

**Original article**

**Nurse's Experiences in Handling Stretcher Patients on Commercial Medical Escort in Indonesia: A Qualitative Study**

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**Abstract**

**Objective:** The health system in Indonesia has a rapid development. Domestic and abroad medical escort services are currently becoming a trend. One of the medical escort services is a stretcher. This research was aimed to understand the experience of nurses in assisting patient in stretcher using commercial flights in Indonesia. **Methods:** Qualitative research is used in this research. Personal interviews are conducted for 3 months from August to October 2019 on fifteen nurses who have authority to conduct stretcher patient assistance. All nurses were spread over 5 islands in Indonesia including Java, Sumatra, Kalimantan, Nusa Tenggara Barat and Bali. Interview transcripts were analyzed using qualitative content analysis. **Results:** Three themes with nine categories were emerged. Patient preparation and equipment, handling of patients on the plane, and hand over preparation are the obtained main themes from this study. **Conclusion:** The handling of patient in stretcher on commercial aviation had several difficulties. Patient who are lying on 9-seats set airplane with nurses sitting across from patient made nurses must carefully prepare everything before take-off. Careful preparations will determine the safety of the patient on stretcher. In addition, nurses understand about the weather and mountainous changes that must be passed.

**Keywords:** Air Medical Service; Experience; Interview; Medical Escort; Nurses; Stretcher

Bangladesh Journal of Medical Science Vol. 21 No. 03 July'22 Page : 502-511  
DOI: <https://doi.org/10.3329/bjms.v21i3.59562>

**Introduction**

Modes of transportation to evacuate patients can use regular aircraft (commercial flights), helicopters, or air ambulance services<sup>1</sup>. Commercial Medical Escort Services there is an option that the patient can sit in a chair or lie down<sup>2</sup>. The patient's condition is stable and they are not under ICU observation, commercial stretchers are the best choice for transporting patients<sup>3</sup>. The patient is placed on a stretcher in three chairs in economy class<sup>4</sup>. In this way the patient can remain lying down, even when taking off and landing<sup>5</sup>. Medical escort crews such as nurses carry equipment that allows them to provide appropriate

medical care for non-emergency patients<sup>6</sup>.

Everyone who is sick wants the best hospital services<sup>7</sup>. People choose to fly only for treatment to various regions and countries are now a trend<sup>8</sup>. Commercial medical escort companies facilitate this. One of the services offered by medical escort companies is a stretcher. Patients as commercial stretchers medical users, are the main focus in this service. although the company focuses on competition to prioritize patient services, without knowing nurses' experience in providing services<sup>9</sup>. Though nurses are at the forefront to serve.

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Patients become subjects in commercial medical escort services, especially in commercial flight using stretchers<sup>10</sup>. A stretcher is an option if the patient does not have a lot of money to rent air ambulances. as a subject, patients always demand the best service from the company, so the company's focus is patient service. the problem is that good service is not only a patient-focused desire factor, but the nurse's experience is worth considering<sup>11</sup>.

The company offers medical services on a stretcher because of consideration of the costs and conditions of the patient's family as well as patients<sup>12</sup>. Such attention is not just for the family and the patient, the experience of the nurse must be considered when making that decision, because it will have an impact on improving services<sup>13,14</sup>. This is also the basis for the company or organization to consider the experience of nurses handling patient patients<sup>15</sup>. nurses in serving patients optimally require valid literature<sup>16</sup>. literature used in services can use manual books, previous research and experience from other nurses<sup>17</sup>. This option can be used to improve the abilities of other nurses<sup>18</sup>. Considering this, some nurses felt their experience was very valuable to their peers and company, but it was never recorded in the study. So that in the future this experience will be the basis for making decisions for patient safety. The results of this study can explain the future approach to treat patients using stretcher, especially in terms of nurses' perceptions of the methods used.

