



Risk Factors in the Implementation of Air Medical Evacuation by the Naval Aviation Center in the Covid-19 Pandemic

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Abstract

The current ongoing pandemic is the Covid-19 pandemic. The national disaster of the Covid-19 pandemic that occurred in Indonesia must be handled by both civilians and the military. One of the parties that plays an active role in handling this pandemic comes from a military organization, namely the Naval Aviation Center (Puspenerbal). During the Covid-19 pandemic, Puspenerbal took part in carrying out various military operations other than war, including air medical evacuation support. During the Covid-19 pandemic, air medical evacuation faces a number of risks. Based on the background of the problems described above, research needs to be carried out as learning material to increase knowledge about risk factors that can arise in air medical evacuation during a pandemic. The method used is qualitative with a descriptive exploratory approach: data collection by observation, in-depth interviews, and documentation; data analysis techniques by data collection, data reduction, and data presentation. The conclusion from this study is that the risk factor for the air medical evacuation stage that has the greatest risk for Puspenerbal is the second stage or in-flight stage. The Puspenerbal needs to plan and coordinate to minimize risk factors in air medical evacuation implementation.

Keywords: *Risk factors; Air Medical Evacuation; Naval Aviation Center; Covid-19 Pandemic*

Introduction

According to the World Health Organization (2020), a pandemic is the international spread of disease that affects large numbers of people around the world simultaneously or continuously and unexpectedly, making it difficult to control. The current ongoing pandemic is the Covid-19 pandemic. This pandemic has been going on for more than two years in Indonesia since the first case was found in Depok, West Java, in March 2020, and has changed all aspects of people's lives. These changes are not only related to healthy living behaviors such as the habit of wearing masks or washing hands but also to various aspects of daily life, both at work and in how to socialize and even worship. Severe Acute Respiratory Syndrome

Corona Virus-2 (SARS-CoV-2) as the cause of Covid-19 first appeared in Wuhan, a city in China, in early December 2019.

On March 11, 2020, the World Health Organization (WHO) declared Covid-19 a global pandemic. Meanwhile, the establishment of the coronavirus pandemic as a national disaster was carried out by President Joko Widodo through the issuance of Presidential Decree Number 12 of 2020, taking into account that non-natural disasters caused by the spread of Coronavirus Disease 2019 (Covid-19) had an impact on increasing the number of victims and loss of property, expanding the area affected by the disaster, as well as having an impact on broad socio-economic aspects in Indonesia. The national disaster of the Covid-19 pandemic that occurred in Indonesia must be handled by both civilians and the military. One of the parties that plays an active role in handling this pandemic comes from a military organization, namely the Indonesian National Armed Force (TNI), which, based on Law No. 3 of 2004 concerning national defense, Article 10 states that one of the TNI's duties is to implement national defense policies to carry out military operations other than war.

The Indonesian Navy is one of the main components of national defense. One of the tasks of the Indonesian Navy is to carry out its duties in the field of defense (Law No. 3 of 2004). The Naval Headquarters has several Central Executive Agencies (Balakpus), one of which is the Naval Aviation Center (Puspenerbal). Puspenerbal is a training center for Indonesian Navy Aviation units in the field of personnel and readiness of air elements who carry out aviation functions including tactical air reconnaissance, anti-ship operations on the surface of the water, anti-submarine operations, cross-helicopter landing troops, fast logistics support, and sea observation, as well as carrying out the function of developing Naval Aviation materials. During the Covid-19 pandemic, Puspenerbal took part in carrying out various military operations other than war, including air medical evacuation support. Air medical evacuation is all efforts and activities in the context of transferring victims or patients of military operations of war, military operations other than war, and training from a health facility in a war/disaster/training area to a health facility more complete by using airplanes and accompanied by health workers so that victims or patients can get maximum health assistance in the shortest possible time (Bujuknis TNI AU, 2008). Transportation facilities for health services are an important need for people who need immediate medical treatment. An air ambulance is a type of ambulance used as a means of inter-island medical transportation in accordance with the geographical conditions of Indonesia. Air ambulances are effectively operated when patients have to travel a distance of more than 241.4 km and require medical therapy (Artha Budi Susila Duarsa, 2022, p. 106).

In the implementation of air medical evacuation, there are stages that must be carried out, namely preparation before flight (preflight), activities during flight (inflight), and termination of air medical evacuation (postflight), where in practice there are several general problems that must be faced. Problems that must be faced include limited range of motion, hypobaric pressure, which can cause dysbarism, noise, vibration, G-force, acceleration or deceleration, and humidity. Other problems can also arise from the patient himself, namely fear of flying, airsickness, travel route and timing, and influence on medical equipment such as monitors or infusions (Artha Budi Susila Duarsa, 2022, p. 110).

