



EMERGENCY MANAGEMENT OF THE PRE-HOSPITAL PHASE IN COVID 19 PATIENT: LITERATURE REVIEW

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Abstract

The addition of Covid-19 cases took place quite quickly and has spread between countries. The high incidence is important to improve health services, especially the pre-hospital phase services. In this phase, good emergency management will reduce the number of disability to death by up to 50% by starting from activating calls prior to the incident location, health workers who understand first aid and transportation using an ambulance and being observed until they arrive at the hospital. Knowing the Pre-Hospital Phase Emergency Management in Covid-19 Patient: Literature Review. The research method used is a literature review. In this method, online searches for articles, journals and books are carried out using accessible databases, namely Google Scholar, PubMed, and Biomed Central. It is known from 10 Literature Articles, journals and books in the emergency management of Covid-19 in the Pre-Hospital phase must be done as much as possible to minimize the number of deaths and transmission that occurs. Handling of emergency Covid-19 in the Pre-Hospital phase includes: Basic and Advanced Life Support (BLS), Oxygen Therapy, Personal Protective Equipment (PPE), and Patient Transport. It is important for medical personnel to pay attention to many things in providing emergency nursing care to Covid-19 patient. Pre-Hospital emergency measures for patient with Covid-19 can be carried out in various ways to improve the patient condition while at the Pre-Hospital, besides that, it can also prevent transmission to medical personnel and people around Covid-19 patient.

Keywords: *covid-19, emergency management, pre-hospital*

1. Introduction

Coronavirus Disease 2019 (Covid-19) is a new type of disease that has never been previously identified in humans. The virus that causes Covid-19 is called Sars-CoV-2. Acute respiratory syndrome coronavirus-2 is a newly discovered corona-virus, which was first discovered in Wuhan, China in December 2019. Since then Covid-19 has become hot news in several media, especially in China, Indonesia and the world Riskesdas (2020). This disease was officially named coronavirus disease 2019 (Covid-19) on February 11, 2020. On January 30, 2020, WHO has designated it as a Public Health Emergency

that Concerns the World (WHO, 2020).

As of June 4, 2020, globally reported data in the world according to WHO (2020) total confirmed cases of Covid-19 were 6,397,294 cases with 383,872 deaths (CFR 6%) in 214 Affected Countries. Indonesia until 4 June 2020, there were 28,818 positive confirmed cases of Covid-19 in 34 provinces with 8,892 cases recovered (Recovery Rate 30.8%) and 1,721 deaths (CFR 6%) (Ministry of Health, 2020).

The source of transmission of Covid-19 is still unknown. Based on scientific evidence, Covid-19 can be transmitted from human to human through coughing/ sneezing droplets and not through the air. Clinical Symptoms Covid-19 infection can cause mild, moderate or severe symptoms. The main clinical symptoms that appear are fever (temperature > 38° C), cough

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and difficulty breathing. In addition, it can be accompanied by severe shortness of breath, fatigue, myalgia, gastrointestinal symptoms such as diarrhea and other respiratory symptoms with an incubation period of up to 14 days. The clinical syndromes that can appear if infected with Covid-19 include: mild pneumonia, severe pneumonia, acute respiratory distress syndrome (ARDS), sepsis and septic shock (WHO, 2020).

The high incidence and mortality of Covid-19 patient is important to improve health services, especially in Pre-Hospital services (Jane Yee *et al*, 2020). Good pre-hospital care will reduce the number of disability to death by 50%. Pre-Hospital can be carried out by a team in work units in collaboration with medical teams

such as Puskesmas, clinics and other health places (Suryanto, 2017).

