and confusion

2.6.4. Infection Severity:

The severity of the infection might range from mild to severe. There were five levels of COVID-19, with asymptomatic being the lowest. Diagnostic criteria of these groups were as follows: (Fang, et al., 2020)

1. 1. Asymptomatic: positive PCR, SARS-CoV-2 test, but no clinical signs or symptoms.

2. 2. Mild: Upper respiratory infection without pneumonia, including cough, fever, sore throat, tiredness, runny nose, myalgia and sneezing.

3. Moderate: Pneumonia with recurrent cough and fever; some patients may have wheezing, but there is no evident hypoxemia, such as difficulty breathing.

4. Severe: Dyspnea, core cyanosis, spo2 less 92%, and other hypoxemia-related symptoms are also symptoms of this stage.

5. Critical: Respiratory failure, shock, acute respiratory disorder and multiple organ dysfunction.

COVID-19 outcome and death may be predicted using this clinical categorization. In adults, 81% of instances with COVID-19 were categorized as mild - to - moderate illness; in children, 81% of cases categorized a light condition. Adult death rates might reach as high as 50% in the most severe instances (Zhang, et al., 2020).

2.6.5 Asymptomatic infection

The relevance of asymptomatic infection as a source of illness in a community cannot be overstated. The transfer of disease from one person to another may be facilitated by the presence of asymptomatic children. Over 90% of pediatric patients may be asymptomatic to mild or moderate condition, according to a study by Dong and colleagues. Even while asymptomatic infection was more common in younger people, it seems to be present at any age. There is a possibility that these asymptomatic people might lead to familial clusters (Dong, et al., 2020).

There was a 5-to-18% asymptomatic infection rate. Asymptomatic status was assigned to 889 of 72,314 China's cases (Bulut, & Kato, 2020).

2.6.5.A. Anosmia

Everyone should take precautions towards COVID-19 in order to secure himself and others, according to WHO guidelines. Screening, early identification, and isolating of patients are critical because to the absence of a viable therapy or vaccination for COVID-19. As a result, detecting COVID-19's early signs is critical and a top priority for the health care system. Patients with the COVID-19 outbreak in China have shown a number of non-specific signs and symptoms, such as high fever, dry cough, dyspnea, myalgia, tiredness and lymphopenia, as well as radiographic indications of pneumonia in the early stages of the outbreak's study. It has recently been observed in countries such as Iran, France, South Korea, Italy, United Kingdom (UK) and US that COVID-19 shows a correlation with abnormal olfactory function. Post viral anosmia, a condition in which the senses of smell and taste have been compromised as a result of an infection of the upper respiratory tract, may develop. There is, however, a lack of understanding of the precise pathogenesis (Heidari, et al., 2020).

2.6.5.B. Frequency of urination

Frequent urination was identified as a novel COVID-19 symptom by expert physicians in 52 verified instances of the disease in Iraq. All of the patients were between the ages of 15 and 52, and none of them had any chronic conditions like renal disorders, diabetes, or hypertension. In addition, their levels of the antidiuretic hormone (ADH) and the hormone aldosterone were assessed. After around the 3rd or 4th day, they began to display signs of COVID-19 fever and other symptoms on a much more regular basis (Lechien, et al ., 2020).

Despite their modest consumption of water and drinks, the frequency increased to more than 3 times per hour, lasted for more than 8 days, and then started to fade as the other symptoms faded. If the virus attaches to the angiotensin receptor, we believe that it will interfere with antidiuretic and aldosterone hormone's ability to regulate the patient's urine, leading to frequent urination and other symptoms (Hashim, et al., 2021).

2.6.5.C. Conjunctivitis

COVID 19 enters cells through attaching to the ACE2 receptor, which is found in numerous organs. These receptors may be found in the iris, cornea, retina, conjunctiva, and ciliary body of the eye (Zou, et al., 2019).

The presence of ACE2 receptors in the cornea and conjunctiva would make the entry of SARS-CoV-2 through the ocular surface theoretically possible. Conjunctivitis caused by SARSCov-2 has many of the same signs and symptoms of acute viral conjunctivitis, including conjunctival lid edema, periorbital dermatitis, watery eyes, congestion, and follicular response (Sindhuja, et al., 2020).

Conjunctivitis may develop before or after a systemic disease. Furthermore, some individuals diagnosed with COVID-19 may present with conjunctivitis before developing other symptoms, and it might be the only finding without systemic signs (Alrawashdeh, et al., 2021).

2.6.5.D. Dysphonia

COVID 19 patients required medical hospitalization generally develop symptoms after around two months, particularly those who required ICU treatment. Joint discomfort, psychological stress dyspnea, fatigue, and chest

pain, are the most common symptoms. Voice-related symptoms, including vocal alterations and laryngeal sensitivity, have also been documented (Halpin, et al., 2021)

In terms of vocal disorders, a single research looked at the incidence of dysphonia in 702 European Covid 19 patients with mild to intermediate. Dysphonia was found in 27percent of the patients, according to the findings. musculoskeletal pain, Cough, thick sputum, chest discomfort, headache, diarrhea, nausea, weariness, and vomiting were all more common in dysphonic individuals. The dysphonic group had more severe dyspnea, nasal obstruction, sore throat, face pain, ear discomfort, dysphagia, and then the non-dysphonic group (Lechien, et al., 2021).

The voice symptoms that occur following COVID-19 are thought to be associated to both orotracheal intubation and respiratory complications. Vocal issues have been found in clinical practice in conjunction with respiratory symptoms. This is because the respiratory system's integrity is critical for appropriate voice production in terms of generating the air pressure required for phonation. Furthermore, in COVID-19 scenario, certain laryngeal events have been reported as paradoxical movement of the vocal folds, with unknown origins (Coelho, et al., 2018).

Before, during, and after COVID-19, a better understanding of the incidence of vocal clinical symptoms is required. As a result, it is feasible to help patients control their symptoms and enhance their functional recovery (Dassie-Leite, et.al., 2021)

2.6.5.E. Skin disease

The first investigations from China found that SARS-CoV-2 individuals had low rates of skin illness. Only 0.2 percent of the 1099 patients diagnosed in Wuhan had skin signs. The interest in skin symptoms of COVID-19

infection has intensified as dermatologists have been more involved in the fight against the newest epidemic (Guan, et al., 2020)

There were Eighteen patients (20.4 percent) who had skin symptoms in the initial report from Northern Italy, eight of whom had skin symptoms at the onset and ten of whom had skin symptoms after admission. It was unfortunate that there were no images or histology available (Recalcati, 2020).

Most COVID-19 patients in Thailand exhibited dermatological symptoms, according to reports (Mungmungpuntipantip & Wiwanitkit, 2020).

Tibetan patients residing in the high-altitude plateau region, where the illness was often moderate, did not show any dermatological indications. We don't know why there are so many multiple images. One reason might be because dermatologists are involved in the triage process, resulting in a greater proportion of skin problems being detected. Another factor to consider is the environment. In comparison to patients with moderate illness receiving outpatient treatment, patients in the ICU will get greater attention for all potential clinical findings. Additional research is required to see whether genetic factors have a role (Lei, et al., 2020)

2.6.5.E.1. Acro-Ischemia

In severe cases of COVID-19, laboratory results such as elevated levels of D-dimer, fibrinogen and fibrinogen degradation products and delayed prothrombin time may indicate disseminated intravascular coagulation and hypercoagulation. With acro-ischemia, these patients have cyanosis of the toe and finger as well as the appearance of dry gangrene and skin bullae on the skin. Six percent of Spanish COVID-19 patients especially the elderly had

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livedo-like characteristics and necrotic. These results were linked to a 10-percent mortality rate (Galván Casas, et al., 2020)

Three patients who died with COVID-19 illness had hyaline thrombi in their skin micro vessels, according to histopathological examinations of different tissues (Yao, et al., 2020).

2.6.5.E.2. Chilblain like eruptions on fingers and toes

In milder instances of COVID-19, particularly in children and young people, chilblain-like edematous and erythematous eruptions have been noticed, which go away without causing scars following the infection. Asymmetrically dispersed chilblain eruptions are the most common. Pseudo-chilblains were found in 19% of the 375 COVID-19 cases in Spain. They might be itchy or painful, and they usually go away within two weeks (Alramthan & Aldaraji, 2020).

2.6.5.E.3 Chickenpox-like rash

In up to 9% of middle-aged COVID-19 patients, chickenpox-like rash with tiny monomorphic vesicles mostly on the trunk observed (Wollina, et al., 2020).

2.7 Diagnosis of COVID 19

2.7.1 Collection of spacemen for laboratory diagnosis

2.7.1.A Triage: Initial testing should ideally be conducted in a way that is isolated from regular patient community, such as in a tent or a dedicated section of the institution. When testing is deemed necessary, the first laboratory collection will comprise a nasopharyngeal swab for coronavirus disease 19 analysis and further tests as needed (Matos & Chung, 2020).

2.7.1.B. Specimen Collection: Samples for people suspected of being infected with the coronavirus are taken through the upper respiratory tract, although many samples are negative even though the patient has clinical signs and symptoms. As well as, the tests that can be conducted through the lower respiratory tract based on a laboratory examination of sputum to test for the COVID-19 virus by RT-PCR and bacterial strains. In addition, other viral tests are performed for the patient if they are available in the health institution, such as influenza tests (Tran, et al., 2012).

2.7.1.C. Blood Culture: When admitting critically ill patient, collect blood cultures for bacteria associated with pneumonia and sepsis, ideally before antimicrobial therapy. If bacterial pneumonia is suspected, do not delay antimicrobial therapy to collect blood cultures. If available, procalcitonin may be helpful as COVID-19 has been associated with low procalcitonin levels which can minimize antibiotic overuse (Lippi & Plebani, 2020).

2.7.1.D. Confirming COVID-19: Positive predicted value (PPV) and Negative predicted value (NPV) of currently available diagnostic tests (Matos & Chung, 2020).

2.7.1.E. Hospitalized Patients: In hospitalized patients with confirmed COVID-19, repeated upper respiratory tract (URT) and lower respiratory tract (LRT) samples can be collected to demonstrate viral clearance. The frequency of specimen collection will depend on local epidemic characteristics and resources. For hospital discharge, in a clinically recovered patient, two negative tests, at least 24 hours apart, is recommended (Tran, et al., 2012).

2.7.1.F. Personal Protective Equipment (PPE): When collecting samples, wear the proper PPE (airborne precautions for LRT specimens, droplet and contact precautions for URT specimens). Using viral swabs (sterile rayon or Dacron, not cotton) and viral transport medium to obtain URT specimens. Nostrils and tonsils should not be sampled. A single URT sample does not rule out the diagnostic of coronavirus disease 19 in a patient suspected coronavirus disease 19, particularly if the patient has respiratory infections or is sick. Additional URT and LRT specimens are indicated. LRT tests are more likely to be positive and for a longer length of time than URT samples. When LRT samples are easily accessible, clinicians may choose to collect solely those (e.g., tracheal aspirates in mechanically ventilated patients). Because of the increased risk of aerosol transfer, sputum induction should be avoided (Lippi & Plebani, 2020).

2.7.1.G. pregnant patients: Prioritizing coronavirus disease 19 screening of pregnant mother with symptoms to facilitate access to specialist treatment may be necessary (Tran, et al., 2012).

2.7.1.H. Co-infection: MERS, SARS, and coronavirus disease 19 individuals have been discovered to be co-infected with various pulmonary bacterial and viral illnesses. As a consequence, a positive test for a pathogen other than coronavirus disease 19 does not rule coronavirus disease 19 out. In all suspected instances, comprehensive microbiologic investigations are required at this time. Other pulmonary virus, such as rhinoviruses, respiratory syncytial virus, endemic human coronaviruses, human metapneumovirus, parainfluenza viruses, influenza A and B, enteroviruses, and adenoviruses may be examined in both URT and LRT specimens. Bacterial pathogens, such

as Legionella pneumonia, may also be examined on LRT tissues (Matos & Chung, 2020).

2.7.1.I. Malaria-endemic areas: Patients with fever must be checked for malaria or other co-infections using approved thin and thick blood films or rapid diagnostic tests (RDTs) or if they are within coming from malaria-endemic regions, and treated accordingly. When thrombocytopenia is present, arbovirus infection must be investigated in the differential diagnosis of undifferentiated febrile illness in endemic areas. Co-infection with the coronavirus disease 19 virus is possible, and a positive dengue diagnostic test does not rule out coronavirus disease 19 testing (Matos & Chung, 2020).

2.7.2 Diagnosing finding:

A preliminary diagnosis of COVID-19 can be made based on the patient's symptoms, and this diagnosis can be confirmed by the use of reverse transcription polymerase chain reaction (RT-PCR) or other nucleic acid testing of contaminated secretions. In patients who have a high clinical suspicion of having COVID-19 infection, chest computerized tomography (CT) scans, in conjunction with laboratory tests, may be helpful in making a diagnosis of the infection. Serological tests, which look for antibodies that are created by the body in reaction to an infection, are able to determine whether or not an infection has occurred in the past (Corman, et al., 2020).

2.7.2. A Nucleic acid testing (Viral testing)

Real-time quantitative polymerase chain reaction (RT-qPCR) and high-throughput sequencing are the two most often employed nucleic acid detection tools for SARS-CoV-2. High-throughput sequencing of the entire genome of SARS-CoV-2 is the most authoritative way for determining the virus's identity. There are several limitations to using high-throughput sequencing technology as a tool for clinical diagnostics because of its equipment dependency and high costs. So, RT-qPCR is the most common, effective, and simple approach for detecting pathogenic viruses in respiratory secretions and blood (Li, et al., 2020).

Standard for confirming the presence of SARS-CoV-2 is still nucleic acid testing kits, which are now commercially accessible. Two one-step quantitative reverse transcription PCR tests have been developed by Chu's team. To amplify the viral genome, ORF1b and N gene-binding primers were utilized, respectively. It is possible to discriminate between SARS-CoV and other Sarbecoviruses using these newly established assays. Further studies of amplicons that are positive in the RT-PCR results will be necessary to validate the species (Chu, et al., 2020).

Two tests RT-PCR created to use ORF1 and S protein primers, as well as two real-time RT-PCR assays with primers binding to the sequence encoding N protein, which were successful in detecting 25 SARS-CoV-2 positive infected individuals in Japan (Shirato, et al., 2020)

To diagnose novel coronaviruses without virus isolates, Corman et al. created a diagnostic procedure. It is based on similarity to SARS-CoV-2 and synthetic nucleic acid technology to develop three RT-PCR assays. Primers binding to E gene can detect bat-associated SARS-related coronaviruses; RNA-dependent RNA polymerase (RdRp) specific probes were used to distinguish SARS-CoV and SARS-CoV-2, respectively; the assay designed

to amplify the region of N gene was less sensitive so it was not further validated (Corman, et al., 2020).

Normally, patients' throat and nasal swabs in the upper respiratory tract are obtained for nucleic acid testing, which is a quick and easy procedure for doctors to do and causes no discomfort to the patients. However, because new coronavirus mostly infects the lower respiratory tract, the viral load in the upper respiratory tract may not be high enough to be detected, leading to false negatives. Furthermore, because the host immune system influences viral replicative activity, it is possible that someone has clinical symptoms but the virus number is insufficient for detection, resulting in misleading negative results. Furthermore, real-time RT PCR results cannot be used to determine the course and severity of pneumonia. Infected individuals with false negative RNA results pose significant hurdles for medical personnel in terms of providing proper therapy and implementing timely isolation measures. It is clear that relying just on nucleic acid testing to diagnose confirmed COVID-19 cases is insufficient (Peng, 2020).

2.7.2.B. Computerized tomography (CT) scans

Although RT-qPCR is specific for COVID-19 detection, its false-negative rate cannot be overlooked because to the serious ramifications of a missed diagnosis. Because it is more sensitive, many clinicians believe that computerized tomography (CT) scans should be one of the necessary auxiliary diagnostic methods. A combination of repeated RT-qPCR testing plus a chest CT scan may be helpful for people with a strong clinical suspicion of SARS-CoV-2 infection but negative RT-qPCR screening. For early identification and evaluation of disease severity in patients with SARS-CoV-2, high-resolution computerized tomography (HRCT) for the chest is very

important. Several researches have looked at chest CT scans of SARS-CoV-2 infected patients (Pan, et al., 2020).

Chest CT presentations can be separated into three stages based on the location and types of lesions: at the early stage, just a single ground-glass opacity or irregular solid nodules of varied sizes can be detected. Ground-glass opacities with a rounded morphology, reticulation, or crazy paving pattern, and patchy, parenchyma or mixed consolidation dispersed in the center and peripheral area of both lungs may develop as the infection proceeds. Multiple lobe nodules become larger and more numerous. Small pleural effusions may occur in a few patients. More extensive pulmonary consolidation and ground-glass opacities, diffuse pulmonary lesions, increased density of bilateral lungs, and even white lung may develop as the disease advances to a critical stage. In a rare number of individuals, pleural effusions, lymphadenopathy, and an air bronchogram sign may be present. The results of a clinical experiment that used CT ratings to predict the mortality of SARS-CoV-2 pneumonia patients have been published (Fang, et al., 2020).

Bilateral pulmonary parenchymal ground-glass and consolidative pulmonary opacities, occasionally with a rounded shape and a peripheral lung distribution, are shown on CT scan images. Patients infected SARS-CoV and MERS-CoV had lung involvement a chest CT revealed that disease proceeded with ground-glass opacities and consolidation, similar to SARS-CoV-2 infection. CT scans, provide a high clinical diagnostic value for COVID-19, especially where infection is common. On other hand CT image have significant ability distinguish viral pneumonia and the hysteresis of aberrant CT imaging (Ajlan, et al., 2014).

2.7.2.C. Antibody detection

Antibody tests, detect the individual who are asymptomatic and those who ever been infected. Within 1–3 weeks following the onset of disease, Immunoglobulin M (IgM) and Immunoglobulin G (IgG) and antibodies in the serum of infected persons appear simultaneously or sequentially. The main antigens for identifying antibodies generated by SARS-CoV-2 infection are N and distinct types of S protein. Antibody test can be used to analyze several aspects of the immunological response and function of antibodies generated by virus infection (Long, et al., 2020).

For identifying neutralizing antibodies against SARS-CoV-2, Nie et al. designed a pseudo virus-based neutralization assay employing a vesicular stomatitis virus pseudo viral manufacturing method. The virus was pseudo typed with the full-length spike protein of SARS-CoV-2, simulating viral attachment and entrance during the infectious process. This assay is substantially safer and can be done in laboratories with a BSL-2 classification (Nie, et al., 2020)

2.7.2.D. Other diagnosis methods

In China, a clinical trial is being conducted to evaluate a quick diagnostic kit for identifying IgM/IgG for new coronavirus pneumonia (ChiCTR2000029870). The clustered regularly interspaced short palindromic repeats (CRISPR) Cas system is characterized by its rapid speed, high specificity, and sensitivity when used as a diagnostic tool. For SARS-CoV-2 detection, a fast-diagnostic technique can be performed. Zhang et al. have released a thorough procedure for detecting COVID-19 utilizing the CRISPR-based Specific High-sensitivity Enzymatic Reporter Unlocking (SHERLOCK) technology. The data can be read out in less than an hour without PCR amplification (Hou, et al., 2020).

Revers Transcription Loop-Mediated Isothermal Amplification (RT-LAMP), used for quick diagnoses that can identify the virus in saliva, urine, serum, oropharyngeal swabs, and nasopharyngeal swabs within 30 minutes (Lamb, et al., 2020).

Isothermal LAMP-based system with a power of hydrogen (pH) indicator that can detect coronavirus colorimetrically. This test is extremely sensitive, detecting as few as 10 copies of the ORF1ab gene within 15 to 40 minutes. These two techniques are faster, more precise, and can be done with less equipment than RT-PCR (Yu, et al., 2020).

2.8 Preventive measures **of COVID 19**

The present approach for limiting the spread of cases is based on preventative measures. To avoid future spread, earlier testing, identification, quarantine, and therapy are essential. Strategies for preventing the spread of disease are centered on patient quarantine and meticulous infection management, including necessary steps to be taken during the diagnosis and treatment of a diseased person (Guner, et al., 2020).

2.8.1. Vaccine

An identical vaccine is being developed to confer immune defense against SARS-CoV-2, the virus that causes COVID-19 (coronavirus disease 2019). SARS and MERS were both caused by coronaviruses that had been studied extensively prior to the outbreak of COVID-19. As a result of this information, different vaccine platform began to be developed more quickly in early 2020. Early vaccinations were designed to prevent symptoms, sometimes severe, sickness from developing. As of January 10, 2020, GISAID had revealed the genetic sequence of SARS-CoV-2 through

GISAID, and by March 19, the worldwide drug manufacturing sector had pledged a big commitment to combating COVID-19. This disease has been reduced in severity and mortality thanks to the COVID-19 vaccinations (Padilla, 2021).

People who are most at risk of problems, such as those most likely to be spread infection and exposed (healthcare staff) or the elderly, are given priority in many nations' phased distribution strategies (Beaumont, P. 2020).

According to official statistics from national public health organizations, 11.29 billion dose of coronavirus disease 19 vaccinations had been delivered globally as of March 31st, 2022. More than 10 billion vaccine doses were preordered by December 2020, with high-income nations purchasing nearly half of those doses, accounting for 14 percent of the global population (So & Woo, 2020).

2.8.2. Respiratory hygiene and face masks

Masks that have an exhalation valve the valves are a vulnerable site that might facilitate the spread of viruses. The WHO and CDC propose that persons use non-medical facial masks in communal places with a high potential of transfer and when it is hard to keep social distance. This guideline is intended to decrease the transmission of the illness by pre-symptomatic and asymptomatic persons and is intended to supplement proven preventative strategies such as social isolation. Facial covers reduce amount and range of particles expelled when coughing, speaking, and breathing (European Centers for Disease Control 2020).

A covering for the face that does not have any vents or holes in it will reduce the risk of infection by filtering out virus-containing particles from air

that is breathed and exhaled via the body. However, if mask has an expiration valve, a person who is infected with the virus but has no symptoms may still be able to spread it to others while wearing it, regardless of whether or not they have been certified to do so. Therefore, masks equipped with an inhalation valve are not appropriate for those who are sick and cannot be relied upon to put a halt to the pandemic on a big scale. In order to control the spread of the virus, a number of nations and local governments have implemented policies that encourage or require members of the general public to wear face masks or other types of facial coverings made of fabric (Centers for Disease Control and Prevention [B] 2020).

People who have been infected and those who are caring for someone who has the sickness should wear masks. When coughing or sneezing without mask, CDC suggests cover nose and mouth with a tissue and if tissue is not available using the inside of the elbow. After sneezing or coughing, it is advised to wash hands. In addition to additional personal protective equipment, healthcare practitioners who engage directly with persons have coronavirus disease should use respirators that are at least as protective as N95 or comparable (European Centers for Disease Control 2020).

2.8.3. Avoiding crowded indoor spaces and ventilation

Centers for Disease Control advises people to avoid congregating in confined settings. An increase in air movement and decrease in the usage of indoor-air-conditioning systems may help to prevent transmission in the workplace. Ventilation and air filtration in public places are recommended by the WHO to aid in the removal of infectious aerosols (Bazant & Bush, 2021).

Compromised ventilation may cause a buildup of exhaled respiration particles. Excessive physical effort, such as exercising, screaming, or singing in a public place, increases the chance of catching COVID-19 disease. The

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risk of infection rises with more time spent in these settings, usually greater than 15 minutes (Agarwal, et al., 2021).

2.8.4. Hand hygiene and washing

It is necessary to practice careful hand cleanliness after every occurrence of sneezing or coughing. In addition, the World Health Organization advises that people wash their hands often with soap and water for at least twenty seconds at a time, particularly after using the restroom or when their hands are obviously unclean, as well as after blowing their noses and before eating. In situations when you do not have access to water and soap, the Centers for Disease Control and Prevention advises using an alcohol-based sanitizer that contains at minimum Sixty percent of alcohol (COVID-19 and Your Health. 2021).

The World Health Organization provides two different recipes that may be used for the production of local sanitizers in areas that do not have easy access to commercial products. Antimicrobial action is derived from isopropanol or ethanol in these formulations. Antiseptic hand hygiene products don't utilize hydrogen peroxide since it is not an active chemical for hand antisepsis, according to the manufacturer's instructions. As a humectant, glycerol is used (World Health Organization - recommended handrub formulations. 2020).

2.8.5. Social distancing

The term social distancing, which is synonymous with physical separation, refers to infection control measures that aim to impede the progression of a disease by reducing the amount of personal contact that exists

between people. Techniques like travel restrictions and quarantines as well as the closure of locations like sports stadium, offices, schools, and movie theaters are all options. Self-imposed social exclusion may be achieved in several ways, including the following: remaining home, traveling less, keeping away from congested locations, utilizing no-touch greetings, and even physically isolating oneself from other people. As a result, several governments are imposing or encouraging social isolation in areas where the epidemic has been confirmed (Wilder-Smith, A., & Freedman, D. O. 2020).

Due of overcrowding and a lack of social separation, prison outbreaks have occurred. Coexisting cardiac & respiratory illness in the prison population in the U.S. puts many of them at risk for poor results with COVID-19 (World Health Organization. 2020).

2.8.6. Quarantine

The use of quarantine is one of most time-tested and proven methods for preventing and controlling the spread of contagious diseases, this method of public health protection was widely utilized in Italy during the fourteenth century. Individuals who may not be ill but may have been exposed to an infective agent or disease are placed in quarantine so that their symptoms can be monitored and so that early cases of the disease can be identified. This can take the form of restricting the activities of these individuals or isolating them from one another. Quarantine is not the same as isolation, which refers to the practice of separating sick or diseased individuals from the general population in order to stop the spread of an illness or pollution (Guner, et al., 2020).

Quarantine is the most successful strategy in lowering the number of diseased and dead people, according to the available research in the literature.

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(Pan, et al., 2020). It has shown to be much more successful in nations that have implemented strong quarantine policies from the start. Results show that quarantine may lower the numbers of infected by 81 percent to 44 percent and the number of dead by 61 percent to 31 percent, according to a Cochrane Library paper that evaluated 29 research (Mayr, et al., 2020).

The term contact refers to a person who is active in any of the activities listed below for at least two days before to the development of symptoms in the patient and for at least fourteen days after the onset of those symptoms (Guner, et al., 2020):

- Spending more than 15 minutes face-to-face with a coronavirus disease 19 patient within one meter.
- Caregiving for coronavirus disease 19 illness sufferers without sufficient personal protection equipment.
- Being in close proximity to a coronavirus disease 19 patient for any length of time, such as in the same job, school, or family.
- Coronavirus disease 19 patient must be kept at least 1 m away from any sort of transportation vehicle at all times.

2.8.7. Lifestyle and healthy diet

adequate sleep, psychological tension management, regular exercise, and nutritious meal are all recommended by public health school. Even though a person's body mass index (BMI) is considered a risk factor for COVID-19, consistent 150-minutes-of-exercise-or-similar physical activity was shown to reduce the probability of admission to hospital and mortality. Vitamin D treatment in SARS-CoV-2 confirmed cases has the ability to

significantly influence patients with both moderate and severe symptoms, according to a meta-analysis released in October 2021 (Harvard, 2020).

2.8.8. Disinfection and Cleaning

Daily disinfection of high surfaces such as bedside tables and door knobs with a basic home disinfectant containing a diluted bleach solution is recommended (that is, 1-part bleach to 99 parts water). 70 percent ethanol may be used to clean areas that cannot be cleaned with bleach. Using a diluted bleach solution, clean and disinfect toilets and bathrooms (one-part bleach to 9 parts water to make a 0.5 percent sodium hypochlorite solution). When cleaning or handling surfaces, clothes, or linen stained with bodily fluids, disposable gloves should be worn. Before disposing of used disposable hazardous goods with another household garbage, store them in a lined container. Machine-washed items including clothes, linens, and towels should be cleaned using a standard laundry detergent and water at 60–90°C or with ordinary laundry soap and water (Guner, et al.,2020).

Wear disposable gloves while touching filthy objects, clothes, or linen to prevent the spread of bacteria. Containers should be lined with trash bags to prevent hazardous material from being mixed up with ordinary household trash (Guner, et al.,2020).

2.9. Treatment strategies for COVID-19:

For SARS-CoV-2 infection, there is presently no clinically validated targeted antiviral medication present. The most critical care method is supportive treatment, which includes fluid conservation, supplemental oxygen, and the prescription of broad-spectrum antibiotics to cover

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subsequent bacterial infection. There are various possible treatment strategies to repurpose current antiviral medications or build effective interventions against this new coronavirus, according to studies on molecular processes of coronavirus infection and the genomic structure of SARS-CoV-2 (Lu, et al., 2020).

2.9.1. Antiviral agents

2.9.1.A. Remdesivir

Ebola virus, MERS-CoV, and SARS-CoV are all RNA viruses. have exhibited broad-spectrum antiviral activity against Remdesivir, a nucleotide analogue that inhibits RNA-dependent RNA polymerase. Remdesivir was given intravenously by the Washington Department of Health in the hopes of protecting patients against SARS-CoV-2 infection. It was discovered that chloroquine and remdesivir are very efficient against SARS-CoV-2 infection with low EC50 values and strong selective indexes in vitro. In the first instance of new coronavirus infection in the United States, intravenous injection of remdesivir significantly improved the patient's clinical status, however this could not be attributed to the drug's impact. The effectiveness and safety of remdesivir in the treatment of mild to severe COVID-19 are currently being studied in clinical studies (Grein, et al., 2020).

2.9.1.B. Arbidol

Arbidol is approved for the management of influenza and other pulmonary viral diseases primarily in Russia and China. An antiviral and a host-targeting agent, it has a wide range of antiviral and host-targeting activities, which include inhibition of viral entrance, fusion, replication and

assembly, budding, and activation of the human immune reaction (Blaising, et al., 2014).

Li Lanjuan, a well-known Chinese epidemiologist, stated in February 2020 that arbidol and darunavir have inhibited the multiplication of novel coronavirus in vitro in early testing. She suggested treating pneumonia patients with SARS-CoV-2 infection with arbidol and darunavir. Patients infected with a new coronavirus and given arbidol in Wuhan and Shanghai exhibited substantial indicators of pneumonia improvement (Wang, et al., 2020).

2.9.1.C. Lopinavir/ritonavir

As a powerful protease inhibitor for human immunodeficiency virus (HIV-1) infection, the FDA has given its approval to the combination medicine lopinavir/ritonavir, which comes in a fixed dosage form. MERS-CoV and SARS-CoV infection may be treated with lopinavir/ritonavir. According to molecular dynamics simulations, lopinavir/ritonavir can bind to the active site of SARS-CoV 3CLpro. Patients administered with lopinavir/ritonavir showed a lower viral load, improved clinical results, and less side effects, according to an open clinical study performed in Hong Kong during the SARS-CoV epidemic in 2003 (Chan, et al., 2015).

2.9.2. Chloroquine and hydroxychloroquine

As an antimalarial and autoimmune disease medicine, chloroquine has been found to be a potential broad-spectrum antiviral agent. In addition to raising the endosomal pH necessary for viral/cell fusion, chloroquine has been shown to inhibit virus infection by interfering with the glycosylation of

SARS-CoV cellular receptors. The initial findings from over Hundred cases indicated that chloroquine had an apparent effectiveness in terms of reducing pneumonia exacerbations, symptom duration, and viral clearance delay, all without causing serious adverse effects. For the treatment and prevention of pneumonia associated with COVID-19, chloroquine was added in the guidelines (Gao, et al., 2020).

2.9.3. Corticosteroids

Corticosteroids were given to (21%) of infected patients, which may help to reduce respiratory disease. The amount of methylprednisolone given depended on the degree of the condition. The World Health Organization's interim advice on the medical treatment of severe acute pulmonary illness when SARS-CoV-2 infection is suspected. The use of corticosteroids is not supported by the clinical outcomes of coronavirus and comparable epidemics. Patients who received corticosteroids were more likely to need ventilators, vasopressors, and renal restoration treatment. Corticosteroid therapy was linked to psychosis, hyperglycemia, and avascular necrosis in the therapy of SARS. Corticosteroids may be hazardous to patients with COVID-19 infection, and there is no reason to assume that they would be beneficial. However, our clinical experience shows that corticosteroids may be given appropriately for the right individuals at the right time (Zhai, et al., 2020).

2.9.4. Antibodies

Vaccinations and therapeutic antibodies might have a significant impact. Anti-SARS-CoV antibodies were tested for cross-reactivity with the COVID-19 spike protein due to the significant degree of similarity between the receptor-binding domains (RBD) of SARS-CoV-2 and SARS-CoV.

Antibodies that neutralize pathogens are mostly induced by the spike protein. Antibodies 230, m396 and 80R directed against the SARS-CoV RBD are able to bind to the COVID-19 RBD. For the treatment and prevention of COVID-19 outbreaks, CR3022, alone or in combination with other neutralizing antibodies, may be a possible therapeutic option (Tian, et al., 2020).

A significant amount of time is required to generate antibodies that are specific to COVID-19. It is not simple to rapidly use monoclonal antibodies in clinical practice for novel pathogens because of the complexity of the process (Wrapp, et al., 2020).

2.9.5. Transfusion of convalescent plasma

In the management of SARS, convalescent plasma was provided after appearance of symptoms, and the aggregated chances of death after therapy were lower when comparing to placebo or no medication. However, in 84 patients with Ebola virus illness, the transfusion of up to 500 milliliters (mL) of convalescent plasma was not linked with a significantly improved chance of survival. During an experiment in the laboratory, coronavirus disease 19 virus was extracted from the bronchoalveolar lavage fluid of a patient who was in critical condition. The virus was able to be rendered harmless by the sera of many individuals. Convalescent individuals were encouraged to give blood by the National Health Commission of China (NHCC) in order to aid in the fight against the coronavirus disease 19 virus. In order to achieve a high neutralizing antibody titer, it is recommended that convalescent plasma be obtained no more than two weeks following recovery. Its therapeutic applicability is severely restricted due to the challenging nature of getting plasma during convalescence. It is necessary to conduct clinical tests that are carefully developed in order to further examine the effectiveness and safety

of convalescent plasma treatment in individuals who have an infection caused by coronavirus disease 19 (Zhou, et al., 2020).

2.9.6. Vaccines

The structure of the S protein from the SARS-CoV-2 virus has been solved, and this could make it possible to rapidly design and evaluate medicinal countermeasures to address the current public health crisis. These data will be used to guide future research towards improving vaccine tactics for this developing virus. The bulk of coronavirus vaccines are designed to attack the spike glycoprotein or S protein. Vaccine research takes time, and no vaccinations are currently available in the event of a pandemic. For instance, an outbreak of the Ebola pandemic started in 2013, and 3 years later, Ebola Vaccine was chosen for phase 1 clinical trials in Africa and Europe for its safety and immunogenicity (Wrapp, et al., 2020).

Vaccine, known as mRNA-1273, is ready for human testing. Developing a first vaccination within weeks after discovering the SARS-CoV-2 genetic sequence is a remarkable feat of time management. The safety and immunogenicity of mRNA-1273 in the treatment of COVID-19 are now being studied in a clinical study. Tianjin University has effectively produced an orally SARS-CoV-2 vaccine that employs food-grade safe S. cerevisiae as a carriers and targeting the S protein. SARS-CoV-2 vaccines are being developed by 18 Chinese biotechnology businesses and universities. For SARS-CoV-2 vaccines, collaboration among scientists from across the globe and fast-track approval by Chinese health institutions have made it possible for them to be created considerably more quickly than for Ebola (Wrapp, et al., 2020).

2.10 Complications of COVID 19

2.10.1 Pulmonary embolism

Despite the fact that pulmonary embolism is not a well-established consequence of respiratory distress, which reflects a hypercoagulable condition in general, critical illness and the accompanying lengthy hospital stay do constitute a hypercoagulable state. However, ARDS caused by COVID 19 infection looks to be a more complicated issue. There has recently been evidence supporting the function of empiric anticoagulant in infected patients with a high D-dimer level. This finding has been linked to hypercoagulability and the possibility of pulmonary microthrombosis. In COVID 19 infected patients hospitalized to the critical care unit, Klok et al. found a higher rate of thrombotic problems (ICU). A large incidence of venous thromboembolic events (VTE) were detected within 24 hours after admissions, according to current research. This indicates that such occurrences occur early in the illness process and are not primarily a result of severe sickness or protracted hospitalization (Akel, et al., 2020).

2.10.2 Myocarditis

Myocarditis have been linked with SARS-CoV2, MERS-CoV and SARS-CoV as complication. The first case of myocarditis caused by a coronavirus was discovered in 1980 when a 43-year-old male with acute pulmonary disease was admitted to the hospital in Helsinki with a high temperature, fatigue, and chest discomfort. There was a considerable rise in coronavirus-specific antibody in the patient's blood tests, demonstrating that

coronaviruses may cause recurrent myocarditis in additional to the initial upper respiratory tract infection (Doyen, et al., 2020).

Cardiovascular enzymes, electrocardiogram (ECG) and echocardiography changes have been seen in individuals with COVID-19, suggesting acute myocardial damage. Even though endomyocardial biopsy (or autopsy) data were available in just a few of these trials, they were sufficient to discriminate between sterile injury to the heart and myocarditis. A 63-year-old man with no prior history of cardiac problems or hypertension was diagnosed with fulminant COVID-19–related myocarditis after his originally came with symptoms associated with pneumonia. As further testing was done, it was found that there were high IL-6 levels as well as high troponin I and N-terminal brain necrosis factor concentrations in the bloodstream (Sala, S., et al., 2020), (Irabien-Ortiz, et al., 2020).

Pulmonary hypertension, huge left ventricle muscle, myocardial dyskinesia and reduced left ventricular efficacy, all of which were detected by echocardiography. Cardiac Magnetic Resonance Imaging (CMR) and postmortem investigation of fatal cases and endomyocardial biopsies have now identified more instances of coronavirus disease 19 related myocarditis. Acute cardiac damage was seen in 12percent of patients with laboratory-confirmed coronavirus disease 19 who are admitted to specialized hospital in China (Inciardi, et al., 2020)

2.10.3 Myocardial fibrosis

Patients with COVID-19 have been documented to have diffuse and localized myocardial fibrosis in their hearts, which may develop in the absent of cardiac abnormalities. According to a research, late gadolinium

enhancement in CMR revealed edema and fibrosis in 7 out 26 individuals who healed from coronavirus disease 19 but subsequently had cardiac symptoms. A case description of a 45-year-old female without history of myocarditis who came with palpitation and unusual chest discomfort three months after developing coronavirus disease 19 revealed diffuse interstitial fibrosis on CMR (Jagia, et al., 2020).

A previously healthful 49-year-old man came with dyspnea six weeks following a beginning of coronavirus disease 19 symptoms, and similar widespread fibrosis results were found. Furthermore, postmortem findings in Fourteen COVID-19 patients indicated localized fibrosis of myocardial in six instances; Despite this, every single one of them had a previous history of a heart attack (Basso, et al., 2020).

2.10.4 Vasculitis and dysfunction of endothelial cells

Immune system responses, inflammatory responses, coagulation, and platelet function are all regulated by endothelial cells. As a consequence, these cells have an important role in variety of COVID-19-related diseases. endothelial cells malfunction and vasculitis are thought to be among additional pathways that may underpin coronavirus disease 19 induced myocarditis, despite the fact that they are now regarded one of the primary cardiovascular consequences of COVID-19 (Siddiqi, et al., 2021).

Endothelial malfunction and circulatory integrity disturbance may result from direct viral infection of endothelial cells through the SARS-CoV-2 receptors ACE2 and TMPRSS2, which are expressed on endothelial cells. In COVID-19 patients, hyperinflammation and hypercoagulability have also

been documented as side effects of endothelial cells malfunction. Infected individuals had increased ACE2 expression, which was linked to breakdown of cell junctions, altered endothelial morphology, cell swelling, and cell detachment from the basement membrane in postmortem investigations (Ackermann, et al., 2020).