During the Covid-19 pandemic, air medical evacuation must contend with a number of risk factors. Flights operated by airlines can be classified into three levels based on the development of the epidemic at the point of origin of flights (international and domestic) and aircraft equipped with High-Efficiency Particular Air (HEPA) filters, as well as other indicators such as load factor, flight length, and the special nature of flight missions. According to the different levels of flight risk, the passenger's body temperature must be measured at different phases of the flight. In flight with low risk, a non-contact (calibrated) infrared thermometer must be used to measure the passenger's body temperature, and symptoms must be observed as needed. If a sick passenger is discovered with symptoms such as fever (37.30C), fatigue, and a dry cough, an immediate report and response must be made, and cooperation in handing over passengers is required. In moderate and high-risk flights, non-contact (calibrated) infrared thermometer equipment must be used to

measure the passenger's body temperature, and symptoms must be observed before boarding. Reports and responses must be made immediately if passengers are found to be sick with symptoms such as fever (37.3 °C), fatigue, and a dry cough. There needs to be good cooperation and coordination in the delivery of passengers. For flights longer than 4 hours, body temperature measurements must be taken during flight operations. If a sick passenger is discovered with symptoms such as fever (37.3 °C), fatigue, and cough, the passenger must be treated in accordance with the guidelines for handling emergency incidents in flight; additionally, the flight crew must immediately communicate with the destination airport and cooperate and coordinate well when handing over passengers after landing (Artha Budi Susila Duarsa, 2022).

Based on the background of the problems described above, research with the title "Risk factors in the Implementation of Air Medical Evacuation by the Naval Aviation Center in the Covid-19 Pandemic" needs to be carried out as learning material to increase knowledge about risk factors that can arise in air medical evacuation during a pandemic.

Theoretical Review

Air Medical Evacuation

All efforts and activities in the framework of transferring OMP, OMSP, and training victims/patients from a health facility in a war/disaster/training area to a health facility that is more equipped with the use of airplanes and be accompanied by health workers so that victims or patients can get maximum health assistance in the shortest possible time (Bujuknis TNI AU, 2008). The standard operating procedure of the EMU is to transfer patients from certain health facilities to health facilities of a higher quality using air transportation and accompanied by medical personnel (Artha Budi Susila Duarsa, 2022). Air medical evacuation is carried out using transport planes and or helicopters with health facilities involving health workers so that victims can be immediately helped by receiving fast, appropriate, correct, and safe treatment and care. The implementation of patient evacuation by air is an integrated activity between the technical operation of aircraft and air medical activities, so the implementation must be planned and careful while applying the technical implementation of operations quickly. The purpose of carrying out this air medical evacuation is to provide medical support quickly and safely to victims who are injured or suffer serious illness from the front line to bases that have better health facilities so that they immediately receive the best possible medical care and that it is useful for reducing disabilities. or a more serious illness in order to save his life.

For the implementation of air medical evacuation during the Covid-19 pandemic, special equipment is needed, namely: 1) Individual personal protective equipment (protective clothing/Hazmat, a head cover, N95 masks, surgical masks, face shields, goggles, gloves, boots, shoe linings, disinfectant fluids), and 2) Medical equipment (Isolation Capsule Chamber, gurney, wheelchair, hemodynamic monitor, oxygen tube and non-rebreathing mask, portable ventilator, intubation set, suction set). Artha Budi Susila Duarsa (2022) explains that in carrying out air medical evacuations, it is influenced by the aviation environment, namely as follows: 1) General environmental problems in aircraft (Limited range of motion, hypobaric pressure, dysbarism, noise or noise greater than 90 decibels, vibration, G force, acceleration-deceleration, air humidity); 2) Airplane type (Aircraft with pressurized and unpressurized cabins, fixed-wing or rotary-wing aircraft, military or civil aircraft); 3) Problems with the patient's condition (The fear of flying, airsickness, route and travel time); 4) Impact on medical equipment such as monitors, infusions, and other devices.

Covid-19 Pandemic

The Covid-19 pandemic has had a major impact on people's lives in various fields, one example being the health sector. The effect of the Covid-19 pandemic in the health sector is that the level of health

has decreased because many are exposed to Covid-19 and many people are stressed because they are worried and afraid of contracting it, which makes the immune system decrease. Besides that, it also has a very big influence on health services. In several areas of Indonesia, there are still inadequate health facilities for handling Covid-19 patients and patients with other diseases. Because of the high number of positive Covid-19 cases, the government's resources, both central and regional, have been focused on dealing with Covid-19 as a result, other than Covid-19, health services are hampered (Moynihan et al., 2021; Pangoempia et al., 2021). Often, patients need more adequate and immediate health services, so medical transportation is needed that can help carry out medical evacuations quickly and safely. Evacuating patients by air is one of the most appropriate and fast options so that patients can immediately obtain more adequate health services.