2. Method

The research method used in this research is literature review. The process of collecting journals is filtered from reliable literature sources based on criteria determined by the author and online searches for articles, journals and books are carried out using accessible databases, namely Google Scholar, PubMed and Biomed Central. The strategy of collecting journals for various literatures is using accredited journal sites using the keywords "Pre-Hospital Management" + "Covid-19". The strategic strategy is described systematically through the PRISMA method as below:

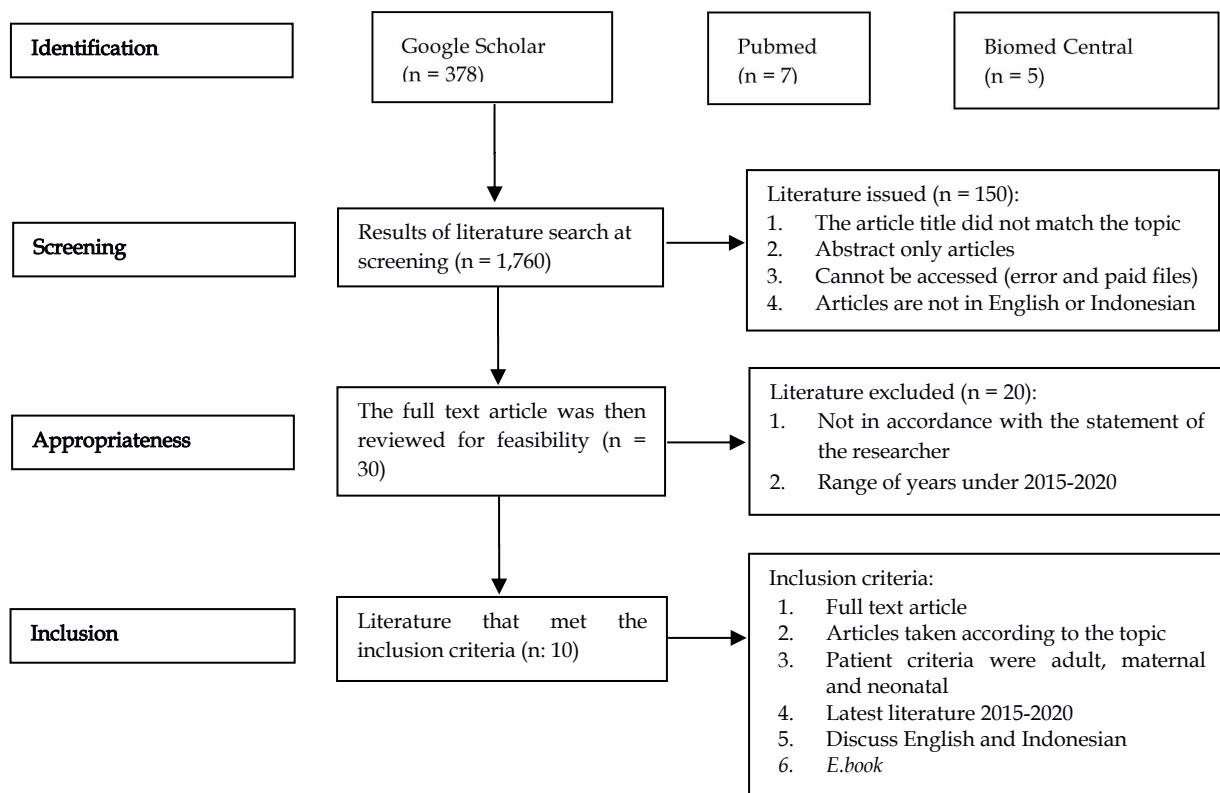


Figure 1. Stages of Literature Review

3. Result and Discussion

This research starts from the process of collecting literature based on keywords that are in accordance with the topic to be studied. The process of collecting literature is done by sorting the number of journals or articles until they are

filtered and getting 4 journals, 3 guidance and 3 books. The search process is carried out through electronic based, such as Google Scholar, PubMed and Biomed Central as for the results of journals or articles that are obtained as follows:

Table 1. Results of the Review Literature Review

Author (year)	Article Source	Title	Research methods	Findings
American Heart Association (2020)	Heart AHA Journals	Interim Guidance for Basic and Advanced Life Support in Adults, Children, and Neonates With Suspected or Confirmed Covid-19	Qualitative research methods by doing a series of specific actions, namely those that have gone through a real theoretical study in order to immediately get the best solution to the problem in the research.	There are several important things that must be considered when trying to provide BLS assistance to patients who suffer from or are suspected of Covid-19, namely: 1. Reducing exposure to Covid-19 by using PPE. 2. Prioritize oxygenation and ventilation strategies with lower risks of aerosolization.
Tabashi, S. et al (2020)	Journal of Cellular & Molecular Anesthesia (JCMA)	Supplemental Oxygen therapy and Non-Invasive Ventilation in Corona Virus Disease 2019 (Covid-19)	Methods A qualitative study with maintaining oxygenation and rational use of devices in patients requiring a higher FiO2 and discussing the controversy regarding non-invasive ventilation (NIV).	Early oxygen support is recommended for every patient with Covid-19, to achieve maximum benefit, the basic principles of oxygen support must be applied. HFNO has been shown to be effective in maintaining oxygenation while it may not have a major impact on clinical outcomes. HFNO should be used with caution because of its ability to spread viruses.
TM Cook (2020)	Association of Anaesthetists	Personal protective equipment during the coronavirus disease (COVID) 2019 pandemic	This applied research is more practical and applicable because research like this originates from a real problem and not a theoretical one.	It also states that the average leakage in 8 out of 10 users should not exceed: 22% for FFP1; 8% for FFP2; and 2% for the FFP3 mask. Finally, the penetration of test aerosols, neither saline nor paraffin oil, should not exceed: 20% for FFP1; 6% for FFP2; and 1% for the FFP3 mask. These tests should be performed on the mask as presented and during simulated use. Perhaps the latter provides the best filtration size, meaning that the overall filter efficiency of the FFP1, FFP2 and FFP3 masks is 80%, 94% and 99%.
WHO (2020b)	World Health Organization	Oxygen sources and distribution for Covid-19 treatment centers	Provides guidance for oxygen sources and distribution strategies for the treatment of Covid-19.	Oxygen therapy is very important in managing Covid-19. Oxygen therapy is recommended for all severe and critical Covid-19 patients to prevent the severity of alveoli damage and hypoxic events. Administration at low doses ranging from 1-2 L / min in children and starting at 5 L / min in adults with nasal cannula, moderate flow rate for use with a venturi mask (6 -10 L / min); or a higher flow rate (10-15 L / min) using a mask with a reservoir bag. In addition, oxygen can be delivered at higher flow rates and in higher concentrations with a target SpO2 value of > 94%.
WHO (2020c)	World Health Organization	Rational use of personal protective equipment (PPE) for coronavirus disease (Covid-19)	Provides recommended guidance for the rational use of personal protective equipment (PPE) in health care and community settings, too.	PPE should be disposed of in a suitable waste container after use, and hand hygiene should be exercised before wearing and after removing PPE. maintains a spatial distance of at least 1 m. All members of the rapid response team should be trained in hand hygiene and how to put on and take off PPE to avoid personal contamination.

The discussion of the results of the literature review is carried out by comparing the supporting theories in each journal that has been screened. The results of the discussion on "Pre-Hospital Phase Emergency Management for Covid-19 Patient" are:

Basic and Advanced Life Support

In the Journal of the American Heart Association (AHA) (2020), there are several important things that must be considered when trying to help, namely:

1. Reducing exposure to Covid-19
 - a. Before entering the premises, all rescuers must wear PPE to prevent contact with airborne particles and droplets.
 - b. Limit personnel in the room or at the scene
 - c. Use mechanical CPR devices if available.
 - d. Communicate the status of Covid-19 clearly
2. Prioritize oxygenation and ventilation strategies with a lower risk of aerosolization by securely attaching a high efficiency particulate air (HEPA) filter to a manual or mechanical ventilation device.
3. Consider the suitability of starting and continuing resuscitation.
4. Lay Helper
 - a. For adults: Lay rescuers should perform at least hand CPR only after cardiac arrest.
 - b. For children: Lay rescuers should perform chest compression and consider mouth-to-mouth ventilation given the higher incidence of respiratory attacks in children.