## Method

### Research Design

This study has an inductive descriptive qualitative design anchored within the naturalistic paradigm<sup>11</sup>. The head of the medical escort company gave him permission to do it. The qualitative descriptive design was used in this study to understand deeply, to describe and interpret phenomena that were studied in the nurse's environment for the experiences that the authors wanted to explore<sup>19</sup>. This research was conducted using personal interviews and then observed using qualitative thematic content analysis to describe nurses' experiences. Qualitative content analysis is used in this study because it is useful in exploring nurses' experiences about certain phenomena<sup>20</sup>.

## Participants and Procedures

A total of fifteen nurses, 13 men and 2 women, who are experienced in treating patient patients are involved in this research. All participant is having a minimum of 2-year working experience as flight nursehandling patients in stretcher (range of experience: 2-5 years with 3 years median of experience). Participant of this research having an age ranged from 25 to 40 years old (median of participant's age: 35 years old). All nurses are holding certificate of authority to perform medical escort by the company and currently distributed over 5 islands in Indonesia's Java, Sumatra, Kalimantan, Nusa Tenggara Barat and Bali. All participant was stating their agreement to join this research by signing the consent form after information and invitation letters were sent to each participant.

## Data Analysis

A qualitative approach using a thematic inductive content analysis was used to analyze the obtained data according to Graneheim and Lundman (2004). This method is considered to be suitable as the researcher wishes to obtain a thorough knowledge and understanding of the topic. The transcribed interview was observed thoroughly five times, focusing on the aim of the study and finding meaning units that described by the participants in performing the handle of patient in stretcher. The meaning units were then condensed referring to Graneheim and Lundman (2004) guidelines. These units were shortened without sacrificing the essence of the original form. The condensed meaning units were then removed and coded and as utilized as the basis for categorization. Several categories were built from meaning units with similar content. These categories were then used as the basis for thematization and analysis of the underlying meaning of the data.

## Ethical Clearance

The Kepanjen college of health sciences ethics committee had approved this study and the head of the private medical escort company had gave the permission to conduct this research in their business. Information about the study was repeated orally to the participants prior to starting the interviews.

## Results

The analyses revealed nine categories. The latent content within these categories were formulated as three themes (Table 1). The findings are presented below and illustrated by quotations from the interview text.

**Table 1. Overview of theme (n = 3) and categories (n = 11) constructed from the interview analysis**

No	Theme	Category
1	Patient preparation and equipment	a) Feasibility of flight b) Inform consent c) Adequate equipment
2	Handling of patients on the plane	a) Observation b) Administration of drugs c) Emergency condition of the patient e) Airplane and weather conditions
3	Hand over preparation	a) Documentation before boarding b) Documentation on the plane

a) Patient preparation and equipment

a) *Feasibility of flight*

Vital signs are the standard values used by nurses to measure the basic functions of the body. Tools for vital signs measurements are carried out with the aim to describe a person’s general health condition. Measurement of vital signs can also provide clues about a person’s disease, as well as illustrate the feasibility of flying a patient using a stretcher.

“Before leaving, nurses are obliged to observe vital signs. Because it is important as a condition for flight eligibility” (Participant 1, 3, 7).

The collaboration of nurses and doctors who treat patients is needed to improve the accuracy of the data and determine the patient’s flightworthiness decisions. Collaboration of each profession prioritizes the importance of relationships with patients. The latest condition and development of the patient when being treated in the room is very necessary for nurse’s data when conduct hand over.

“We must communicate to the treating doctor in the hospital to determine the eligibility of the patient” (Participant 10)

Determination of the fitness or flightworthiness for patients is determined by several factors. one of that is infectious diseases must be understood, so that the spread of disease can be prevented. Other than that, everything that interferes otherpassengers’ comfort will be rejected by the airline, such as wounds that cause odor. In addition to certify the patient eligibility, flight eligibility documents must also state that the patient does not has an infectious disease and does not cause odor. The person, significantly, is advised to postpone flights until they are no longer in contagious and/ or smelly conditions.