Endothelial cells have been shown to express genes involved in immunomodulation, leukocyte activation, cytokine generation, and antigen presentation. When compared to other organs, lung endothelial cells have a greater abundance of these transcripts. Endothelial cells play an important role in the development and persistence of inflammation, according to these findings. Additionally, SARS-CoV-2 binding to ACE2 hinders the enzyme's activity, resulting in bradykinin buildup and enhanced vascular permeability (Teuwen, et al., 2920).

The occurrence of thrombotic episodes also is prevalent in COVID-19 patients, particularly who admitted to intensive care. The basement membrane is exposed to circulating platelets when Endothelial cell integrity is disrupted, causing platelet aggregation and thrombosis. In addition, in response to IL-1 and TNF-, Endothelial cells produce P-selectin, vWF, and fibrinogen, leading platelet to direct adhere to ECs and become active. Hypercontractility of activated Endothelial cells may cause cell-cell connections to be disrupted and vascular leakage to occur. (Teuwen, et al., 2020).

2.10.5. Thrombotic events

The occurrence of thrombotic events is also prevalent in coronavirus disease 19 patients, especially those referred to critical care. Emboli and microthrombi were found in the lungs and various organs, including the brain,

during the autopsies of four COVID-19 patients. Disease severity and death have been linked to the presence of emboli. Patients with coronavirus disease 19 have a complex etiology for their prothrombotic condition. Platelets are activated and recruited as a consequence of EC damage, which exposes collagen in the extracellular matrix (Teuwen, et al., 2020).

Platelets and leukocytes are attracted to active ECs by a variety of cell attachment molecules, include P-selectin. Predisposition to coagulopathy is also induced by an overactive inflammatory response, with increased proinflammatory cytokines (Grosse, et al., 2020).

Disseminated intravascular coagulation, that is frequent in critically sick patients, and hyperferritinemia, which is linked to macrophage activating syndrome, are further variables that contribute to a hypercoagulable condition and subsequent thrombus development. ICU admission also prolongs immobilization and venous stasis in patients who need mechanical breathing, which worsens coagulopathy and often complicates the illness course. Blood thinners may reduce fatality in coronavirus disease 19 patients who are hospitalized, according to certain studies (Chen, et al., 2020).

2.10.6. Cardiac arrhythmias

Arrhythmia is a possible complication in coronavirus disease 19 patients. Seven percent of the 137 SARS-CoV-2 patients hospitalized in China, reported having cardiac arrhythmias as a first symptom. The arrhythmia rate was much greater, at (16.7) percent, in 138 verified coronavirus disease 19 instances, in a different Chinese study. Sinus tachycardia is shown to be the most prevalent kind of arrhythmia in individuals with coronavirus disease 19. It is not entirely apparent if sinus

tachycardia is caused by an increase in cardiac output as a result of inflammatory stress, hypoxia, fever, or medicines, or whether it is caused by changes in the structure of the myocardium (Liu, et al., 2020).

A research that included 700 individuals who were hospitalized due to a coronavirus disease 19 infection found that there were 25 cases of atrial fibrillation (AF), Nine cases of bradyarrhythmia, and Ten cases of no sustained ventricular tachycardia (NSVT). In addition, admission to the ICU was linked to occurrences of AF and NSVT. Additionally, on the electrocardiograms (ECGs) of (27.5) percent of the patients who admitted to the intensive care unit, atrial arrhythmias were detected, but none of the patients who were treated in a setting other than the ICU had this finding. Patients diagnosed with coronavirus disease 19 who have severe conditions may also have ventricular arrhythmias, which puts these patients at risk for cardiogenic shock and necessitates additional evaluation to evaluate whether or not extracorporeal membrane oxygenation is required (Bhatla, et al., 2020).

Myocarditis, myocardial inflammation, interstitial tissue edema, medication side effects, and fibrosis are some of the underlying processes that cause cardiac arrhythmias in coronavirus disease 19 patients, leading to ion channel dysregulation (Na+ and K+), conduction abnormalities and structural alterations. However, the appearance of a new tachyarrhythmia in a patient, together with an increase in blood cardiac biomarkers, might indicate myocarditis (Driggin, et al., 2020).

2.10.7. Dysautonomia

Medically, dysautonomia is disorder of the autonomic nervous system (ANS) that occurs when the sympathetic or parasympathetic components

malfunction or overwork. There have been reports of this syndrome in people with coronavirus disease 19 as a severe acute symptom or as part of the chronic sequelae of a prolonged illness known as long COVID (Miglis, et al., 2020).

Complaints of orthostatic intolerance, such as sleep difficulties palpitation, chest discomfort, lightheadedness, headache, presyncope, gastrointestinal symptoms, shortness of breath, and exhaustion, may be present in certain individuals with long-term coronavirus disease 19. Although the etiology of postural orthostatic hypotension in coronavirus disease 19 is still unclear, many processes, such as invasion of the sympathetic nervous system, hypovolemia, medullary centers in the brainstem, and autoimmune, are possible causes (Farshidfar, et al., 2021).

2.10.8. Complications of gastrointestinal

Several extrapulmonary symptoms, including nausea, vomiting, diarrhea, gastrointestinal bleeding, stomach discomfort, and anorexia, have lately been recorded in coronavirus disease 19 patients, with concomitant consequences ranging from moderate non-pneumonic diseases to respiratory failure (Tian, et al., 2020).

Extrapulmonary signs might be readily neglected and underestimated due to the predominance of pulmonary indications, leading in a delayed diagnosis of coronavirus disease 19 in individuals with main Gastrointestinal abnormalities. Serious Gastrointestinal problems have been seen more often in critically sick individuals. In coronavirus disease 19 patients, gastrointestinal problems such as acute calculous cholecystitis, ileus,

intestinal ischemic and severe liver necrotic, have been described, especially in those hospitalized to ICU (Pan, et al., 2020).

Gastrointestinal ischemia is a rare medical disorder that occurs when gut hypoperfusion occurs due to any cause. Coronavirus disease 19 probable vasculopathy or coagulopathy may enhance the risk of thromboembolic events and related ischemia, according to recent research. Extremity pulmonary embolism and venous thrombosis are mentioned in the majority of reported papers. Thromboembolic events in the gastrointestinal system, such as mesenteric ischemia, are particularly dangerous because they represent a potentially lethal medical urgency with a high fatality rate (Klok, et al., 2020).

Several pathophysiological processes were proposed to explain Gastrointestinal ischemia in coronavirus disease 19 patients, including vasculopathy, endothelial dysfunction, hypercoagulable condition, inflammation, and immobility (Bikdeli, et al., 2020).

It's not apparent if coronavirus disease 19 causes arterial thromboembolic events or whether they're just a coincidence. A very high clinical suspicion index and low threshold for cross sectional imaging and clinical screening of Gastrointestinal symptoms in the era of coronavirus disease 19 is advocated because of the probable danger of Gastrointestinal ischemia development and its associated consequences that may need urgent surgical intervention. In the absence of complete and inclusive data, we methodically analyzed the consequence of the imaging findings of verified coronavirus disease 19 patients with Gastrointestinal ischemia problems and made our diagnosis (Keshavarz, et al., 2021).

In additional to Gastrointestinal symptoms, people with significant coronavirus disease 19 show increased hepatic enzymes and a greater

incidence of hepatic damage, nearly (76.3) percent of coronavirus patients showed negative hepatic examinations, and (21.5) percent suffered hepatic damage during their hospitalization. There was a substantial increase in the incidence of pulmonary disease in patients who had abnormalities hepatic functional testing, specifically increased alanine and aspartate aminotransferase (ALT/AST). Numerous researches have confirmed these results, and various different methods for how they could occur have presented (Bloom, et al., 2021).

Patient with coronavirus have been documented to have pancreatic damage. Angiotensin converting inhibiter II seems to be expressed in both islet cells and exocrine of the pancreas, according to single-cell RNA sequencing, percent demonstrated serologic indications of exocrine pancreas damage, identified as increased lipase or amylase (Wang, et al., 2020).

Acute pancreatitis has been reported in a few patients, the disease also on endocrine pancreas and influence on glucose control. in addition to exocrine damage individuals may have to develop diabetes (Bohn, et al., 2020).

As a result of viral-induced pancreatic malfunction and immunological imbalance as well as related coagulopathy and vasculopathy, coronavirus disease 19 seems to worsen diabetic problems in individuals. (Drucker, 2020).

2.10.9. Renal Injury and Failure

Acute kidney injury is believed to impact about (20–40) percent of critically sick patients who admitted to the intensive care, needing extracorporeal support therapies and renal replacement treatment, and is now

regarded a useful prognostic predictor for coronavirus disease 19 survival (Cheng, et al., 2020).

Early detection and optimal therapy choices need a knowledge of the complex and pathophysiological processes of renal failure in COVID-19 research showed that viral particles investigation of (26) postmortem coronavirus disease patients which revealed direct virulence in tubular epithelium and podocytes (Su, et al., 2020).

Protein leakage, mitochondrial failure, acute tubular necrosis, are thought to ensue from direct SARS-CoV-2 infections, kidney dysfunction may be caused by uncontrollable ischemia, cytokine production, and thromboembolism. This kind of renal damage is characterized by volume depletion, intrarenal inflammation, and increased vascular permeability (Bohn, et al., 2020).

2.11. Analysis of Bloom's taxonomy

Learning is all around us. As we go about our everyday routines, we have the opportunity to gain new physically and mentally abilities. There is no such thing as a certain time or place for learning. It's a gradual process, not an event. The numerous ways we take in information, analyze it, link it, catalog it, and utilize it culminate in the constant development and alteration of the brain's architecture. Cognitive, emotional, and psychomotor are three categories subdivided of learning. There are many degrees of learning within each topic, ranging from the most basic and superficial to the most complicated and in-depth. It's noteworthy to note that although the cognitive and affective taxonomies were established in 1956 and 1964, the psychomotor domain wasn't properly defined until the 1970s. (Hoque, 2016).

Benjamin Bloom created and introduced his taxonomy at the beginning of 1956. Its main goal was to guarantee that learning became more than a mechanical act or process of recalling things in a predetermined order. To show the progression of the learning prototype, a pyramid was created. goal of its creation was to make it easier to write learning goals and course outcomes as students progressed in their study (Rupani, 2011).

The goal was to guarantee that learning outputs were constructed in such a way as to allow instructors to progressively lead students from obtaining subject knowledge to its practical application in the real world, and then to their own interpretation of the same (Riazi, 2010).

Two models of taxonomy that have been used to date: One is based on Bloom's taxonomy as originally provided in 1956, while the other is based on Bloom's taxonomy as updated in 2001. As a first step in both, information is conveyed simply to guarantee that students have a working knowledge of a phenomena; this is followed by an understanding stage, and finally an application stage, when the knowledge is put into practice (Orey, 2010).

The next step is assessment, which allows students to analyze the obtained material in terms of its application and critically appraise how it might be adjusted to meet the requirement. Finally, there is the phase of invention, which is regarded as the greatest degree of accomplishment, wherein new knowledge or ideas are formed depending on previous stages' learning experiences (Paul, et al., 2012).

According to a number of studies, motivation is critical to the success of any program. Learning and teaching methods, intrinsic motivation, the intended trajectory of career choices (Boud, 2013).

Higher-level learning is more self-directed, creative, and intrinsic. Adult learners' desire to study might be harmed by placing them in a hierarchical organized learning environment, since much of the evaluation is dependent on program goals (Mickes, et al., 2010).

"The myth is that learning can be guaranteed if instruction is delivered systematically, one small piece at a time, with frequent tests to ensure that students and teachers stay on task. Elaborate instructional programs and systems are produced, glossily packaged and extravagantly advertised, claiming impossible levels of effectiveness and playing continuously on parental guilt. Detailed, objectives specified for the particular model of instruction that teacher should be engaged in at any particular time, and equally detailed tests are imposed to ensure conformity to the chosen path, no manner how much confusion, frustration, and despair result" (Paul, et al., 2012).

2.11.1. Cognitive Domain

1- **Knowledge:** the ability to remember and retain information.

2- **Comprehension:** difficulties and instructions should be interpreted, interpolated, understood, and translated. In own terms, describe an issue. Determine the connections between values, generalizations, dates, and principles.

3- **Application:** Use of a term or notion in a novel context or without prompting. Applies classroom knowledge to unfamiliar problems in the workplace. Enhance knowledge transfer to novel or unusual contexts.

4- **Analysis:** The process of breaking down information or ideas into their component elements so that their organizational structure may be

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comprehended. Makes a clear distinction between facts and conclusions drawn from them.

5- **Synthesis**: From several components, constructs a pattern or structure. Assemble elements to make a whole, focusing on developing a novel structure or meaning.

6- **Evaluation:** Perform evaluations of the worth of concepts or resources (Hyder & Bhamani, 2016).

2.11.2. Measurable verbs for bloom's taxonomy

Benjamin Bloom developed a taxonomy of measurable verbs with the purpose of assisting people in accurately describing and organizing observable attitudes, capacities, actions, skills, and knowledge. The concept behind this hypothesis is that there are varying degrees of visible behaviors that point to the existence of certain processes taking place in the brain (cognitive activity) (Herrnstein & Murray, 2010).

Bloom's taxonomy was updated by Anderson and Krathwohl (2001) to meet the more outcome-oriented current educational aims, including changing the titles of the levels from noun to active verbs and rearranging the sequence of the top two levels. Remembering was created from the lowest level (Knowledge), in which the learner was required to remember or recall knowledge. Understanding evolved from comprehension, with the pupil explaining or describing topics. Using the knowledge in a different manner, such as interpreting, selecting, or writing, became Applying. The word analysis was changed to analyzing, and learner required to distinguish between distinct components or connections, exhibiting the capacity to contrast and compare. These four levels are the same as they were in the original structure (Paul, et al., 2012).

In general, throughout the previous 40 years of study, these levels have been established as a hierarchy (Anderson & Krathwohl). Anderson and Krathwohl introduced a framework of knowledge dimensions within these processing levels are employed, additional to modifying the taxonomy (metacognition, procedural, conceptual, and factual). The Iowa State University Center for Excellence in Learning and Teaching has a great visual description of how these two taxonomies might be used to develop lecture goals. In the updated paradigm, the two highest, most complicated stages of Evaluation and Synthesis were called Creating and Evaluating (Anderson, & Krathwohl, 2001).

2.11.3. Revised Bloom's Taxonomy

Create lesson plans and discussion questions that are connected with Bloom's Taxonomy to guarantee that your students' thought grows to higher levels. The updated taxonomy is as follows: (Hyder & Bhamani, 2016).

1- **Remembering:** Recall words, facts, fundamental ideas, and responses from previously taught information to demonstrate memory.

2- **Understanding:** Organize, compare, translate, interpret, provide descriptions, and state essential concepts to show comprehension of facts and ideas.

3- **Applying:** Apply principles, strategies, concepts, and learned information in novel ways to resolve issues in novel contexts.

4- **Analyzing:** Identify motivations or reasons to examine and separate down material into components. Assume things and gather evidence to back up your assertions.

5- **Evaluating:** Make judgements regarding validity of ideas, quality of work or information, determined on a set of standards to present and defend beliefs.

6- Creating: Build data in a unique manner by combining pieces in a new structure or suggesting alternate options.

2.11.4. The Knowledge Dimension

1. **Factual Knowledge:** Learners must understand the fundamentals of field in order to get familiar with it and solve difficulties in it.

2. **Conceptual Knowledge:** The interconnections between the fundamental pieces of a bigger system that allow members to work together.

3. **Procedural Knowledge:** How to do research, how to perform anything, and what criteria to using methods, algorithms, skills, and procedures.

4. **Metacognitive Knowledge:** Knowledge and awareness of one's own cognition, as well as knowledge of cognition in general (Kolb, A. Y., & Kolb, D. A. 2012).

2.12. Perception

Perception (from Latin perceptio, receiving, collecting) is the interpretation. arrangement and identification, of sensory data to represent and comprehend the provided surroundings or information. Perception is mediated by impulses traveling through the neurological system, which are the consequence of chemical or physical activation of the sensory system (Schacter, et al., 2011).

Perception is modified by the recipient's, attention expectancy, knowledge, and remembering, as well as the passively receiving of these signals. Sensory input is a technique for converting low-level data into higher-

level data (e.g., extracts shapes for object recognition). The following steps link a person's expectations and conceptions, as well as restorative and selective processes (such as attention) that impact perception (Bernstein, 2018).

2.12.1. Model of the perceptual process

Jerome Bruner, a psychologist, established a model of perception in which individuals combine information from a target and a circumstance to construct social category-based impressions of themselves and others (Alan & Gary, 2011). This model is composed of three states:

1. When humans come across an unexpected objective, they are particularly receptive to the target's and the situation's informative signals.

2. People will actively seek for clues to clarify this uncertainty since the first phase does not provide sufficient information on which to establish views about the objective. People gradually gather certain recognizable indicators that allow them to create a preliminary classification of the target.

3. Cues become more selective and open. More indications are sought to corroborate the target's categorization. They purposefully disregard and misinterpret signs that contradict their preconceived notions. They grow increasingly selective in their vision, eventually painting a consistent image of the object.

2.12.2. Perception components

Perception has three components, according to Alan Saks and Gary Johns: (Sarahm 2013).

1. The Perceiver: is an individual whose attention is drawn to the stimuli and who so starts to perceive it. Many elements may impact a perceiver's perceptions, but the three most important are experiences, emotion state, and motivation status. All of these characteristics, have a significant impact on how an individual view a condition. The perceiver may use a perception defence in which they only see what they want to see.

2. The Target: the subject of perception; the object or person that is perceived. The quantity of data acquired by the perceiver's sensory organs influences their interpretation and comprehension of the object.

3. The Situation: timing, stimulus intensity, and surrounding elements that influence the perceptual process. These elements may cause a single stimulus to be interpreted by the brain as only a stimulus and not a percept.

2.12.3. Impact of perception

To understand influence of perception, it might be useful to examine the operation of the process. This changes considerably according to each sense. (Cherry, 2020):

1. **The environmental stimulus:** Environment is brimming with stimuli that might pique the interest of many senses. Everything in the environment that has the potential to be recognized is the environmental stimulus.

2. **The attended stimulus:** is the environment-specific item on which attention is directed.

3. **The image on the retina:** This includes light travelling through the cornea and pupil of the eye before reaching the lens. cornea assists to concentrate light reaches the eye, while the iris regulates the shape of the pupils to decide how much light passes. A reversed picture is projected onto the retina by the lens and cornea.

4. **Transduction:** Retinal picture is subsequently converted into electrical impulses via a process called transduction. This enables the brain to comprehend the visual signals that are delivered to the brain.

5. **Neural processing**: electrical impulses are subsequently processed by the nervous system. The route a signal takes is determined by sort of signal it is, i.e. visual signal or auditory signal.

6. **Perception:** During this stage, the stimulus item is perceived in the environment. You become consciously aware of the stimuli at this moment.

7. **Recognition:** Perception is not limited to being consciously aware of stimuli. In addition, the brain must be able to understand and classify the information received from the senses. The following phase, known as recognition, is the capacity to assign and interpret meaning to an item.

8. **Action:** In response to a stimulus that has been received and identified, the action phase of perception entails some form of motor movement. This might include a large movement, such as blinking eyes in reaction to a blast of dust, or sprinting toward a distressed person.

2.12.4. Nursing and perception

Nursing is a health care profession, which is focused on the care of individuals, families, and communities; so that they can attain, maintain, or recover optimum health. Nurses provide holistic care for sick or healthy persons of all cultures and ages, depending on the person's requirements (Mukhlif & Saber, 2014).

Perception refers to nurses' perspectives, understandings and beliefs about the nursing profession's image based on their previous and current training experiences (Ingwu, et al., 2016).

The profession of nursing has long been regarded as the most trustworthy in the healthcare field. For example, in the United States, nursing has long been recognized as the profession with the highest level of public trust (Milton, 2018).

2.13. Theoretical framework

Table (2.1): Application of the theoretical framework

No.	Bloom taxonomy	Revised bloom taxonomy	Integrating with study
1.	**Knowledge:** Recall and remember information.	**Remembering:** Recall words, facts, fundamental ideas, and responses from previously taught information to demonstrate memory.	Data is collected from nurses working in critical care units to identify those with poor knowledge regarding pulmonary care for coronavirus disease 19 (pre-test).
2.	**Comprehension:** difficulties and instructions should be interpreted, interpolated, understood, and translated. In own terms, describe an issue. Determine the connections between values,	**Understanding:** Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving	

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	generalizations, dates, and principles.	descriptions, and stating main ideas.	
3.	**Application:** Use of a term or notion in a novel context or without prompting. Applies classroom knowledge to unfamiliar problems in the workplace. Enhance knowledge transfer to novel or unusual contexts.	**Applying:** Apply principles, strategies, concepts, and learned information in novel ways to resolve issues in novel contexts.	Applying a structured educational program to increase nurse's knowledge and good outcome care for patients infected with coronavirus disease 19.
4.	**Analysis:** The process of breaking down information or ideas into their component elements so that their organizational structure may be comprehended. Makes a clear distinction between facts and conclusions drawn from them.	**Analyzing:** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Identified nurses with poor knowledge (pre-test)
	Critical thinking: - is applied by nurses in the process of solving problems of patients and decision-making process with creativity to enhance the effect. It is an essential process for a safe, efficient and skillful nursing intervention.		
5.	**Synthesis**: Builds a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure. Originality and creativity.	**Evaluating:** Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Put frame-work to increase nurse's knowledge and information's through structured education program (pre-test)
6.	**Evaluation:** Make judgments about the value of ideas or materials.	**Creating:** Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.	Evaluate nurse information after applied a structured educational program through two phases (posttest 1 and posttest 2)

2.14. Previous study

First study

Assessment of Turkish oncology nurses' knowledge regarding COVID-19 during the current outbreak in Turkey by Semerci. R. et al., 2020

Abstract: Between April and May 2020, 185 Turkish nurses participated in this descriptive research. Coronavirus disease 19 Nurse Information Scale and coronavirus disease 19 Nurse Information Form were used to gather data in an online survey. Nurses' knowledge of coronavirus disease 19 was studied using multilinear regression analysis.

Results: 48.1 percent of the 185 nurses surveyed got instruction for coronavirus disease 19 19 (51.9 percent did not), and 70.3 percent followed and studied the coronavirus disease 19 Guidelines released by the Ministry of Health (29.7 percent did not follow guidelines). The findings illustrate the importance of the guideline for nurses' understanding.

Conclusion: In order to effectively protect cancer patients from infectious illness, hospital administrators and the Ministry of Health must equip nurses with more knowledge, according to these results.

Second study

Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City by Giao . H et al., 2020.

Objective: To find out how well District 2 Hospital healthcare professionals understand and value COVID-19.

Methods: A descriptive research carried out at District 2 Hospital between Jan and Feb 2020. Information was acquired using a self-administered tool that asked healthcare personnel about their attitudes and knowledge about coronavirus disease 19. Demographics, mean attitudes, and knowledge scores of healthcare employees have been described using descriptive analysis. Spearman's correlation, T-test, and ANOVA were employed to examine the connection between research variables and their statistical significance.

Conclusions: most of healthcare professionals reported favorable attitudes and excellent understanding of coronavirus disease 19. Nevertheless, some nurse's attitudes and knowledge about the virus are lower than what would be anticipated given their position. Healthcare professionals need further education initiatives and campaigns.

Third study

Knowledge, Awareness and Practice of Health care Professionals amid SARS-CoV-2, Corona Virus Disease Outbreak by Ahmed N et al., 2020

Abstract

Methods: During the two-month period 'Feb-March' 2020, descriptive research was done by distributing a well-structured questionnaire including three parts including practice, attitude, and knowledge to health care workers in different clinics and hospitals. Using a questionnaire survey, information from 810 respondents were obtained manually and through online survey registered on www.surveys.google.com. a tool had 3 components that assessed respondent practice, awareness, and knowledge. Using a statistical tool for biographical, social sciences, and dependent variables were analyzed descriptively. The Spearman test performed to

determine whether or not there was a correlation between degree of education and gender of the health care professionals' responses.

Results: A seminar, workshop, or lecture on coronavirus disease 19 was not attended by 73% of respondents as a means of increasing awareness. 67 % of healthcare workers used the universal precaution approach to infection management, while 57.4 percent disinfected surfaces in dental surgery using sodium hypochlorite. The replies of the healthcare professionals to questions about education level and gender not significantly ($p > 0.05$).

Conclusion: According to the survey, the great majority of medical professionals are adequately aware and knowledgeable of coronavirus disease 19. However, several areas of the practice of health care providers were found to be lacking, such as adhering to CDC recommendations while providing client management, learning verifiable information on coronavirus disease 19, following using N-95 masks, and cleaning procedure. Mandatory, all healthcare professionals should participate in ongoing professional development sessions, which should include coronavirus disease 19 workshops, and seminars in order to manage the pandemic and reduce its death and morbidity.

Fourth study

Effect of Nursing Educational Program on Nurses′ Knowledge and Practices regarding Pandemic Covid-19 in Isolation Unit by Abd Elaziz M.A et al., 2021

To examine the impact of nursing education on nurses' understanding of and behavior in relation to the outbreak coronavirus disease 19 in chest department and isolated section. This study used a descriptive research

design. critical care nurse's practices observational checklists instrument and critical care nurses' knowledge evaluation questionnaire sheet were 2 instruments utilized for collection of data.

Results: The two stated study hypotheses may be supported by P value = 0.001, nurses' total practices and total knowledge should increase after the application of an educational program, and a significant relationship was established between them (r =0.370 p value =0.044).

Conclusion: Nursing practices and knowledge about care of coronavirus disease 19 patient were significantly influenced by the use of educational program.

Recommendation: Nurses will need in-service retraining to maintain their awareness and techniques on care of coronavirus disease 19 patients up to date.

Fifth study:

Efficacy of COVID-19 Prevention Educational Program on Nurses' knowledge and Practices at Hemodialysis Unit by Elpasiony N.M et al., 2021

The goal of this study was to see how effective the coronavirus disease 19 preventive training program was at improving nurses' knowledge and behaviors in hemodialysis units. A representative selection of Thirty nurses of Mansoura university hospital from the hemodialysis unit participated in a quasi-experimental study. nurses' practices observation checklists, coronavirus disease 19 infection control perceived obstacles, and coronavirus disease 19 infection structural questionnaire used to gather information.

Results: Before and after the training session, there were statistically significant variations in the overall mean of nurses' practices and knowledge addressing coronavirus disease 19 prevention of infection. most (93.3 percent) of our participation nurses cited overcrowding in a hemodialysis unit and a lack of resources for infection prevention and control practice implementation as perceived impediments.

Conclusion and Recommendations: The education session had a good influence on nurses' knowledge and behaviors about coronavirus disease 19 infection prevention, which will have a beneficial impact on patient health. As a result, it is advised that more structured ongoing teaching sessions with ongoing follow be provided to nurses in order to maintain them competent and up-to-date.

Sixth study

Nurses' perceptions and demands regarding COVID-19 care delivery in critical care units and hospital emergency services by González-Gil M.T 2021

Identifying intensive care and urgent nurses' perceptions of decision-making, safety, communications, psychosocio-emotional requirements and organization throughout the severe stage of the pandemic outbreak in Madrid, Spain. An online survey was used to conduct a descriptive research with emergency and critical care nurses from 26 government hospitals in Madrid as the first part of a mixed methods research.

Results: 37.5 percent mentioned working with the dread of being infected and its implications, 28.2 percent mentioned increased workloads, high patient-to-nurse ratios, and shifts that did not enable them to relax or disengage, while

taking on additional duties while treating patients with COVID-19 (23.9 percent). Inadequate communication with middle management (21.2%), failure to give psychosocial treatment to families and patients, and emotional exhaustion (53.5%), with difficulties expressing feelings, were also cited (44.9 percent).

Conclusions: Nurses who work in emergency and critical care rooms may be considered a vulnerable group. As a result, it is vital to look further into other parts of their pandemic experiences.

Chapter Three

Methodology

Chapter Three

3. Methodology

This section subroit the systematic process, which carried out this study such as study design, setting, sampling, tools, validity and reliability, and method of data collection.

3.1. Study Design:

A quasi-experimental design selected as suitable method to evaluate the effectiveness of structured educational program of pulmonary care for coronavirus disease 19 on the critical care unit nurse's knowledge and perception from the period between 15th September 2020 to 20 May 2022.

3.2 Administrative Permissions:
3.2.A. Formal Permission:

Proposal was prepared and presented in the seminar which established during conference by the scientific postgraduate committee University of Babylon, Collage of Nursing as the first step of the study. A protocol form fulled to obtain the formal acceptance of the study (Appendix 1), three ethical committee collage of nursing completed in order to formal acceptance (Appendix 2), for facility data collection a formal request send to the Ministry of Health – Babylon Health Directorate - Training and Human Development Center from postgraduate committee Collage of Nursing (Appendix 3). An official acceptance obtains from Health Directorate. Training Center to facilitate the process of data collection in 6. Feb. 2022 (Appendix 4.a, 4.b, 4.c). In order to established data collection and caring out the study process the research attend metting within the directors of Al-Hillah Teaching Hospital (Al- Hillah Teaching Hospital, Imam Al-Sadiq Teaching Hospital

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and Marjan Teaching Hospital) Which included in the study, short presentation of the study title and objectives presented to obtain the acceptance to start the process.

3.3. Setting

The study conducted at the critical care units which distributed at Al-Hillah Teaching Hospitals

3.3.1. Al-Shefaa Center at Marjan Teaching Hospital: This center established to receive patient diagnostic with Covid 19, who need special care. It's opened at the end of 2020 exactly in 18th November 2020, it consists from 54 beds, which classified as two classes, the first 23 beds with receive patient on continuous positive airway pressure (C.PAP), and the remining 31 beds equip with mechanical ventilation machine.

3.3.2. Imam Al-Sadiq Teaching Hospital: the critical care unit in this hospital opened at 30. October 2017. This center consists from 15 beds divided to 8 beds as male ward, 4 beds as female ward, 2 beds as isolation ward and one bed as privet room.

3.3.3. Al- Hillah Teaching Hospital: the critical care unit in this hospital consist 12 beds mixed between male and female patient.

3.4. Study Sample

Non-probability (purposive) sample methods selected to collect the data which is consider the suitable methods for this type of design, (61) nurses out of (214) working in the critical care units distributed around three hospitals. The original sample (61) were divided to two groups, the first one

is control group consist of (30) nurses, while the remining number (31) assigned as interventional group member.

Al-Shefaa center at marjan teaching hospital selected as pilot study area, which consist from (89) nurses, (13) of them assigned to participate in the pilot study, the researcher can't apply the educational program at this center because of increasing the number of patients with Covid 19 and it's the unique center assigned to admit patients, the nurse's does not have enough time to take sessions, also the hospital policy refused to applied educational program, so the researcher uses this center for a pilot study only.

Critical care unit nurses in imam Al-Sadiq teaching hospital who selected to participate in the study are (51) nurses distributed as:

1. Ten nurses participate to perform the initial need assessment.
2. five of them pass in the pretest exam, obtain more than (60).
3. Three of nurses refuse to participate in the study.
4. Two nursing from morning shift refuse to participate in the pretest.
5. One nurse with secondary school which excluded from the study.
6. Thirty nurses agree to participate in the study they act as control group.

Al-Hillah teaching hospital selected as proper area to perform the educational program sessions. Most of the nurses agree to attend the sessions the total number (74), they distributed as:

1- Seventeen of nurses refuse to participate in the study.
2- Eleven withdraw during educational sessions distributed in morning and evening shift.
3- Ten of them pass in the pretest exam, obtain more than (60).
4- Five of them with secondary school who excluded from the study.
5- Thirty-one of nurses agree to participate in the study and completed all educational sessions.

3.4.1. The Criteria of the Sample Selection:

3.4.1.A. The inclusion criteria for sample selection:

The nurses were selected according to the following criterion:

1. Critical care unit nurses only.
2. Agree in participate in the study.
3. Scored less than 60% in the pre-test.

3.4.1.B. The exclusion criteria for sample selection:

1. Nurses graduated from secondary nursing school.

3.5 Steps of the Study:

The following steps take place during carrying out this study:

3.5.1. Assessment of Nursing Needs to pulmonary care of coronavirus disease 19 in critical care unit:

Depending on the importance of provide proper care for pulmonary system that effected by coronavirus disease 19 in the critical care unit; the knowledge of the nurses impacted the level of care for this reason and to assess the needs of the nurses to such structured program an assessment for need carried out. special assessment form consists of (10) items is formulated based on a review of related literature in order to assess the actual needs of nurse of such program (Appendix 5 a, b), (10) nurses working in critical care unit in imam Al-Sadiq teaching hospital were selected to carry out this assessment. The results show that (10) nurses didn't pass the exam the gain less than 60 degree which consider a passing degree according to the ministry of health system (Appendix 6), these results determine the deficit in nurse's knowledge working in the critical care unit about pulmonary care for coronavirus disease

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19 and their needs to knowledge educational program to improve nurse's management.

2.5.2. The questionnaire:

In order to evaluated the effectiveness of structured educational program of pulmonary care for coronavirus disease 19 on the critical care unit nurses comprehensive review of related literature was performed to proper questionnaire form as a tool to achieve the objectives of study. Two version of questionnaire prepared in Arabic and English language to take it easy to participate (Appendix 7 and 8). The questionnaire divided as the following:

Part One: Demographical Data sheet, it consists from (4) items.

This part of the questionnaire contains information regarding; Age, Gender, Educational status and Marital status.

Part Two: Employment information, it consists from (4) items.

This part of the questionnaire contains information regarding: years of service in nursing, years of service in the critical care unit, attendance of training courses related to pulmonary care for patients with respiratory complications in the case of COVID 19, and learning resources (social media, digital science websites, hospital library, and nurse colleagues).

Part three: Critical Care Unit Nurses' Knowledge of Pulmonary Care for Patients with Coronavirus Disease 19, This part of the questionnaire includes four domains with multiple choice questions. The questions in all domains are arranged according to revised bloom taxonomy priorities, which are (Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating).

First Domain: - Oxygen supplement which consist from (13) questions.

Second Domain: - Chest Physiotherapy which consist from (7) questions.

Third Domain: - Endotracheal Intubation which consist from (5) questions.

Fourth Domain: - Nursing care for Tracheostomy which consist from (8) questions.

Table (3.1): Destitutions of question as bloom taxonomy related to nurse's knowledge.

No	Domain	Bloom taxonomy	Sequence of items in domain
1	First Domain	Remembering	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
		Understanding	11, 12, 13
2	Second Domain	Remembering	1, 2, 3
		Understanding	4, 5
		Appling	6, 7
3	Third Domain	Remembering	1, 2
		Appling	3, 4, 5
4	Fourth Domain	Remembering	1
		Understanding	2, 3, 4, 5
		Appling	6, 7, 8,

Part four: - Critical Care Unit Nurses Perception about Pulmonary Care for Coronavirus Disease 19, this part of the questionnaire includes (2) domains, the first domain talking about nurse's perception about safety from coronavirus disease 19 which consist of (16) items, while second domain focused on communication and relationship between team members which consist of (5) items adopted from (González-Gil, M. T., et al., 2021).

3.5.3 Rating and Scoring:

The questionnaire, which is used to facilitate data collection consist of multiple-choice question which scored and rated as (2) for correct answer and (1) for incorrect answer. While the critical care unit nurses perception about pulmonary care for Coronavirus Disease 19, which consists two domains related to use (5) Likert scale used rating and scoring system was (5) for strongly answer, (4) related to agree, while (3) for unsure, disagree take (2), and strongly disagree scored as 1.

3.5.4 Construction of the educational program:

There have been no previous studies or programs in Iraq or the Babylon Governorate that are comparable to the current study, so the researcher relies on books, international studies, and WHO publications that deal with this issue as sources when developing this program.

The educational program (Appendix 9) was constructed to provided the nurse's with knowledge for provided pulmonary care for coronavirus disease 19, which presented as four sessions content the following:

A. The First Session:

This session contains an introduction about important of oxygen therapy for patient with coronavirus disease 19 and it's important for the nurse. The objectives of this session are:

1- Identify the indications of oxygen administration.

2- Define complications of oxygen administration.

3- Identify Methods of Oxygen Administration.

Title of this session was (oxygen therapy), in order to provide an idea and increased knowledge for nurses about indication, complication and methods of oxygen administration for patient with coronavirus disease in critical care unit by using of teaching aids such as power point, clarifies pictures and describing program, which is presented for (45) minutes by using a side room in critical care unit at Al-Hillah Teaching Hospital.

B. The Second Session:

This session was entitled "incentive spirometry, small-volume nebulizer therapy and chest physiotherapy". This session was divided into two parts. Part one provided information about incentive spirometry, small-volume nebulizer therapy and part two provided information about chest physiotherapy, which was presented for (45) minutes, by using teaching aids such as power point, clarifying pictures and describing programs. The objective of this session is the following: -

1- Identify the indications of incentive spirometry.
2- Define nursing management for patient with incentive spirometry.
3- Identify the indications of Small-Volume Nebulizer Therapy.
4- Define nursing management for patient with Small-Volume Nebulizer Therapy.
5- Identify goals of chest physiotherapy.
6- Define the techniques of chest physiotherapy.
7- Define nursing management for patient with postural drainage.
8- Identify nursing management for patient with chest percussion and Vibration.
9- Define nursing management for patient with Breathing Retraining.

C. The Third Session:

This session titled as (Endotracheal Intubation), objectives are:

1- Identify provided nursing for patient with endotracheal intubation.

    a- Nursing care immediate after intubation.

    b- Nursing procedure to Extubation (Removal of Endotracheal Tube)

    c- Nursing Care of Patient Following Extubation

2- Identify complications of endotracheal intubation

Time duration presented in this session for (45) minutes at an un-active word in the critical care unit at Al-Hillah Teaching Hospital by using teaching aids such as power point, clarifying pictures and describing programs.

D. Fourth session:

Titled as (Tracheostomy, nursing diagnosis and intervention for patient with mechanical ventilation and Weaning the Patient from the Ventilator), this session also divided into two parts, the first part give simple introduction about tracheostomy, tracheotomy used Preventing Complications, Complications, and Nursing Management for patients with tracheostomy. The second part talking about nursing diagnosis and intervention for patient with mechanical ventilation and Weaning the Patient from the Ventilator. Time duration presented in this session for (45) minutes, by using different teaching strategies. The objective of this session is the following:

1- Determine the uses of tracheostomy.

2- Define how to Preventing Complications Associated with Endotracheal and Tracheostomy Tubes.

3- Identify the complication of tracheostomy.

   a- Early complications

   b- Long-term complications

   c- Nursing management for complication of tracheostomy.

4- Identify nursing diagnosis and intervention for patient with mechanical ventilation**.**

5- Define nursing role with patient Weaning the Patient from the Ventilator.

3.5.6 Validity of the questionnaire

The content validity determined throughout the distribution of the constructed educational program and questionnaire form for a panel of (12) experts. The study objectives and program were reviewed by 6 experts who works as faculty members collage of nursing distributed as 6 from university of Baghdad, one from Al-Kufa, one from Al-Ameed and 2 from university of Babylon, one from Karbala and one from Higher Health Institute, /Al- Najaf Health Department (Appendix 11), all reasonable changes and recommendations were taken into consideration in order to create the best tool for achieving the study objectives.

3.5.7 Pilot Study

For assessment of the adequacy of the data collection plan and the reliability of the prepared questionnaire, a pilot study carried out on (13) nurses working in Al-Shefaa Center at Marjan Teaching Hospital. The participants were selected according to special inclusion criteria for pretest collected after obtaining the participant agreement. The data collection of test

for (13) nurses beginning at 12th December 2021, retest is performed after 10 days and extended for 2 days.

The pilot study has aimed to:

1-Determine the questionnaire's dependability.

2- To assess the feasibility of the measures that must be taken as part of the main study.

3- To see if the items on the questionnaire are clear and understandable to nurses.

4- Estimated time to complete questionnaire which ranged between (25 – 30) minutes.

5- Enabling the researcher to get experience to any change if necessary.

3.5.8 Reliability:

Dependability, consistency of the variables which included in the study questionnaire was measured by using correlation coefficients, it's an important indicator of an instrument's quality. The pilot study performed as a small and primary study before starting the study procedures in order to assess the stability of the instrument which is prepared to collect the data. The results of the pilot study were statistically managed and the results revealed that the reliability which estimated as (0.874) for knowledge and (0.804) for perception which is statistically acceptable.