Methods

This study uses a qualitative approach, where researchers use descriptive methods to obtain data. The descriptive method is a research method that proposes conducting research solely on existing facts or phenomena that empirically live on in the speakers, so that what is produced or recorded is in the form of exposure as it is. The preparation of this manuscript uses library research methods, namely collecting all reading materials related to the problems discussed and then understanding them carefully according to research findings. The data in this study were obtained through several data collection techniques. Primary data in this study was obtained through observation and interviews, while secondary data was obtained from books, journals, and reports. The analytical method used is descriptive-qualitative.

Results and Discussion

The Naval Aviation Center (Puspenerbal) is the Indonesian Navy's Central Executive Agency, reporting to the Chief of Staff and tasked with fostering and carrying out the Indonesian Navy's aviation functions in order to support the Indonesian Navy's tasks. In its implementation, it has the task of fostering the Indonesian Navy's aviation forces, which include tactical air reconnaissance, anti-submarine, anti-ship on water, cross-helicopter landing, fast logistical support, limited sea observation, carrying out aircraft support functions, material development, and aviation personnel. The Navy operates as a sub-Integrated Fleet Weapon System (SSAT) in the framework of enforcing sovereignty and law at sea (Kasal Regulation, 2009). The Director of Puspenerbal Personnel, as one of the supporting elements of the leadership, oversees the Sub Directorate of Health, which is the technical executor in carrying out or organizing health development for Navy Aviation personnel, with one of its duties being to plan and carry out air medical evacuation. During the Covid-19 pandemic from 2020 to 2022, there was an increase in requests for air medical evacuation. Puspenerbal has carried out 22 air medical evacuations for patients confirmed positive for Covid-19, non-Covid-19 patients, bodies of positive Covid-19 patients, and bodies of non-Covid-19 patients.

The Covid-19 pandemic has had a major impact on people's lives in various fields, including the health sector. Patients often need more adequate and immediate health services, so medical transportation is needed that can help carry out evacuation quickly and safely. Evacuating patients by air is one of the most appropriate and fast options so that patients can immediately obtain more adequate health services. There are risk factors that must be faced by the Puspenerbal in carrying out air medical evacuation before the pandemic period because there is still a lack of complete training hours, the number of personnel with flight health qualifications is limited, and the number and type of supporting equipment is still limited. The risk factors that must be faced by all personnel supporting air medical evacuation activities during this pandemic based on the results of data collection are shown in the table below.

Table 1. Risk factors faced by Puspenerbal in air medical evacuation during the Covid-19 pandemic

No	Risk factors	
1	Pre Flight	Type and condition of aircraft ready to carry out operations
		The preparation of a bulkhead on an airplane causes space for the aircraft to be limited.
		The readiness of the flight crew and health workers who will be on duty
		Readiness of medical equipment to be carried on or onboard the plane
		The condition of the patient to be evacuated
2	In flight	Sudden weather change
		There is no negative pressure system or HEPA filter.
		Because an emergency flight is possible, the crew must be able to handle an emergency situation without causing panic among the passengers or patients on board.
		The patient's condition worsened at the time of evacuation.
		Large oxygen cylinders, large patient beds, and emergency equipment are not yet available.
		The use of level 3 PPE causes the movement of personnel, both health workers and aircraft crew, to be more limited.
3	Post flight	Long flight durations and distances can affect the condition of patients and flight crew.
		Risk of contracting disease from evacuated patients due to prolonged contact with patients

Source: Data Processed by Researchers (2022)

The risk factors in the air medical evacuation stage show that the aviation environment influences the implementation of air medical evacuation (Artha Budi Susila Duarsa, 2022). Bujuknis TNI AU (2008) also states that the ability of air medical evacuation is influenced by the selection and preparation of the type of aircraft to be used (light, medium, or heavy transport aircraft or helicopters), the patient's condition (lying or sitting), and the limitations of flight operations (aircraft carrying capacity, runway conditions, flight routes, and weather). Based on the results of interviews and other supporting data, the researchers analyzed that, in order to minimize the risk factors that could arise at each stage as a result of the conditions that occurred during the implementation of air medical evacuation during the Covid-19 pandemic, good coordination must be established between all personnel involved. All personnel involved in the implementation of air medical evacuation must know their respective duties and responsibilities that have been specified in the standart operating procedure for the operation of Indonesian Navy aircraft in handling outbreaks of infectious diseases.