If you are willing and able to provide rescue breaths, using a face mask or cloth that covers the mouth and nose of the rescuer and / or victim can reduce the risk of transmission.
5. Telecommunications must screen all calls for symptoms of Covid-19 (for example, fever, cough, shortness of breath) or known Covid-19 infection in victims or recent contacts, including household members.
 - a. For lay helpers, telecommunications should provide rescuers with guidance on the risks of exposure to Covid-19 and instructions for compression-specific CPR, as above.
 - b. For EMS Officers, telecommunication operators must notify the EMS team dispatched regarding the condition or signs and symptoms of the victim.
6. Transport
 - a. Family members and other patient contacts who are suspected or confirmed by Covid-19 may not join the transport vehicle.

- b. If spontaneous circulation (ROSC) has not been achieved, consider not moving to a hospital given the risk of additional exposure to hospital service providers.
7. Neonatal Resuscitation
 - a. Early steps of routine neonatal care and early steps of aerosol-generating neonatal resuscitation.
 - b. Postpartum airway suction should not be performed routinely for clear or meconium-stained amniotic fluid as it can generate aerosols.
 - c. Administration of endotracheal drugs, such as surfactants or epinephrine through an umbilical vein catheter is a more effective route of administration during neonatal resuscitation.
 - d. Closed (appropriately spaced) transfer and incubator care should be used for neonatal intensive care patient whenever possible but does not protect against viral aerosolization.
 8. Maternal Resuscitation
 - a. Cardiopulmonary physiological changes of pregnancy may increase the risk of acute decompensation in critically ill pregnant patient with Covid-19 .
 - b. Preparation for perimortem delivery, occurring after 4 minutes of resuscitation, should be initiated early on in the resuscitation algorithm to allow the formation of obstetric and neonatal teams with PPE even if ROSC is achieved and perimortem delivery is not required.

Oxygen Therapy

Supplemental oxygen therapy is essential in managing Covid-19. Oxygen therapy is recommended for all severe and critical Covid-19 patient to prevent the severity of alveoli damage and hypoxic events. Immediate oxygen therapy for patient with respiratory distress, hypoxemia or shock. The first oxygen therapy is about 5 lpm with a target SpO₂ of $\geq 90\%$ in nonpregnant patient and $\geq 92-95\%$ in pregnant patient (Elsevier, 2020). No breathing or obstruction, severe respiratory distress, central cyanosis, shock, coma and seizures are signs of distress in children. These conditions should be given oxygen therapy during resuscitation with a target SpO₂ $\geq 94\%$ (WHO, 2020).

All areas where SARI patient are managed must be equipped with oximetry, a functioning oxygen system, disposable, oxygen delivery devices such as a nasal cannula, a simple face mask, and a mask with a reservoir. Pay attention

to prevention of infection or transmission of droplets or equipment when administering or administering oxygen delivery kits to patient (WHO, 2020).

There are 2 types of oxygen therapy that can be used, namely low flow oxygen therapy and high flow oxygen therapy (Tabashi, 2020):

1. Low flow oxygen therapy
 - a. Nasal cannula: Oxygen that can be given 1-6 lpm (FiO₂ increases about 4% per liter flow from 24% to 44%).
 - b. Simple Mask (Hudson): A minimum flow rate of 5-10 lpm is required. The FiO₂ given is 35% to 60% which also depends on the flow rate and the minute of ventilation.
 - c. Reservoir bag (non-rebreather mask): This tool allows providing a higher oxygen concentration of about 85-90% with flow rates of up to 15 lpm.
2. High flow oxygen therapy
 - a. Facial mask with Venturi valve: A tool capable of providing low concentrations of O₂ (24-30%). But higher flow rates can provide 24% - 60% FiO₂.
 - b. High Flow Nasal Cannula: This system can provide flow rates between 1 - 60 lpm. FiO₂ can range from 24% when using low flow to more than 70% with high flow rates.

Patient with respiratory distress who failed standard oxygen therapy including severe hypoxemic respiratory failure. The patient still shows heavy breathing efforts even though he has been given oxygen with a mask with a reservoir (flow rate 10-15 liters / minute) (Aacharya, 2011). Hypoxemic respiratory failure in ARDS usually fails intrapulmonary ventilation-perfusion and usually requires mechanical ventilation (WHO, 2020b).