Table (3.2): Intraclass correlation coefficient.

Attempt	Items	N	Mean	SD	Correlation coefficient
Test- Retest	Knowledge	13	1.39	0.485	0.874
Test- Retest	Perception	13	1.43	0.272	0.804

3.6. Ethical consideration:

Professional ethics for nurses will stated the ideal path in which they should behave in all relationships including patients, patient's family, co-workers. The ethical rules followed by the researcher when carring out nursing researches directed to secure individuals right and welfare. Formal agreement obtained for all nurses who participate in the study after a brief introduction of the study objectives and importance.

3.7. Data Collection:

Data were collected through self-report method during the period of 3ed January 2022 to 15th February-2022; the critical care nurses who participate in the study need approximately (25 - 30) minutes to complete all items of the questionnaire. The participants inform that they are free to withdraw from the recruitment even they had given their consent previously to participate in the study. All the participants of the study group (61) are exposed to pre-test, to determine their knowledge about pulmonary care of coronavirus disease 19. All the participants of the interventional group (31) are exposed to the educational program, which was implemented at Al-Hillah teaching Hospital \ critical care unit, there divided into following sub-groups: -

The first group: -

First session is presented at 17th January 2022 for nurses working in the critical care unit. This group consists of 12 nurses. The lecture started at 9:50 am and take about (40) minutes. Break time was given it take about (15) minutes. Second session started at 10:45 am and takes about (43) minutes, so it ended at 11:28 am. Third session is presented in the next day. The number of nurses who attend the session are seven, five of them absent than withdraw from the group, the session started at 9:45 am and take about (35) minutes. Break time was given it taken about (10) minutes. The fourth session started at 10:45 am and take about (43) minutes, so it ended at 11:28 am. Two post-test collected after three weeks from the end of the fourth session exactly at 8th February 2022.

The second group: -

First session is presented at 19th January 2022. This group consists of 7 nurses. The lecture started at 3:35 pm and take about (45) minutes. Break time was given it takes about (10) minutes. Second session stated at 4:20 pm and takes about of (40) minutes, so it ended at 5:00 pm. Third session is presented in the night shift at 23th January 2022. The number of nurses their take this session is seven. The lecture started at 3:50 and it takes about (35) minutes, so this lecture ended at 4:25 pm. Break time was given it takes about (15) minutes. Fourth session started at 4:40 pm and it takes about (43) minutes, so it ended at 5:23 pm. The session completed on 15th February. According to the policy of hospital, the evening staff working in the critical care unit have three days' off after completing their night shift. Therefore, the two post test need about 23 days to completed.

The third group: -

For this group first session is presented on 20th January 2022. This group consists of 6 nurses. The session started at 3:30 pm and take about (41) minutes. Break time was given it takes about (10) minutes. Second session at 4:21 pm and takes about (37) minutes, so it ended at 4:58 pm. Third session is presented in the night shift at 24th January 2022. The number of nurses who attend this session is 5, one of them withdraw. The session started at 3:50 pm and takes about (43) minutes, so this lecture ended at 4:33 PM. Break time was given it takes about (12) minutes. Fourth session started at 4:45 pm and takes about (40) minutes, so it ended at 5:25 PM. Post-test two is collected for this group after 23 days from the end of the fourth session exactly at 16th February 2022.

The fourth group: -

First session started at 21th January 2022. This night shift group consists of 5 nurses. The lecture started at 4:15 pm and takes about (37) minutes. Break time was given it takes about (10) minutes. Second session started at 5:02 pm and takes about (41) minutes, so it ended at 5:43 PM. Third session is presented in the night shift at 25th January 2022. The number of nurses their take this session is three, two of them withdraw. The lecture started at 3:30 pm and takes about (35) minutes. Break time was given it takes about (10) minutes. Fourth session started at 4:15 pm and take about (43) minutes, so it ended at 4:58 PM. Two post test take place finished after 23 days.

The fifth group: -

First session is presented at 22th January 2022. This group consists of 6 nurses. The lecture started at 3:30 pm and takes about (35) minutes. Break time was given it takes about (10) minutes. Second session started at 4:15 pm

and take about (40) minutes, so it ended at 4:55 PM. Third session is presented in the night shift at 26th January 2022. The number of nurses their take this session is five, one of them withdraw. The lecture started at 3:45 pm and takes about (42) minutes. Break time was given it takes about (13) minutes. Fourth session started at 4:45 pm and took a duration of (40) minutes, so it ended at 5:25 PM. Two post test take place finished after 23 days.

The sixth group: -

First session is presented at 24th January 2022 for nurses working in the critical care unit. This group consists of 7 nurses. The lecture started at 10:00 am and takes about (40) minutes. Break time was given it takes about (10) minutes. Second session started at 10:50 am and take about (37) minutes, so it ended at 11:27 AM. Third session is presented in the next day at 25th January 2022. The number of nurses their take this session is four, three of them withdraw. The lecture started at 10:15 am and take about (43) minutes. Break time was given it takes about (17) minutes. Fourth session started at 11:15 am and takes about (40) minutes, so it ended at 11:55 AM. Two post-test two were collected for this group after three weeks from the end of the fourth session exactly at 15st February 2022.