Based on the data that has been obtained and analyzed by the researchers, the result is that the air medical evacuation stage that has the greatest risk for Puspenerbal is the second stage, or the in-flight stage. Artha Budi Susila Duarsa (2022) states that in the second stage of air medical evacuation, onboard health workers must carry out various activities, including routine or intensive observation of patient conditions, handling and management needed during flight, checking air circulation in the plane, checking and placing medical supplies or medicines on the plane, evaluating scenarios for entering and leaving the plane, and evaluating scenarios if the patient suddenly gets worse on the flight. The risk factors that arise in this second stage are also a result of the conditions that must be faced in the previous stage, namely the type and condition of the aircraft that are ready to carry out operations; the insulation in the aircraft, which limits space for movement in the aircraft; the readiness of the flight crew and medical personnel who will be on duty; and the condition of the patient who will be evacuated.

To minimize the impact of risk factors in the implementation of air medical evacuation, which can cause obstacles in its implementation, the pueblo needs to seriously plan before carrying out air medical evacuation and improve the ability to coordinate between the personnel involved in it and all personnel involved in the implementation of the evacuation. Air medics must know their respective duties and

responsibilities that have been specified in the standart operating procedure for the operation of Indonesian Navy aircraft in handling outbreaks of infectious diseases. This is in accordance with research conducted by Bibek Rajbhandari (2020) entitled "Air Medical Evacuation of Nepalese Citizens During Epidemic of Covid-19 from Wuhan to Nepal," which discusses the Nepalese government's plan to evacuate its citizens studying in Wuhan after the emergence of the Covid-19 virus there and the planned closure of the city of Wuhan. This study aims to share experiences, challenges faced, and recommendations for the future with similar cases where, during an evacuation, a plan had previously been prepared that consisted of several stages, namely the planning stage, the task distribution stage (evacuation, isolation, screening, and quarantine), and the waste management team and logistics team.

The successful and safe implementation of air medical evacuation is highly dependent on pre-flight preparations. In the preparation stage, there are several things that must be carried out, including preparing the patient and the medical team, completing the medical information sheet, preparing the necessary medical equipment, preparing the aircraft, aircrew, and ground handling, preparing the accompanying health workers who understand safety and emergency procedures, preparing complete medical equipment to support the flight, and providing a preflight briefing. Whereas in the second stage, namely during the flight or in-flight, several activities were carried out, namely routine observation of patient conditions, handling and management required during flight, checking air circulation in the aircraft (top to bottom circulation, HEPA filter), and checking and placing of infrastructure facilities. Medical and pharmaceutical supplies are on board. and at the stage of terminating the air/postflight medical evacuation, the activities that must be carried out include transferring patients from the plane and referral to the destination medical facility; dropping off the patient and the mode of transportation required to transport the patient from the destination airport to the destination hospital; updating the patient's main disease; transferring and handling patients to recipients; and postflight de-briefing. With the density of activities that must be carried out at each stage of air medical evacuation, the risk factors that arise at each stage can cause obstacles to the implementation of evacuation. The risk factor is an uncertain condition, but if it arises, it will result in a hazard in the implementation of air medical evacuation. Risk factors can be mild, moderate, or severe.

Based on the findings of data analysis and interpretation, the risk factors that can cause obstacles for Puspenerbal in carrying out air medical evacuation, particularly during the Covid-19 pandemic and non-pandemic, have revealed that the aviation environment influences the implementation of air medical evacuation, where the ability of air medical evacuation is influenced by Puspenerbal must take steps to minimize risk factors that can arise at each stage as a result of conditions that occurred during the implementation of air medical evacuation during the Covid-19 pandemic, as follows make careful planning before carrying out an air medical evacuation, improving the pattern of good coordination among all personnel involved, improving supporting infrastructure for air medical evacuation, ensure that every person involved in the evacuation knows their respective duties and responsibilities, and monitoring the health condition of personnel involved in air medical evacuation before, during, and after being on duty.

Conclusions

The Covid-19 pandemic has significantly affected people's lives in many areas, including the medical field. Medical transportation is required to facilitate evacuations quickly and safely since patients frequently require more rapid and adequate health care. One of the best and quickest choices for evacuating patients so they may quickly access better medical care is via air. There are risks that the Puspenerbal must deal with when performing air medical evacuation before the pandemic era since there are still not enough training hours to be completed, not enough people who are qualified to fly, and not enough of the right kinds of supporting equipment. The risk factor for the air medical evacuation stage that has the greatest risk for Puspenerbal is the second stage or in-flight stage, namely the sudden change in weather, the fact that the

aircraft used does not have a negative pressure system or a hepa filter, the possibility of an emergency flight, the fact that the patient's condition worsened during the evacuation, the fact that supporting equipment was incomplete, and the fact that the movement of personnel, both health workers and aircraft crew, was limited. The Puspenerbal needs to plan and coordinate to minimize risk factors in air medical evacuation implementation.

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