Personal Protective Equipment (PPE)

Droplet prevention by using PPE when treating patient or being within two meters using google glasses is added based on risk assessment. The patient should also wear a fluid-resistant surgical mask. Normal clothes are equipped with plastic gowns and gloves to prevent transmission of the SARS-CoV-2 virus (Cook, 2020).

The recommendations regarding the standard for using PPE based on location and action procedures include the following (PERDATIN, 2020):

1. PPE Grade 1
Location / Coverage:
 - a. Pre-examination triage, polyclinic

- b. Activities that do not generate aerosols
PPE usage standards:
 - 1) 3 ply surgical mask
 - 2) Work outfit
 - 3) Disposable rubber gloves
2. PPE Level 2
Location / Coverage:
 - a. Post-triage patient room / ER
 - b. Activities that do not generate aerosols
 - c. PPE usage standards:
 - 1) Eye protection
 - 2) Headgear
 - 3) 3 ply surgical mask
 - 4) Gown
 - 5) Disposable handsocon
3. PPE Grade 3
Location / Coverage:
 - a. The procedure room and surgery for patient with suspected or confirmed Covid-19
 - b. Activities that generate aerosols
PPE usage standards:
 - 1) Eye protection and face shield
 - 2) Head cover / head cap
 - 3) All-cover gown and apron
 - 4) N95 mask or equivalent
 - 5) Disposable sterile rubber surgical gloves
 - 6) Boots

The use of masks in the standard states that the particle filtration should not exceed 92%. Of the various types of masks, the overall filter efficiency of the FFP1, FFP2 and FFP3 masks is 80%, 94% and 99% (Cook, 2020).

Patient Transportation

The following is the transportation preparation protocol for referral hospitals (Prehospital) (PERDATIN, 2020; PAHO, 2020):

1. Contact the referral hospital to provide information on the patient under supervision who will be referred.
2. The transport ambulance has an isolation stretcher.
3. Ambulance separated from the driver and sufferer with a plastic barrier.
4. Officers who will make referrals must regularly apply hand hygiene and wear masks and medical gloves when bringing patient to the ambulance
 - a. When referring patient under Covid-19 surveillance, officers apply contact, droplet and airborne precautions.
 - b. PPE should be replaced each time you treat a different patient and properly disposed of

in an outbreak with a cover in accordance with national regulations on infectious waste.

5. Ambulance drivers must be separated from cases (keep a minimum distance of one meter). PPE is not required if distance can be maintained. If the driver also has to help transfer the patient to the ambulance, then the driver must wear the appropriate PPE.
6. Referral drivers and carers should frequently clean their hands with alcohol and soap.
7. Ambulances or transport vehicles should be cleaned and disinfected with special attention to areas that come into contact with patient under surveillance. Cleaning using a disinfectant containing 0.5% sodium hypochlorite (which is equivalent to 5000 ppm) with a ratio of 1 part disinfectant to 9 parts water.

After carrying out transportation, disinfect the transport equipment by:

1. Special means of transportation should be used specifically for transporting infected cloth.
2. Equipment should be disinfected immediately after each use for transport.
3. Transport equipment should be cleaned with a disinfectant containing chlorine (with 1000 mg / L active chlorine). Let the disinfectant sit for 30 minutes before cleaning the cleaner with clean water.

4. Conclusion and Suggestion

Based on the results, pre-hospital emergency measures for Covid-19 patient can be carried out in various ways, including handling basic and advanced life support, providing oxygen therapy, patient transportation and the use of personal protective equipment (PPE). Suggestions from this research for medical personnel, it will be an input to increase knowledge and become a source of reference in Pre-Hospital emergency actions for patient and can reduce transmission of the Covid-19 virus. This is expected to be a reference to prevent and reduce the curve of the transmission rate of the Covid-19 virus for Patient and Communities. Further research, Hopefully more in researching the problem of hospital emergency handling with Covid-19.

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