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┌─────────────────────────────┐
│      Research Problem        │
└─────────────────────────────┘
              │
┌─────────────────────────────┐
│   Concentrated Study Design  │
└─────────────────────────────┘
```

Build a Questionnaire — Build the Educational Program

Reviewing to experts — Reviewing to experts

Rebuilding the Questionnaire — Rebuilding the Education Program

Legal and Official Acceptance

(N= 214)

Pilot Study (n) = 13 — Excluded from the study (n = 139)

61 Nurses enrolled and randomized

Experimental group, Time 0 (T 0) baseline test (n = 31) — **Control group, Time 0 (T 0) baseline test (n = 30)**

Four sessions education about Pulmonary care of COVID 19 — **No interventions**

Time 1 (T 1): posttest-I (n = 31) — **Time 1 (T 1): posttest-I (n = 30)**

Three weeks follow-up

Time 2 (T 2): posttest-II (n = 31) — Time 2 (T 2): posttest-II (n = 30)

Figure (3.1): flow-chart for study steps.
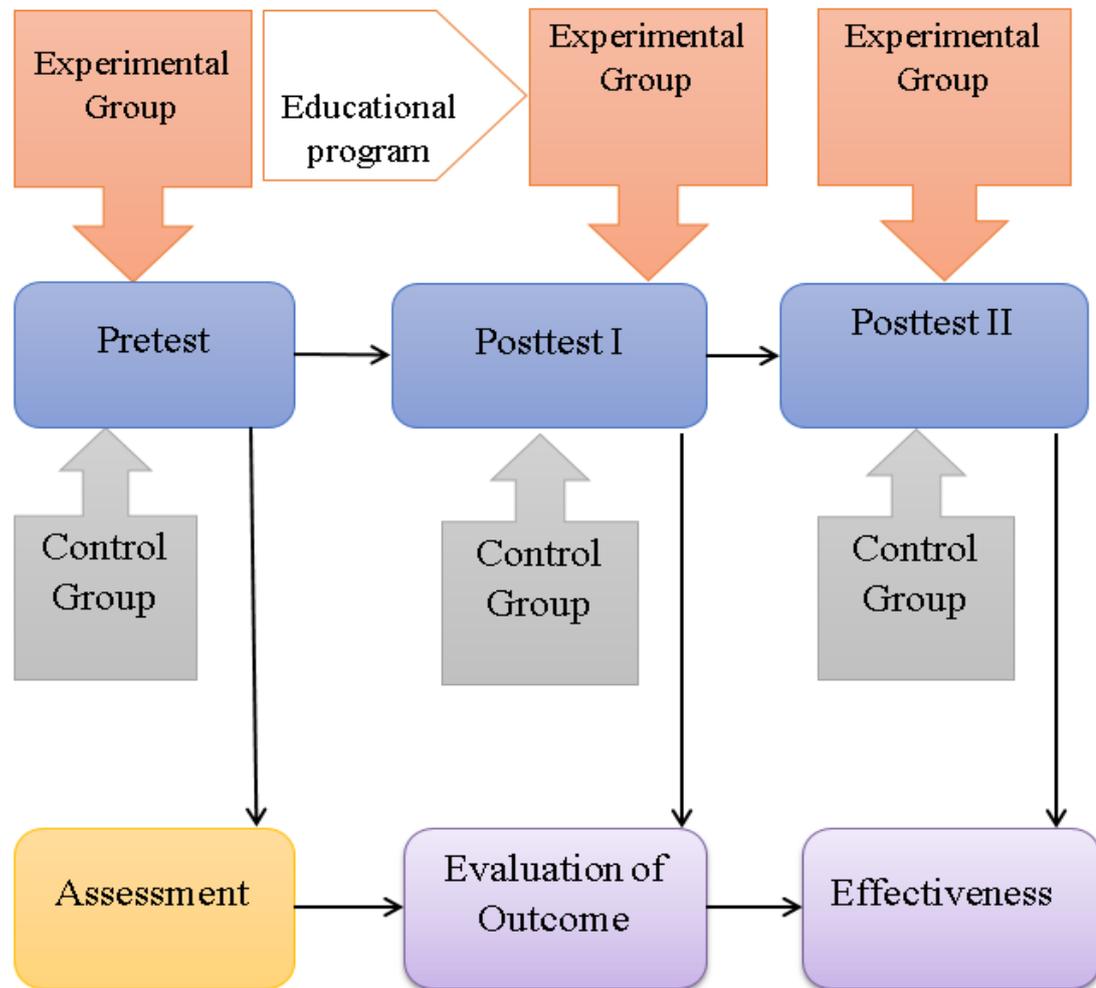
Figure (3-2): The Effectiveness and Repeated Measure Framework.

3.8. Data analysis:

The tabulation of collection data analyzed by many statistical approaches. In order to obtain study results by using statistics package program for social sciences (SPSS) ver. (22) and the Microsoft Excel (2010).

In order to determine whether the objectives of the study have met or not, the data of the present study has been analyzed through application of the following statistical approach:

3.8.1 Descriptive statistical methods

This type of statistical methods used to synthesize and describe data.

1- Frequency: a list of values in ascending order, as well as a count or percentage of how many times each value happened. Frequency is used to calculate the description of demographic characteristics and employment information.

2- Percentage:

$$\text{percentage (\%)} = \frac{\text{frequencies (f)}}{\text{size of sample}} \times 100$$

3- Mean: all values a sum to divided by number of subjects, use to estimate the value of the data.

$$x = \frac{\Sigma x}{n}$$

4- Standard Deviation: is summarizing average deviation of values from the stamiated mean.

$$s = \sqrt{\frac{\Sigma(x - \bar{x})^2}{n - 1}}$$

3.7.2 Inferential data analysis

This approach is performed through the application of the following:

1. Intraclass Correlation coefficient: the questionnaire's internal consistency and reliability of nurse's knowledge and perception regarding pulmonary care for coronavirus disease 19.

$$ICC = (MS_{between} \quad MS_{within})/(MS_{between} - MS_{within})$$

2. Chi-Square test: used to test the independency distribution of the observed frequencies, and for measuring the association between the studies variables according to its type.

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

3. t-test (independent t. test): A parametric test for testing differences in two group means.

$$t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}}$$

4. Repeated Measure analysis of variance (ANOVA) Test: is used to test mean group differences of three or more groups.

$$s^2 = \frac{\sum (X - \overline{X})^2}{N-1}$$

5. Spearman correlation coefficient: - is one of descriptive statistical analyses methods used to find out the direction and severity the relationship between variables on an ordinal scale.

6- Pearson's (*r*) correlation coefficient: - is statistical analysis method used in both types descriptive and inferential statistic used in order to determine how two variables are related to one another with ratio scale.

$$r_s = 1 - \frac{6 \sum d^2}{n(n^2 - 1)}$$

Chapter Four

Results

Chapter four
Study Results

In order to evaluate the effectiveness of structured educational program upon nurse's knowledge about pulmonary care for coronavirus disease 19 who their working in intensive care unit, data were collected from those nurses by using specific instrument prepared for the mentioned purpose. Many statistical approaches were employed to determine the result and determine if there are significant changes between variables after the participants completed an educational program designed for this purpose.

Table (4.1): Allocation of the Demographic characteristics of the study sample (interventional and control group).

Demographic characteristics	Rating and intervals	Interventional group		Control group	
		F	%	F	%
Age / Years	Less than 24	10	32.3	8	26.7
	24-26	**15**	**48.4**	**15**	**50.0**
	More than 26	6	19.4	7	23.3
	Total	31	100.0	30	100.0
Gender	Male	**19**	**61.3**	15	50
	Female	12	38.7	15	50
	Total	31	100.0	30	100
Education Status	Diploma in Nursing	**16**	**51.6**	10	33.3
	Bachelor of Nursing	14	45.2	**20**	**66.7**
	Postgraduate	1	3.2	0	0
	Total	31	100.0	30	100.0
Marital Status	Single	**18**	**58.1**	10	33.3
	Married	13	41.9	**20**	**66.7**
	Divorced	0	0	0	0
	Separated	0	0	0	0
	Widow	0	0	0	0
	Total	31	100	30	100

The demographic data is shown in this table for (60) nurse their working in intensive care unit who agree to participate in the study, (31) nurses act as interventional group and the other (30) act as control group. The table shows that most of participants in both groups 15 (48.4%), 15 (50%) were between (24-26) years age group, 19 (61.3%), 15 (50%) were male. Related to educational status 16 (51.6%) were diploma degree in interventional group, while 20 (66.7%) were bachelor degree in the control group, 18 (58.1%) of the interventional group were single and 20 (66.7%) from control group were married.

Table (4.2): Distribution of study samples (both groups) related to employment information.

Items	Rating and intervals	Interventional group		Control group	
		Frequency	**Percent**	**Frequency**	**Percent**
Years of Services in nursing	Less than 1 year	**14**	**45.2**	13	43.3
	1-5 years	13	41.9	**14**	**46.7**
	More than 5 years	4	12.9	3	10.0
	Total	31	100	30	100.0
Years of Services in the intensive care unit	Less than 1 year	**23**	**74.2**	14	46.7
	1-5 years	8	25.8	**15**	**50.0**
	More than 5 years	0	0	1	3.3
	Total	31	100.0	30	100.0
Participated in courses on pulmonary care for patients with respiratory complication in case of COVID 19.	No	**29**	**93.5**	**29**	**96.7**
	Yes	2	6.5	1	3.3
	Total	31	100.0	30	100.0
Do you educate yourself about the field of specialization	No	7	22.6	2	6.7
	Yes	**24**	**77.4**	**28**	**93.3**
	Total	31	100.0	30	100.0

This table shows that the high percentage of the interventional group 14 (45.2%) were less than one year in nursing experience in nursing filed, while the control group recorded 14 (46.7%) were within 1-5 years of nursing

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practice in the field. Related intensive care unit experience the participant recorded 23 (74.2%) were less than 1 year for interventional group, while 15 (50 %) were between (1-5) years for control group. Both group members recorded no participation in any courses recorded to COVID 19. Most of study group (both groups) depended on self-learning 24 (77.4%), 28 (93.3%).

Table (4.3): Distribution of the study sample (both groups) related to learning resources in the field of COVID 19.

N	Items	Interventional group		Control group	
		Frequency	Percent	Frequency	Percent
1.	Social Media	4	16.7	**8**	**28.6**
2.	Digital science websites	1	4.2	1	3.6
3.	Hospital library	0	0	0	0
4.	Nurse colleagues	4	16.7	4	14.3
5.	Social Media and Digital science websites	1	4.2	0	0
6.	Social Media and Nurse colleagues	**7**	**29.2**	**8**	**28.6**
7.	Digital science websites and Nurse colleagues	4	16.7	2	7.1
8.	Digital science websites and Hospital library	0	0	1	3.6
9.	Social Media, Digital science websites and Nurse colleagues	0	0	1	3.6
10.	Social Media, Digital science websites and Nurse colleagues	3	12.5	0	0
11.	Social Media, Hospital library and Nurse colleagues	0	0	2	7.1
12.	Digital science websites, Hospital library and Nurse colleagues	0	0	1	3.6
Total		**24**	**100**	**28**	**100**

According to learning resources as a rich field of information related to COVID 19 the study sample in both groups that the high percentage of 7

(29.2%) and 8 (28.6 %) were gain their knowledge from social media and their colleagues were both social media only and social media.

Table (4.4): Comparison between the mean score of the pretest of both groups knowledge for both study group and control group

t-test: Independent						
Groups	**No.**	**M**	**Std.**	**Std. E**	**P-value**	**Assessment**
Interventional	31	44.42	2.997	.538	**.082**	**N. S**
Control	30	45.67	2.468	.451		

No= (number of study sample), M= mean, Std= (stander deviation), Std. E= (stander error), P. value= (probability value), N. S= (Non-Significant)

This table shows the comparison between knowledge responses of both groups (interventional and control group) in their first pre-test the recorder mean score shows no significant differences between the responses (P. value =.082).

Table (4.5) Assessment of the responses of study sample (interventional and control) and control group related to knowledge about oxygen supplement.

N	Items	Interventional group			Control group		
		Pretest	**Posttest 1**	**Posttest 2**	**Pretest**	**Posttest 1**	**Posttest 2**
		M ± Std	**M ± Std**	**M± Std**	**M ± Std**	**M ± Std**	**M ± Std**
1.	The goal of oxygen therapy is:	1.65 .486	1.90 .301	1.97 .180	1.93 .254	1.73 .450	1.66 .484
2.	The transfer of oxygen to tissues depends on several factors such as	1.58 .502	1.90 .301	1.81 .402	1.43 .504	1.50 .509	1.53 .507

3.	…………It is a drop in the arterial oxygen content in the blood, and its symptoms include difficulty breathing, elevated blood pressure, and altered pulse rate, warm core, icy limbs	1.74 .445	1.87 .341	1.68 .475	1.60 .498	1.67 .479	1.43 .504
4.	The shortage of oxygenated blood is caused by consequences of oxygen deficiency in the cells.	1.29 .461	1.90 .301	1.58 .502	1.23 .430	1.23 .430	1.33 .479
5.	If the peripherals blood oxygenation (SPO2) is less than …….. in people with COVID-19, we recommend commencing supplemental oxygen.	1.16 .374	1.77 .425	1.68 .475	1.30 .466	1.33 .479	1.43 .504
6.	When providing ventilation support to people suffering from acute respiratory failure, hypoxemia because of COVID 19it is suggested that oxygen concentration not exceed …….	1.48 .508	1.68 .475	1.68 .475	1.53 .507	1.40 .498	1.40 .498
7.	It is recommended that SPO2 be kept at………. as possible for pregnant women with COVID-19 and emergency symptoms (shock, convulsions, coma, severe respiratory distress, central cyanosis, or obstructed or absent breathing).	1.65 .486	2.00 0.000	1.84 .374	1.77 .430	1.77 .430	1.77 .430
8.	It is recommended that SPO2 be kept at or more than………. as possible for children with COVID-19 and emergency symptoms (shock, convulsions, coma, severe respiratory distress, central cyanosis, or obstructed or absent breathing).	1.06 .250	1.87 .341	1.58 .502	1.30 .466	1.43 .504	1.37 .490
9.	Which of the following forms of oxygen treatment must be utilized for persons diagnosed with COVID-19 who also have acute hypoxemic respiratory failure?	1.13 .341	1.48 .508	1.29 .461	1.27 .450	1.33 .479	1.40 .498
10.	Amount of oxygen gas flow supplement for adult by high flow nasal cannula systems can deliver about	1.29 .461	2.00 0.000	1.77 .425	1.20 .407	1.37 .490	1.17 .379
11.	Which of the following statements is not considered a means of assessing the patient's need for oxygen	1.13 .341	1.81 .402	1.58 .502	1.23 .430	1.23 .430	1.17 .379
12.	One of the complications of oxygen therapy is oxygen toxicity, which occurs as a result of giving a very high concentration of oxygen	1.10 .301	1.77 .425	1.61 .495	1.10 .305	1.13 .346	1.23 .430
13.	Which of the following oxygen delivery systems is not considered a low flow oxygen delivery system?	1.42 .502	1.74 .445	1.71 .461	1.60 .498	1.33 .479	1.23 .430

General mean and SD	1.36 .240	1.82 .139	1.67 0.163	1.42 0.247	1.42 0.196	1.39 0.180
Assessment	Poor	Good	Good	Poor	Poor	Poor
No.	31	31	31	30	30	30

M= mean of scores, Std= (stander deviation), cut off point= 0.5, mean of scores = 1.5, (poor knowledge= 1-1.49), (good knowledge = 1.50-2).

This table presents the statistical analysis of nurse's who working in intensive care unit knowledge about oxygen supplement, the general mean and SD for interventional group (1.36 ± .240) in their pre-test, while significant change is clearly presented in the following two post-test (1.82 ± 0.139), (1.67 ± 0.163). this indicate significant improvement in nurse's knowledge regarding oxygen supplement after their attendance to the educational program session, while the results shows that the general mean and SD for control group (1.42 ± 0.247) in their pre-test, while no significant change is presented in the following two post-test (1.42 ± 0.196), (1.39 ± 0.180).

Table (4.6): Assessment of the responses of study sample (interventional and control) and control group related to knowledge about chest physiotherapy.

N	Items	Interventional group			Control group		
		Pretest	Posttest 1	Posttest 2	Pretest	Posttest 1	Posttest 2
		M ± Std	M ± Std	M± Std	M ± Std	M ± Std	M ± Std
1.	One of the goals of chest physiotherapy is	1.48 .508	1.97 .180	1.87 .341	1.67 .479	1.60 .498	1.87 .346
2.	When the patient's head is placed down, which of the lung lobes is more effective and in response to draining secretions from the bronchi:	1.16 .374	1.71 .461	1.61 .495	1.17 .379	1.07 .254	1.37 .490
3.	The rate of postural drainage for the patient is usually	1.19 .402	1.68 .475	1.52 .508	1.43 .504	1.17 .379	1.30 .466

4.	The purpose of inhaling bronchodilators, water or saline before postural drainage is all of the following except	1.35 .486	1.65 .486	1.65 .486	1.47 .507	1.47 .507	1.43 .504
5.	Which of the following statements is not an indication of the use of small-volume nebulizer	1.13 .341	1.65 .486	1.48 .508	1.27 .450	1.23 .430	1.17 .379
6.	Keep the airway patent to facilitate secretion drainage. The patient positioned comfortably as possible with a vomiting basin, sputum cup, and tissues provided. The nurse asks the patient	1.35 .486	1.84 .374	1.77 .425	1.37 .490	1.37 .490	1.47 .507
7.	When performing stimulatory breathing, the patient should be positioned	1.74 .445	1.97 .180	.301	1.77 .430	1.77 .430	1.73 .450
General mean and SD		1.35 .216	1.78 .140	1.69 .166	1.45 .211	1.45 .211	1.48 .244
Assessment		Poor	Good	Good	Poor	Poor	Poor
No.		31	31	31	30	30	30

M= mean of scores, Std= stander deviation, cut off point= 0.5, mean of scores = 1.5, (poor knowledge= 1-1.49), (good knowledge = 1.50-2).

This table presents the statistical analysis of nurse's who working in intensive care unit knowledge about chest physiotherapy, the general mean and SD for interventional group (1.35 ± .216) in their pre-test, while significant change is clearly presented in the following two post-test (1.78 ± .140), (1.69 ± 0.166). this indicate significant improvement in nurse's knowledge regarding oxygen supplement after their attendance to the educational program session, while the results shows that the general mean and SD for control group (1.45 ± 0.211) in their pre-test, while no significant change is presented in the following two post-test (1.45 ± 0.211), (1.48 ± .244).

Table (4.7): Assessment of the responses of study sample (interventional and control) and control group related to knowledge about endotracheal.

N	Items	Interventional group			Control group		
		Pretest	Posttest 1	Posttest 2	Pretest	Posttest 1	Posttest 2
		M ± Std	M ± Std	M± Std	M ± Std	M ± Std	M ± Std
1.	Passing a tube via the nose or mouth into the trachea is endotracheal intubation. Intubation is the technique of choice in emergency treatment when a patient cannot be treated with simpler procedures.	1.71 .461	1.94 .250	1.87 .341	1.63 .490	1.73 .450	1.80 .407
2.	All of the below are considered as defects of the tracheostomy tubes and tracheostomy except	1.65 .486	1.71 .461	1.81 .402	1.77 .430	1.80 .407	1.80 .407
3.	Which of the following is not considered as one of the steps of endotracheal tube care	1.35 .486	1.65 .486	1.55 .506	1.23 .430	1.13 .346	1.17 .379
4.	Which of the following is not considered as a procedure to remove an endotracheal tube	1.10 .301	1.77 .425	1.68 .475	1.33 .479	1.20 .407	1.20 .407
5.	A complication of endotracheal intubation is a loosening of the cuff pressure, which results in tracheal bleeding, ischemia, and aspiration pneumonia. The cuff pressure must be maintained between	1.32 .475	1.68 .475	1.61 .495	1.37 .490	1.37 .490	1.40 .498
General mean and SD		1.43 .080	1.75 0.114	1.70 .134	1.47 0.223	1.45 0.305	1.47 0.311
Assessment		Poor	Good	Good	Poor	Poor	Poor
No.		31	31	31	30	30	30

M= mean of scores, Std= (stander deviation), cut off point= 0.5, mean of scores = 1.5, (poor knowledge= 1-1.49), (good knowledge = 1.50-2).

This table presents the statistical analysis of nurse's who working in intensive care unit knowledge about endotracheal intubation, the general mean and SD for interventional group (1.43 ± 0.080) in their pre-test, while significant change is clearly presented in the following two post-test (1.75 ± 0.114), (1.70 ± 0.134). this indicate significant improvement in nurse's

knowledge regarding oxygen supplement after their attendance to the educational program session, while the results shows that the general mean and SD for control group (1.47 ± 0.223) in their pre-test, while no significant change is presented in the following two post-test (1.45 ± 0.305), (1.47 ± .311).

Table (4.8): Assessment of the responses of study sample (interventional and control) groups related to knowledge about tracheostomy.

N	Items	Interventional group			Control group		
		Pretest	Posttest 1	Posttest 2	Pretest	Posttest 1	Posttest 2
		M ± Std	M ± Std	M± Std	M ± Std	M ± Std	M ± Std
1.	All of the following symptoms and signs are negative reactions that the nurse will terminate the weaning process if it occurs except	1.26 .445	1.77 .425	1.68 .475	1.27 .450	1.40 .498	1.43 .504
2.	Which of the following statements is not an indication for the use of a tracheostomy	1.48 .508	1.65 .486	1.55 .506	1.30 .466	1.33 .479	1.43 .504
3.	All of the following signs and symptoms are considered early complications of endotracheal tubes and tracheostomy except:	1.00 0.000	1.65 .486	1.35 .486	1.10 .305	1.10 .305	1.13 .346
4.	All of the following signs and symptoms are considered to be long-term complications of endotracheal tubes and tracheostomy except	1.26 .445	1.65 .486	1.42 .502	1.17 .379	1.20 .407	1.30 .466
5.	All the statements below are considered procedures to prevent complications associated with endotracheal tubes and tracheostomy except	1.26 .445	1.68 .475	1.61 .495	1.20 .407	1.30 .466	1.47 .507
6.	After vital signs have been stabilized, the patient is placed in the ……… position to facilitate ventilation, promote drainage, reduce edema, and prevent pressure on the suture lines.	1.65 .486	1.77 .425	1.81 .402	1.63 .490	1.53 .507	1.50 .509
7.	A priority for patient nursing care when the nursing diagnosis is impaired gas exchange associated	1.19 .402	1.87 .341	1.58 .502	1.07 .254	1.07 .254	1.13 .346

8.	Increasing mucus production due to the presence of the tube in the trachea or mechanical ventilation with continuous positive pressure, which affects the efficiency of the airway, one of the priorities of the nursing intervention for this diagnosis is	1.10 .301	1.61 .495	1.29 .461	1.00 0.000	1.03 .183	1.07 .254
	General mean and SD	1.27 .205	1.71 .091	1.54 .172	1.22 .195	1.25 .176	1.31 0.174
	Assessment	**Poor**	**Good**	**Good**	**Poor**	**Poor**	**Poor**
	No.	31	31	31	30	30	30

M= mean of scores, Std= (stander deviation), cut off point= 0.5, mean of scores = 1.5, (poor knowledge= 1-1.49), (good knowledge = 1.50-2).

This table presents the statistical analysis of nurse's who working in intensive care unit knowledge about endotracheal intubation, the general mean and SD for interventional group (1.27 ± 0.205) in their pre-test, while significant change is clearly presented in the following two post-test (1.71 ± 0.091), (1.54 ± 0.172). this indicate significant improvement in nurse's knowledge regarding oxygen supplement after their attendance to the educational program session, while the results shows that the general mean and SD for control group (1.22 ± 0.195) in their pre-test, while no significant change is presented in the following two post-test (1.25 ± 0.176), (1.31 ± .174).

Table (4.9): Overall all mean of scale of knowledge for interventional and control groups

Value	Interventional group			Control group		
	Pretest	Posttest1	Posttest2	Pretest	Posttest1	Posttest2
Mean of scale	1.34	**1.81**	**1.73**	1.38	1.37	1.40
Stander deviation	.092	**.149**	**.189**	.074	.111	.087
Assessment	Poor	Good	Good	Poor	Poor	Poor

cut off point = 0.5, M.S. = 1.5, (poor knowledge = 1-1.49), (good knowledge = 1.50-2)

This table shows a significant difference in a results between control group and interventional group outcome related to COVID 19 respiratory system care, the general mean of pretest for both groups recorded (1.34 ± 0.092) and (1.38 ± 0.074) which recorded poor knowledge level for both groups. The post-test for control group show no significant change during two trial (1.37 ± 0.111) and (1.40 ± 0.087).

On the other hand, the results of interventional group knowledge recorded significant change from pre-test (1.34 ± 0.092) and two post-test (1.81± 0.149) and (1.73 ± 0.189), that mean the educational program session act effectively upon the nurse's knowledge.

Table (4.10): Overall score study group (interventional and control) related to their knowledge.

Values	Interventional			Control		
	Pretest	Posttest1	Posttest2	Pretest	Posttest1	Posttest2
Minimum score	39	52	50	40	39	42
Maximum score	49	66	65	49	53	52
No.	31	31	31	30	30	30
Mean of score	44.42	59	55.45	45.67	45.33	46.23
Stander deviation	3.047	4.195	5.341	2.468	3.680	2.897
Assessment	**Poor**	**Good**	**Good**	**Poor**	**Poor**	**Poor**

Cut of point (16), Poor knowledge (33 - 49), Good knowledge (50 - 66).

This table show significant changing in mean of score and stander deviation for interventional group between pretest, posttest 1 and posttest 2 (44.42 ± 3.047), (59 ± 4.195) and (55.45 ± 5.341). while there is no change in mean of score for control group. This indicate that educational program is

effective and cause improvement in nurse's knowledge their working in intensive care unit.
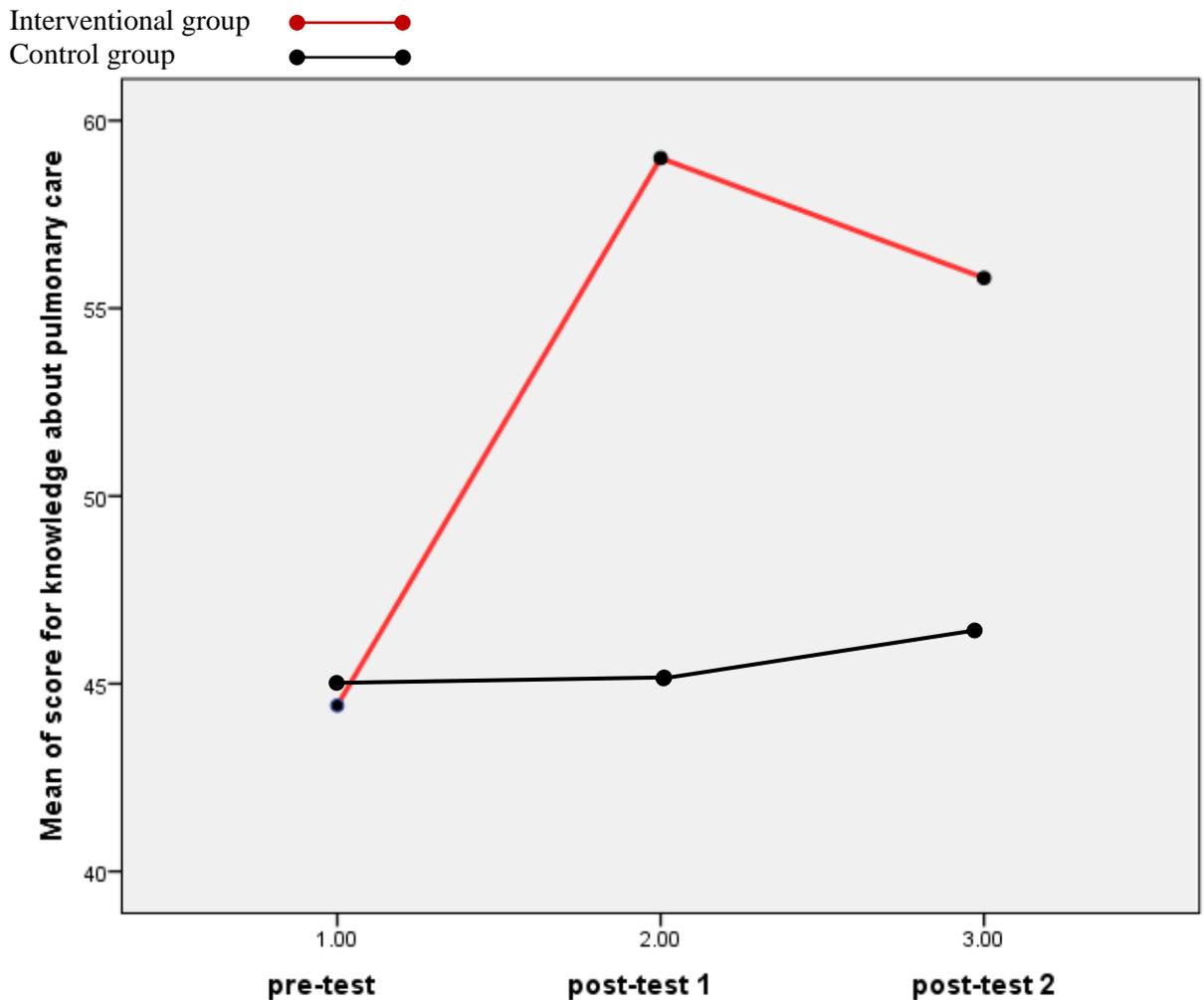
Figure (4.1): Estimated marginal knowledge means for both groups

Figure (4.1) show changes in the levels of the nursing knowledge about pulmonary care of coronaviruses disease in both groups throughout the three phases of pretest and posttest 1, posttest 2.

Table (4.11): Analysis of variance (ANOVA) test for nursing knowledge about pulmonary care of coronaviruses disease of interventional group.

Variance analyses						
	total Squares	df	mean squares	F	Significant	Assessment
Between Groups	3642.086	2	1821.043			
Within Groups	1486.387	90	16.515	110.263	**.001**	**H. S**
Total	5128.473	92				

ANOVA= Analyses of variance, df= degree of freedom, sig= significant

Analyses of variance is one of inferential statistical analyses methods used to find out and test the differences between mean of more than two means of groups. This table show high worthy differences founded between pretest and first and second post-test for nursing knowledge regarding pulmonary care for coronavirus disease 19 at P- value 0.001 which are less than 0.01.

Table (4.12): Differences within the three phases regarding nursing knowledge for interventional group.

Multiple Comparisons					
knowledge (I)	knowledge (J)	Mean-difference(I-J)	Std	Sign.	Assessment
Pretest	Posttest 1	-14.581	1.032	**.001**	**H.S**
	Posttest 2	-11.387	1.032	**.001**	**H.S**
Posttest 1	Pretest	14.581	1.032	**.001**	**H.S**
	Posttest 2	3.194	1.032	**.007**	**H.S**
Posttest 2	Pretest	11.387	1.032	**.001**	**H.S**

	Posttest 1	-3.194	1.032	**.007**	**H.S**

In terms of variations in interventional group knowledge over the three phases, the findings show that there is a considerable difference in knowledge between phase one and phase two (sig.= 0.001), and phase three (sig.= 0.001). also, this table recorded that high worthy variation on the knowledge between phase two and phase one (sig.= 0.001) and phase three (sig.= 0.007). These results indicate that there is a changing in levels of knowledge between all phases.

Table (4.13): Analysis of variance (ANOVA) Test for nursing knowledge about pulmonary care of coronavirus disease of control group.

Variance Analysis						
	Total Squares	**df**	**Mean squares**	**F**	**Significant**	**Assessment**
Between Groups	3.813	2	1.906			
Within Groups	821.310	87	9.440	0.202	0.818	N. S
Total	825.122	89				

ANOVA= Analyses of variance, df= degree of freedom, sig= significant

This table show not significant differences for pre and first/second post-test for the control group members for nursing knowledge regarding pulmonary care for coronavirus disease at p- value 0.818 which are more than 0.05.

Table (4.14): Differences within the Three Phases regarding nursing knowledge for control group.

Multiple Comparisons					
Knowledge (I)	**Knowledge (J)**	**Mean-difference(I-J)**	**Std**	**Sign.**	**Assessment**
Pretest	Posttest 1	.118	.787	.988	N.S
	Posttest 2	-.368	.800	.890	N.S
Posttest 1	pretest	-.118	.787	.988	N.S
	Posttest 2	-.486	.794	.814	N.S
Posttest 2	pretest	.368	.800	.890	N.S
	Posttest 1	.486	.794	.814	N.S

In terms of variations in control group knowledge over the three phases, the findings show that there is a considerable difference in knowledge between phase one and phase two (sig.= 0. 988) and phase three (sig.= 0. 890). also, this table indicates that not significant differentiation in knowledge between phase two and phase one (sig.= 0. 988) and phase three (sig.= 0. 814). These results indicate that there is no changing in levels of knowledge between all phases.

Table (4.15): Association between demographic characteristic and nursing knowledge for study group.

Demographic characteristic	χ^2	d.f	P-value	Ass
Age	9.434	2	.582	N.S
Gender	20.632	1	**.019**	**S**
Educational status	38.964	2	**.014**	**S**
Marital status	10.603	1	**.021**	**S**

P-value = probability value, d.f. = degree of freedom, χ^2 = Chi-square Value, ASS = assessment

This table show significant association between nurses knowledge and gender, educational and marital status at p-value (0.019, 0.014 and 0.021) which are less than 0.05. While the results indicate that non-significant association between nurses knowledge and age (0.582) at p-value 0.05.

Table (4.16): Relationship (Spearman Correlation) between nursing knowledge for study group and their demographic data.

		Age Groups	Gender	Educational Status	Marital Status
Overall knowledge for study group	**Correlation Coefficient (rho)**	.114	**.426**	**.448**	**.425**
	Sig. (2-tailed)	.542	**.017**	**.012**	**.017**
	N	31	31	31	31
	Assessment	Not relationship	Positive moderate relationship	Positive moderate relationship	Positive Moderate Relationship

Spearman correlation coefficient is one of descriptive statistical analyses methods used to find out the direction and severity the relationship between variables on an ordinal scale. Table (4.16) show that positive moderate relationship between nurse's knowledge and gender, educational

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and Marital status (0.426, 0.448 and 0.425) with significant association at P-Value (0.017, 0.012 and 0.017) which are less than 0.05. In other side table present that no relationship between nurses' knowledge and age.

Table (4.17): Assessment of the responses of the study sample (control and interventional group) related to their perception about COVID 19 safety intervention.

N	Items	Interventional group			Control group		
		Pretest	Posttest 1	Posttest 2	Pretest	Posttest 1	Posttest 2
		M ± Std	M ± Std	M± Std	M ± Std	M ± Std	M ± Std
1.	I am equipped to guarantee my safety while caring for COVID-19-infected patients.	3.94 1.289	3.77 1.230	4.33 1.061	3.81 1.327	3.47 1.383	3.60 1.354
2.	To prevent the transmission of the virus in the healthcare facility, asepsis procedures are used.	4.23 1.175	4.06 1.124	4.37 .890	4.06 .892	3.90 1.185	3.60 1.133
3.	I fear making errors in the care of COVID-19-infected individuals as a result of the care pressure.	3.77 1.146	3.84 .969	4.00 .983	3.94 .964	3.97 .890	3.90 .885
4.	I lack adequate expertise about the management of COVID-19-infected individuals.	3.06 1.093	3.35 1.112	3.33 1.061	3.48 1.122	3.13 1.106	3.13 1.042
5.	The facility makes sure that all of its employees are trained in the proper processes and how to wear safety equipment.	3.48 1.387	3.68 1.275	3.50 1.225	3.52 1.338	3.40 1.354	3.30 1.343
6.	The strategies for treating individuals infected with COVID-19 have been well mapped out.	3.19 1.046	3.26 .965	3.13 .937	3.26 1.032	3.37 1.033	3.10 1.062
7.	Healthcare staff are expected to execute duties for which they are unprepared.	3.10 1.193	3.29 1.071	3.87 1.196	3.42 .886	2.93 1.311	3.67 1.124
8.	While performing my healthcare responsibilities, I consider the probability of contracting COVID-19.	3.97 1.224	3.61 1.086	4.07 1.143	3.68 1.045	4.03 .999	4.00 1.017
9.	I consider the likelihood that I am an asymptomatic carrier.	4.10 .944	3.74 1.064	4.07 1.112	3.94 1.031	3.93 1.143	4.13 .860

No.	Item						
10.	I'm terrified of infecting the individuals with whom I reside or come into touch.	4.23 .956	4.32 .909	4.40 .968	4.26 .999	4.23 1.073	4.37 .928
11.	I am afraid of being infected with covid 19 virus.	3.74 1.290	3.90 .790	3.80 1.095	3.87 .718	3.70 1.264	3.60 1.248
12.	I am not well accustomed to use the PPE.	3.03 1.378	3.03 1.426	3.00 1.531	3.26 1.154	3.13 1.408	2.93 1.143
13.	The PPE is not enough to protect from infection.	3.84 1.186	3.48 1.262	3.97 .964	3.58 1.057	4.00 .983	4.00 1.114
14.	The circumstances (crowdedness) in the work place is suitable for transmitting infection.	4.06 .929	4.45 .624	4.00 .983	4.13 .846	3.90 1.094	4.03 .850
15.	The public stigmatizes those who get infection.	2.94 1.365	2.94 1.315	2.33 1.398	2.48 1.288	2.13 1.383	2.2 1.349
16.	organization is not committed to the preventive measures.	3.45 1.287	3.58 1.119	3.50 .900	3.19 1.138	3.17 1.053	3.47 .937
	General mean and SD	**3.63 0.453**	**3.65 0.423**	**3.73 0.564**	**3.62 0.444**	**3.53 0.543**	**3.56 0.543**
	Assessment	**Agree**	**Agree**	**Agree**	**Agree**	**Agree**	**Agree**
	No.	**31**	**31**	**31**	**30**	**30**	**30**

Mean of scale = (3), Cut of point = (0.7), strongly disagree = (1-1.7), disagree = (1.8-2.5), unsure = (2.6-3.3), agree = (3.4 - 4.1), strongly agree= (4.2 - 5).

This table presents the statistical analysis of nurse's perception about safety from coronavirus disease 19. This table shows the general mean and SD for interventional group (3.63 ± 0.453) in their pre-test with agree assessment, while simple significant change is presented in the following two Post-test (3.65 ± 0.423), (3.73 ± 0.564) with agree assessment.

This table presents the statistical analysis of nurse's perception their working in intensive care unit about safety from coronavirus disease 19. This table shows the general mean and SD for control group (3.62 ± 0.444) in their pre-test, while no significant change is presented in the following two Post-test (3.53 ± 0.543), (3.56 ± 0.543) with agree assessment.

Table (4.18): Assessment of the responses of interventional and control group related to their perception about communication and relationship between team members

N	Items	Interventional group			Control group		
		Pretest	Posttest 1	Posttest 2	Pretest	Posttest 1	Posttest 2
		M ± Std	M ± Std	M± Std	M ± Std	M ± Std	M ± Std
1.	Between doctors and nurses, there is a lot of collaboration.	3.81 1.046	3.90 .978	3.68 1.077	3.73 1.202	3.73 1.285	3.63 1.066
2.	Physicians and nurses have excellent working connections.	3.68 1.137	3.90 .908	3.42 .958	3.80 .961	3.60 1.354	3.50 1.106
3.	Senior and middle management are receptive to improvement suggestions from the health professionals.	3.13 1.284	3.29 1.071	3.23 1.117	3.03 1.351	3.00 1.339	3.50 1.106
4.	Managers of the middle and above ranks enquire about the demands of the health professionals.	3.19 1.327	3.16 1.098	3.00 1.065	2.97 1.299	2.83 1.234	2.90 1.322
5.	Managers of the middle and upper levels strive to address the demands of the health professionals.	3.13 1.522	3.39 1.054	3.32 1.107	3.23 1.251	2.83 1.234	2.70 1.236
General mean and SD		**3.39 0.328**	**3.53 0.350**	**3.33 0.249**	**3.35 0.390**	**3.20 0.433**	**3.09 0.441**
Assessment		Unsure	Agree	Unsure	Unsure	Unsure	Unsure
No		31	31	31	30	30	30

Mean of scale = (3), Cut of point = (0.7), strongly disagree = (1-1.7), disagree = (1.8-2.5), unsure = (2.6-3.3), agree = (3.4 - 4.1), strongly agree= (4.2 - 5).

This table presents the statistical analysis of nurse's perception about communication and relationship between team members. This table shows the general mean and SD for interventional group (3.39 ± 0.328) in their pre-test and post-test 2 (3.33 ± 0.249) with unsure assessment, while simple significant change is presented in Post-test 1 (3.53 ± 0.423) with unsure agree assessment.

This table presents the statistical analysis of nurse's perception about communication and relationship between team members. This table shows the general mean and SD for control group (3.35 ± 0.390) in their pre-test, while

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no significant change is presented in the following two Post-test (3.20 ± 0.433), (3.09 ± 0.441) with unsure assessment.

Table (4.19): Overall mean of score for perception both groups interventional and control

Values	Interventional group			Control group		
	Pretest	Posttest1	Posttest2	Pretest	Posttest1	Posttest2
Minimum score	43	54	54	45	54	53
Maximum score	94	96	96	96	96	99
N	**31**	**31**	**31**	**30**	**30**	**30**
Mean of Score	75.06	75.97	76.43	74.52	72.40	72.50
Stander deviation	11.764	9.904	8.951	10.564	9.744	9.850
Assessment	**Agree**	**Agree**	**Agree**	**Agree**	**Agree**	**Agree**

Cut of point = 16, strongly disagree = (21-37), disagree = (38-54), uncertain = (55-71), agree = (72-88), strongly agree= (89-105).

This table show simple significant changing in overall mean of score and stander deviation for interventional group between pretest, posttest 1 and posttest 2 (75.06± 11.764), (75.97 ± 9.904) and (76.43± 8.951) with agree assessment. while there is no change in mean of score for control group with agree assessment.
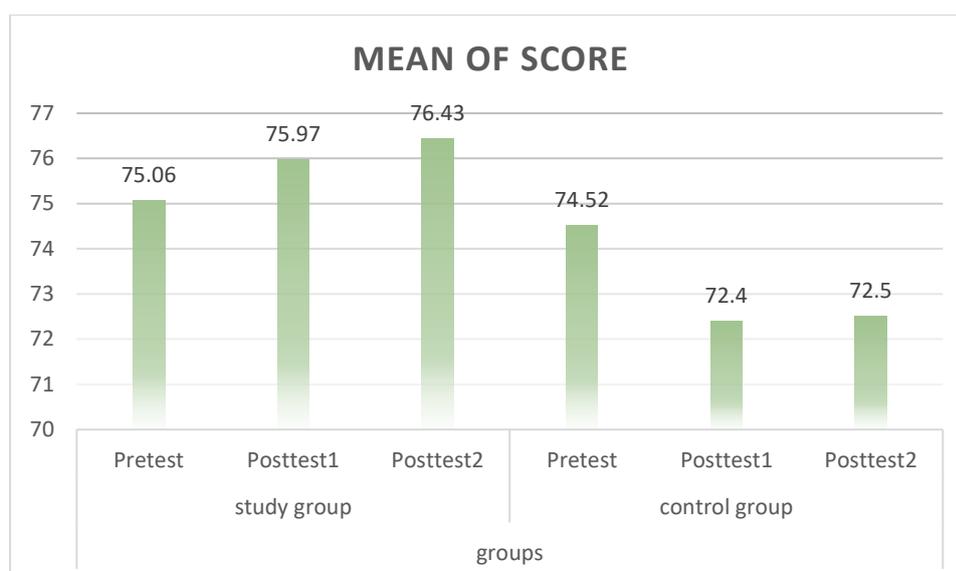

Figure (4.2): Overall mean of score for perception both groups interventional and control.

Figure (4.2) show changes in the levels of the nursing perception about pulmonary care of coronavirus 19 disease in interventional and control groups throughout the three phases of pre and first / second post-test.

Table 4-20: Overall distribution of the interventional group related to nursing perception about pulmonary care of coronavirus disease 19.

	Interventional group					
	Pretest		**Posttest1**		**Posttest2**	
	F	**%**	**F**	**%**	**F**	**%**
Strongly disagree	0	0	0	0	0	0
Disagree	2	6.5	1	3.2	1	3.3
Unsure	7	22.6	8	25.8	6	20.0
Agree	**19**	**61.3**	**19**	**61.3**	**22**	**70.0**
Strongly Agree	3	9.7	3	9.7	2	6.7
Sum	31	100	31	100	31	100

Cut of point = 16, strongly disagree = (21-37), disagree = (38-54), uncertain = (55-71), agree = (72-88), strongly agree= (89-105).

The above table shows that the majority of nursing perception for interventional group at all stages of pretest **19 (61.3%)**, posttest 1 **19 (61.3%)** and posttest 2 **22 (70.0%)** were with agree perception toward pulmonary care for coronavirus disease.
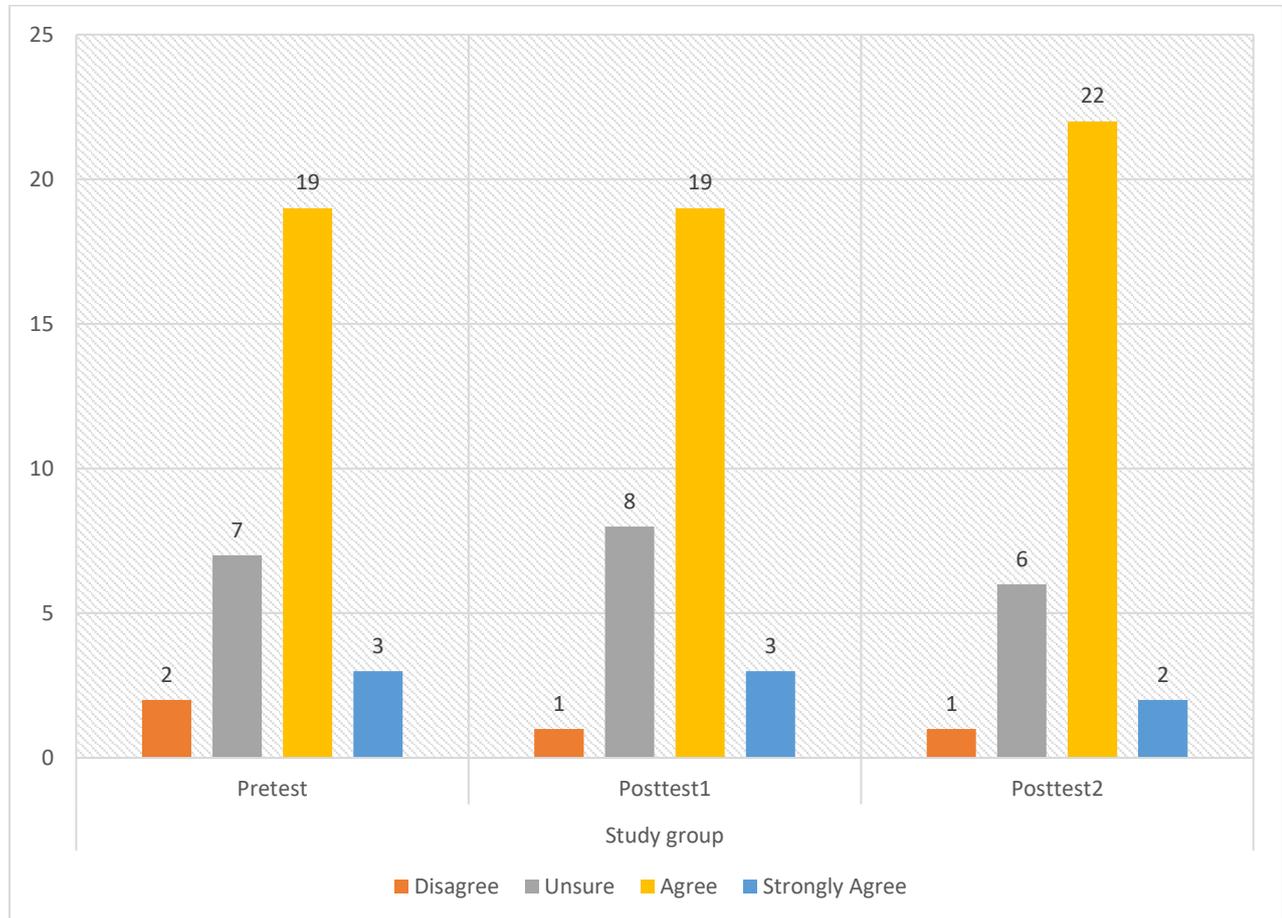

Figure (4.3): Overall distribution of the interventional group related to nursing perception about pulmonary care of coronavirus disease 19.

	Control group

	Pretest		Posttest1		Posttest2	
	F	**%**	**F**	**%**	**F**	**%**
Strongly disagree	0	0	0	0	0	0
Disagree	1	3.2	1	3.3	1	3.3
Unsure	9	32.3	**14**	**46.7**	**15**	**50.0**
Agree	**18**	**58.1**	**14**	**46.7**	12	40.0
Strongly Agree	2	6.5	1	3.3	2	6.7
Sum	30	100	30	100	30	100

Table (4.21): Overall distribution of the control group related to nursing perception about pulmonary care of coronavirus disease 19.

Cut of point = 16, strongly disagree = (21-37), disagree = (38-54), uncertain = (55-71), agree = (72-88), strongly agree= (89-105).

The table shows that the majority of nursing perception for control group at all stages of pretest 18 (58.1%) were with agree perception, posttest 1 14 (46.7%) are equal record at both unsure and agree assessment, and posttest 2 15 (50%) were with agree perception toward pulmonary care for coronavirus disease.
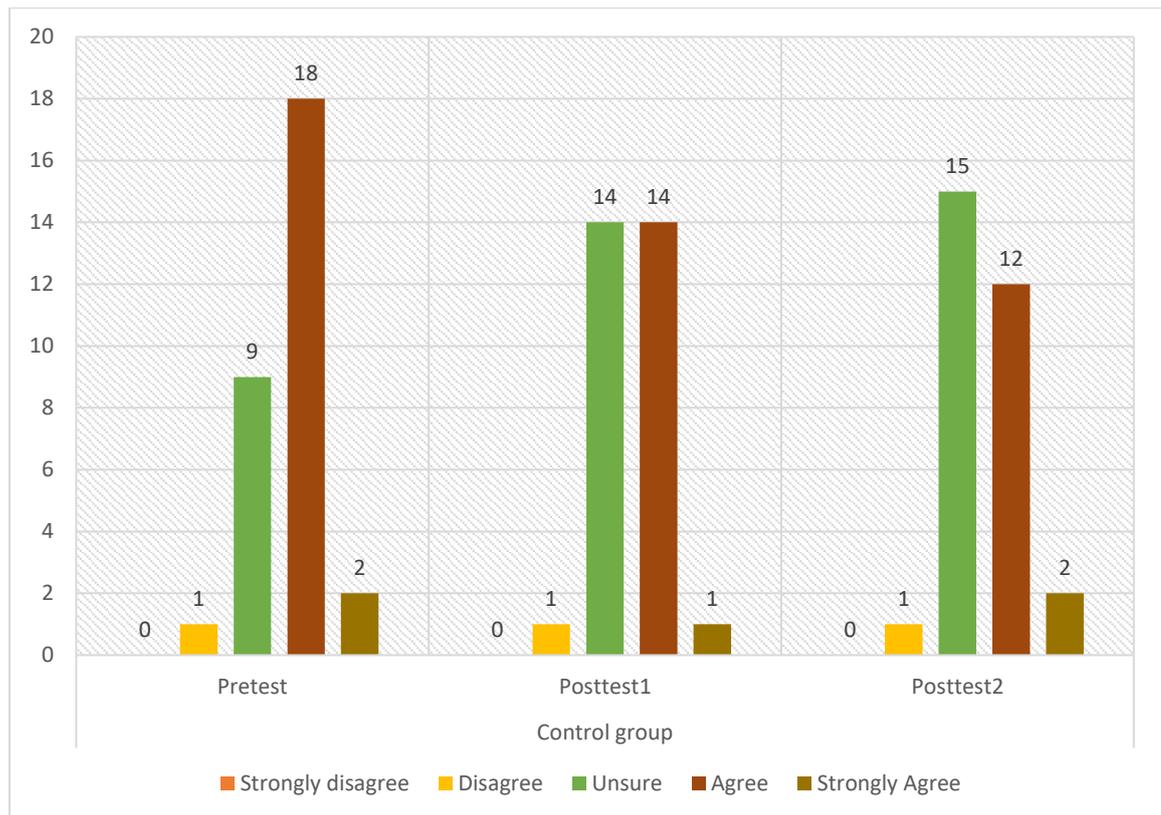
Fig (4.4): Overall distribution of the control group related to nursing perception about pulmonary care of coronavirus disease 19.

Table (4.22): Mean of score comparing regarding pretest perception for both interventional group and control group

t-test: independent						
	N	**Mean**	**Std. D**	**Std. E**	**P. Value**	**Assessment**
Interventional	31	75.06	11.764	2.113	.612	N. S
Control	30	76.43	8.951	1.634		

This table shows the comparison between perception responses of between control and interventional group pre-test, no significant differentiations between responses of the interventional and control group member related to their pre-test (P = 0.612).

Table (4.23): Analysis of variance (ANOVA) Test for nursing perception about pulmonary care of coronaviruses disease 19 of interventional group.

Variance analysis						
	Total squares	df	mean squares	F	Significant	Assessment
Inter Groups	33.312	2	16.656			
Within Groups	10442.581	90	116.029	.144	.866	**N. S**
Total	10475.892	92				

This table show not assigned differences found inter pre and first / second post-test for nursing perception regarding pulmonary care for coronavirus disease at p- value 0.866 which are more than 0.05.
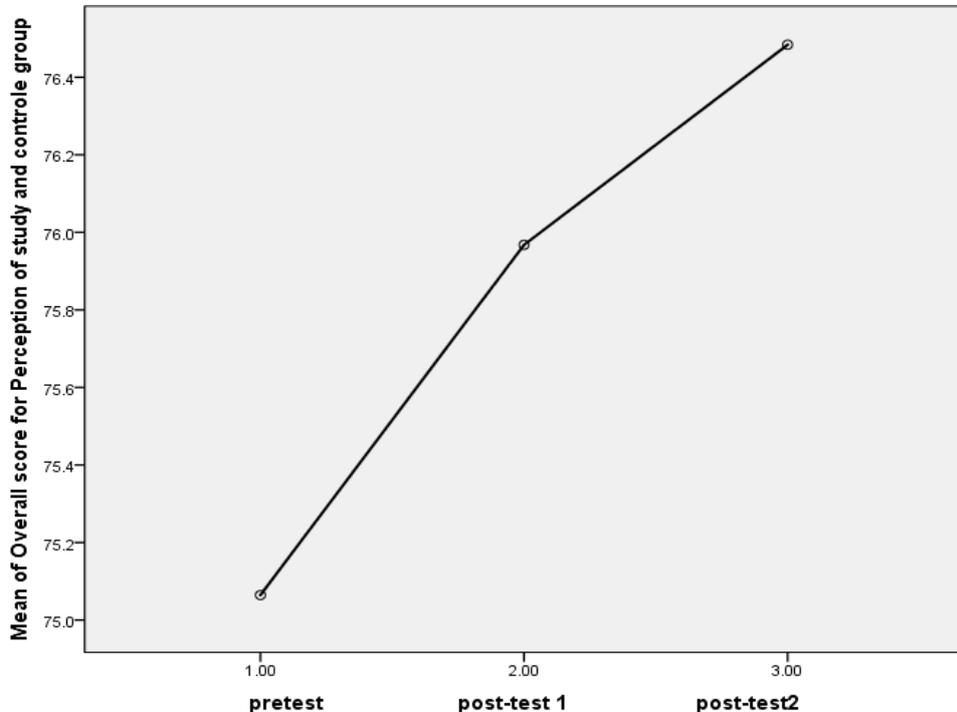

Figure (4.5): Estimated marginal perception means for interventional group

Figure (4.4) show changes in the levels of the nursing perception about pulmonary care of coronavirus 19 disease in interventional groups throughout the three phases of pretest and posttest 1, posttest 2.
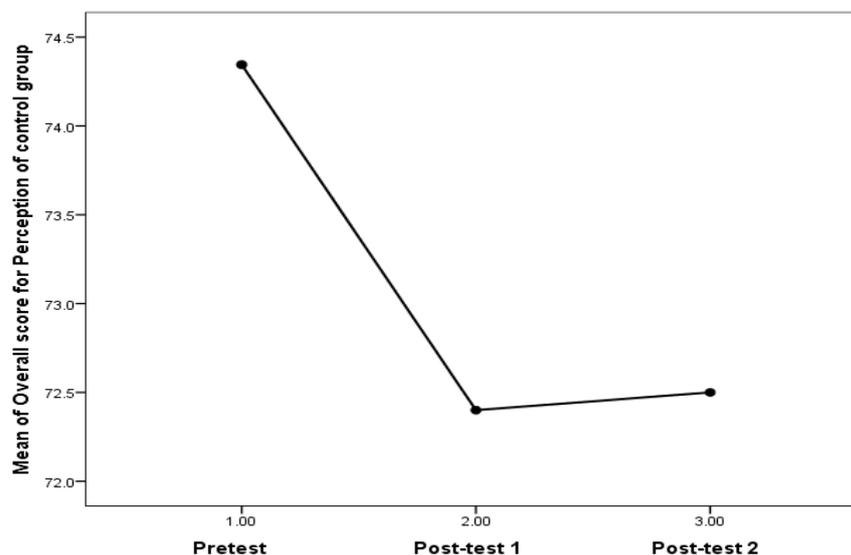

Figure (4.6): Estimated marginal perception means for control group

Figure (4.6) show changes in the levels of the nursing perception about pulmonary care of coronavirus disease 19 in control groups throughout the three phases of pre and first/second post-test.

Table (4.24): Association between demographic characteristics and nursing perception for study group.

Demographic characteristics	x^2	degree of freedom	P-value	Asses
Gender	21.333	2	.439	**N.S**
Age	47.274	1	.266	**N.S**
Educational states	20.250	2	.505	**N.S**
Marital status	22.500	1	.371	**N.S**

The above table show no significant association between nursing perception and demographical characteristics.

Table (4.25): Relationship between knowledge and perception of critical care nurses of pulmonary care coronavirus disease 19 for study group.

	Mean	Std. Deviation	N	Pearson Correlation (*r*)	P-Value	Assessment
Knowledge	59.00	4.195	31	0.470	.008	Positive moderate relationship (H. S)
Perception	75.97	9.904	31			

Pearson's (*r*) correlation coefficient is statistical analysis method used in both types descriptive and inferential statistic used in order to determine how two variables are related to one another with ratio scale. In the table above show a high significant relationship between nurse knowledge and perception toward pulmonary care with coronavirus disease 19 at P-Value 0.008 which less than 0.05.

Chapter Five

Discussion

Chapter Five

5. Discussion:

Results of nursing education program application toward pulmonary care of coronavirus disease 19 for nurses who work in critical care unit are discussed in this chapter. The data was collected using knowledge and perception for nurses, and the data collected was analyzed and reported in accordance with the study's objectives. The training session is intended to give nurses with sufficient and critical information and perception in pulmonary care for coronavirus disease.

Table (1), which presented the results related to the demographical characteristic of the study sample shows that most of study sample (both groups) 15 (48.4%), 15 (50%) were (24-26) years old. This result supported by study carried out by (Ahmed et al 2020) titled as "knowledge, awareness and practice of health care professionals amid SARS-CoV-2, corona virus disease outbreak", the finding revealed that most of the participants 300 (37%) out of n= 810 were (22-25) years old. Most of the nurses in the critical care units were young related to the responsibilities complex of the work and fast turn off.

In relation to gender, the results shows that most of the interventional group were male 19 (61.3%), while the control group were equal in numbers between male and female 15 (50%). The study published in, 2021 to study "Efficacy of COVID-19 prevention educational program on Nurses' knowledge and practices at hemodialysis unit" in Egypt by Elpasiony et al founded that most of participants were male 16 (53.3%). The critical care unit

receives complicated cases the work load is so heavy for this reason most of the nurses in this area were male.

Saddon and Hassan, 2017, applied an educational program in Al-Amara City at Al-Sader teaching hospital to enhancing the nursing care of patients with chronic obstructive pulmonary illness, in this study the researcher founded that most of the participant 17 (56.7%), 15 (50.0%) were with diploma in nursing, this results parallel with our finding which shows that the high percentage of the interventional group 16 (51.6%) were diploma holders, while high percentage of the control group 20 (66.7%) were bachler holders.

The marital status of nurses working in intensive care unit who participate in the study were 18 (58.1%) were single for interventional group, while for control group 20 (66.7%) were married.

Related to the years of experience table (2) shows that 14 (45%) were less than one year in the interventional group and 14 (46.7%) for control group were between (1-5) years of experience. This result agree with study applied by Giao et al, 2020 which carried out to assess health care worker knowledge and attitude toward coronavirus disease 19 , the results indicate that (70%) of the participant were nurses, (62.9%) were with less than 5 years' experience.

Related to years of experience in the intensive care unit the results shows that 23 (74.2%) were less than 1 year in the interventional group, while the control group recorded 15 (50 %) within 1-5 years of experience in critical care unit. This results not supported by study applied in kingdom of Saudi Arabia among critical care nurses titled as "effect of structured teaching program on knowledge regarding prevention of ventilator associated pneumonia" which founding that most of participants (39%) their experience in critical care unite between (5 – 10) years (Chithra and Janula 2017).

Also, table (2) shows that most of the participants in study sample 29 (93.5%) and 29 (96.7%) didn't received any educational courses related to pulmonary care for patients with respiratory complication in case of coronavirus disease 19. This result supported by study applied in turkey to assess nurses knowledge about coronavirus disease 19 which founded that most of study sample 96 (51.4%) were not receiving an education about coronavirus disease 19.

This conclusion might be explained by the fact that nurses in the study settings did not get any in-service education or training. Inadequate nurse training may be the result of organizational reasons such as a lack of training resources and a nursing staff shortage, which prevents nurses from attending training programs outside of the hospital. On the other hand most of the study sample (both groups) 24 (77.4%), 28 (93.3%) were depending on self-education related to interested study phenomena. The nurses who work in the critical care unit needs to improve their knowledge to maintain the quality of care which provided of the patients and their families.

According to learning resources which is mostly used by nurses who participated in the study (both groups) table (3) presented that 7 (29.2%) and 8 (28.6 %) of the participants used the social media as a learning resources plus shearing information with their colleagues to improve their knowledge and find the correct answers for their questions. This result compatible with results finding by Elhadi et al in 2020, their finding indicate that most of the participants (75.7%) were obtain their knowledge from different resources from social media platform.

Table (4) shows that there is no significant differences between responses of the both group in their pretest (P. value =.082). This might be attributed to a lack of participation toward pulmonary care training sessions

about coronavirus disease 19 for most of the nurses who work in the critical area because COVID 19 is a new pandemic in the word.

Mostafa et al, 2019 carried out an educational sessions to improve nurses knowledge and practices pulmonary diseases caring oxygen therapy in Egypt, found that high significant differences recorded in the mean score of nurse's knowledges before and after carring out the educational sessions related to oxygen therapy, this result parallel with results appeared in table (5) which presents statistical analysis of nurse's who participate in the study shows changes of their knowledge level when comparing between the pre-test (1.36 ± 0.240), and long with two posttest (1.82 ± 0.139), (1.67 ± 0.163). this significant improvement in nurse's knowledge regarding oxygen supplement. Occurs after their involvement in the educational session which prove the effectiveness of the educational program session on the development the nurse's knowledge.

Table (6): this table presented the statistical results directed toward chest physiotherapy. The pre-test revealed (1.35 ± 0.216) for interventional group and (1.45 ± 0.211) for control group, during the two post-test the results shows $(1.78 \pm .140)$ and (1.69 ± 0.166) for interventional group and (1.45 ± 0.211), (1.48 ± 0.244) for control group. The results indicated that significant changes presented on the interventional group member who attend the educational session, while no significant changes recoded on the results related to the control group. the positive impact of the educational program clearly proved as a fool to develop the nurse's knowledge. This result supported by a study applied by Mohamed et al 2019, to determine the effect educational program on nurses' clinical outcomes and performance about chest physiotherapy for intensive care unit patient, which found that majority of the nurses have a good knowledge after applied educational program between pretest, immediate post and one-month post intervention.

Table (7): presented the statistical results directed toward endotracheal intubation. The pre-test revealed (1.43 ± 0.080) for interventional group and (1.47 ± 0.223) for control group, during the two post-test the results shows (1.75 ± 0.114) and (1.70 ± 0.134) for interventional group and (1.45 ± 0.305), (1.47 ± .311) for control group. The results indicated that significant changes presented on the interventional group member who attend the educational session, while no significant changes recoded on the results related to the control group. the positive impact of the educational program clearly proved as a fool to develop the nurse's knowledge. This result parallel with study applied in Egypt in critical care area by Hassan et al 2018, which titled as "effect of the education program on nurses practice regarding care of adult patients with endotracheal tube", in this study find that the total mean score pre applied the educational program were (36.8) and this score increased after applied program reach to (80.3) and is slightly decreased after flow up to (78.9).

Table (8) presented the statistical results directed toward tracheostomy. The pre-test revealed (1.27 ± 0.205) for interventional group and (1.22 ± 0.195) for control group, during the two post-test the results shows (1.71 ± 0.091) and (1.54 ± 0.172) for interventional group and (1.25 ± 0.176), (1.31 ± .174) for control group. The results indicated that significant changes presented on the interventional group member who attend the educational session, while no significant changes recoded on the results related to the control group. the positive impact of the educational program clearly proved to develop the nurse's knowledge. This might be due to the training program's good influence on nurses' knowledge of tracheostomy care. This result agree with finding of a study carried out by Malk et al 2022 they found that when an educational program implemented there was a considerable improvement appears on the nurses knowledge related to tracheostomy and its care

A study aimed to "assess the efficacy of the COVID-19 prevention educational program on nurses' knowledge and practices at hemodialysis unit", founded that a considerable improvement in nurses' awareness of COVID-19 infection prevention was seen after the teaching program was implemented at mean of score and stander deviation pretest 68.15 ± 25.09 and posttest 94.07 ± 7.50 (Elpasiony 2021). These results parallel with results in table (10) which shows significant changing in mean of score and stander deviation for interventional group related to their pretest (44.42 ± 3.047) and two posttests (59 ± 4.195), (55.45 ± 5.341). while there is no change in mean of score for control group related to their pre-test (45.67 ± 2.468) and two posttests (45.33 ± 3.680), (46.23 ± 2.897). These results indicated that the educational program is effective and cause improvement in nurse's knowledge regarding to their interested study phenomena.

Table (11) shows high significant differences between pretest and two posttests for nurses knowledge regarding pulmonary care for coronavirus disease 19 at (P- value 0.001) which are less than (0.01). this results in the same line with study results by Abd Elaziz et al (2021), who reported that significant differences and improvement of nurse's knowledge pretest and post-test after application educational program regarding Pandemic Covid-19 at (P.value 0.001).

Table (13) shows not significant differences for control group between pretest, posttest 1 and posttest 2 for nursing knowledge regarding pulmonary care for coronavirus disease at (P- value 0.818) which are more than 0.05.

Coronavirus disease 19 is new pandemic and most of the nursing their working in all hospital department's not have enough information about patient care and management with this pandemic, control group not take any educational session to improvement in their knowledge and awareness

regarding care of coronavirus disease 19, so the results appear not improvement in their education.

The results in table (15) shows significant association between nurses' knowledge and gender, educational and marital status at (P-value 0.019, 0.014 and 0.021) which are less than (0.05), also, the table indicate that non-significant association between nurses' knowledge and age (0.582) at p-value 0.05. these results parallel with study applied in kingdom of Saudi Arabia titled as "Awareness, Attitudes, Prevention, and Perceptions of COVID-19 Outbreak among nurses in Saudi Arabi", which founding that not significant association between knowledge and age groups, at p-value (0.78) which is more than (0.05). at the same study founded that not significant association between nursing knowledge and gender, educational status and marital status (0.08), (0.391) and (0.154) which not supported our study results (Al-Dossary 2020).

Nurses are required to give high-quality care to their clients in both health and disease, as well as to educate them by guiding them toward a self-regulated healthy lifestyle. Nursing professionals must improve their talents in order to see professional care in a new light and put new information into practice. knowledge and practice study aids nurses in developing policies by providing a greater grasp of the existing situation, barriers, and solutions.

Teaching programs for nurses serve a vital role in helping staff nurses learn and improve the knowledge they need to offer high-quality care to their patients.

In each phase of the clinical simulation, Bloom's taxonomy may be used to build the competence clinic in nursing, allowing nurses to enhance their knowledge, abilities, and attitudes. methodologically designed research that

uses Bloom's taxonomy to develop nursing competence in clinical simulation is required.

Table (17) presents the statistical analysis of nurse's perception their working in intensive care unit about safety from coronavirus disease 19. This table shows the general mean and SD for study group (3.63 ± 0.453) in their pre-test with agree assessment, while simple significant change is presented in the following two Post-test (3.65 ± 0.423), (3.73 ± 0.564) with agree assessment. This results not agree with study result carried out from Madrid in 2021 to find out the nurse's perception regarding COVID 19 care delivery in critical care unit, which reported that lack of confidence in their ability to avoid being infected with COVID-19 and becoming asymptomatic transmitters, creating a danger of spreading the virus to their workplaces and families. Lack of safety was mentioned as a result of a lack of personal protective equipment (PPE), a lack of awareness of this new coronavirus, and a lack of well-defined procedures for handling patients diagnosed with SARS-CoV-2 (González-Gil et al., 2021).

Another study applied by Lucchini et al., 2020, found that inappropriate safety of nursing team their working in critical care unit result from human resources and workloads are out of balance. This might be due to the increased burden associated with caring for COVID-19 patients. Report on the importance of maintaining nurse-to-patient ratios of 1:1.5. A ratio of 1:2 is also recommended by the Spanish Society of Intensive Nursing and Coronary Units (Prior to the COVID-19 epidemic, the average nurse-to-patient ratio was 1:2.5.). (Lucchini et al., 2020) (Cruz-Lendínez et al., 2019)

The majority of nurses stated that the way their workplaces were set up prevented them from resting and disconnecting between shifts, leaving them emotionally exhausted and unable to sleep or get a good night's rest. (Huang et al., 2020).

Previous research have shown CCU management experiences involving good handover and rest intervals, as well as specific shifts and work distribution. Concentrated care interventions with maximum exposure lengths of four hours are advised, as are pauses for basic requirements and emotional venting, as well as overlapping shifts for one hour (Raurell-Torredà, 2020).

All of the previous points play an important role in reducing nursing perception toward safety and communication with another team member during coronavirus disease 19 pandemic.

Table (18) presents the statistical analysis of nurse's perception their working in intensive care unit about communication and relationship between team members. This table shows the general mean and SD for study group (3.39 ± 0.328) in their pre-test and post-test 2 (3.33 ± 0.249) with unsure assessment, while simple significant change is presented in post-test 1 (3.53 ± 0.423) with unsure agree assessment. This results not in the same line with results applied by González-Gil et al (2021), which mentioned that lack of communication and relationship between team members in critical area through pandemic might be connected to their feelings of moral distress as a result of making non-consensual decisions.

In 2020 Al-Dossary et al applied a study to found nursing perception toward coronaviruses in Saudi Arabia which reached that most of the participants from nursing with high perception (69.2%) this results agree with the results in table (20) which shows that the majority of nursing perception for study group at all stages of pretest 19 (61.3%), posttest 1 19 (61.3%) and posttest 2 22 (70.0%) were with agree perception toward pulmonary care for coronavirus disease.

The table (24) shows no significant association between nursing perception and demographical data at p-value more than (0.05). these results agree with study applied in Spain to identify nursing perception who there working in critical care unite towered coronaviruses disease 19 which finding

that no significant association between nursing perception and their demographical characteristic (González-Gil 2021).

Elpasiony et al in 2021, applied a study in one of the critical areas to applied educational program for nursing staff to assess efficacy of coronavirus prevention, according to the findings of their post-program study, worthy relationship recorded between nurses and their level of practice and knowledge at r= 0.595 and p-value (0.001). this result agree with our study results which appeared in table (25) show a high significant relationship between nurse knowledge and perception toward pulmonary care with coronavirus disease 19 at P-Value (0.008) which less than 0.05 and r= 0.470. In light of these findings, if nurses are aware about how pulmonary manage and care of COVID-19 patients, this will improve their perception and performance and consequently the quality of care they provide and patient outcomes.

Overall, the current study findings show that the positive influences of educational sessions on the critical care unit nurses' knowledge and perception. These findings support the research hypothesis of the study there is significant differences between effective of an educational program on critical care nurse's knowledge and perception toward pulmonary care - Coronavirus Disease 19.

Chapter Six

Conclusions
&
Recommendations

Chapter Six

Conclusions and Recommendations

6.1. Conclusion:

1- Most of participants in both groups were between (24-26) years old, male. Related to educational status most of the interventional group were with diploma, while were bachelor degree in the control group, most of the interventional group were single and control group were married.

2- Related to employment information's most of the interventional group were less than one year in nursing experience in nursing filed, while the control group recorded within 1-5 years of nursing experience in nursing filed. Related to intensive care unit experience the participant recorded were less than 1 year for interventional group, while were between (1-5) years for control group.

3- Both group members recorded no participation in any courses recorded to COVID 19. Most of study group (both groups) depended on self-learning. According to learning resources as a rich field of information related to COVID 19 the study sample in both groups that most of the participants were gain their knowledge from social media and their colleagues were both social media only and social media.

4- the comparison between knowledge responses of both groups (interventional and control group) in their first pre-test recorder low mean score and shows no significant differences between the responses.

5- High significant differences of interventional group between their pretest and two posttest recording for the nursing knowledge regarding

pulmonary care for coronavirus disease 19 knowledge, while no significant differences recorded among control group members.

6- Significant changing related to perception in interventional group between pretest, posttest 1 and posttest 2 with agree assessment. while there is no change in mean of score for control group.

7- No significant association between nursing perception and demographical data.

8- The finding shows positive effect of the educational program on the nurse's knowledge which act a strong reason to accept the alternative hypothesis.

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6.2. Recommendations:

1- Continuous nursing education and Inservice training programs of nurses should be organized within critical care units and equipped with the training facilities and resources needed to improve quality of nurses' knowledge and perceptions, which will improve nursing care which offered to the patients' and positively on health services outcome.

2- Developing a systematic periodical evaluation for nurses to determining a strategy of upgrade their knowledge and enhancing their output.

3- Reapplication on based study is recommended based on a wider probability sample collected from several geographic locations is necessary to raise an efficiency of nurses regarding pulmonary care of coronavirus disease 19.

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Appendices

Ethical permission

University of Babylon

College of Nursing

Research Ethics Committee

جـــامـــعة بـــابـــل

كـــلية التمريــض

لجنة اخلاقيات البحث العلمي

Issue No:

Date: /   /2021   **Approval Letter**

To,

Ali Ahmed Zghier

The Research Ethics committee at the University of Babylon, College of Nursing has reviewed and discussed your application to conduct the research study entitled "Effectiveness of structured educational program of pulmonary care for coronavirus disease 19 on the critical care unit nurses knowledge and perception at al-Hilla Teaching Hospitals."

The Following documents have been reviewed and approved:

1. Research protocol
2. Research instrument/s
3. Participant informed consent

Committee Decision:

The committee approves the study to be conducted in the presented form. The Research Ethics committee expects to be informed about any changes occurring during the study, any revision in the protocol and participant informed consent.

Prof. Dr. Salma K. Jehad

Chair Committee

College of Nursing

Research Ethical Committee

/   /2021

Ministry of Higher Education
and Scientific Research

وزارة التعليم العالي والبحث العلمي   جمهورية العراق

University of Babylon
College of Nursing

جامعة بابل
كلية التمريض
لجنة الدراسات العليا

Ref. No. :
Date: /   /

العدد :
التاريخ : ١٤ / ١١ / ٢٠٢١

الى / مستشفى الحلة التعليمي
مستشفى الأمام الصادق (ع) التعليمي
م/ تسهيل مهمة

تحية طيبة :

يطيــب لنــا حســن التواصــل معكــم ويرجــى تفضـلكم بتسـهيل مهمــة طالــب الـدكتوراه
(علــي أحمــد زغيــر نــذير) لغــرض جمــع عينــة دراســة الـدكتوراه والخاصــة بالبحــث
الموسوم :

فاعليــة البرنـــامج التثقيفــي المــنظم للرعايــة الرئويــة لمــرض فيــروس كورونــا ١٩ فــي وحـدة الرعايــة
الحرجة معرفة وادراك التمريضيين في مستشفيات الحلة التعليمية

**Effectiveness of Structured Educational Program of Pulmonary Care for Coronavirus
Disease 19 on the Critical Care Unit Nurses Knowledge and Perception at AL-Hillah
Teaching Hospitals**

مع الاحترام ...

المرافقات //
• بروتوكول .
• استبانة

ا.م . د. نهاد محمد قاسم الدوري
معاون العميد للشؤون العلمية والدراسات العليا
٢٠٢١/١١/

صورة عنه الى //
• مكتب السيد العميد للتفضل بالاطلاع مع الاحترام .
• لجنة الدراسات العليا
• الصادرة .

E-mail:nursing@uobabylon.edu.iq

STARS

07711632208   وطني
009647711632208   المكتب

w w w . u o b a b y l o n . e d u . i q

جمهورية العراق

		وزارة الصحة والبيئة
Ministry Of Health Babylon Health Directorate Email:- Babel_Healthmoh@yahoo.com Tel:282628 or 282621		دائرة صحة محافظة بابـــل المديــر العـــام مركــز التدريب والتنمية البشرية وحدة أدارة البحوث
		العدد : ١٠٦٦
		التاريخ: ١٥ / ١١ / ٢٠٢١

إلى / مستشفى الحلة التعليمي

مستشفى الامام الصادق (ع) التعليمي

م/ تسهيل مهمة

تحية طيبة ...

أشارة إلى كتاب جامعة بابل / كلية التمريض / وحدة الدراسات العليا ذي العدد ٣٤٧٠ في ٢٠٢١/١١/١٤

نــرفق لكم ربطا استمارات الموافقة المبدئية لمشروع البحث العائد للباحث طالب الدراسات العليا الدكتوراه (علي احمد زغير نذير)

للتفضــل بــالاطلاع وتسهيل مهمـة المومـا أليـه مـن خـلال توقيـع وختم اسـتمارات اجراء البحث المرفقــة فـي مؤسســاتكم وحسـب الضــوابط والإمكانــات لاستحصــال الموافقــة المبدئيــة ليتسنى لنا أجراء اللازم على أن لا تتحمل مؤسساتكم أيـة تبعـات ماديـة وقانونيـة .... مـع الاحترام

المرفقات :

استمارة عدد /٢

الدكتور

محمد عبد الله عجرش

مدير مركز التدريب والتنمية البشرية

/ / ٢٠٢١

نسخة منه إلى :

• مركز التدريب والتنمية البشرية / وحدة أدارة البحوث مع الأوليات ...

حنان ٢٠٢١/١١/١٥

جمهورية العراق

		وزارة الصحة والبيئة
Ministry Of Health Babylon Health Directorate Email:- Babel_Healthmoh@yahoo.com Tel:282628 or 282621		دائرة صحة محافظة بابـــل المديـــر العـــام مركـز التدريب والتنمية البشرية وحدة أدارة البحوث
		العدد : ١-٦٦
		التاريخ: ١٥ / ١١ / ٢٠٢١

إلى / مستشفى الحلة التعليمي
مستشفى الامام الصادق (ع) التعليمي

وزارة الصحة
دائرة صحة بابل
مركز التدريب والتنمية البشرية

م/ تسهيل مهمة

تحية طيبة ...

أشارة إلى كتاب جامعة بابل / كلية التمريض / وحدة الدراسات العليا ذي العدد ٣٤٧٠ في ٢٠٢١/١١/١٤

نرفق لكم ربطا استمارات الموافقة المبدئية لمشروع البحث العائد للباحث طالب الدراسات العليا الدكتوراه (علي احمد زغير نذير)

للتفضل بالاطلاع وتسهيل مهمة الموما أليه من خلال توقيع وختم استمارات اجراء البحث المرفقة في مؤسساتكم وحسب الضوابط والإمكانات لاستحصال الموافقة المبدئية ليتسنى لنا أجراء اللازم على أن لا تتحمل مؤسساتكم أية تبعات مادية وقانونية .... مع الاحترام

المرفقات :

استمارة عدد /٢

الدكتور
محمد عبد الله عجرش
مدير مركز التدريب والتنمية البشرية
/ / ٢٠٢١

نسخة منه إلى /

- مركز التدريب والتنمية البشرية / وحدة أدارة البحوث مع الأوليات ...

حنان ٢٠٢١/١١/١٥

		جمهورية العراق
Ministry Of Health Babylon Health Directorate Email:- Babel_Healthmoh@yahoo.com Tel:282628 or 282621		وزارة الصحة والبيئة دائرة صحة محافظة بابـــل المديـــر العــام مركــز التدريب والتنمية البشرية وحدة أدارة البحوث
		العدد : ١٠٦٦
		التاريخ: ٥/ ١١ /٢٠٢١

إلى / مستشفى الحلة التعليمي
مستشفى الامام الصادق (ع) التعليمي

م/ تسهيل مهمة

تحية طيبة ...

أشارة إلى كتاب جامعة بابل / كلية التمريض / وحدة الدراسات العليا ذي العدد ٣٤٧٠ في ٢٠٢١/١١/١٤

نـرفق لكم ربطا استمارات الموافقة المبدئية لمشروع البحث العائد للباحث طالب الدراسات العليا الدكتوراه (علي احمد زغير نذير)

للتفضل بـالاطلاع وتسهيل مهمـة المومـا أليـه مـن خـلال توقيع وختم اسـتمارات اجراء البحـث المرفقـة فـي مؤسساتكم وحسـب الضـوابط والإمكانـات لاستحصـال الموافقـة المبدئيـة ليتسـنى لنـا أجـراء اللازم علـى أن لا تتحمـل مؤسساتكم أيـة تبعـات ماديـة وقانونيـة .... مع الاحترام

المرفقات :
استمارة عدد ٢/

الدكتور
محمد عبد الله عجرش
مدير مركز التدريب والتنمية البشرية
/ / ٢٠٢١

نسخة منه إلى :

• مركز التدريب والتنمية البشرية / وحدة أدارة البحوث مع الأوليات ...

حنان ٢٠٢١/١١/١٥

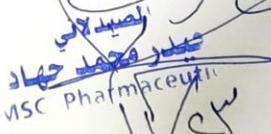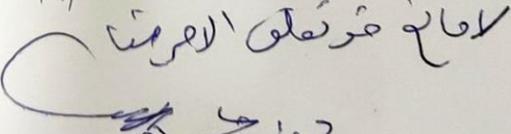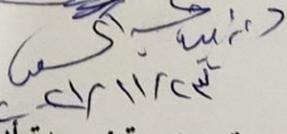دائرة صحة محافظة بابل / مركز التدريب والتنمية البشرية // ايميل المركز babiltrainning@gmail.com

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جمهورية العـــراق		
Ministry Of Health Babylon Health Directorate Email:- Babel_Healthmoh@yahoo.com Tel:282628 or 282621		وزارة الصحة والبيئة دائرة صحة محافظة بابـــل المديـــر العـــام مركـز التدريب والتنمية البشرية لجنة البحوث

استمارة رقم :-٢٠٢١/ ٠٣-

رقم القرار :- ١

تاريخ القرار :-٦ / ٦ /٢٠٢٢

وزارة الصحة
دائرة صحة بابل
مركز التدريب والتنمية البشرية
لجنة البحوث

قرار لجنة البحوث

تحية طيبة ...

درست لجنة البحوث في دائرة صحة بابل مشروع البحث ذي الرقم (٥ /٢٠٢٢/ بابل) المعنــون (فاعلية البرنامج التثقيفي المنظم للرعاية الرئوية لمرض فيروس كورونا ١٩ في وحدة الرعاية الحرجة معرفة وأدراك التمريضيين في مستشفيات الحلة التعليمية) والمقـدم مـن الباحث(علي احمد زغير) إلى وحدة أدارة البحوث والمعرفي مركز التدريب والتنمية البشرية في دائرة صحة بابل بتاريخ ٢٠٢٢/١/١٠ وقَررت :

قبول مشروع البحث أعلاه كونه مستوفيا للمعايير المعتمدة في وزارة الصحة والخاصة بتنفيذ البحوث ولا مانع من تنفيذه في مؤسسات الدائرة .

مـــــــع الاحتـــــــرام

الدكتور/ محمد عبد الله عجرش
رئيس لجنة البحوث
/ ٢٠٢٢

نسخة منه إلى :

● مكتب المدير العام / مركز التدريب والتنمية البشرية / وحدة إدارة البحوث ... مع الأوليات.

سوئان

Ministry of Higher Education and Scientific Research

وزارة التعليم العالي والبحث العلمي   جمهورية العراق

University of Babylon

جامعة بابل

College of Education for Human Sciences

كلية التربية للعلوم الإنسانية

Ref. No :

Date: /   /

العدد : ٧٢٩٥

التاريخ :   /٦ /٢٠٢٢

جامعة بابل / كلية التمريض

مكتب السيد معاون العميد للشؤون العلمية المحترم

م / أعادة رسالة

تحية طيبة :

اشــارة الــى كتــابكم المــرقم (٢١٩٣) فــي ٢٠٢٢/٦/٢٢، نعيــد إلــيكم أطروحــة طالــب الدراســات العليــا / الــدكتوراه (علــي احمــد زغيــر) بعــد تقويمهــا لغويــاً مــن قبــل (أ.م.د. حسـين حميـد معيـوف) مـن قسـم اللغـة الانكليزيـة فـي كليتنـا، وقد ثبـت الملاحظـات علـى متن الاطروحة يرجى من الباحث الالتزام بها .

*** مع الاحترام ***

د. اسامة كاظم عمران
معاون العميد للشؤون العلمية
والدراسات العليا

<u>نسخة منه إلى //</u>
- الدراسات العليا
- الصادرة

// اشارة //

Consent Form for Participation in a Study

Collage of nursing / Babylon university

Title of Study: Effectiveness of Structured Educational Program of Pulmonary Care for Coronavirus Disease 19 on the Critical Care Unit Nurses Knowledge and Perception at Al-Hillah Teaching Hospitals

❖ Description of the research and your participation:

You are inviting to participate in current research study, the purpose of this research is (To find out the Effectiveness of Structured Educational Program of Pulmonary Care for Coronavirus Disease 19 on the Critical Care Unit Nurses Knowledge and Perception). Your participation will involve:

A- Pretest: which involve collection data about of nurse's knowledge and perception toward pulmonary care for coronavirus disease 19 by self-report method in instrument prepared for this reason.

B- Educational sessions: which involve attending to four educational sessions about 45 minutes for each session in order to present the structured educational program content.

C- **Posttest one**: Immediately posttest after the fourth session with the same instrument and same methods of data collection doing in order to find out the change in nurses' knowledge and perception toward pulmonary care for coronavirus disease 19.

D- **Posttest two**: after three weeks of posttest one posttest two doing in order to identify the changes in nurse's knowledge and perception toward pulmonary care for coronavirus disease 19.

❖ Risks and discomforts:

There are no known risks associated with this research or with apply of structured educational program contents.

❖ Potential benefits:

Yet there are no known clear benefits to you that would result from your participation in this research. OR (but expect to improve nurse's knowledge and perception toward pulmonary care for coronavirus

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disease 19). This research may help us to identify (the effectiveness of structured educational program of pulmonary care for coronavirus disease 19 on the critical care unit nurse's knowledge and perception).

❖ Protection of confidentiality:

We will do everything we can to protect your privacy, your data will use for the research purpose. Your identity will not be revealed in any publication resulting from this study.

❖ Voluntary participation:

Your participation in this research study is voluntary. You may choose not to participate and you may withdraw your consent to participate at any time. You will not be penalized in any way should you decide not to participate or to withdraw from this study.

❖ Contact information:

If you have any questions or concerns about this study or if any problems arise, please contact the researcher (Ali Ahmed Zghair) at phone number ().

<div style="border:1px solid black; padding:10px;">

Consent:

I have read this consent form and have been given the opportunity to ask questions. I give my consent to participate in this study.

Participant ID:--------------------. **Participant's signature**:-------------------.

Date: -------------------.

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1- **Ventilatory Support In adults with COVID-19, we suggest starting supplemental oxygen if the peripheral oxygen saturation (SPO2) is**
a) Less than 92%
b) Less than 90%
c) Less than 87 %
d) Less than 95%

2- **Ventilatory Support In adults with COVID-19 and acute hypoxemic respiratory failure on oxygen, we recommend that SPO2 be maintained**
a) No higher than 96%
b) No higher than 94%
c) No higher than 92%
d) no higher than 90%

3- **Ventilatory Support In pregnant women with COVID-19 and emergency signs (obstructed or absent breathing, severe respiratory distress, central cyanosis, shock, coma or convulsions, we recommend that SPO2 be maintained**
a) 92- 95%
b) 94%
c) 92%
d) 90%

4- **Ventilatory Support in Children with COVID-19 and emergency signs (obstructed or absent breathing, severe respiratory distress, central cyanosis, shock, coma or convulsions, we recommend that SPO2 be maintained equal or more**

a. 92- 95%
b. 94%
c. 92%
d. 90%

5- **For adults with COVID-19 and acute hypoxemic respiratory failure which of the following oxygen therapy must be used:-**

a) Nasal intermittent positive pressure ventilation (NIPPV)
b) conventional oxygen
c) high flow nasal cannula (HFNC)
d) all of the above

6- **Amount of O2 gas flow supplement for adult by HFNO systems can deliver about: -**

a) 60 L/min.
b) 25 L/min
c) 75 L/min
d) 100L/min

7- **Amount of o2 gas flow supplement for Pediatric by HFNO systems can deliver about: -**

a) 60 L/min.
b) 25 L/min
c) 75 L/min
d) 100L/min

8- **In mechanically ventilated adults with COVID-19 and ARDS, we recommend using**:-

a) Low tidal volume (Vt) ventilation (Vt 4-8 mL/kg of predicted body weight
b) Over higher tidal volumes (Vt>8 mL/kg)
c) Both of low and high

9- **For mechanically ventilated adults with COVID-19 and moderate to severe ARDS, which of the following strategies can using:-**
a) A higher PEEP strategy
b) A lower PEEP strategy
c) Moderate PEEP strategy
d) All of the above.

10- **For mechanically ventilated adults with COVID-19 and moderate to severe ARDS, we suggest to keep patient in prone ventilation for**
   a) 12 to 16 hours,
   b) 8 to 12 hours
   c) 16 to 20 hours
   d) 4 to 8 hours

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نموذج الموافقة على المشاركة في دراسة

كلية التمريض / جامعة بابل

عنوان الدراسة:ـ فاعلية البرنامج التثقيفي المنظم للرعاية الرئوية لمرض فيروس كورونا ١٩ في وحدة الرعاية الحرجة معرفة وإدراك التمريضيين في مستشفيات الحلة التعليمية.

❖ **وصف البحث وكيفية المشاركة:**

ندعوك للمشاركة في الدراسة البحثية الحالية ، والغرض من هذا البحث هو (لمعرفة فعالية البرنامج التعليمي المنظم للرعاية الرئوية لمرض فيروس كورونا ١٩ في معرفة وإدراك التمريضيين في وحدة الرعاية الحرجة). ومشاركتكم ستتضمن التالي:

أـ **الفحص القبلي:** والذي يتضمن جمع بيانات حول معرفة وادراك التمريضيين تجاه الرعاية الرئوية لمرض فيروس كورونا ١٩ بطريقة التقرير الذاتي باستمارة اعدت لهذا السبب.

بـ **الجلسات التثقيفية:** والتي تتضمن حضور أربع جلسات **تثقيفية** والتي تستغرق حوالي ٤٥ دقيقة لكل جلسة من أجل تقديم محتوى البرنامج التثقيفي المنظم .

</div>

ج- الاختبار البعدي الأول: الاختبار البعدي الاول يتم مباشرة بعد الجلسة الرابعة بنفس الأستمارة ونفس طريقة جمع البيانات من أجل معرفة التغيير في معرفة وادراك التمريضيين تجاه الرعاية الرئوية لمرض فيروس كورونا ١٩.

د- الاختبار البعدي الثاني: بعد ثلاثة أسابيع من الاختبار البعدي الاول ، يتم إجراء اختبار لبعدي لتحديد التغيرات في معرفة وادراك التمريضيين تجاه الرعاية الرئوية لمرض فيروس كورونا ١٩.

❖ **المخاطر والمضايقات:**

لا توجد مخاطر معروفة مرتبطة بهذا البحث أو بتطبيق محتويات البرنامج التثقيفي المنظم.

❖ **الفوائد المحتملة:**

لا توجد فوائد واضحة معروفة قد تنجم عن مشاركتك في هذا البحث. أو (لكن نتوقع ان تكون النتائج هي تحسن معرفة التمريضيين وإدراكهم تجاه الرعاية الرئوية لمرض فيروس كورونا ١٩). قد يساعدنا هذا البحث في تحديد (فعالية البرنامج التعليمي المنظم للرعاية الرئوية لمرض فيروس كورونا ١٩ على معرفة وإدراك التمريضيين وحدة الرعاية الحرجة).

❖ **حفظ الخصوصية:**

سنفعل كل ما في وسعنا لحماية خصوصيتك ، وستستخدم بياناتك لغرض البحث فقط. لن يتم الكشف عن هويتك في أي منشور ناتج عن هذه الدراسة.

❖ **والمشاركة الطوعية:**

مشاركتك في هذه الدراسة البحثية تطوعية. يمكنك اختيار عدم المشاركة ويمكنك سحب موافقتك على المشاركة في أي وقت. لن تتعرض لاي عقوبه بأي شكل من الأشكال إذا قررت عدم المشاركة أو الانسحاب من هذه الدراسة.

❖ **معلومات الاتصال:**

إذا كانت لديك أية أسئلة أو استفسارات بخصوص هذه الدراسة أو في حالة ظهور أي مشاكل ، يرجى الاتصال بالباحث (**علي أحمد زغير**) على رقم الهاتف (---).د

موافقة:

لقد قرأت نموذج الموافقة هذا وأتيحت لي الفرصة لطرح الأسئلة. أعطي موافقتي للمشاركة في هذه الدراسة.

رمز المشارك: ------------------. **توقيع المشارك:** -------------------.

تاريخ: ------------------.

ملاحظة: ـ يرجى وضع علامة دائرة حول الإجابة الصحيحة شاكرين تعاونكم معنا

١ـ يفضل البدء بتزويد المصاب بفايروس كورونا (١٩) من البالغين بالأوكسجين بنسب عالية لتحسين مستوى تشبع الدم الاوكسجين في نسبة: ـ

أـ أقل من ٩٢%

بـ أقل من ٩٠%

تـ أقل من ٨٧%

ثـ أقل من ٩٥%

٢ـ نتيجة الإصابة بقلة الاوكسجين الناتجة عن قصور الجهاز التنفسي يوصي بإدامة نسبة الاوكسجين عند المصاب بفايروس كورونا (١٩) بمستوى الاتي: ـ

أ) لا تزيد عن ٩٦%

ب) لا تزيد عن ٩٤%

ج) لا تزيد عن ٩٢%

د) لا تزيد عن ٩٠%

٣ـ التوصية بإدامة نسبة الاوكسجين في الدم للام الحامل المصابة بفايروس كورونا (١٩) والتي تظهر عليها العلامات (انسداد المجاري التنفسية، قصور الجهاز التنفسي، الازرقاق، الصدمة، فقدان الوعي او التعرض لنوبات التشنج) ضمن المعدل الاتي: ـ

أ) ٩٢-٩٥%

ب) ٩٤%

ج) ٩٢%

د) ٩٠%

٤ـ التوصية بإدامة نسبة الاوكسجين في الدم للأطفال المصابين بفايروس كورونا (١٩) والتي تظهر عليها العلامات (انسداد المجاري التنفسية، قصور الجهاز التنفسي، الازرقاق، الصدمة، فقدان الوعي او التعرض لنوبات التشنج) ضمن المعدل الاتي: ـ

أ) ٩٢ـ٩٥%

ب) ٩٤%

ج) ٩٢%

د) ٩٠%

٥ـ أي من الطرق التي يجب استعمالها لتزويد المرضى البالغين المصابين بفايروس كورونا (١٩) عند اصابتهم بقصور الجهاز التنفسي وقلة معدل الاوكسجين بالدم: ـ

أ) التنفس الأنفي بالضغط الإيجابي المتقطع(NIPPV)

ب) الأكسجين التقليدي

ج) قنية أنفية عالية التدفق(HFNC)

د. جميع ما ورد أعلاه

٦ـ توصى باستعمال احد الاختبارات المدرجة للمرضى البالغين الخاضعين للمعالجة بالتنفس الاصطناعي المصابين بفايروس كورونا (١٩)

أ) تهوية ذات سعة منخفض 4-8 Vt) (Vt) مل / كغ

ب) تهوية ذات سعة عالية 8 <Vt) مل / كجم(

ج) كلا من المنخفض والعالي

٧ـ أي من الاستراتيجيات يمكن استعمالها للمرضى البالغين الخاضعين للمعالجة بالتنفس الاصطناعي المصابين بمتلازمة الضائقة التنفسية الحاد المتوسط نتيجة اصابتهم بفايروس كورونا

أ) استراتيجية ضغط الزفير ذات نهاية موجب عالي

ب) استراتيجية ضغط الزفير ذات نهاية موجب واطئ

ج) استراتيجية ضغط الزفير ذات نهاية موجب المعتدلة

د. كل ما ورد اعلاه.

٨ـ استعمال القنيات الانفية في تزويد الاوكسجين للمريض توفر حوالي

أ) ٦٠ لتر / دقيقة.

ب) ٢٥ لتر / دقيقة

ج) ٧٥ لتر / دقيقة

د) ۱۰۰ لتر / دقيقة

٩ ـ للمرضى المصابين بمتلازمة الضائقة التنفسية الحادة او المتوسطة نتيجة اصابتهم بفايروس كورونا (١٩) وبعد خضوعهم للجهاز التنفسي الاصطناعي يفضل وضع المريض بوضع الاستلقاء على بطنه ما بين: -

أ) من ١٢ إلى ١٦ ساعة

ب) من ٨ إلى ١٢ ساعة

ج) من ١٦ إلى ٢٠ ساعة

د) من ٤ إلى ٨ ساعات

١٠ ـ لتسهيل تهوية الرئة الوقائية للمرضى المصابين بمتلازمة الضائقة التنفسية الحادة او المتوسطة نتيجة اصابتهم بفايروس كورونا (١٩) وبعد خضوعهم للجهاز التنفسي الاصطناعي يوصى استخدام عوامل الحجب العصبي العضلي، حسب الحاجة، على النحو التالي:

أ- التسريب بشكل المستمر لعامل تثبيط العصبي العضلي

ب- تسريب بشكل جرعات متقطعة لعامل تثبيط العصبي العضلي

ت- كلاهما

Assessment of nurse's knowledge and perception need to pulmonary care of coronavirus disease 19

No	Participants	Degree	Result
1.	Participant 1	20	Fail
2.	Participant 2	30	Fail
3.	Participant 3	30	Fail
4.	Participant 4	20	Fail
5.	Participant 5	10	Fail
6.	Participant 6	50	Fail
7.	Participant 7	40	Fail
8.	Participant 8	30	Fail
9.	Participant 9	30	Fail
10.	Participant 10	50	Fail

This table show that all of the participant (10 nurses) not pass in assessment need toward pulmonary care of coronavirus disease 19.
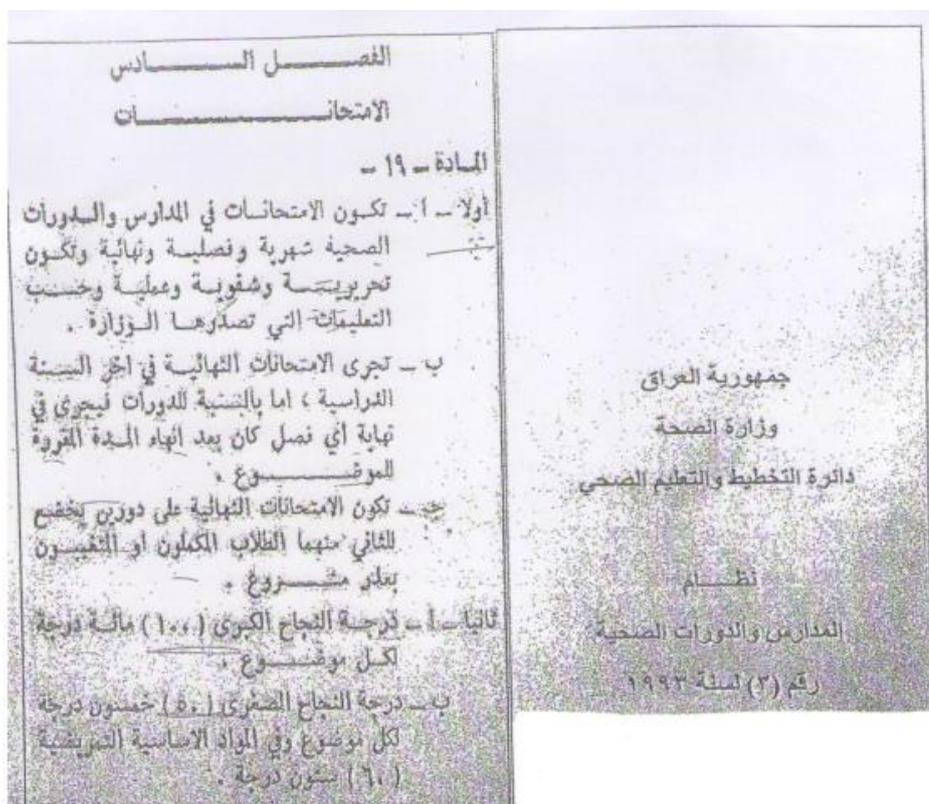
Title of study

Effectiveness of Structured Educational Program of Pulmonary

Care for Coronavirus Disease 19 on the Critical Care Unit Nurses

Knowledge and Perception at Al-Hillah Teaching Hospitals

Part One: Demographical Data:

1- Gender: Male……….   Female……………..

2- Age:……………….   years

3- Educational states

        A. Secondary school ……………

        B. Graduate Diploma in Nursing …………..

        C. Bachelor of Nursing graduate……….

        D. Postgraduate graduate ……….

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4. Marital status: Single…....   Married ………….Separated …………
                                Widow ……….   Divorced…………

Part two: Employment information

   1. Years of Services in nursing…………

   2. Years of Services in the critical care unit………….

   3- Participated in courses on pulmonary care for patients with
      respiratory complication in case of COVID 19.

                Yes …….   No ………..

   4- Do you educate yourself about the field of specialization:
   Yes .... No ....

   If the answer is yes, identify the learning resources:

   Social Media.....

   Digital science websites ....

   Hospital library ....

   Nurse colleagues........

Part three: - Critical Care Unit Nurses Knowledge about Pulmonary Care for patient with Coronavirus Disease 19.

First Domain: - Oxygen supplement.
1- **The goal of oxygen therapy is :**
   A. Provide adequate transport of oxygen in the blood
   B. Increased breathing
   C. Increased pressure on the heart muscle
   D. reduce the pressure on the heart muscle

2- **The transfer of oxygen to tissues depends on several factors such as:**
   A. Efficiency and production of the kidneys.
   B. venous oxygen content.
   C. Hemoglobin concentration and metabolic requirements.
   D. lack of combustion.

3- …………..**It is a decrease in the arterial oxygen concentration in the blood, and it can be observed through changes, including shortness of breath, increased blood pressure, changes in heart rate Heart, cold extremities**
   A. lack of oxygen in the tissues.
   B. Lack of oxygen in the blood
   C. lack of oxygen in cells
   D. lack of oxygen in the body's organs

4- **The lack of oxygen in the blood occurs as a result of complications of lack of oxygen in the tissues.**
   A- True
   B- False
   C - Sometimes
   D- I'm not Sure

5- **Ventilatory Support in adults with COVID-19, we suggest starting supplemental oxygen if the peripheral oxygen saturation (SPO2) is less than**
   A. 92%

B. 90%

C. 87 %

D. 95%

6- **Ventilatory Support in adults with COVID-19 and acute hypoxemic respiratory failure on oxygen, its recommend that SPO2 should be maintained not higher than**

 A. 96%

 B. 94%

 C. 92%

 D. 90%

7- **Ventilatory Support for pregnant women with COVID-19 and emergency signs (obstructed or absent breathing, severe respiratory distress, central cyanosis, shock, coma or convulsions, its recommend that SPO2 should be maintained as:**

A. 92- 95%

B. 94%

C. 92%

D. 90%

8- **Ventilatory Support for Children with COVID-19 and emergency signs (obstructed or absent breathing, severe respiratory distress, central cyanosis, shock, coma or convulsions, we recommend that SPO2 be maintained equal or more**

A. 92- 95%

B. 94%

C. 92%

D. 90%

9- **For adults with COVID-19 and acute hypoxemic respiratory failure which of the following oxygen therapy must be used: -**

A. Nasal intermittent positive pressure ventilation (NIPPV)

B. conventional oxygen

C. high flow nasal cannula (HFNC)

D. simple O2 mask

10- Amount of oxygen gas flow supplement for adult by high flow nasal cannula systems can deliver about: -
A. 5 L/min.
B. 10 L/min
C. 15 L/min
D. 20 L/min

11-   Which of the following statements is not considered a means of assessing the patient's need for oxygen:
A- Arterial blood gas analysis
B-Venous blood gas analysis
C- pulse oximetry
D- Clinical evaluation

12-   One of the complications of oxygen therapy is oxygen toxicity, which occurs as a result of giving a very high concentration of oxygen
A. More than 75% for a period of more than 24 hours.
B. More than 25% for a period of more than 24 hours.
C. More than 50% for a period of more than 24 hours.
D. More than 80% for a period of more than 24 hours.

13-   Which of the following oxygen delivery systems is not considered a low flow oxygen delivery system?
A. Nasal cannula
B. Nasal catheterization
C. Oxygen masks
D. Venturi Mask

Second Domain: - Chest Physiotherapy.

1- One of the goals of chest physiotherapy is: -
A - Removal of bronchial secretions
B - improve ventilation
C - Increasing the efficiency of the respiratory muscles.
D - Increasing the efficiency of the vascular system.

2- When the patient's head is placed down, which of the lung lobes is more effective and in response to draining secretions from the bronchi:

    A - The upper and middle lobes

    B - Middle and lower lobes

    C - Superior and inferior lobes

    D - All lobes

3- **The rate of postural drainage for the patient is usually**

    A- Two to four times per day

    B- Once or twice per day

    C - four to fifth times per day

    D- six and more per day

4- The purpose of inhaling bronchodilators, water or saline before postural drainage is all of the following except: -

    A - To expand the bronchioles

    B - Reducing bronchospasm

    C - Reduce the thickness of mucus and phlegm

    D - Increased edema in the walls of the airways

5- Which of the following statements is not an indication of the use of small-volume nebulizer:

A - Ease of getting rid of respiratory secretions.

B - Decreased vital capacity with ineffective deep breathing and coughing.

C- Unsuccessful attempts at the simplest methods that aim to clean pulmonary secretions.

D- The ability to breathe deeply

6- **To help keep the airway open so secretions can drain, position the patient as comfortably as possible with a vomiting basin, sputum cup, and tissues provided. The nurse asks the patient**

    A. Stay in each position for 10 to 15 minutes and inhale slowly through the lips and exhale slowly through the nose.

B. Stay in each position for 10 to 15 minutes and inhale slowly through the nose and exhale slowly through the nose.

C. Stay in each position for 10 to 15 minutes and inhale slowly through the nose and exhale slowly through the lips.

D. Stay in each position for 10 to 15 minutes and inhale slowly through the lips and exhale slowly through the lips.

7- When performing stimulatory breathing, the patient should be positioned

    A. Semi-sitting position

    B. Supine position

    C. Lateral position

    D. Prone position

Third Domain: - Endotracheal Intubation

1- Endotracheal intubation involves passing an endotracheal tube through the nose or mouth into the trachea. Intubation provides a patent airway when the patient is having respiratory distress that cannot be treated with simpler methods and is the method of choice in emergency care.

A. True.

B. False.

C. Sometimes.

D. I'm not Sure about it.

2- All of the below are considered as defects of the tracheostomy tubes and tracheostomy except: -

    A - Tubes cause discomfort.

    B - Patient's ability to swallow is good

    C - Ulceration and narrowing of the larynx or trachea occurs.

    C - Inability to speak

3- Which of the following is not considered as one of the steps of endotracheal tube care?

    A- Check the consistency of the chest expansion

    B - X-ray of the chest

    C - Ensure low humidity

    D - Continuing to change the patient's position every two hours

----

4- Which of the following is not considered as a procedure to remove an endotracheal tube?

A - Explaining the procedure to the patient

B - Give 100% oxygen for a few breaths

C - Removal of the tube at the height of exhalation

d- Taking into account the location of the tube from the trachea

5- A complication of endotracheal intubation is a loosening of the cuff pressure, which results in tracheal bleeding, ischemia, and aspiration pneumonia. The cuff pressure must be maintained between: -

A - 10 - 15 millimeters of mercury

B - 20 - 25 millimeters of mercury

C- 5 - 10 millimeters of mercury

D - 30 - 35 millimeters of mercury

Fourth Domain: - Nursing care for Tracheostomy.

1- All of the following symptoms and signs are negative reactions that the nurse will terminate the weaning process if it occurs except:-

A - Increased heart rate by 20 beats per minute

B - an increase in systolic blood pressure by 20 mm Hg

C- Oxygen saturation drops below 80%

D- The respiratory rate is less than 8 or greater than 20 breaths / minute.

2- Which of the following statements is not an indication for the use of a tracheostomy?

A - Bypass upper airway obstruction

b- Allow removal of tracheal secretions

C- Inhalation of oral or gastric secretions

D- Allow long-term use of mechanical ventilation

3- All of the following signs and symptoms are considered early complications of endotracheal tubes and tracheostomy except: -

A - tracheal dilatation

B - tube removal

C- pneumothorax

D- recurrent laryngeal nerve damage

4- All of the following signs and symptoms are considered to be long-term complications of endotracheal tubes and tracheostomy except: -
  A - airway thrombus
  B - airway obstruction
  C- rupture of the inguinal artery
  D- dysphagia

5- All the statements below are considered procedures to prevent complications associated with endotracheal tubes and tracheostomy except:-
  A - Maintain adequate warm humidity.
  B- Maintaining the cuff pressure at a less than appropriate level.
  C- Aspirating fluids as needed
  D- Monitor for signs and symptoms of infection, including temperature and white blood cell count.

6- After vital signs have been stabilized, the patient is placed in the ……… position to facilitate ventilation, promote drainage, reduce edema, and prevent pressure on the suture lines.
  A – Supain position
  B - Semi-sitting position
  C – Lateral position
  D – Prone position

7- A priority for patient nursing care when the nursing diagnosis is impaired gas exchange associated with the underlying disease, ventilator adjustments, or weaning is a priority.
  A- The nurse monitors adequate fluid balance by assessing the presence of peripheral edema, calculating daily fluid intake and output, and daily body weight monitoring.
  B - Giving analgesics to relieve pain without inhibiting the respiratory drive, in order to ensure that the respiratory system's resistance to the mechanical system is reduced.
  C- Giving prescribed medications to control the underlying disease and monitoring its side effects.
  D- All of the above

8- **Increasing mucus production due to the presence of the tube in the trachea or mechanical ventilation with continuous positive pressure, which affects the efficiency of the airway, one of the priorities of the nursing intervention for this diagnosis is**

A- Measures to clear the airway of secretions include aspiration of fluids, CPT, frequent change of position, and increased movement

B - Maintain airway humidification through a respirator.

C - Assessment of the presence of secretions by lung auscultation every 2 to 4 hours at least.

D- All of the above

Part four: - Critical Care Unit Nurses Perception about Pulmonary Care for Coronavirus Disease 19.

Domain 1: - Nurse's perception their working in intensive care unit about safety from coronavirus disease 19

Items	Strongly agree	Agree	Unsure	Disagree	Strongly disagree
1- I have equipment to ensure that I am safe when caring for patients infected with COVID-19.					

2- Asepsis measures are followed to prevent spreading the virus within the healthcare setting.					
3- I am afraid of making mistakes in the care of patients infected with COVID-19 due to the pressure on care.					
4- I feel that I lack sufficient knowledge on the care of patients infected with COVID-19.					
5- The center ensures that it trains staff in the procedures and how to use protective equipment.					
6- Patient care protocols for patients infected with COVID-19 are well defined.					
7- Healthcare workers are asked to perform tasks for which they have not been trained					
8- I think about the possibility of becoming infected with COVID-19 while carrying out my healthcare duties.					
9- I think about the possibility of being a probable asymptomatic carrier.					
10- I am afraid of infecting the people I live with/I have contact with.					
11- I am afraid of being infected with covid 19 virus.					
12- I am not well accustomed to use the PPE.					
13- The PPE is not enough to protect from infection.					
14- The circumstances (crowdedness) in the work place is suitable for transmitting infection.					
15- The public stigmatizes those who get infection.					
16- organization is not committed to the preventive measures.					

Domain 2: - Communication and relationship between team members.

Items	Strongly agree	Agree	Unsure	Disagree	Strongly disagree
1- There is a lot of teamwork between physicians and nurses.					
2- There are good working relationships between physicians and nurses.					
3- Middle and senior managers are open to proposals for improvement from the healthcare team.					
4- Middle and senior managers inquire about the needs of the healthcare team.					
5- Middle and senior managers try to meet the needs of the healthcare team.					

فاعلية البرنامج التثقيفي المنظم للرعاية الرئوية لمرض فيروس كورونا ١٩ في وحدة الرعاية الحرجة معرفة وإدراك التمريضيين في مستشفيات الحلة التعليمية

الجزء الأول: الخصائص الديموغرافيا للتمريضيين

١. العمر:

٢. الجنس: ذكر.........................   أنثى ....

٣. المستوى التعليمي:

أـ   إعدادية تمريض..........

بـ   دبلوم في التمريض..........

تـ   بكالوريوس في التمريض..........

ثـ   دراسات عليا ....

٤. الحالة الاجتماعية: أعزب/ باكر................... متزوج/ متزوجة ....

منفصل/ منفصلة............... ارمل/ ارملة.................. مطلق/ مطلقة.................

الجزء الثاني: المعلومات الوظيفية

١. سنوات الخدمة في التمريض...............

٢. مدة خدمتك في وحدة العناية الحرجة ....

٣. شاركت في دورات حول للرعاية الرئوية لمرض فيروس كورونا ١٩ في وحدة الرعاية الحرجة...............

٤. هل تتولى تثقيف ذاتك حول حقل الاختصاص: نعم .... لا ....

اذا كانت الاجابة بنعم، حدد مصادر التعلم:

ا ـ   مواقع التواصل الاجتماعي.....

بـ   مواقع علمية رقميه...........

تـ   مكتبة المستشفى...........

ثـ   الزملاء التمريضيين........

الجزء الثالث: اسئلة حول معارف التمريضيين للرعاية الرئوية لمرضى فيروس كورونا ١٩ في وحدة الرعاية الحرجة.

ملاحظة: ـ يرجى وضع علامة دائرة حول الإجابة الصحيحة شاكرين تعاونكم معنا

المجال الاول:ـ اسئلة العلاج بالاوكسجين

١ـ الهدف من العلاج بالأوكسجين هو:ـ

أـ   توافر النقل الكافي للأوكسجين في الدم

ب-   زيادة عمل التنفس

ت-   زيادة الضغط على عضلة القلب

ث-   تقليل الضغط على عضلة القلب

٢ـ يعتمد نقل الأوكسجين إلى الأنسجة على عوامل عدة مثل:

أـ   كفاءة الكليتين ونتاجهما.

ب-   محتوى الأوكسجين الوريدي.

ت-   تركيز الهيموجلوبين ومتطلبات التمثيل الغذائي.

ث-   قلة الاحتراق

٣ـ ....هو انخفاض في تركيز الأوكسجين الشرياني في الدم ، ويمكن ملاحظته من خلال التغيرات منها ضيق التنفس ،زيادة ضغط الدم، التغيرات في معدل ضربات القلب، برودة الأطراف

أـ   نقص الاوكسيجين في الانسجة.

ب-   نقص الاوكسجين في الدم

ت-   نقص الاوكسجين في الخلايا

ث-   نقص الاوكسجين في اعضاء الجسم

٤ـ يحدث نقص الاوكسجين في الدم نتيجة مضاعفات نقص الاوكسجين في الانسجة.

أـ   صح

ب-   خطأ

ت-   في بعض الاحيان

ث-   انا لست متأكدا من ذلك

٥ـ يفضل البدء بتزويد المصاب بفايروس كورونا (١٩) من البالغين بالأوكسجين بنسب عالية لتحسين مستوى تشبع الدم الاوكسجين عندما تبلغ النسبة اقل من: ـ

أـ   ٩٢%

ب-   ٩٠%

ت-   ٨٧%

ث-   ٩٥%

٦- نتيجة الإصابة بقلة الاوكسجين الناتجة عن قصور الجهاز التنفسي يوصي بإدامة نسبة الاوكسجين عند المصاب بفايروس كورونا (١٩) بمستوى لا تزيد عن : -

أ) ٩٦%

ب) ٩٤%

ج) ٩٢%

د) ٩٠%

٧- التوصية بإدامة نسبة الاوكسجين في الدم للام الحامل المصابة بفايروس كورونا (١٩) التي تظهر عليها العلامات (انسداد المجاري التنفسية، قصور الجهاز التنفسي، الازرقاق، الصدمة، فقدان الوعي او التعرض لنوبات التشنج) ضمن المعدل الاتي: -

أ- ٩٢-٩٥%

ب- ٩٤%

ت- ٩٢%

ث- ٩٠%

٨- التوصية بإدامة نسبة الاوكسجين في الدم للأطفال المصابين بفايروس كورونا (١٩) التي تظهر عليها العلامات (انسداد المجاري التنفسية، قصور الجهاز التنفسي، الازرقاق، الصدمة، فقدان الوعي او التعرض لنوبات التشنج) ضمن المعدل الاتي: -

أ) ٩٣%

ب) ٩٤%

ت) ٩٢%

ث) ٩٠%

٩- من الطرائق التي يجب استعمالها لتزويد المرضى البالغين المصابين بفايروس كورونا (١٩) عند اصابتهم بقصور الجهاز التنفسي وقلة معدل الاوكسجين بالدم هي: -

أ) التنفس الأنفي بالضغط الإيجابي المتقطع(NIPPV)

ب) الأوكسجين التقليدي

ج) قنية أنفية عالية التدفق(HFNC)

د. قناع الاوكسجين العادي

١٠- استعمال القنيات الانفية في تزويد الاوكسجين للمريض توفر حوالي

أ) ٥ لتر / دقيقة.

ب) ١٠ لتر / دقيقة

ج) ١٥ لتر / دقيقة

د) ٢٠ لتر / دقيقة

----

١١ ـ   احد العبارات الاتية لا تعد وسيلة لتقييم حاجة المريض إلى الأوكسجين:ـ

أ ـ   تحليل غازات الدم الشرياني

ب ـ   تحليل غازات الدم الوريدي

ت ـ   قياس التأكسج النبضي

ث ـ   التقييم السريري.

١٢ ـ   احدى مضاعفات العلاج بالاوكسجين هي سمية الاوكسجين التي تحدث نتيجة إعطاء تركيز عال جدًا من الأوكسجين عندما يكون تركيزه:

أ ـ   أكبر من ٧٥٪ لفترة تزيد عن ٢٤ ساعة.

ب ـ   أكبر من ٢٥٪ لفترة تزيد عن ٢٤ ساعة.

ت ـ   أكبر من ٥٠٪ لفترة تزيد عن ٢٤ ساعة.

ث ـ   أكبر من ٨٠٪ لفترة تزيد عن ٢٤ ساعة.

١٣ـاي من انظمة توصيل الاوكسجين الاتيه لا تعد على أنها من انظمة التدفق المنخفض للاوكسجين.

أ ـ   قنية الأنف

ب ـ   قسطرة الأنف

ت ـ   أقنعة الأكسجين

ث ـ   قناع الفنتوري

المجال الثاني :ـ العلاج الطبيعي للصدر

١ ـ اي من العبارات الاتية لا تعد من اهداف العلاج الطبيعي للرئتين :ـ

أ ـ إزالة إفرازات الشعب الهوائية

ب ـ تحسين التهوية

ت ـ زيادة كفاءة عضلات الجهاز التنفسي.

ث ـ زيادة كفاءة الجهاز الوعائي.

٢ ـ عند وضع راس المريض الى الاسفل اي من فصوص الرئه اكثر تاثيرا واستجابة لاستخراج الافرازات من القصبات الهوائية:

أ ـ   الفصين الاعلى والوسطى

ب ـ   الفصين الوسطى والاسفل

ت ـ   الفصين الاعلى والاسفل

ث ـ   جميع الفصوص

٣- **معدل اجراء التصريف الوضعي للمريض عادةً هو**

أ- مرة الى مرتين يوميا

ب- مرتان إلى أربع مرات يوميًا

ت- اربع الى ستة مرات يوميا

ث- اكثر من ستة مرات يوميا

٤- **الهدف من استنشاق موسعات الشعب الهوائية أو اضافة الماء أو المحلول الملحي الى الرئتين قبل شفط السوائل هوجميع ماذكر ادناه ماعدا:-**

أ- لتوسيع القصيبات

ب- وتقليل تشنج القصبات

ت- تقليل سماكة المخاط والبلغم

ث- زيادة الوذمة في جدران الشعب الهوائية

٥- **اي العبارات الاتية لا تعد من دواعي استعمال التبخير:-**

أ- سهولة التخلص من إفرازات الجهاز التنفسي.

ب- انخفاض القدرة الحيوية مع عدم فعالية السعال.

ت- محاولات غير الناجحه لأبسط الاساليب التي تهدف الى تنظيف الإفرازات الرئوية.

ث- عدم فعالية التنفس العميق.

٦- **للمساعدة في الحفاظ على مجرى الهواء مفتوحًا حتى يمكن تصريف الإفرازات يتم وضع المريض بوضع مريح قدر الإمكان مع توفير حوض التقيؤ وكوب البلغم والمناديل الورقية. يطلب الممرض من المريض**

أ- البقاء في كل وضع لمدة ١٠ إلى ١٥ دقيقة واستنشاق الهواء ببطء من خلال الشفاه واخراج الزفير ببطء من خلال الانف.

ب- البقاء في كل وضع لمدة ١٠ إلى ١٥ دقيقة واستنشاق الهواء ببطء من خلال الأنف واخراج الزفير ببطء من خلال الانف.

ت- البقاء في كل وضع لمدة ١٠ إلى ١٥ دقيقة واستنشاق الهواء ببطء من خلال الأنف واخراج الزفير ببطء من خلال الشفاه.

ث- البقاء في كل وضع لمدة ١٠ إلى ١٥ دقيقة واستنشاق الهواء ببطء من خلال الشفاه واخراج الزفير ببطء من خلال الشفاه.

٧- **عند اجراء التنفس التحفيزي يجب وضع المريض بوضعية:-**

أ- شبه الجالس

ب- الاستلقاء الجانبي

ت- الاستلقاء على الظهر

ث- الاستلقاء على الباطن

المجال الثالث:ـ التنبيب الرغامي.

١ ـ يتضمن التنبيب الرغامي تمرير أنبوب رغامي عبر الأنف أو الفم إلى القصبة الهوائية. يوفر التنبيب مجرى هواء جيد عندما يعاني المريض من ضائقة تنفسية لا يمكن معالجتها بأساليب بسيطه وهي الطريقة المفضلة في الحالات الطوارئ.

أ ـ   صح

ب ـ   خطأ

ت ـ   في بعض الاحيان

ث ـ   انا لست متأكدا من ذلك

٢ ـ جميع ماذكر ادناه يعتبر من عيوب أنابيب القصبة الهوائية والفغر الرغامي ماعدا:ـ

أ ـ   الأنابيب تسبب عدم الراحة.

ب ـ   قدرة المريض على البلع جيده

ت ـ   يحدث تقرح وتضيق في الحنجرة أو القصبة الهوائية.

ث ـ   عدم قدرته على الكلام

٣ ـ اي من الاجراءات الاتية لا تعد من خطوات رعاية المريض بأنبوب القصبة الهوائية:

أ ـ   تحقق من تناسق تمدد الصدر

ب ـ   اجراء الأشعة السينية للصدر

ت ـ   ضمان الرطوبة القليله

ث ـ   الاستمرار في تغيير وضع المريض كل ساعتين

٤ ـ اي من الاجراءات الاتية لا تعد ضمن خطوات لازالة الأنبوب الرغامي:

أ ـ شرح الإجراء للمريض

ب ـ أعطِ ١٠٠٪ أكسجين لعدة أنفاس قليلة

ت ـ إزالة الأنبوب في ذروة الزفير

ث ـ مراعاة موقع الانبوب من القصبة الهوائيه.

٥ ـ من مضاعفات التنبيب الرغامي هو التخلخل في ضغط الكفة الذي ينتج عنه نزيف عنه القصبة الهوائية ونقص التروية الإصابة بالالتهاب الرئوي التنفسي لذى يجب الحفاظ على ضغط الكفه بين:ـ

أ ـ   ١٠ ـ ١٥ مليمتر زئبق

ب ـ   ٢٠ ـ ٢٥ مليمتر زئبق

ت ـ   ٥ ـ ١٠ مليمتر زئبق

ث ـ   ٣٠ ـ ٣٥ مليمتر زئبق

المحور الرابع :ـ العناية التمريضية للفغر الرغامي.

١ ـ جميع الاعراض والعلامات التاليه تعد ردود فعل سلبية يقوم الممرض / الممرضه بإنهاء عملية الفطام في حالة حدوثها ماعدا:ـ

أـ   زيادة معدل ضربات القلب بمقدار ٢٠ نبضة في الدقيقة

ب ـ   زيادة ضغط الدم الانقباضي بمقدار ٢٠ ملم زئبق

ت ـ   انخفاض تشبع الأكسجين إلى أقل من ٨٠٪

ث ـ   معدل التنفس أقل من ٨ أو اكبر ٢٠ نفسًا / دقيقة

٢ ـ احد العبارات التاليه لا تعد من دواعي استخدام فغر القصبة الهوائية

أـ   تجاوز انسداد مجرى الهواء العلوي

ب ـ   السماح بإزالة الإفرازات الرغامية

ت ـ   استنشاق الإفرازات الفموية أو المعدية

ث ـ   السماح باستخدام التهوية الميكانيكية على المدى الطويل

٣ ـ جميع العلامات والاعراض الاتية تعد من المضاعفات المبكرة لانابيب القصبة الهوائية والفغر الرغامي ماعدا:ـ

أـ   التوسع الرغامي

ب ـ   خلع الأنبوب

ت ـ   استرواح الصدر

ث ـ   تلف العصب الحنجري المتكرر

٤ ـ جميع العلامات والاعراض الاتية تعد من المضاعفات طويلة المدى لانابيب القصبة الهوائية والفغر الرغامي ماعدا:ـ

أـ   الخثرة الهوائيه

ب ـ   انسداد مجرى الهواء

ت ـ   تمزق الشريان العضدي الرأسي

ث ـ   عسر البلع

٥ ـ جميع العبارات ادناه تعد من الاجراءات لمنع المضاعفات المصاحبة لأنابيب القصبة الهوائية والفغر الرغامي ماعدا:ـ

أـ   الحفاظ على الرطوبة الدافئة الكافية.

ب ـ   الحفاظ على ضغط الكفة عند المستوى اقل من المناسب.

ت ـ   شفط السوائل حسب الحاجة

ث ـ   مراقبة علامات وأعراض العدوى ، بما في ذلك درجة الحرارة وعدد خلايا الدم البيضاء

٦- **بعد استقرار العلامات الحيوية ، يتم وضع المريض في وضعية .... لتسهيل التهوية ، وتعزيز الصرف ، وتقليل الوذمة ، ومنع الضغط على خطوط الخياطة.**

أ- الاستلقاء على الظهر

ب- شبه جالس

ت- الاستلقاء على الجانب

ث- الاستلقاء على البطن

٧- **من اولويات العناية التمريضيه للمريض عندما يكون تشخيصة التمريضي ضعف تبادل الغازات المرتبط بالمرض الأساس ، أو تعديلات ضبط جهاز التنفس الصناعي ، أو الفطام هو**

أ- يراقب الممرض / الممرضه توازن السوائل الكافي من خلال تقييم وجود الوذمة المحيطية ، وحساب المدخول والمخرجات اليومية للسوائل ، ومراقبة وزن الجسم يوميا.

ب- اعطاء المسكنات لتخفيف الألم دون تثبيط الدافع التنفسي وذلك لضمان تقليل مقاومة الجهاز التنفسي للجهاز الميكانيكي.

ت- إعطاء الأدوية الموصوفة للسيطرة على المرض الأساسي ومراقبة آثارها الجانبية.

ث- جميع ماذكر اعلاه

٨- **زيادة إنتاج المخاط لوجود الأنبوب في القصبة الهوائية أو التهوية الميكانيكية ذات الضغط الإيجابي المستمر والتي تؤثر على كفاءة مجرى الهواء، من اولويات التداخل التمريضي لهذا التشخيص هو**

أ- تدابير تطهير مجرى الهواء من الإفرازات تشمل شفط السوائل، العلاج الطبيعي للرئتين ، تغيير الوضع المتكرر ، وزيادة الحركة

ب- الحفاظ على ترطيب مجرى الهواء عن طريق جهاز التنفس الصناعي.

ت- تقييم وجود الإفرازات عن طريق التسمع الرئة كل ٢ إلى ٤ ساعات على الأقل.

ث- جميع اذكر اعلاه

الجزء الرابع:ـ اسئلة حول ادراك التمريضيين للرعاية الرئوية لمرض فيروس كورونا ١٩ في وحدة الرعاية الحرجة.

المحور الاول :ـ الحماية

لا اوافق بشده	لا اوافق	غير متاكد	اوافق	اوافق بشده	العناصر
					١ـ امتلك معدات للتأكد من أنني بأمان عند رعاية المرضـى المصـابين بمرض فايروس كورونا ١٩.
					٢ـ يتم إتبـاع إجراءات التعقيم لمنع انتشـار الفيروس في إطار الرعاية الصحية.
					٣ـ أخشـى من ارتكاب أخطاء اثناء رعاية مرضى مصـابين بمرض فايروس كورونا ١٩ بسـبب ضغط العمل.
					٤ـ أشـعر أنني أفتقر إلى المعرفة الكافية بشـأن رعاية المرضـى المصـابين بمرض فايروس كورونا ١٩.
					٥ـ تركز المؤسـسـة على تدريب الموظفين على الإجراءات وكيفية استخدام معدات الحماية.
					٦ـ بروتوكولات رعـايـة المرضـى المصابين بمرض فايروس كورونا ١٩ محددة بشكل جيد.
					٧ـ يُطلب من العاملين في مجال الرعاية الصـحية القيام بمهام لم يتم تدريبهم عليها
					٨ـ أفكر في إمكانية الإصـابة بمرض فايروس كورونـا ١٩ أثنـاء قيـامي بواجبـات الرعايـة الصحية.
					٩ـ أفكر في إمكانية أن أكون حاملًا للعدوى بدون أعراض.
					١٠ـ أخشى إصابة الأشخاص الذين أعيش معهم / الذين تلامست معهم.

					١١ـ أخشـى أن أصـاب بمرض فايروس كورونا ١٩.
					١٢ـ لسـت معتادًا على اسـتخدام معدات الوقاية الشخصية.
					١٣ـ معدات الوقاية الشخصية غير كافية للحماية من العدوى.
					١٤ـ ظروف (الازدحام) في مكان العمل مناسـبة لنقل العدوى.
					١٥ـ الاصابة بالمرض يعتبر وًصمة اجتماعية.
					١٦ـ عدم التزام المنظمـة بـإجراءات السـلامـة الوقائية.

المحور الثاني:ـ التواصل والعلاقة بين أعضاء الفريق.

لا اوافق بشده	لا اوافق	غير متاكد	اوافق	اوافق بشده	العناصر
					١ـ هناك الكثير من العمل الجماعي بين الأطباء والتمريضيين.
					٢ـ توجـد علاقـات عمـل جيـدة بين الأطبـاء والتمريضيين.
					٣ـمسؤل الملاك التمريضي ومدير المستشفى منفتحون على مقترحات التحسـين من فريق الرعاية الصحية.
					٤ـ يستفسر مدير المستشفى ومسؤول الملاك التمريضـــي عن احتيـاجـات فريق الرعـايـة الصحية.
					٥ـ يحاول مدير المسـتشـفى ومسـؤول الملاك التمريضـــي تلبيـة احتيـاجـات فريق الرعـايـة الصحية.

Effectiveness of Structured Educational Program of Pulmonary Care for Coronavirus Disease 19 on the Critical Care Unit Nurses Knowledge and Perception at Al-Hillah Teaching Hospitals

Introduction

Coronavirus disease 2019(COVID-19) is a newly infectious disease caused by a newly discovered coronavirus. Most people infected with COVID-19 virus will develop mild to moderate respiratory illness that can be cured without special treatment. Older people, as well as those with underlying conditions such as cardiovascular disease, diabetes, chronic respiratory diseases, and cancer are more likely to develop serious illnesses. (Yan G, et al 2020).

General objectives: -

At the end of this program the nurse should be able to provide respiratory care for patients with COVID 19: -

1- Define indication, complication and methods of oxygen demonstration.
2- Define indication and nursing management for patient with incentive spirometry.
3- Identify indication and nursing care for patient with nebulizer therapy
4- Identify nursing role in chest physiotherapy.
5- Define Care of the patient with an endotracheal tube.
6- Identify complication and nursing management for patient with tracheostomy
7- Define nursing management for patient with mechanical ventilation.
8- Identify weaning of patient from mechanical ventilation.

First lecture

Title: Oxygen Therapy

Time: 45 minutes

Place: Al- Hillah teaching hospital

Teaching method: lecture

Teaching aids: PowerPoint

Specific objectives: -

At the end of this lecture the nurse should be able to: -

1- Identify the indications of oxygen administration
2- Define complications of oxygen administration
3- Identify Methods of Oxygen Administration

Introduction

Oxygen therapy is the administration of oxygen at a concentration greater than that found in the environmental atmosphere. The goal of oxygen therapy is to provide adequate transport of oxygen in the blood while decreasing the work of breathing and reducing stress on the myocardium.

Oxygen transport to tissues depends on factors such as:

1- Cardiac output
2- Arterial oxygen content
3- Concentration of hemoglobin
4- Metabolic requirements.

The need for oxygen is assessed by arterial blood gas analysis, pulse oximetry, and clinical evaluation.

Indications

A change in the patient's respiratory rate or pattern may be one of the earliest indicators of the need for oxygen therapy.

These changes may result from hypoxemia or hypoxia.

1- **Hypoxemia**, a decrease in the arterial oxygen tension in the blood, is manifested by changes in
   A. mental status (progressing through impaired judgment, agitation, disorientation, confusion, lethargy, and coma)

   B. dyspnea

   C. increase in blood pressure,

   D. changes in heart rate

   E. dysrhythmias

   F. central cyanosis (late sign)

   G. diaphoresis

   H. cool extremities.

2- Hypoxemia usually leads to **hypoxia**, a decrease in oxygen supply to the tissues and cells that can also be caused by problems outside the respiratory system. With long-standing hypoxia (as seen in chronic obstructive pulmonary disease [COPD] and chronic heart failure), fatigue, drowsiness, apathy, inattentiveness, and delayed reaction time may occur.

Complications

In general, patients with respiratory disorders are given oxygen therapy only to increase the partial pressure of oxygen (PaO2) back to the patient's normal baseline, which may vary from 60 to 95 mm Hg. In terms of the oxyhemoglobin dissociation curve, arterial hemoglobin at these levels is 80% to 98% saturated with oxygen; higher **fraction of inspired oxygen (FiO2)** flow values add no further significant amounts of oxygen to the red blood cells or plasma. Instead of helping, increased amounts of oxygen may produce toxic effects on the lungs and central nervous system or may depress ventilation.

It is important to observe for subtle indicators of inadequate oxygenation when oxygen is given by any method. Therefore, the nurse assesses the patient frequently for confusion, restlessness progressing to lethargy, diaphoresis, pallor, tachycardia, tachypnea, and hypertension. Intermittent or continuous pulse oximetry is used to monitor oxygen levels.

A. Oxygen Toxicity

Oxygen toxicity may occur when too high concentration of oxygen (greater than 50%) is given for an extended period (generally longer than 24 hours).

If oxygen toxicity is untreated, these radicals can severely damage the alveolar capillary membrane leading to pulmonary edema and progressing to cell death.

Signs and symptoms of oxygen toxicity includes: -

1) substernal discomfort,
2) paresthesias
3) dyspnea
4) restlessness
5) fatigue
6) malaise

7) progressive respiratory difficulty
8) hypoxemia
9) alveolar atelectasis

B. **Absorption Atelectasis**

An additional adverse effect of the administration of high concentrations of oxygen (greater than 50%) to patients who are sedated and breathing small **tidal volumes** of air (volume of air inspired and expired with each breath) is absorption atelectasis. Normally, 79% of room air is comprised of nitrogen. During inhalation, nitrogen, in addition to other gases, fills the alveoli and helps keep the alveoli open. With the administration of high concentrations of oxygen, nitrogen is diluted and replaced with oxygen. Oxygen in the alveoli is absorbed quickly into the bloodstream and not replaced rapidly enough in the alveoli to maintain patency. The alveoli collapse, causing atelectasis

C. **Other Complications**

Because oxygen supports combustion, there is always a danger of fire when it is used. Oxygen therapy equipment is also a potential source of bacterial contamination; therefore, the nurse (or respiratory therapist) changes the tubing according to infection prevention policy, manufacturer's recommendations, and the type of oxygen delivery equipment. When oxygen is used at high flow rates, it should be moistened by passing it through a humidification system to prevent it from drying the mucous membranes of the respiratory tract.

Methods of Oxygen Administration

Oxygen is dispensed from a cylinder or a piped-in system. A reduction gauge is necessary to reduce the pressure to a working level, and a flow meter regulates the flow of oxygen in liters per minute (L/min).

The amount of oxygen delivered is expressed as a percentage concentration (e.g., 70%). The appropriate form of oxygen therapy is best determined by arterial blood gas levels, which indicate the patient's oxygenation status.

Oxygen delivery systems are classified as low-flow (variable performance) or high-flow (fixed performance) delivery systems.

A.   **Low flow systems** contribute partially to the inspired gas the patient breathes, which means that the patient breathes some room air along with the oxygen.

Examples of low-flow systems are

1. **A nasal cannula** is used when the patient requires a low-to-medium concentration of oxygen This method allows the patient to move about in bed, talk, cough, and eat without interrupting oxygen flow. Flow rates in excess of 4 L/min may lead to

----

swallowing of air or may cause irritation and drying of the nasal and pharyngeal mucosa.

nasal cannula

2. **The nasal (oropharyngeal) catheter** is rarely used but may be prescribed for short-term therapy to administer low-to-moderate concentrations of oxygen. The catheter should be changed frequently (e.g., every 8 hours), alternating nostrils to prevent nasal irritation and infection.
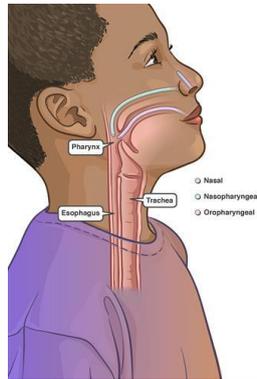
The nasal (oropharyngeal) catheter

When oxygen is given via cannula or catheter, the percentage of oxygen reaching the lungs varies with the depth and rate of respirations, particularly if the nasal mucosa is swollen or if the patient is a mouth breather.

3. **Oxygen masks** come in several forms.
    a. *Simple masks* are used to administer low-to moderate concentrations of oxygen. The body of the mask itself gathers and stores oxygen between breaths.

Simple masks

b. *Partial rebreathing masks* have a reservoir bag that must remain inflated during both inspiration and expiration. The nurse adjusts the oxygen flow to ensure that the bag does not collapse during inhalation.

Partial rebreathing masks

c. *Nonrebreathing masks* are similar in design to partial rebreathing masks except that they have additional valves.

Nonrebreathing masks

B.   **High-flow systems** provide the total inspired air. A specific percentage of oxygen is delivered independent of the patient's breathing. High-flow systems are indicated for patients who require a constant and precise amount of oxygen.

Examples of high-flow systems are

1. The *Venturi mask* is the most reliable and accurate method for delivering precise concentrations of oxygen through noninvasive means.

The Venturi mask

2. The *transtracheal oxygen catheter* requires minor surgery, to insert a catheter through a small incision directly into the trachea. It is indicated for patients with chronic oxygen therapy needs.

The transtracheal oxygen catheter

3. The *T-piece* is a special adaptor used to deliver oxygen, which connects to the endotracheal or tracheostomy tube and is useful in weaning patients from mechanical ventilation.
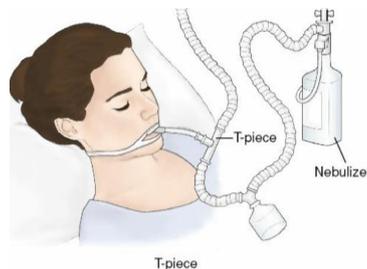
The T-piece

4. *aerosol masks, **tracheostomy collars**, and face tents,* all of which are used with aerosol devices (nebulizers) that can be adjusted for oxygen concentrations from 27% to 100% (0.27 to 1.00)**.**
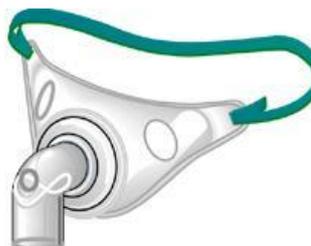
aerosol masks   **tracheostomy colla**   **face tents**

Second lecture

Title: Incentive Spirometry, Small-Volume Nebulizer (Mini-Nebulizer) Therapy and **Chest Physiotherapy**

Time: 45 minutes

Place: Al- Hillah teaching hospital

Teaching method: lecture and picture

Teaching aids: PowerPoint and pictures

Specific objectives: -

At the end of this lecture the nurse should be able to: -

10- Identify the indications of incentive spirometry.
11- Define nursing management for patient with incentive spirometry
12- Identify the indications of Small-Volume Nebulizer Therapy.
13- Define nursing management for patient with Small-Volume Nebulizer Therapy
14- Identify goals of chest physiotherapy.
15- Define the techniques of chest physiotherapy.
16- Define nursing management for patient with postural drainage.
17- Identify nursing management for patient with Chest Percussion and Vibration.
18- Define nursing management for patient with Breathing Retraining

Part one

Incentive Spirometry

Introduction

Incentive spirometry is a method of deep breathing that provides visual feedback to encourage the patient to inhale slowly and deeply to maximize lung inflation and prevent or reduce atelectasis. The purpose of an incentive spirometer is to ensure that the volume of air inhaled is increased gradually as the patient takes deeper and deeper breaths.

Incentive Spirometry

Indications

Incentive spirometry is used after surgery, especially thoracic and abdominal surgery, to promote the expansion of the alveoli and to prevent or treat atelectasis.

Nursing Management

- The nurse instructs the patient to:
- Assume a semi-fowler position or an upright position before initiating therapy.
- Use diaphragmatic breathing which performed as:-
  Place the mouthpiece of the spirometer firmly in the mouth, breathe air in (inspire) slowly through the mouth, and hold the breath at the end of inspiration for about 3 seconds to maintain the ball/indicator between the lines. Exhale slowly through the mouthpiece.
- Cough during and after each session. Splint the incision when coughing postoperatively.
- Perform the procedure approximately 10 times in succession, repeating the 10 breaths with the spirometer each hour during waking hours.

Breathing Exercises
General Instructions

The nurse instructs the patient to:

- Breathe slowly and rhythmically to exhale completely and empty the lungs completely.
- Inhale through the nose to filter, humidify, and warm the air before it enters the lungs.
- If you feel out of breath, breathe more slowly by prolonging the exhalation time.
- Keep the air moist with a humidifier.

Diaphragmatic Breathing

Goal: To use and strengthen the diaphragm during breathing

The nurse instructs the patient to:

- Place one hand on the abdomen (just below the ribs) and the other hand on the middle of the chest to increase the awareness of the position of the diaphragm and its function in breathing.
- Breathe in slowly and deeply through the nose, letting the abdomen protrude as far as possible.
- Breathe out through pursed lips while tightening (contracting) the abdominal muscles.
- Press firmly inward and upward on the abdomen while breathing out.

- Repeat for 1 minute; follow with a rest period of 2 minutes.
  Gradually increase duration up to 5 minutes, several times a day
  (before meals and at bedtime).

-

Small-volume nebulizer

Indications

Indications for the use of a small-volume nebulizer include:

1- difficulty in clearing respiratory secretions
2- reduced vital capacity with ineffective deep breathing and coughing
3- unsuccessful trials of simpler and less costly methods for clearing secretions, delivering aerosol, or expanding the lungs.

Small-volume nebulizer

Nursing Management

The nurse instructs the patient to breathe through the mouth, taking slow, deep breaths, and then to hold the breath for a few seconds at the end of inspiration to increase intrapleural pressure and reopen collapsed alveoli, thereby increasing functional residual capacity. The nurse encourages the patient to cough and to monitor the effectiveness of the therapy.

Part two

Chest Physiotherapy

introduction

Chest physiotherapy (CPT) includes postural drainage, chest percussion and vibration, and breathing retraining. In addition, educating the patient about effective coughing technique is an important part of CPT.

The goals of CPT are to

1- remove bronchial secretions

2- improve ventilation

3- increase the efficiency of the respiratory muscles.

A. Postural Drainage (Segmented Bronchial Drainage)

Postural drainage allows the force of gravity to assist in the removal of bronchial secretions. The secretions drain from the affected bronchioles into the bronchi and trachea and are removed by coughing or suctioning. Postural drainage is used to prevent or relieve bronchial obstruction caused by accumulation of secretions.

lower and middle lobe bronchi drain more effectively when the head is down, whereas the upper lobe bronchi drain more effectively when the head is up.

The nurse instructs the patient to inhale bronchodilators and mucolytic agents, if prescribed, before postural drainage, because these medications improve drainage of the bronchial tree.

Nursing Management

The nurse should keep in mind the medical diagnosis, the lung lobes or segments involved, the cardiac status, and any structural deformities of the chest wall and spine. Auscultation of the chest before and after the procedure is used to identify the areas that need drainage and assess the effectiveness of treatment.

Postural drainage is usually performed two to four times daily, before meals (to prevent nausea, vomiting, and aspiration) and at bedtime.

Prescribed bronchodilators, water, or saline may be nebulized and inhaled before postural drainage to dilate the bronchioles, reduce bronchospasm, decrease the thickness of mucus and sputum, and combat edema of the bronchial walls.

The nurse makes the patient as comfortable as possible in each position and provides an emesis basin, sputum cup, and paper tissues. The nurse instructs the patient to remain in each position for 10 to 15 minutes and to breathe in slowly through the nose and out slowly through pursed lips to help keep the airways open so that secretions can drain.

After the procedure, the nurse or family caregivers note the amount, color, viscosity, and character of the expelled sputum. The nurse evaluates the patient's skin color and pulse. It may be necessary to administer oxygen during postural drainage.

Lungs anterior

Lower lobes, lateral basal segments

Lungs anterior

Upper lobes, apical segments

Lungs posterior — Lower lobes, superior segments

Lungs posterior — Upper lobes, posterior segments
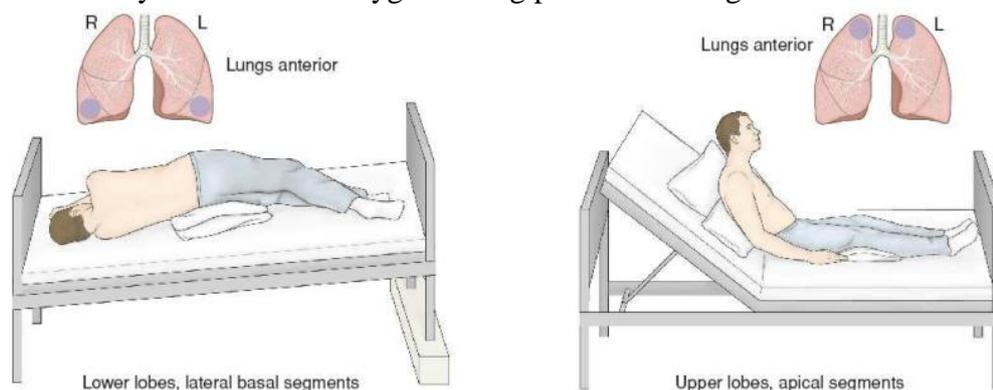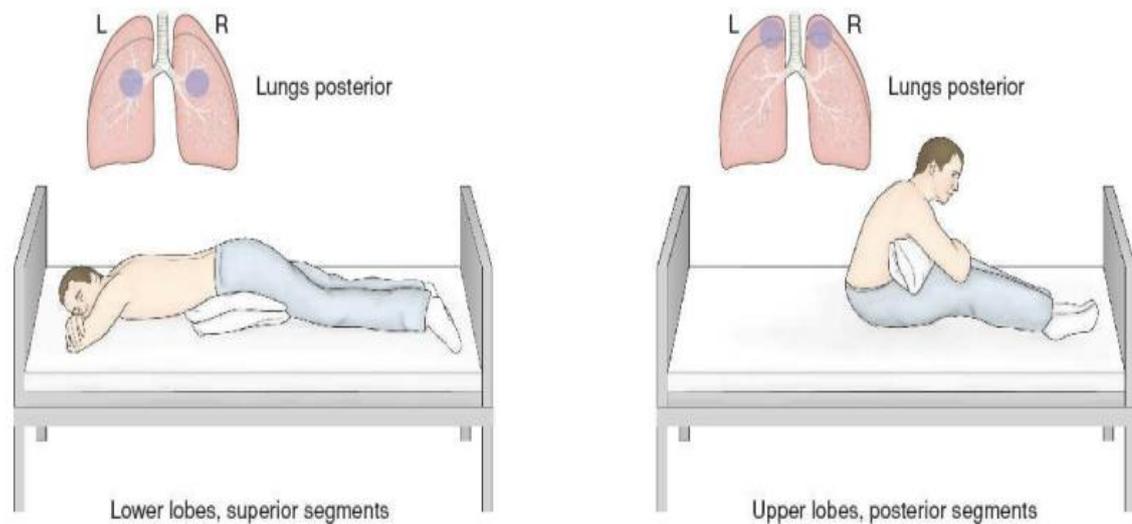
Effective Coughing Technique

The nurse instructs the patient to:

1. Assume a sitting position and bend slightly forward. This upright position permits a stronger cough.
2. Flex the knees and hips to promote relaxation and reduce the strain on the abdominal muscles while coughing.
3. Inhale slowly through the nose and exhale through pursed lips several times.
4. Cough twice during each exhalation while contracting (pulling in) the abdomen sharply with each cough.
5. Splint the incisional area, if any, with firm hand pressure or support it with a pillow or rolled blanket while coughing.

B. Chest Percussion and Vibration

Chest percussion and vibration help dislodge mucus adhering to the bronchioles and bronchi.

Chest percussion is carried out by cupping the hands and lightly striking the chest wall in a rhythmic fashion over the lung segment to be drained.

Percussion, alternating with vibration, is performed for 3 to 5 minutes for each position.

As a precaution, percussion over chest drainage tubes and the sternum, spine, liver, kidneys, spleen, or breasts (in women) is avoided. Percussion is performed cautiously in older adult patients because of their increased incidence of osteoporosis and risk of rib fracture.

Vibration is the technique of applying manual compression and tremor to the chest wall during the exhalation phase of respiration. This helps increase the velocity of the air expired from the small airways, thus freeing mucus.

Nursing Management

When performing CPT, the nurse ensures that the patient is comfortable, is not wearing restrictive clothing, and has not just eaten.

The nurse gives medication for pain, as prescribed, before percussion and vibration and splints any incision and provides pillows for support as needed.

The positions are varied, but focus is placed on the affected areas. On completion of the treatment, the nurse assists the patient to assume a comfortable position.

Treatment should be stopped if any of the following occur: increased pain, increased shortness of breath, weakness, lightheadedness, or hemoptysis.

Therapy is indicated until the patient has normal respirations, can mobilize secretions, and has normal breath sounds, and until the chest x-ray findings are normal.

C. Breathing Retraining

Breathing retraining consists of exercises and breathing practices that are designed to achieve more efficient and controlled ventilation and to decrease the work of breathing.

These exercises promote maximal alveolar inflation and muscle relaxation; relieve anxiety; eliminate ineffective, uncoordinated patterns of respiratory muscle activity; slow the respiratory rate; and decrease the work of breathing.

This type of breathing helps prevent airway collapse secondary to loss of lung elasticity in emphysema. The nurse instructs the patient in diaphragmatic breathing and pursed-lip breathing.

Nursing Management

The nurse instructs the patient to breathe slowly and rhythmically in a relaxed manner and to exhale completely to empty the lungs. The patient is instructed to always inhale through the nose because this filter, humidifies, and warms the air. If short of breath, the patient should be instructed to concentrate on prolonging the length of exhalation; this helps avoid initiating a cycle of increasing shortness of breath and panic. The nurse instructs the patient that an adequate dietary intake promotes gas exchange and increases energy levels. Gas-producing foods such as beans, legumes, broccoli, cabbage, and Brussels sprouts should be avoided to prevent gastric distress.

Appendix 9   **Educational Program**

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Third lecture

Title: Endotracheal Intubation

Time: 45 minutes

Place: Al- Hillah teaching hospital

Teaching method: lecture

Teaching aids: PowerPoint and pictures

Specific objectives: -

At the end of this lecture the nurse should be able to: -

  3- Identify nursing Care of the Patient with an Endotracheal Tube.
    d- Nursing care immediate after intubation.
    e- Nursing procedure to Extubation (Removal of Endotracheal Tube)
    f- Nursing Care of Patient Following Extubation
  4- Identify complications of endotracheal intubation

Introduction

Endotracheal intubation involves passing an endotracheal tube through the nose or mouth into the trachea. Intubation provides a patent airway when the patient is having respiratory distress that cannot be treated with simpler methods and is the method of choice in emergency care.

Endotracheal Tube
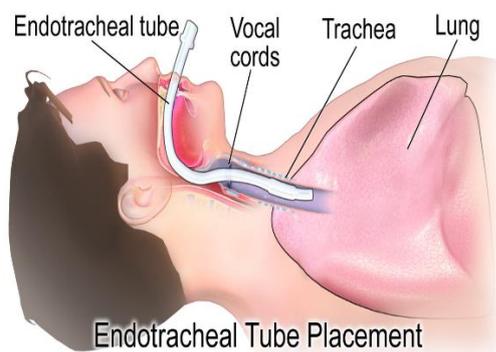
Care of the Patient with an Endotracheal Tube

Immediately After Intubation

1. Check symmetry of chest expansion.

2. Auscultate breath sounds of anterior and lateral chest bilaterally.

3. Obtain capnography or end-tidal CO_2 as indicated

4. Ensure chest x-ray obtained to verify proper tube placement.

5. Check cuff pressure every 6–8 hours.

6. Monitor for signs and symptoms of aspiration.

7. Ensure high humidity; a visible mist should appear in the T-piece or ventilator tubing.
8. Administer oxygen concentration as prescribed by the primary provider.
9. Secure the tube to the patient's face with tape, and mark the proximal end for position maintenance.

a. Cut proximal end of tube if it is longer than 7.5 cm (3 in) to prevent kinking.
b. Insert an oral airway or mouth device if orally intubated to prevent the patient from biting and obstructing the tube.

10. Use sterile suction technique and airway care to prevent contamination and infection.

11. Continue to reposition patient every 2 hours and as needed to prevent atelectasis and to optimize lung expansion.

12. Provide oral hygiene and suction the oropharynx whenever necessary.

Extubation (Removal of Endotracheal Tube)

1. Explain procedure.

2. Have self-inflating bag and mask ready in case ventilatory assistance is required immediately after extubation.

3. Suction the tracheobronchial tree and oropharynx, remove tape, and then deflate the cuff.

4. Give 100% oxygen for a few breaths, then insert a new, sterile suction catheter inside tube.

5. Have the patient inhale. At peak inspiration, remove the tube, suctioning the airway through the tube as it is pulled out.

Note: In some hospitals, this procedure can be performed by respiratory therapists; in others, by nurses. Check hospital policy.

Care of Patient Following Extubation

1. Give heated humidity and oxygen by facemask and maintain the patient in a sitting or high Fowler's position.

2. Monitor respiratory rate and quality of chest excursions. Note stridor, color change, and change in mental alertness or behavior.

3. Monitor the patient's oxygen level using a pulse oximeter.

4. Keep patient nothing by mouth (NPO)

5. Provide mouth care.

6. Educate the patient about how to perform coughing and deep breathing exercises

Complications

1- Cuff pressures should be maintained between 20- and 25-mm Hg (24 to 30 cm H2O) because high cuff pressure can cause tracheal bleeding, ischemia, and pressure necrosis, whereas low cuff pressure can increase the risk of aspiration pneumonia.

2- Routine deflation of the cuff is not recommended because of the increased risk of aspiration and hypoxia

3- Endotracheal and tracheostomy tubes have several disadvantages
   A. The tubes cause discomfort.
   B. The cough reflex is depressed because glottis closure is hindered.
   C. Secretions tend to become thicker because the warming and humidifying effect of the upper respiratory tract has been bypassed.
   D. The swallowing reflexes (glottic, pharyngeal, and laryngeal reflexes) are depressed because of prolonged disuse and the mechanical trauma produced by the endotracheal or tracheostomy tube, increasing the risk of aspiration as well as microaspiration and subsequent ventilator associated pneumonia (VAP).
   E. In addition, ulceration and stricture of the larynx or trachea may develop.
   F. Of great concern to the patient is the inability to talk and to communicate needs.

4- Unintentional or premature removal of the tube is a potentially life-threatening complication

Fourth lecture

Title: Tracheostomy, nursing diagnosis and intervention for patient with mechanical ventilation and Weaning the Patient from the Ventilator

Time: 45 minutes

Place: Al- Hillah teaching hospital

Teaching method: lecture

Teaching aids: PowerPoint

Specific objectives: -

At the end of this lecture the nurse should be able to: -

6- Determine the uses of tracheostomy.
7- Define how to Preventing Complications Associated with Endotracheal and Tracheostomy Tubes.
8- Identify the complication of tracheostomy.
    d- Early complications
    e- Long-term complications
    f- Nursing management for complication of tracheostomy.
9- Identify nursing diagnosis and intervention for patient with mechanical ventilation.
10- Define nursing role with patient Weaning the Patient from the Ventilator

introduction

A tracheotomy is a surgical procedure in which an opening is made into the trachea. The indwelling tube inserted into the trachea is called a tracheostomy tube. A tracheostomy (the stoma that is the product of the tracheotomy) may be either temporary or permanent.
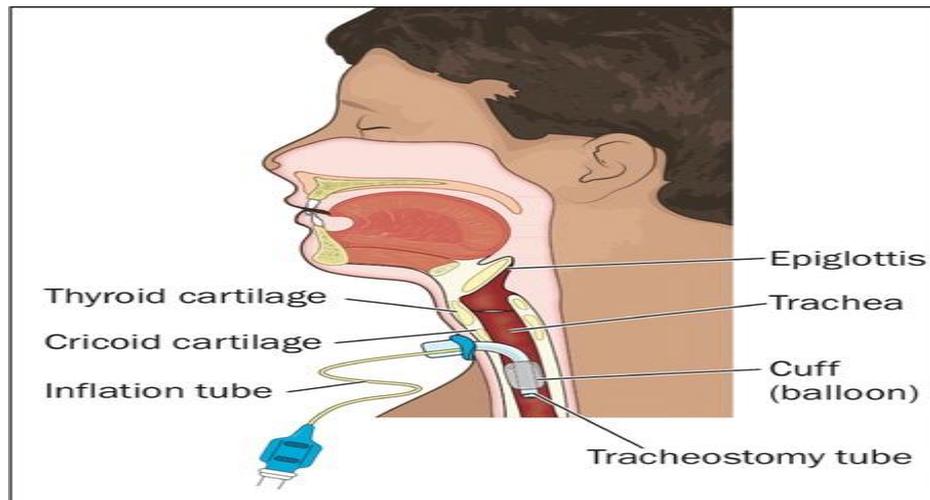
A tracheotomy is used to

1- bypass an upper airway obstruction
2- allow removal of tracheobronchial secretions
3- permit the long-term use of mechanical ventilation
4- prevent aspiration of oral or gastric secretions in the unconscious or paralyzed patient (by closing off the trachea from the esophagus)
5- replace an endotracheal tube.

Preventing Complications Associated with Endotracheal and Tracheostomy Tubes

1. Administer adequate warmed humidity.
2. Maintain cuff pressure at appropriate level.
3. Suction as needed.
4. Maintain skin integrity.
5. Change tape and dressing as needed or per protocol.
6. Auscultate lung sounds.
7. Monitor for signs and symptoms of infection, including temperature and white blood cell count.
8. Administer prescribed oxygen and monitor oxygen saturation.
9. Monitor for cyanosis.
10. Maintain adequate hydration of the patient.
11. Use sterile technique when suctioning and performing tracheostomy care.

Complications
Complications may occur early or late in the course of tracheostomy tube management.

Early complications include

tube dislodgement, accidental decannulation, bleeding, pneumothorax, air embolism, aspiration, subcutaneous or mediastinal emphysema, recurrent laryngeal nerve damage, and posterior tracheal wall penetration.

Long-term complications include

Airway obstruction from accumulation of secretions or protrusion of the cuff over the opening of the tube, infection, rupture of the innominate artery, dysphagia, tracheoesophageal fistula, tracheal dilation, tracheal ischemia, and necrosis. Tracheal stenosis may develop after the tube is removed.

Nursing Management

The patient requires continuous monitoring and assessment. The newly made opening must be kept patent by proper suctioning of secretions. After the vital signs are stable, the patient is placed in a semi-Fowler's position to facilitate ventilation, promote drainage, minimize edema, and prevent strain on the suture lines. Analgesia and sedative agents must be given with caution because of the risk of suppressing the cough reflex. Major objectives of nursing care are to ensure a patent airway, monitor the patient's respiratory status, assess for complications, alleviate the patient's apprehension, and provide an effective means of communication.

Managing the Cuff

The cuff on an endotracheal or tracheostomy tube should be inflated if the patient requires mechanical ventilation or is at high risk for aspiration. The pressure within the cuff should be the lowest possible pressure (20 to 25 mm Hg) that allows delivery of adequate tidal volumes and prevents pulmonary aspiration (Urden et al., 2014). Cuff pressure must be monitored by the respiratory therapist or nurse at least every 8 hours by attaching a handheld pressure gauge to the pilot balloon of the tube or by using the minimal leak volume or minimal occlusion volume technique.

Complications.

Hypoxemia can result because the oxygen source is connected from the patient or the oxygen is removed from the patient's airways when the suction is applied.

Atelectasis is thought to occur when the suction catheter is larger than one-half of the diameter of the ETT.
Excessive negative pressure occurs when suction is applied, promoting collapse of the distal airways. Bronchospasms are the result of stimulation of the airways with the suction catheter. Cardiac dysrhythmias, particularly bradycardias, are attributed to vagal stimulation.

Airway trauma occurs with impaction of the catheter in the airways and excessive negative pressure applied to the catheter.

Part two

introduction

Nursing diagnosis and intervention

Nursing care of the patient who is mechanically ventilated requires expert technical and interpersonal skills. Nursing interventions are similar regardless of the setting; however, the frequency of interventions and the stability of the patient vary from setting to setting. Nursing interventions for the patient who is mechanically ventilated are not uniquely different from those for patients with other pulmonary disorders, but astute nursing assessment and a therapeutic nurse–patient relationship are critical.

Nursing Diagnosis and Interventions

A. **Impaired gas exchange related to underlying illness, ventilator setting adjustments, or weaning.**
    Nursing interventions
    1. judicious administration of analgesic agents to relieve pain without suppressing the respiratory drive and frequent repositioning to diminish the pulmonary effects of immobility.
    2. The nurse also monitors for adequate fluid balance by assessing for the presence of peripheral edema, calculating daily intake and output, and monitoring daily weights.
    3. Administers medications prescribed to control the primary disease and monitors for their side effects.

B. **Ineffective airway clearance related to increased mucus production associated with presence of the tube in trachea or continuous positive-pressure mechanical ventilation.**
    Continuous positive-pressure ventilation increases the production of secretions regardless of the patient's underlying condition.
    1. The nurse assesses for the presence of secretions by lung auscultation at least every 2 to 4 hours.
    2. Measures to clear the airway of secretions include suctioning, CPT, frequent position changes, and increased mobility as soon as possible. Frequency of suctioning should be determined by patient assessment. If excessive secretions are identified by inspection or auscultation techniques, suctioning should be performed. Sputum is not produced continuously or every 1 to 2 hours but as a response to a pathologic condition. Therefore, there is no rationale for routine suctioning of all patients every 1 to 2 hours. Although suctioning is used to aid in the clearance of secretions, it can damage the airway mucosa and impair cilia action.

3. Humidification of the airway via the ventilator is maintained to help liquefy secretions so that they are more easily removed.
4. Bronchodilators may be indicated to dilate the bronchioles in patients with acute lung injury or COPD and are classified as adrenergic or anticholinergic.
5. Patients receiving bronchodilator therapy of either type should be monitored for adverse effects, including dizziness, nausea, decreased oxygen saturation, hypokalemia, increased heart rate, and urine retention.

C. Risk for trauma and infection related to endotracheal intubation or tracheostomy.
   1. Cuff pressure is monitored every 8 hours to maintain the pressure at 20 to 25 mm Hg.
   2. Patients with an endotracheal or tracheostomy tube do not have the normal defenses of the upper airway. In addition, these patients frequently have multiple additional body system disturbances that lead to immunocompromise. Tracheostomy care is performed at least every 8 hours, and more frequently if needed, because of the increased risk of infection.
   3. The ventilator circuit tubing and in-line suction tubing are replaced periodically, according to infection prevention guidelines, to decrease the risk of infection.
   4. The nurse administers oral hygiene frequently because the oral cavity is a primary source of contamination of the lungs in the patient who is intubated (El-Rabbany, Zaghlol, Bhandari, et al., 2015)
   5. The presence of a nasogastric tube in the patient who is intubated can increase the risk of aspiration, leading to nosocomial pneumonia. The nurse positions the patient with the head elevated above the stomach as much as possible.

D. Impaired physical mobility related to ventilator dependency.
   1. The nurse helps the patient whose condition has become stable to get out of bed and move to a chair as soon as possible.
   2. If the patient is unable to get out of bed, the nurse encourages performance of active range-of-motion exercises at least every 6 to 8 hours.
   3. If the patient cannot perform these exercises, the nurse performs passive range-of-motion exercises at least every 8 hours to prevent contractures and venous stasis.

E. Impaired verbal communication related to endotracheal tube or tracheostomy tube

F. Defensive coping and powerlessness related to ventilator dependency

Collaborative problems/Potential Complications

A. Ventilator problems (increase in peak airway pressure or decrease in pressure or loss of volume)

B. Alterations in cardiac function

C. Barotrauma (trauma to the trachea or alveoli secondary to positive pressure) and pneumothorax

D. Pulmonary infection and sepsis

E. Delirium

Weaning the Patient from the Ventilator

introduction

Respiratory weaning, the process of withdrawing the patient from dependence on the ventilator, takes place in three stages: the patient is gradually removed from the ventilator, then from either the endotracheal or tracheostomy tube, and finally from oxygen. Weaning is started when the patient is physiologically and hemodynamically stable, demonstrates spontaneous breathing capability, recovering from the acute stage of medical and surgical problems, and when the cause of respiratory failure is sufficiently reversed (Kacmarek et al. 2017).

Care of the Patient Being Weaned from Mechanical Ventilation
1. Assess patient for weaning criteria:

   a. Vital capacity: 10–15 mL/kg

   b. Maximum inspiratory pressure (MIP) at least –20 cm H2O

   c. Tidal volume: 7–9 mL/kg

   d. Minute ventilation: 6 L/min

   e. Rapid/shallow breathing index: Below 100 breaths/min/L; PaO2 >60 mm Hg with FiO2 <40%

2. Monitor activity level, assess dietary intake, and monitor results of laboratory tests of nutritional status. Reestablishing independent spontaneous ventilation can be physically exhausting. It is crucial that the patient have enough energy reserves to succeed.

3. Assess the patient's and family's understanding of the weaning process and address any concerns about the process. Explain that the patient may feel short of breath initially and provide encouragement as needed. Reassure the patient that he or she will be attended closely and that if the weaning attempt is not successful, it can be tried again later.

4. Implement the weaning method as prescribed (e.g., continuous positive airway pressure [CPAP] and T-piece).

5. Monitor vital signs, pulse oximetry, electrocardiogram, and respiratory pattern constantly for the first 20–30 minutes and every 5 minutes after that until weaning is

complete. Monitoring the patient closely provides ongoing indications of success or failure.

6. Maintain a patent airway; monitor arterial blood gas levels and pulmonary function tests. Suction the airway as needed.

7. In collaboration with the primary provider, terminate the weaning process if adverse reactions occur. These include a heart rate increase of 20 bpm, systolic blood pressure increase of 20 mm Hg, a decrease in oxygen saturation to <90%, respiratory rate <8 or >20 breaths/min, ventricular dysrhythmias, fatigue, panic, cyanosis, erratic or labored breathing, paradoxical chest movement.

8. If the weaning process continues, measure tidal volume and minute ventilation every 20–30 minutes; compare with the patient's desired values, which have been determined in collaboration with the primary provider.

9. Assess for psychological dependence if the physiologic parameters indicate that weaning is feasible and the patient still resists. Possible causes of psychological dependence include fear of dying and depression from chronic illness. It is important to address this issue before the next weaning attempt.

Removal of the Tracheostomy Tube

Removal of the tracheostomy tube is considered when the patient can breathe spontaneously; maintain an adequate airway by effectively coughing up secretions, swallow, and move the jaw. Secretion clearance and aspiration risks are assessed to determine whether active pharyngeal and laryngeal reflexes are intact. Once the patient can clear secretions adequately, a trial period of mouth breathing or nose breathing is conducted. This can be accomplished by several methods. The first method requires changing to a smaller size tube to increase the resistance to airflow or plugging the tracheostomy tube (deflating the cuff first). The smaller tube is sometimes replaced by a cuffless tracheostomy tube, which allows the tube to be plugged at lengthening intervals to monitor patient progress. A second method involves changing to a fenestrated tube (a tube with an opening or window in its bend). This permits air to flow around and through the tube to the upper airway and enables talking. A third method involves switching to a smaller tracheostomy button (stoma button). A tracheostomy button is a plastic tube approximately 1 inch long that helps keep the windpipe open after the larger tracheostomy tube has been removed. Finally, when the patient demonstrates the ability to maintain a patent airway, the tube can be removed. An occlusive dressing is placed over the stoma, which heals in several days to weeks.

Weaning from Oxygen

The patient who has been successfully weaned from the ventilator, cuff, and tube and has adequate respiratory function is then weaned from oxygen. The FiO2 is gradually reduced

until the PaO2 is in the range of 70 to 100 mm Hg while the patient is breathing room air. If the PaO2 is less than 70 mm Hg on room air, supplemental oxygen is recommended.

الرعاية الرئوية لمرض فيروس كورونا ١٩ في وحدة الرعاية الحرجة معرفة وإدراك التمريضيين في مستشفيات الحلة التعليمية

مقدمة

يعد مرض فيروس كورونا (COVID-19) من الامراض الحديثة المعدية يعاني معظم الاشخاص المصابين باعراض خفيفة او متوسطة الحده. ولكن يتعرض البعض الاخر وخصوصا كبار السن او المصابين بالامراض المزمنة باعراض شديده ومضاعفات تطول القلب والاوعية الدمويه والجهاز التنفسي. (يان جي وآخرون ٢٠٢٠).

الأهداف العامة: ـ

في نهاية هذه المحاضره يكتسب التمريضيين المهارات التالية للعناية التنفسية بمرضى كورونا: ـ

١ـ تحديد دواعي استعمال الاوكسجين ،مضاعفاته وطرق اعطائه.

٢ـ تحديد دواعي استعمال والعناية التمريضية للمريض مع التنفس التحفيزي.

٣ـ تحديد دواعي استعمال والعناية التمريضية للمريض بالعلاج التبخيري.

٤ـ التعرف على دور الممرض في العلاج الطبيعي للصدر.

٥ـ تحديد عناية المريض بواسطة أنبوب القصبة الهوائية.

٦ـ تحديد المضاعفات والعناية التمريضية مع المريض المصاب بثقب القصبة الهوائية.

٧ـ كيفية التعرف على العناية التمريضية للمريض الخاضع للتهوية الصناعية.

٨ـ التعرف على كيفية فطام المريض من جهاز التهوية الصناعية.

المحاضرة الأولى

العنوان: العلاج بالأكسجين

الوقت: ٤٥ دقيقة

المكان: مستشفى الحلة التعليمي

طريقة التدريس: محاضرة

الوسائل التعليمية: عرض الشرائح

أهداف المحاضره: -

في نهاية هذه المحاضرة يجب أن يكون الممرض قادرة على: -

١- التعرف على مؤشرات إعطاء الأكسجين.

٢- تحديد مضاعفات إعطاء الأكسجين.

٣- التعرف على طرق إعطاء الأوكسجين.

مقدمة

العلاج بالاوكسجين هو إعطاء الاوكسجين بتركيز أكبر من ذلك الموجود في الغلاف الجوي البيئي. الهدف من العلاج بالأوكسجين هو توفير النقل الكافي للأكسجين في الدم مع تقليل عمل التنفس وتقليل الضغط على عضلة القلب.

يعتمد نقل الأوكسجين إلى الأنسجة على عدة عوامل مثل:

١- التروية الدموية (القلبيه).

٢- محتوى الأوكسجين الشرياني.

٣- تركيز الهيموجلوبين.

٤ـ متطلبات التمثيل الغذائي.

يتم تقييم الحاجة إلى الأوكسجين عن طريق تحليل غازات الدم الشرياني ، وقياس التأكسج النبضي ، والتقييم السريري.

دواعي الإستعمال

قد يكون التغيير في معدل أو نمط التنفس لدى المريض أحد المؤشرات المبكرة للحاجة إلى العلاج بالأكسجين.

قد تنجم هذه التغييرات عن نقص الأوكسجين في الدم أو نقصه في الانسجة.

١ ـ **نقص الأوكسجين في الدم** :ـ وهو انخفاض في تركيز الأوكسجين الشرياني في الدم ، ويمكن ملاحظته من خلال التغيرات في

أ-   الحالة العقلية (ضعف الادراك ، الإثارة ، قلة الوعي ، الارتباك ، الخمول ، والغيبوبة)

ب-   ضيق التنفس

ت-   زيادة ضغط الدم.

ث-   التغيرات في معدل ضربات القلب.

ج-   الازرقاق

ح-   التعرق

خ-   برودة الأطراف.

٢- **نقص الاوكسجين في الانسجة:** عادة ما يؤدي نقص الأوكسجين في الدم إلى نقص الأوكسجين في الانسجة ، وهو انخفاض في إمداد الأكسجين للأنسجة والخلايا والذي يمكن أن ينتج أيضًا عن مشاكل خارج الجهاز التنفسي. مع نقص الأكسجة طويل الأمد (كما يظهر في مرض الانسداد الرئوي المزمن وفشل القلب المزمن) ، قد يحدث التعب والنعاس واللامبالاة وعدم الانتباه وتأخر في ردة الفعل.

المضاعفات

بشكل عام ، يتم إعطاء المرضى الذين يعانون من اضطرابات الجهاز التنفسي العلاج بالأوكسجين فقط لزيادة الضغط الجزئي للأوكسجين (PaO2) إلى المستوى الطبيعي ، والذي قد يتراوح من ٦٠ إلى ٩٥ ملم زئبق. من حيث منحنى تفكك أوكسي هيموغلوبين ، فإن الهيموغلوبين الشرياني عند هذه المستويات يكون ٨٠٪ إلى ٩٨٪ مشبع بالأوكسجين ؛ لا تضيف قيم تدفق الأكسجين المستوحى (FiO2) كميات كبيرة أخرى من الأكسجين إلى خلايا الدم الحمراء أو البلازما. بدلاً من المساعدة ، قد تؤدي كميات الأكسجين المتزايدة إلى إحداث تأثيرات سامة على الرئتين والجهاز العصبي المركزي أو قد تؤدي إلى انخفاض في مستوى التهوية.

من المهم ملاحظة المؤشرات الدقيقة لعدم كفاية الأوكسجين عند إعطاء الأوكسجين بأي طريقة. لذلك ، يقوم الممرض بتقييم المريض بشكل متكرر من حالات للارتباك ، الأرق الذي يتطور إلى الخمول ، التعرق ، الشحوب ، عدم انتظام دقات القلب ، تسارع في معدل التنفس ، وارتفاع ضغط الدم.

لمراقبة مستويات الاوكسجين يتم عن طريق قياس مستوى الاوكسجين بشكل مستمر او متقطع.

أ- سمية الأوكسجين:-

قد تحدث سمية الأوكسجين عندما يتم إعطاء تركيز عالي جدًا من الأكسجين (أكبر من ٥٠٪) لفترة طويلة (تزيد عمومًا عن ٢٤ ساعة).

إذا لم يتم علاج سمية الأوكسجين ، فمن الممكن أن تلحق أضرارًا بالغة بالغشاء الشعري السنخي مما يؤدي إلى الوذمة الرئوية وموت الخلايا المتقدم.

علامات وأعراض تسمم الأكسجين تشمل

١)   عدم الراحة تحت القص

٢)   تنمل

٣)   ضيق التنفس

٤)   القلق

٥)   التعب

٦)   توعك

٧)   صعوبة تنفسية

٨)   نقص الأوكسجين الحراري

٩)   ضمور الحويصلات الرئوية

ب- الضمور الامتصاصي:-

يحدث نتيجة إعطاء تركيزات عالية من الأكسجين (أكبر من ٥٠٪) للمرضى الذين يتم تخديرهم ويتنفسون كميات صغيرة من الحجم المدي.

في العادة ، ٧٩٪ من هواء الغرفة يتكون من النيتروجين. أثناء الاستنشاق ، يملأ النيتروجين ، بالإضافة إلى الغازات الأخرى ، الحويصلات الهوائية ويساعد على إبقاء الحويصلات مفتوحة. مع إعطاء تركيزات عالية من الأوكسجين ، يتم تخفيف النيتروجين واستبداله بالأوكسجين. يتم امتصاص الأوكسجين الموجود في الحويصلات الهوائية بسرعة في مجرى الدم ولا يتم استبداله بالسرعة الكافية في الحويصلات للحفاظ على المباح. ممى يودي الى انهيار الحويصلات الهوائية ، ويسبب في انخماص الرئة.

ج- مضاعفات أخرى:-

نظرًا لأن الأكسجين يسبب الاحتراق ، فهناك دائمًا خطر نشوب حريق عند استخدامه. معدات العلاج بالأكسجين هي أيضًا مصدر محتمل للتلوث البكتيري ؛ لذلك ، يقوم الممرض (أو المعالج التنفسي) بتغيير الأنبوب وفقًا لسياسة الوقاية من العدوى وتوصيات الشركة المصنعة ونوع معدات توصيل الأكسجين. عند استخدام الأكسجين بمعدلات تدفق عالية ، يجب ترطيبه عن طريق تمريره عبر نظام ترطيب لمنعه من تجفيف الأغشية المخاطية في الجهاز التنفسي.

طرق إعطاء الأكسجين

يتم اعطاء الاوكسجين من الاسطوانة أو نظام الأنابيب. يعد مقياس الاختزال ضروريًا لتقليل الضغط إلى مستوى العمل ، ويقوم مقياس التدفق بتنظيم تدفق الأكسجين باللتر في الدقيقة (لتر / دقيقة).

يتم قياس كمية الأوكسجين التي يتم توصيلها بالنسبة مئوية (على سبيل المثال ، ٧٠٪).

أفضل طريقة لتحديد الشكل المناسب للعلاج بالأكسجين هي قياس مستويات غازات الدم الشرياني بشكل متكرر ، والتي تشير إلى مستوى الأوكسجين لدى المريض.

يتم تصنيف أنظمة توصيل الأكسجين على أنها أنظمة توصيل منخفضة التدفق (أداء متغير) أو عالية التدفق (أداء ثابت).

أ- **أنظمة التدفق المنخفض:-** تساهم جزئيًا في الغاز المستوحى الذي يتنفسه المريض ، مما يعني أن المريض يتنفس بعض هواء الغرفة مع الأوكسجين.

أمثلة على أنظمة التدفق المنخفض

١. **قنية الأنف:-** تستخدم عندما يحتاج المريض إلى تركيز منخفض إلى متوسط من الأكسجين. تسمح هذه الطريقة للمريض بالتحرك في السرير والتحدث والسعال وتناول الطعام دون مقاطعة تدفق الأكسجين. قد تؤدي معدلات التدفق التي تزيد عن ٤ لتر / دقيقة إلى ابتلاع الهواء أو قد تسبب تهيجًا وجفافًا في الغشاء المخاطي للأنف والبلعوم.

قنية الأنف

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٢. قسطرة الأنف (الفموي البلعومي):- نادراً ما يتم استخدامها ولكن يمكن وصفها للعلاج قصير الأمد لإعطاء تركيزات منخفضة إلى متوسطة من الأوكسجين. يجب تغيير القسطرة بشكل متكرر (على سبيل المثال ، كل ٨ ساعات) ، مع تبديل فتحتي الأنف لمنع تخدش وعدوى الأنف.

عندما يتم إعطاء الأكسجين عن طريق القنية أو القسطرة ، فإن نسبة الأكسجين التي تصل إلى الرئتين تختلف باختلاف عمق ومعدل التنفس ، خاصة إذا كان الغشاء المخاطي للأنف منتفخًا أو إذا كان المريض يتنفس في الفم.
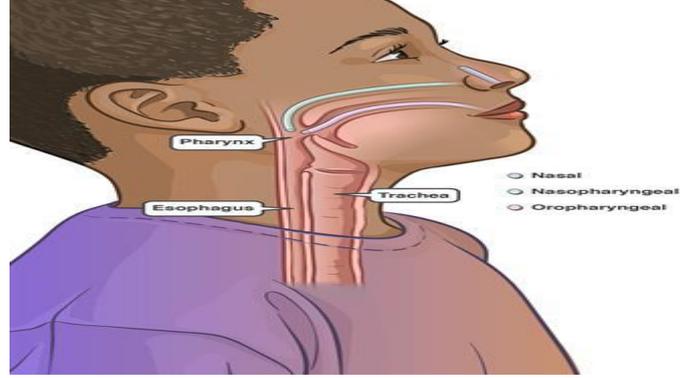
قسطرة الأنف

٣. أقنعة الأكسجين:- وتأتي بعدة أشكال.

أ. أقنعة بسيطة:- تستخدم لإعطاءتركيزات منخفضة إلى معتدلة من الأكسجين. يقوم جسم القناع نفسه بتجميع الأكسجين وتخزينه بين الأنفاس.

أقنعة بسيطة

ب. أقنعة إعادة التنفس الجزئية:- تحتوي على كيس خزان يجب أن يظل منتفخًا أثناء الشهيق والزفير. يقوم الممرض بضبط تدفق الأكسجين لضمان عدم انكماش الكيس أثناء الاستنشاق.

أقنعة إعادة التنفس الجزئية

ج. الأقنعة غير القابلة لإعادة التنفس:- تتشابه في التصميم مع أقنعة إعادة التنفس الجزئي فيما عدا أنها تحتوي على صمامات إضافية.

الأقنعة غير القابلة لإعادة التنفس

ب- **أنظمة التدفق العالي:-** توفر اغلب الهواء الملهم للمريض. يتم توصيل نسبة معينة من الأكسجين بشكل مستقل عن تنفس المريض. أنظمة التدفق العالي تعطى للمرضى الذين يحتاجون إلى كمية ثابتة ودقيقة من الأوكسجين.

أمثلة على أنظمة التدفق العالي

١. **قناع الفنتوري:-** هو الطريقة الأكثر موثوقية ودقة لإيصال تركيزات دقيقة من الأكسجين من خلال وسائل غير تداخلية.

قناع الفنتوري

٢. **قسطرة الأكسجين عبر القصبة الهوائية:-** تتطلب إجراء عملية جراحية بسيطة لإدخال قسطرة من خلال شق صغير مباشرة في القصبة الهوائية. يتم اجرائه للمرضى الذين يعانون من احتياجات المزمنة للعلاج بالأوكسجين.

قسطرة الأكسجين عبر القصبة الهوائية

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٣. **القطعة T:-** عبارة عن محول خاص يستخدم لتوصيل الأكسجين ، والذي يتصل بأنبوب القصبة الهوائية أو أنبوب الثقب الرغامي ، وهو مفيد في فطام المرضى من التهوية الميكانيكية.

القطعة T
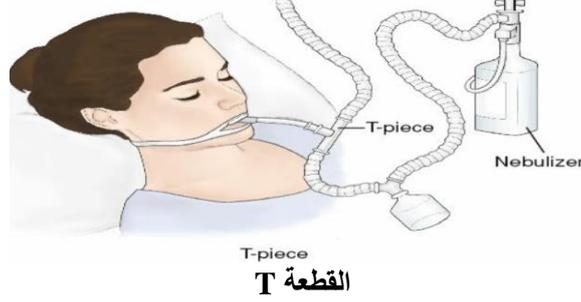
٤. **أقنعة الهباء الجوي وأطواق القصبة الهوائية وخيام الوجه ، أجهزة الهباء الجوي:-** تستخدم لتعديلها تركيزات الأكسجين من ٢٧٪ إلى ١٠٠٪.

خيام الوجه   **أطواق القصبة الهوائية**   **أقنعة الهباء الجوي**

المحاضرة الثانية

العنوان: قياس التنفس التحفيزي وعلاج التبخير صغيرة الحجم و العلاج الطبيعي للصدر

الوقت: ٤٥ دقيقة

المكان: مستشفى الحلة التعليمي

طريقة التدريس: محاضرة

الوسائل التعليمية: PowerPoint ، الصور

أهداف المحاضرة: ـ

في نهاية هذه المحاضرة يجب أن يكون الممرض / الممرضه قادرة على: ـ

١- التعرف على دواعي استعمال التنفس التحفيزي.

٢- معرفة العناية التمريضية للمريض بقياس التنفس التحفيزي

٣- التعرف على دواعي استعمال العلاج باستخدام التبخير صغيرة الحجم.

٤- معرفة العناية التمريضية للمريض باستخدام علاج التبخير صغير الحجم.

٥- تحديد أهداف العلاج الطبيعي للصدر.

٦- تحديد تقنيات العلاج الطبيعي للصدر.

٧- تحديد العناية التمريضية للمرضى الذين يعانون من الافرازات الوضعي.

٨- التعرف على العناية التمريضية للمريض بالقرع والاهتزاز الصدري.

الجزء الاول

قياس التنفس التحفيزي

مقدمة

قياس التنفس التحفيزي هو طريقة للتنفس العميق لغرض توفير تغذية راجعة لتشجيع المريض على الاستنشاق ببطء وعمق لزيادة توسع الرئة إلى الحد الأقصى ومنع ضمور الرئة أو تقليله. الغرض من مقياس التنفس التحفيزي هو ضمان زيادة حجم الهواء المستنشق تدريجيًا حيث يأخذ المريض أنفاسًا عميقة.

التنفس التحفيزي

دواعي الإستعمال

يستخدم قياس التنفس التحفيزي بعد الجراحة ، وخاصةً في جراحة الصدر البطن ، لتعزيز توسع الحويصلات الهوائية ومنع او علاج ضمور الرئة.

العناية التمريضيه:-

• وضع المريض في وضعية شبه الجالس او الجالس قبل بدء العلاج.

• استخدام التنفس البطني.

وضع قطعة الفم الخاصة بمقياس التنفس بثبات في الفم ، استنشاق الهواء ببطء من خلال الفم ، حبس الانفاس في نهاية الشهيق لمدة ٣ ثوانٍ تقريبًا للحفاظ على موشر الكرة بين السطور. زفر الهواء ببطء من خلال الفوهة.

• السعال أثناء وبعد كل جلسة.

• يكرر الإجراء ١٠ مرات متتالية تقريبًا في كل جلسه.

التنفس الحجابي

الهدف: استخدام الحجاب الحاجز وتقويته أثناء التنفس

يطلب الممرض من المريض:

• وضع إحدى اليدين على البطن (أسفل الضلوع مباشرة) والأخرى على منتصف الصدر لزيادة الوعي بموضع الحجاب الحاجز ووظيفته في التنفس.

• التنفس ببطء وبعمق من خلال الأنف ، مع ترك البطن يبرز إلى أقصى حد ممكن.

• الزفير من خلال الشفتين مع شد (تقلص) عضلات البطن.

• اضغط بقوة للداخل وللأعلى على البطن أثناء الزفير.

• يكرر لمدة دقيقة واحده يتبعها فترة راحة لمدة دقيقتين.

قم بزيادة المدة تدريجيًا حتى ٥ دقائق ، عدة مرات في اليوم (قبل الوجبات وعند النوم).

التبخير صغيرة الحجم

دواعي الإستعمال

١- صعوبة في التخلص من إفرازات الجهاز التنفسي.

٢- انخفاض القدرة الحيوية مع عدم فعالية التنفس العميق والسعال.

٣- محاولات غير الناجحه لأبسط الاساليب التي تهدف الى تنظيف الإفرازات الرئوية أو توصيل الهباء الجوي أو توسيع الرئتين.

التبخير صغيرة الحجم

الدور التمريضي:

يقوم الممرض/ الممرضة بارشاد المريض إلى التنفس من خلال الفم ، وأخذ أنفاس بطيئة وعميقة ، ثم حبس النفس لبضع ثوان في نهاية الشهيق لزيادة الضغط داخل الجنبة وإعادة فتح الحويصلات الهوائية المنهارة ، وبالتالي زيادة القدرة الوظيفية المتبقية. يقوم الممرض بتشجيع المريض على السعال ومراقبة فعالية العلاج.

الجزء الثاني

العنوان: العلاج الطبيعي للصدر

المقدمة

يشمل العلاج الطبيعي للصدر (CPT) التصريف الوضعي وإيقاع الصدر والاهتزاز وإعادة تدريب التنفس. بالإضافة إلى ذلك ، يعد تثقيف المريض حول تقنية السعال الفعالة جزءًا مهمًا من العلاج الطبيعي للرئتين.

أهداف العلاج الطبيعي للرئتين هي

١- إزالة إفرازات الشعب الهوائية

٢- تحسين التهوية

٣- زيادة كفاءة عضلات الجهاز التنفسي.

أ- التصريف الوضعي (تصريف الشعب الهوائية المقسم)

يسمح التصريف الوضعي بقوة الجاذبية تساهم للمساعدة في إزالة إفرازات الشعب الهوائية. تصب الإفرازات من الشعب الهوائية المصابة إلى القصبات الهوائية والقصبة الهوائية ويتم إزالتها عن طريق السعال أو الشفط.

يستخدم التصريف الوضعي لمنع أو تخفيف انسداد الشعب الهوائية الناتج عن تراكم الإفرازات.

تستنزف القصبات الهوائية في الفصين السفلي والوسطى بشكل أكثر فعالية عندما يكون الرأس لأسفل ، في حين أن القصبات الهوائية في الفص العلوي تستنزف بشكل أكثر فعالية عندما يكون الرأس مرفوعًا.

يقوم الممرض / الممرضه بإرشاد المريض لاستنشاق موسعات الشعب الهوائية وعوامل حاله للبلغم ، إذا تم وصفها ، قبل التصريف الوضعي ، لأن هذه الأدوية تحسن تصريف الشعب الهوائية.

العناية التمريضية

يجب أن يضع الممرض / الممرضه في الاعتبار التشخيص الطبي وفصوص الرئة المعنية وحالة القلب وأي تشوهات هيكلية لجدار الصدر والعمود الفقري. يتم التقييم الجسدي بتقنية الاصغاءلصدر المريض قبل وبعد الإجراء لتحديد المناطق التي تحتاج إلى تصريف وتقييم فعالية العلاج.

يتم إجراء التصريف الوضعي عادةً مرتين إلى أربع مرات يوميًا ، قبل وجبات الطعام (لمنع الغثيان والقيء والطموح) وقبل النوم.

يتم استنشاق موسعات الشعب الهوائية أو الماء أو المحلول الملحي قبل التصريف الوضعي لتوسيع القصيبات وتقليل تشنج القصبات وتقليل سماكة المخاط والبلغم ومكافحة الوذمة في جدران الشعب الهوائية.

وضع المريض بوضعية مرتاحًا قدر الإمكان مع توفير حوض التقيؤ وكوب البلغم والأنسجة الورقية. يطلب الممرض من المريض البقاء في كل وضع لمدة ١٠ إلى ١٥ دقيقة واستنشاق الهواء ببطء من خلال الأنف واخراج الزفير ببطء من خلال الشفاه للمساعدة في الحفاظ على مجرى الهواء مفتوحًا حتى يمكن تصريف الإفرازات.

يجب على الممرض أو مقدمو الرعاية في العائلة ملاحظة كمية البلغم المطرود ولونه ولزوجته وخصائصه. تقوم الممرضة بتقييم لون جلد المريض والنبض. قد يكون من الضروري إعطاء الأكسجين أثناء التصريف الوضعي.

Lower lobes, lateral basal segments

Upper lobes, apical segments
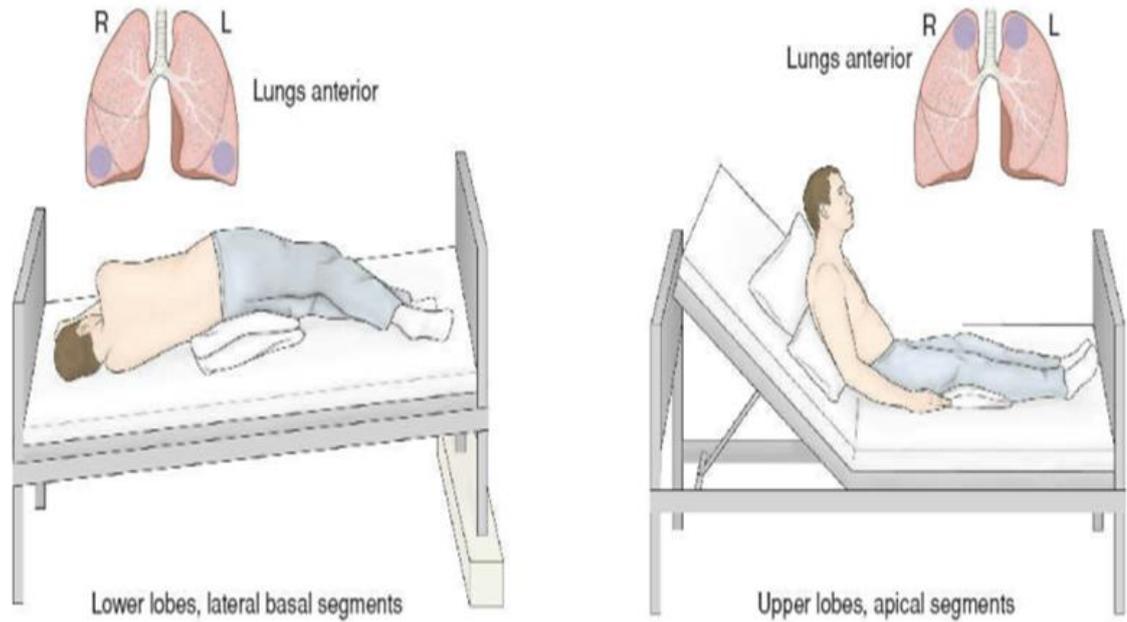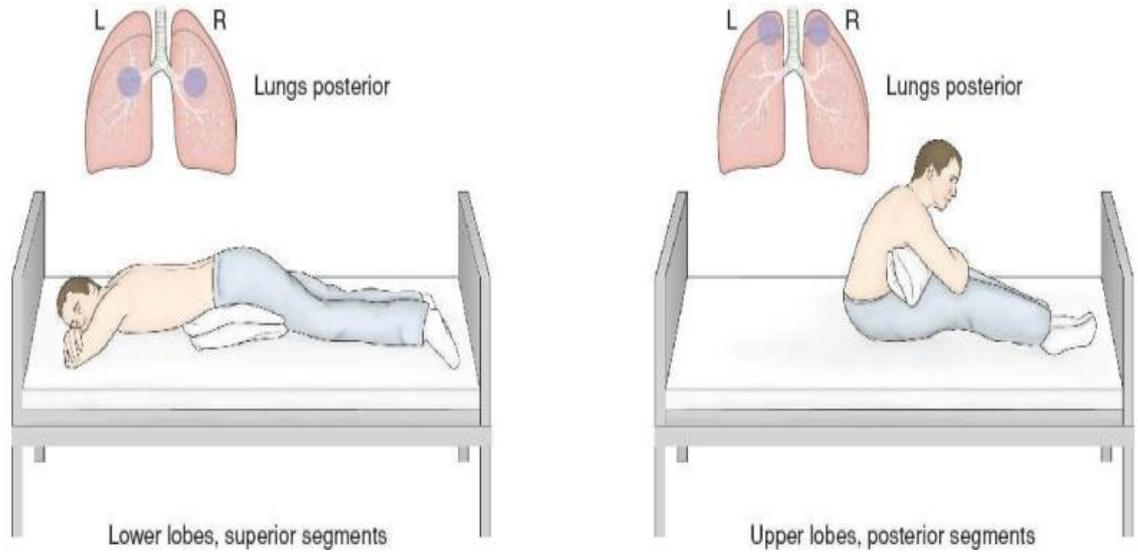
تقنية السعال الفعال

١. اتخاذ وضعية الجلوس والانحناء قليلاً للأمام. هذا الوضع المستقيم يسمح بسعال أقوى.

٢. ثني الركبتين والوركين لتعزيز الاسترخاء وتقليل الضغط على عضلات البطن أثناء السعال.

٣. يستنشق ببطء من خلال الأنف ويخرج الزفير من خلال الشفاه عدة مرات.

٤. اسعل مرتين خلال كل زفير مع تقلص (شد) البطن بحدة مع كل سعال.

٥. تجبير منطقة الجرح ، إن وجدت ، بضغط يدوي قوي أو دعمها بوسادة أو بطانية ملفوفة أثناء السعال.

ب. قرع الصدر والاهتزاز

يساعد قرع الصدر والاهتزاز على طرد المخاط الملتصق بالشعب والشعيبات الهوائية.

يتم إجراء قرع الصدر عن طريق اليدين بضرب جدار الصدر برفق بطريقة إيقاعية على جزء الرئة ليتم تصريفه.

يتم تنفيذ الإيقاع بالتناوب مع الاهتزاز لمدة ٣ إلى ٥ دقائق لكل موضع.

كإجراء احترازي ، يتم تجنب القرع على أنابيب الصرف الصدري والقص أو العمود الفقري أو الكبد أو الكلى أو الطحال أو الثدي (عند النساء). يتم إجراء القرع بحذر عند المرضى البالغين كبار السن بسبب زيادة معدل الإصابة بهشاشة العظام وخطر الإصابة بكسور في الضلع.

الاهتزاز هو تقنية الضغط اليدوي والرعشة على جدار الصدر أثناء مرحلة الزفير من التنفس. هذا يساعد على زيادة سرعة الهواء المنتهي من الممرات الهوائية الصغيرة ، وبالتالي تحرير المخاط.

العناية التمريضية

عند إجراء العلاج الطبيعي للرئتين ، يتأكد الممرض من أن المريض مرتاح ، ولا يرتدي ملابس مقيدة ، ولم يأكل.

عطي الممرض أدوية للألم ، على النحو الموصوف ، قبل الإيقاع والاهتزاز وتجبير أي شق وتوفر وسائد للدعم حسب الحاجة.

تتنوع في وضعية المريض ، ولكن يتم التركيز على المناطق المتأثرة. عند الانتهاء من العلاج ، يساعد الممرض المريض على اتخاذ وضع مريح.

يجب إيقاف العلاج في حالة حدوث أي مما يلي: زيادة الألم أو ضيق التنفس أو الضعف أو الدوار أو نفث الدم.

يتم الاستمرار بالعلاج حتى يحصل المريض على تنفس طبيعي ، ويمكنه تحريك الإفرازات ، والحصول على أصوات تنفس طبيعية ، وحتى تكون نتائج الأشعة السينية على الصدر طبيعية.

ج- إعادة تدريب التنفس

إعادة تدريب التنفس من تمارين وممارسات التنفس المصممة لتحقيق تهوية أكثر كفاءة وتحكمًا ولتقليل عمل التنفس.

تعمل هذه التمارين على تعزيز الانتفاخ الأقصى للحويصلات الهوائية واسترخاء العضلات ؛ تخفيف القلق؛ القضاء على الأنماط غير الفعالة وغير المنسقة لنشاط عضلات الجهاز التنفسي ؛ يبطئ معدل التنفس وتقليل عمل التنفس .

يساعد هذا النوع من التنفس على منع انهيار مجرى الهواء نتيجة لفقدان مرونة الرئة في انتفاخ الرئة. يشجع المريض لاستعمال عضلات البطن في التنفس واخراج الهواء من بين الشفتين

العناية التمريضة

يطلب الممرض من المريض أن يتنفس ببطء وبشكل منتظم وبطريقة مريحة وأن يقوم بالزفير بالكامل لتفريغ الرئتين. يُطلب من المريض أن يستنشق دائمًا من الأنف لأن الانف يرشح يرطب ويدفئ الهواء. في حالة ضيق التنفس ، يجب توجيه المريض للتركيز على إطالة مدة الزفير ؛ هذا يساعد على تجنب من زيادة ضيق التنفس والذعر.

يقوم الممرض بإرشاد المريض إلى أن تناول الغذاء الكافي يعزز تبادل الغازات ويزيد من مستويات الطاقة.

يجب تجنب الأطعمة المنتجة للغازات مثل الفاصوليا والبقوليات والبروكلي والملفوف وغيرها لمنع انتفاخ البطن.

المحاضرة الثالثة

العنوان: التنبيب الرغامي

الوقت: ٤٥ دقيقة

المكان: مستشفى الحلة التعليمي

طريقة التدريس: محاضرة

الوسائل التعليمية: PowerPoint ، الصور

أهداف محددة: -

في نهاية هذه المحاضرة يجب أن يكون الممرض / الممرضه قادرة على: -

١ـ التعرف على الرعاية التمريضية للمريض بواسطة أنبوب القصبة الهوائية.

أـ الرعاية التمريضية بعد التنبيب مباشرة.

بـ الاجراءات التمريضيه لنزع الأنبوب (إزالة الأنبوب الرغامي)

جـ الرعاية التمريضية للمريض بعد نزع الأنبوب

٢ـ التعرف على مضاعفات التنبيب الرغامي

مقدمة

يتضمن التنبيب الرغامي تمرير أنبوب رغامي عبر الأنف أو الفم إلى القصبة الهوائية. يوفر التنبيب مجرى هواء جيد عندما يعاني المريض من ضائقة تنفسية لا يمكن معالجتها بأساليب بسيطه وهي الطريقة المفضلة في الحالات الطوارئ.

التنبيب الرغامي هو وسيلة لتوفير مجرى هوائي للمرضى الذين لا يستطيعون الحفاظ على مجرى هوائي مناسب بمفردهم (على سبيل المثال ، المرضى الذين يعانون من غيبوبة والمرضى الذين يعانون من انسداد مجرى الهواء العلوي) ، وللمرضى الذين يحتاجون إلى تهوية ميكانيكية وشفط الإفرازات من الشجرة الرئوية.

Endotracheal tube | Vocal cords | Trachea | Lung

Endotracheal Tube Placement
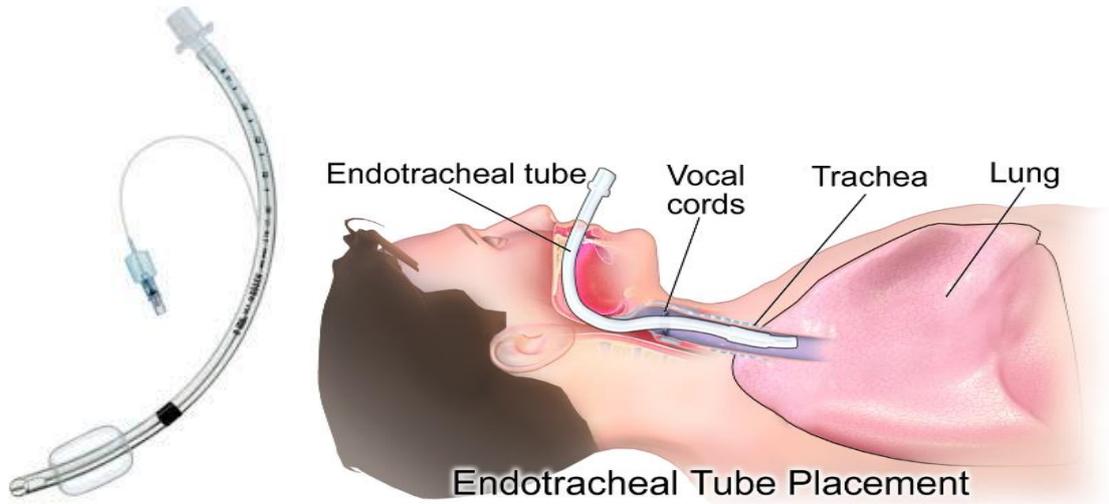
رعاية المريض بأنبوب القصبة الهوائية مباشرة بعد التنبيب

١. تحقق من تناسق تمدد الصدر.

٢. الاستماع الى أصوات تنفس الصدر من الجزء الأمامي والجانبي.

٤. تأكد من الحصول على الأشعة السينية للصدر للتحقق من وضع الأنبوب بشكل صحيح.

٥. فحص ضغط المطوق كل ٦-٨ ساعات.

٦. مراقبة علامات وأعراض الاستنشاق.

٧. ضمان الرطوبة العالية. يجب أن يظهر ضباب مرئي في قطعة T أو أنبوب جهاز التنفس الصناعي.

٨. تزويد المريض بالأوكسجين على النحو الموصوف.

٩. تأمين وتثبيت الأنبوب على وجه المريض بشريط لاصق ، للحفاظ على موقعه بالنسبة للقصبة الهوائيه.

أ. قطع الطرف القريب من الأنبوب إذا كان أطول من ٧,٥ سم (٣ بوصات) لمنع الالتواء.

ب. أدخل مجرى الهواء الفموي أو جهاز الفم إذا تم التنبيب عن طريق الفم لمنع المريض من العض وانسداد الأنبوب.

١٠. استخدام تقنية الشفط المعقمة والعناية بمجرى الهواء لمنع التلوث والعدوى.

١١. الاستمرار في تغيير وضع المريض كل ساعتين وحسب الحاجة للوقاية انكماش الرئة وتحسين توسع الرئة.

١٢. توفير نظافة الفم وشفط منطقة البلعوم كلما لزم الأمر.

نزع الأنبوب (إزالة الأنبوب الرغامي)

١. شرح الإجراء للمريض.

٢. جهز كيس وقناع ذاتي النفخ في حالة الحاجة إلى مساعدة التنفس الصناعي فور نزع الأنبوب.

٣. شفط الشجرة الرغامية والبلعوم ، وإزالة الشريط ، ثم تفريغ الكفة.

٤. أعطِ ١٠٠٪ أكسجين لعدة أنفاس قليلة ، ثم أدخل قسطرة شفط معقمة جديدة داخل الأنبوب.

٥. اجعل المريض يستنشق. في ذروة الشهيق ، قم بإزالة الأنبوب ، وامتصاص مجرى الهواء عبر الأنبوب عند سحبه للخارج.

رعاية المريض بعد نزع الأنبوب

١. إعطاء الأكسجين الرطب عن طريق قناع الوجه والحفاظ على المريض في وضع الجلوس أو شبه الجالس.

٢. مراقبة معدل التنفس ونوعية النزهات الصدرية. لاحظ الصرير وتغيير اللون والتغيير في اليقظة أو السلوك العقلي.

٣. مراقبة مستوى الأكسجين لدى المريض باستخدام مقياس التأكسج النبضي.

٤. احتفظ بالمريض NPO (لا شيء عن طريق الفم).

٥. توفير العناية بالفم.

٦. توعية المريض بكيفية أداء تمارين التنفس العميق والسعال

المضاعفات

١- يجب الحفاظ على ضغط الكفة بين ٢٠ و ٢٥ مم زئبق لأن ضغط الكفة المرتفع يمكن أن يسبب نزيف القصبة الهوائية ونقص التروية ونخر الضغط ، في حين أن ضغط الكفة المنخفض يمكن أن يزيد من خطر الإصابة بالالتهاب الرئوي التنفسي.

٢- لا ينصح بالنفخ الروتيني للحزام بسبب زيادة خطر الإصابة بالشفط ونقص الأكسجة

٣- أنابيب القصبة الهوائية والفغر الرغامي لها عيوب عديدة

A. الأنابيب تسبب عدم الراحة.

ب. يكون منعكس السعال منخفضًا بسبب إعاقة انسداد المزمار.

ج. تميل الإفرازات إلى أن تصبح أكثر سمكًا بسبب تجاوز تأثير الاحترار والترطيب في الجهاز التنفسي العلوي.

د- قدرة المريض على البلع قليلة بسبب الإهمال المطول والكدمات الميكانيكية الناتجة عن الأنبوب الرغامي أو فغر الرغامي ، مما يزيد من خطر الاستنشاق والالتهاب الرئوي المرتبط بجهاز التنفس الصناعي.

E. بالإضافة إلى ذلك ، قد يحدث تقرح وتضيق في الحنجرة أو القصبة الهوائية.

و. من الأمور التي تشغل بال المريض عدم قدرته على الكلام وتوصيل احتياجاته.

٤- الإزالة غير المقصودة أو المبكرة للأنبوب من المضاعفات التي قد تهدد الحياة

المحاضرة الرابعة

العنوان: الفغر الرغامي و التشخيص والتداخل التمريضي للمريض تحت التهوية الميكانيكية وفطم المريض عن جهاز التنفس الصناعي

الوقت: ٤٥ دقيقة

المكان: مستشفى الحلة التعليمي

طريقة التدريس: محاضرة

الوسائل التعليمية: PowerPoint، الصور

أهداف محددة: ـ

في نهاية هذه المحاضرة يجب أن يكون الممرض قادرة على: -

١ـ تحديد استخدامات ثقب القصبة الهوائية.

٢ـ تحديد كيفية منع المضاعفات المصاحبة لأنابيب القصبة الهوائية والفغر الرغامي.

٣ـ التعرف على مضاعفات ثقب القصبة الهوائية.

أـ المضاعفات المبكرة

بـ المضاعفات طويلة المدى

جـ العناية التمريضيه لمضاعفات ثقب القصبة الهوائية.

٤ـ تحديد التشخيص والتداخل التمريضي للمريض تحت التهوية الميكانيكية.

٥ـ تحديد دور الممرض مع فطام المريض عن جهاز التنفس الصناعي

الجزء الاول

الفغر الرغامي

المقدمة

الفغر الرغامي هو إجراء جراحي يتم فيه عمل فتحة في القصبة الهوائية. يُطلق على الأنبوب الذي يتم إدخاله في القصبة الهوائية أنبوب فغر القصبة الهوائية. فغر القصبة الهوائية قد يكون مؤقتًا أو دائمًا.
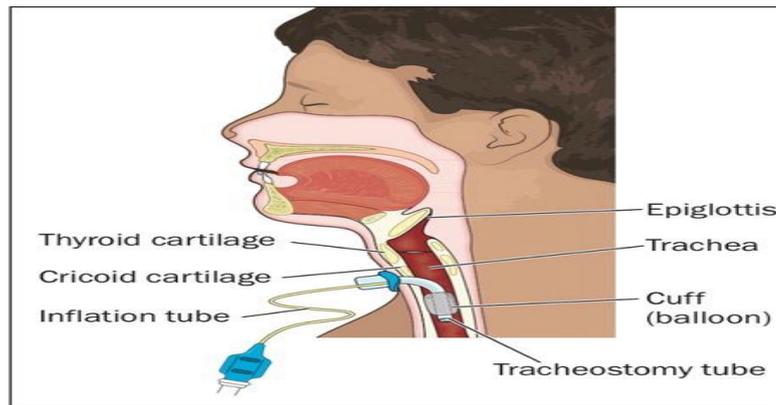
يتم استخدام بضع القصبة الهوائية

١ـ تجاوز انسداد مجرى الهواء العلوي

٢ـ السماح بإزالة الإفرازات الرغامية

٣ـ السماح باستخدام التهوية الميكانيكية على المدى الطويل

٤ـ منع استنشاق الإفرازات الفموية أو المعدية لدى المريض الفاقد للوعي أو المشلول (بإغلاق القصبة الهوائية من المريء)

٥ـ استبدل الأنبوب الرغامي.

منع المضاعفات المصاحبة لأنابيب القصبة الهوائية والفغر الرغامي

1. الحفاظ على الرطوبة الدافئة الكافية.
2. حافظ على ضغط الكفة عند المستوى المناسب.
3. الشفط حسب الحاجة.
4. الحفاظ على سلامة البشرة.
5. قم بتغيير الشريط اللاصق والضمادة حسب الحاجة أو حسب البروتوكول.
6. الاستماع لأصوات الرئة.
7. راقب علامات وأعراض العدوى ، بما في ذلك درجة الحرارة وعدد خلايا الدم البيضاء.
8. اعطاء الأكسجين الموصوف ومراقبة تشبع الأكسجين.
9. مراقبة الزرقة.
10. الحفاظ على قدر كافٍ من السوائل للمريض.
11. استخدم تقنية معقمة عند الشفط والعناية بالفغر الرغامي.

المضاعفات

قد تحدث المضاعفات في وقت مبكر أو متأخر في مسار عناية أنبوب القصبة الهوائية.

تشمل المضاعفات المبكرة

خلع الأنبوب ، النزيف ، استرواح الصدر ، الخثرة الهوائي ، الشفط ، انتفاخ الرئة تحت الجلد أو المنصف ، تلف العصب الحنجري المتكرر ، واختراق جدار القصبة الهوائية الخلفي.

تشمل المضاعفات طويلة المدى

انسداد مجرى الهواء من تراكم الإفرازات أو نتوء الكفة فوق فتحة الأنبوب ، والعدوى ، وتمزق الشريان اللامسمى ، وعسر البلع ، والناسور الرغامي المريئي ، والتوسع الرغامي ، ونقص تروية القصبة الهوائية ، والنخر. قد يحدث تضيق القصبة الهوائية بعد إزالة الأنبوب.

العناية التمريضيه

1. يحتاج المريض إلى مراقبة وتقييم مستمرين.
2. يجب الاحتفاظ بالفتحة التي تم تصنيعها حديثًا عن طريق الشفط المناسب للإفرازات.
3. بعد استقرار العلامات الحيوية ، يتم وضع المريض في وضع شبه جالس لتسهيل التهوية ، وتعزيز الصرف ، وتقليل الوذمة ، ومنع الضغط على خطوط الخياطة.
4. يجب إعطاء المسكنات والعوامل المهدئة بحذر بسبب خطر تثبيط السعال.
5. تتمثل الأهداف الرئيسية للرعاية التمريضية في ضمان مجرى هوائي جيد ، مراقبة حالة الجهاز التنفسي للمريض ، تقييم المضاعفات ، وتخفيف مخاوف المريض ، وتوفير وسيلة اتصال فعالة.

الجزء الثاني

المقدمة

التشخيص والتدخل التمريضي

تتطلب الرعاية التمريضية للمريض الذي يخضع للتهوية الميكانيكية مهارات تقنية ومهارات شخصية متخصصة. تدخلات التمريض متشابهة بغض النظر عن المكان ؛ ومع ذلك ، فإن تواتر التدخلات واستقرار المريض يختلف من مكان إلى آخر. لا تختلف التدخلات التمريضية للمريض الذي يخضع للتهوية الميكانيكية بشكل فريد عن تلك الخاصة بالمرضى الذين يعانون من اضطرابات رئوية أخرى ، ولكن التقييم التمريضي الذكي والعلاقة العلاجية بين الممرض والمريض أمر بالغ الأهمية.

التشخيص والعناية التمريضية

أ. ضعف تبادل الغازات المرتبط بالمرض الأساسي ، أو تعديلات ضبط جهاز التنفس الصناعي ، أو الفطام.

العناية التمريضية

١. اعطاء المسكنات لتخفيف الألم دون تثبيط الدافع التنفسي ذلك لضمان تقليل مقاومة الجهاز التنفسي للجهاز الميكانيكي.

٢. يراقب الممرض / الممرضه توازن السوائل الكافي من خلال تقييم وجود الوذمة المحيطية ، وحساب المدخول والمخرجات اليومية للسوائل ، ومراقبة وزن الجسم يوميا.

٣. إعطاء الأدوية الموصوفة للسيطرة على المرض الأساسي ومراقبة آثارها الجانبية.

ب. زيادة إنتاج المخاط لوجود الأنبوب في القصبة الهوائية أو التهوية الميكانيكية ذات الضغط الإيجابي المستمر والتي تؤثر على كفاءة مجرى الهواء.

التهوية المستمرة بالضغط الإيجابي تزيد من إنتاج الإفرازات بغض النظر عن الحالة الأساسية للمريض.

١. يقوم الممرض / الممرضه بتقييم وجود الإفرازات عن طريق التسمع الرئة كل ٢ إلى ٤ ساعات على الأقل.

٢. تدابير تطهير مجرى الهواء من الإفرازات تشمل الشفط ، CPT ، تغيير الوضع المتكرر ، وزيادة الحركة. يجب تحديد وتيرة الشفط من خلال تقييم المريض. إذا تم تحديد الإفرازات الزائدة عن طريق الفحص أو تقنيات التسمع ، فيجب إجراء الشفط. لا يتم إنتاج البلغم بشكل مستمر أو كل ساعة إلى ساعتين ولكن كاستجابة للحالةالمرضية. لذلك ، لا يوجد سبب منطقي للشفط الروتيني لجميع المرضى كل ساعة إلى ساعتين. على الرغم من استخدام الشفط للمساعدة في إزالة الإفرازات ، إلا أنه يمكن أن يتلف الغشاء المخاطي في مجرى الهواء ويضعف عمل الأهداب.

٣. الحفاظ على ترطيب مجرى الهواء عن طريق جهاز التنفس الصناعي للمساعدة في تسييل الإفرازات بحيث يسهل إزالتها.

٤. يمكن استخدام موسعات الشعب الهوائية لتوسيع القصيبات في المرضى الذين يعانون من إصابات الرئة الحادة أو مرض الانسداد الرئوي المزمن وتصنف على أنها أدرينالية أو مضادات الكولين.

٥. يجب مراقبة المرضى الذين يتلقون علاج موسع قصبي من أي نوع من الآثار السلبية ، بما في ذلك الدوار ، والغثيان ، وانخفاض تشبع الأكسجين ، ونقص بوتاسيوم الدم ، وزيادة معدل ضربات القلب ، واحتباس البول.

ج- خطر الإصابة بالصدمات والعدوى المرتبطة بالتنبيب الرغامي أو فغر القصبة الهوائية.

١. يتم مراقبة ضغط الكفة كل ٨ ساعات للحفاظ على الضغط عند ٢٠ إلى ٢٥ ملم زئبق.

٢. المرضى الذين لديهم أنبوب رغامي أو أنبوب فغر القصبة الهوائية ليس لديهم الدفاعات الطبيعية للمجرى الهوائي العلوي. بالإضافة إلى ذلك ، غالبًا ما يعاني هؤلاء المرضى من اضطرابات إضافية متعددة في نظام الجسم تؤدي إلى ضعف المناعة. العناية بثقب القصبة الهوائية كل ٨ ساعات على الأقل ، وبشكل أكثر تكرارًا إذا لزم الأمر ، بسبب زيادة خطر الإصابة بالعدوى.

٣. يتم استبدال أنبوب دائرة جهاز التنفس الصناعي وأنابيب الشفط بشكل دوري ، وفقًا لإرشادات الوقاية من العدوى ، لتقليل مخاطر العدوى.

٤. يقوم الممرض بتنظيف الفم بشكل متكرر لأن تجويف الفم هو مصدر رئيسي لتلوث الرئتين عند المريض.

٥. إن وجود أنبوب أنفي معدي في المريض يمكن أن يزيد من خطر الإصابة بالشفط ، مما يؤدي إلى التهاب رئوي في المستشفيات. الحفاظ على وضع المريض بوضع شبه جالس لتفادي المضاعفات.

دـ ضعف الحركة الجسدية المرتبطة بالاعتماد على جهاز التنفس الصناعي.

١. يساعد الممرض / الممرضه المريض الذي أصبحت حالته مستقرة على النهوض من السرير والانتقال إلى الكرسي في أسرع وقت ممكن.

٢. إذا كان المريض غير قادر على النهوض من الفراش ، فإن الممرض يشجع على أداء تمارين نطاق الحركة النشطة كل ٦ إلى ٨ ساعات على الأقل.

٣. إذا لم يتمكن المريض من أداء هذه التمارين ، يتوجب على الممرض / الممرضه الحرص على القيام باداء المريض للتمارين بواسطة مساعدته على تحريك الاطراف واجزاء الجسم والتي يطلق عليها (نطاق الحركة السلبية) كل ٨ ساعات على الأقل لمنع التقلصات والركود الوريدي.

فطام المريض عن جهاز التنفس الصناعي

المقدمة

الفطام التنفسي ، عملية سحب المريض من الاعتماد على جهاز التنفس الصناعي ، تتم على ثلاث مراحل: يتم إخراج المريض تدريجياً من جهاز التنفس الصناعي ، ثم من أنبوب الرغامي أو أنبوب القصبة الهوائية ، وأخيراً من الأكسجين. يبدأ الفطام عندما يكون المريض مستقرًا فسيولوجيًا وديناميكيًا ، ويظهر القدرة على التنفس التلقائي ، ويتعافى من المرحلة الحادة من المشاكل الطبية والجراحية ، وعندما يتم عكس سبب فشل الجهاز التنفسي بشكل كافٍ.

رعاية المريض المفطم من التهوية الميكانيكية

١. تقييم معايير الفطام للمريض:

أ. القدرة الحيوية: ١٠-١٥ مل / كغ

ب. أقصى ضغط استنشاق (MIP) لا يقل عن ٢٠ سم ماء

ج. الحجم المدي: ٧-٩ مل / كغ

د. التهوية الدقيقة: ٦ لتر / دقيقة

ه. مؤشر التنفس السريع : أقل من ١٠٠ نفس / دقيقة / لتر ؛ 60 >PaO2 ملم زئبق مع ٪40< FiO2

٢. مراقبة مستوى النشاط وتقييم كمية الغذاء المدخله ومراقبة نتائج الاختبارات للحالة التغذوية.

٣. تقييم فهم المريض والأسرة لعملية الفطام ومعالجة أي مخاوف بشأن هذه العملية. اشرح أن المريض قد يشعر بضيق في التنفس في البداية وقدم التشجيع حسب الحاجة.

٤. تطبيق طريقة الفطام كما هو موصوف (على سبيل المثال ، ضغط مجرى الهواء الإيجابي المستمر [CPAP] والقطعة على شكل حرف T).

٥. مراقبة المؤشرات الحيوية وقياس التأكسج النبضي ومخطط القلب ونمط التنفس باستمرار لمدة ٢٠-٣٠ دقيقة الأولى وكل ٥ دقائق بعد ذلك حتى انتهاء الفطام.

٦. الحفاظ على مجرى الهواء الفعال. مراقبة مستويات غازات الدم الشرياني واختبارات وظائف الرئة. شفط مجرى الهواء حسب الحاجة.

٧. التوقف عن عملية الفطام في حالة حدوث ردود فعل سلبية. وتشمل هذه زيادة معدل ضربات القلب بمقدار ٢٠ نبضة في الدقيقة ، وزيادة ضغط الدم الانقباضي بمقدار ٢٠ ملم زئبق ، وانخفاض تشبع الأكسجين إلى أقل من ٩٠٪ ، ومعدل التنفس أقل من ٨ أو> ٢٠ نفسًا / دقيقة ، واضطراب النظم البطيني ، والتعب ، والهلع ، والزرقة ، وعدم انتظام أو صعوبة في التنفس ، وحركة الصدر متناقضة.

٨. إذا استمرت عملية الفطام ، قم بقياس الحجم المدي والتهوية كل ٢٠-٣٠ دقيقة.

٩. قم بتقييم الاعتماد النفسي إذا كانت المعلمات الفسيولوجية تشير إلى أن الفطام ممكن وأن المريض لا يزال يقاوم. تشمل الأسباب المحتملة للاعتماد النفسي الخوف من الموت والاكتئاب من الأمراض المزمنة. من المهم معالجة هذه المشكلة قبل محاولة الفطام التالية.

إزالة أنبوب القصبة الهوائية

يؤخذ في الاعتبار إزالة أنبوب فغر القصبة الهوائية عندما يستطيع المريض التنفس بشكل عفوي ؛ الحفاظ على مجرى هوائي مناسب عن طريق السعال الفعال للإفرازات وابتلاعها وتحريك الفك. يتم تقييم مخاطر إزالة الإفراز والشفط لتحديد ما إذا كانت ردود الفعل البلعومية والحنجرة النشطة سليمة.

بمجرد أن يتمكن المريض من إزالة الإفرازات بشكل كافٍ ، يتم إجراء فترة تجريبية للتنفس الفموي أو التنفس بالأنف. يمكن تحقيق ذلك بعدة طرق. تتطلب الطريقة الأولى التغيير إلى أنبوب بحجم أصغر لزيادة مقاومة تدفق الهواء أو سد أنبوب فغر القصبة الهوائية (تفريغ الكفة أولاً). يتم أحيانًا استبدال الأنبوب الأصغر بأنبوب فغر القصبة الهوائية بدون الكفة ، والذي يسمح بسد الأنبوب على فترات مطولة لمراقبة تقدم المريض.

تتضمن الطريقة الثانية التغيير إلى أنبوب نفاث (أنبوب بفتحة أو نافذة في ثنيه). يسمح هذا للهواء بالتدفق حول الأنبوب وعبره إلى مجرى الهواء العلوي ويتيح التحدث.

تتضمن الطريقة الثالثة التبديل إلى زر فغر القصبة الهوائية الأصغر (زر الفغرة).

زر فتح القصبة الهوائية عبارة عن أنبوب بلاستيكي يبلغ طوله حوالي ١ بوصة يساعد في إبقاء القصبة الهوائية مفتوحة بعد إزالة أنبوب فغر القصبة الهوائية الأكبر. عندما يُظهر المريض قدرته على الحفاظ على مجرى الهواء ، يمكن إزالة الأنبوب. يتم وضع ضمادة انسداد على الفغرة ، والتي تلتئم في غضون عدة أيام إلى أسابيع.

الفطام من الأكسجين

يتم بعد ذلك فطام المريض الذي تم فطامه بنجاح من جهاز التنفس الصناعي والكفة والأنبوب ولديه وظيفة تنفسية كافية عن الأكسجين. يتم تقليل FiO_2 تدريجيًا حتى يصبح PaO_2 في حدود ٧٠ إلى ١٠٠ ملم زئبق بينما يتنفس المريض هواء الغرفة. إذا كان PaO_2 أقل من ٧٠ مم زئبق في هواء الغرفة ، يوصى باستخدام الأكسجين الإضافي.

Panel of expert

ت	اسم الخبير	الشهادة	اللقب العلمي	مكان العمل	الاختصاص الدقيق	سنوات الخبرة
١.	راجحة عبد الحسن حمزة	دكتوراه	استاذ	جامعة الكوفة \ كلية التمريض	تمريض صحة البالغين	٣٩
٢.	امين عجيل الياسري	دكتوراه	استاذ	جامعة بابل \ كلية التمريض	تمريض صحة المجتمع	٣٧
٣.	حسين هادي عطية	دكتوراه	استاذ	جامعة بغداد \ كلية التمريض	تمريض صحة البالغين	٣٦
٤.	هدى باقر حسن	دكتوراه	استاذ	جامعة بغداد \ كلية التمريض	تمريض صحة البالغين	٣٥
٥.	صباح عباس احمد	دكتوراه	استاذ	جامعة بغداد \ كلية التمريض	تمريض صحة البالغين	٣٤
٦.	حكيمة شاكر حسن	دكتوراه	استاذ	جامعة بغداد \ كلية التمريض	تمريض صحة البالغين	٣٢
٧.	شذى سعدي محمد	دكتوراه	استاذ	جامعة بابل \ كلية التمريض	تمريض صحة البالغين	٢٢
٨.	خالدة محمد خضر	دكتوراه	استاذ	جامعة بغداد \ كلية التمريض	تمريض صحة البالغين	٢٠
٩.	حسام عباس داوود	دكتوراه	استاذ مساعد	جامعة كربلاء \ كلية التمريض	تمريض صحة البالغين	٢٠
١٠.	ضياء كريم عبد علي	دكتوراه	استاذ مساعد	جامعة العميد \ كلية التمريض	تمريض صحة البالغين	١٥
١١.	صادق عبد الحسين حسن	دكتوراه	استاذ مساعد	جامعة بغداد \ كلية التمريض	تمريض صحة البالغين	١٢
١٢.	حيدر ابراهيم علي	دكتوراه	ممرض جامعي اختصاص	دائرة صحة النجف \ معهد الصحة العالي	تمريض صحة البالغين	١٢

الرعاية الرئوية لمرض فيروس كورونا 19
في وحدة العناية المركزة

طالب الدكتوراه

علي احمد الخفاجي

اشراف

د. سحر ادهم علي

المستخلص

الخلفية الدراسـية: مرض فيروس كورونا ٢٠١٩ هو وباء فيروسـي يصـيب مليون شـخص في ٢٠٠ دولة ، تم اكتشـافه لأول مرة في ووهان ، الصــين. في وحدات العناية المركزة ، يعاني المرضـى ذوو الحالات الحرجة من أحتمالات كبيرة من الأعراض والقيود الوظيفية الفسيولوجية ، وبالتالي يعتمد العلاج على مستوى راحة التمريضيين وقدراتهم ومعرفتهم. الهدف من الدراسة: تهدف الدراسـه الى تقييم فعالية البرنامج التثقيفي المنظم للرعاية الرئوية لمرض فيروس كورونا ١٩ على معرفة وادراك التمريضيين في وحدة العناية المركزه. المنهجية: دراسة كمية (تصـميم شـبه تجريبي) تم اختياره كطريقة مناسبة لتقييم فعالية البرنامج التعليمي المنظم للرعاية الرئوية لمرض فيروس كورونا ١٩ على معرفة وإدراك التمريضيين في وحدة العناية المركزه من الفترة ما بين ١٥ سـبتمبر ٢٠٢٠ إلى ٢٠ مايو ٢٠٢٢ ، في مسـتشـفيات الحلة التعليمية. عينة غير احتمالية (هادفة) قوامها (٦١) ممرض\ه من اصـل (٢١٤) عاملين في وحدة العناية المركزه تم اختيارهم مقسـمين الى مجموعتين، الاولى مجموعة ضـابطة تتكون من (٣٠) ممرض\ه بينما العدد المتبقي (٣١ ممرض\ه مجموعة تدخلية. تم إعداد نموذج اسـتبيان خاص مقسـم على النحو التالي: الجزء الأول: البيانـات الديموغرافيـة ، الجزء الثـاني يتكون من: المعلومـات الوظيفيه ، والجزء الثالث يتالف من معرفة الرعاية الرئوية لمرضـى فيروس كورونا ١٩ ، ويتضـمن أربعة مجالات (العلاج بالأكسجين ،العلاج الطبيعي للصدر ،التنبيب الرغامي ،الفغر الرغامي والرعاية التمريضية). أخيرًا ، الجزء الرابع: يتالف استبيان ادراك التمريضيين من مجالين ، المجال الأول يتحدث عن ادراك التمريضيين لعملهم في وحدة العناية المركزة حول السلامة من مرض فيروس كورونا ١٩ والمجال الثاني يركز على التواصـل والعلاقة بين أعضـاء الفريق. حددت الثباتية من قبل ١٢ خبيرًا ، بينما كانت الموثوقية (0.874) للمعرفة و (0.804) للإدراك حيث تعتبر مقبوله إحصـــائيًا. النتائج: توجد فروق ذات دلالة إحصـائية بين الاختبارين القبلي والاختبار البعدي لأعضـاء المجموعة التداخلية فيما يتعلق بمعارفهم بالرعاية الرئوية لمرض فيروس كورونا ١٩ ، بينما لم تسجل فروق ذات دلالة إحصائية بين أعضاء المجموعة الضابطة. الاستنتاجات: أظهرت النتائج الأثر الإيجابي للبرنامج التثقيفي على معرفة التمريضيين مما يشـكل سـبباً قوياً لقبول الفرضـية البديلة. التوصـيات: توصـي الدراسـه الى تنظيم برامج التعليم التمريضـي المسـتمر والتدريب أثناء الخدمة للتمريضـيين داخل وحدات العناية المركزه وتزويدها بمرافق التدريب والموارد اللازمة لتحسين جودة معرفة التمريضيين وادراكهم ، مما سيحسن الرعاية التمريضية المقدمة للمرضى بشكل إيجابي على نتائج الخدمات الصحية.

فاعلية البرنامج التثقيفي المنظم على معرفة وادراك التمريضيين للرعاية الرئوية لمرض فيروس كورونا ١٩ في وحدات الرعاية الحرجة

اطروحه مقدمة

الى مجلس كلية التمريض ، جامعة بابل

من قبل

علي أحمد زغير الخفاجي

وهي جزء من متطلبات نيل درجة الدكتوراه فلسفة في التمريض

بأشراف
الأستاذ الدكتوره سحر أدهم علي