“The airline always rejects someone who has an infectious disease and patients who have wounds

with a pungent odor” (Participants 2, 5, 6)

The types of patients who pass the flight eligibility certification for stretchers on the airline in general are strokes, vertebral fractures, hip fractures, Guillain-Barre syndrome (GBS), and all diseases that require bed rest during a trip. with special note if they need oxygen, the maximum that can be given is 4 Lpm.

“In general, diagnosed diseases which mainly allowed to flight are strokes, vertebral fractures, hip fractures, Guillain-Barre syndrome (GBS)” (Participants 15)

“Airline regulations, regarding flight eligibility, stated that the maximum oxygen delivery in the cabin is 4 Lpm, because pressures exceeding 4 Lpm will affect the air pressure in commercial aircraft” (Participants 14)

A patient’s passport is needed if he wants to go for treatment abroad to verify the identity and citizenship of a person. This document gives a guarantee of security and protection for the owner in a foreign land. A passport alone is not enough to get permission to enter and guarantee security when seeking treatment abroad. Each country has its own policy regarding the requirements for foreign nationals who enter the country with or without a visa. Laws specify that transfer orders by the treating physician and acceptance documents by the receiving facility must be prepared before the patient boards a medical flight. The patient’s medical chart, discharge summary, latest lab results and other medical information must also be carried. Approval for medical aviation transportation must be sent to the operator of the medical escort company in advance.

“Passport and visa documents are always forgotten by the family, because families rarely pay attention to this problem” (Participant 9,11,13)

b) *Informed consent*

Approval of informed consent for medical treatment from patients or families must be obtained. Acceptance must be given after getting a full explanation of the actions to be taken against patients and all the consequences of the actions. Approval of medical actions performed by nurses and doctors consists of the process of providing an explanation and the process of making decisions. For patients and families, informed consent is an appreciation of their rights to the doctor or nurses and can be used as a reason for a lawsuit against the doctor/ nurses in the event of a deviation from the practice informed consent.

“For the safety and protection of nurses and medical

in taking action, it is necessary to sign prior informed consent” (Participants 1 to 15)

c) *Adequate equipment*

Vital signs are very important for examining bodily functions, knowing clinical signs, establishing a disease diagnosis and determining the right therapeutic plan while on an airplane. Vacuum mattress was also considered to be important to reduce mobilization due to vibrations originating from weather disturbances and landing or take off aircraft conditions.

“Preparation of instruments to measure oxygen saturation, pulse, and equipment to monitor vital signs must be prepared” (Participants 1, 4, 8)

“Vacuum mattress is needed, especially when it is raining and cloudy, it helps in reducing the movement which aggravates the patient’s condition” (Participants 5, 6, 9)

Drugs given to patients must go through procedures and recommendations from the treating doctor beforehand, except drugs for emergency conditions that must be brought even without the recommendation of the treating doctor. An intravenous (IV) access must always be ready. If the patient does not need IV access on a continuing basis, it can be capped. All medications that are necessary and those that are meant for comfort must be administered. These medicines must also be available for the crew in case the need arises midair.

“Checking the type, amount and time of administration of the drug while on the trip must be recorded and prepared carefully” (Participants 3,9, 15)

b) *Handling of patients on the plane*

i. *Observation*

Nurses and doctors are obliged to make observations according to the patient’s condition. An emergency patient requires a shorter observation time compared to non-emergency conditions.

“Vital sign observations every 15-20 minutes are needed to increase awareness of the patient’s condition” (Participants 8,11,12,15)

Nurses and doctors need to consider the side effects of medication on elevation and oxygen that is not under high pressure. Observation after drug administration also needs to be considered because each person has a different response when administering the drug.

“After administration of the drug in the plane, close observation is needed, because the altitude

can sometimes affect the performance of the drug” (Participants 1,4)

ii. *Emergency condition of the patient*

Communication of nurses and doctors during an emergency requires rapid and responsive responses. Previously, it was necessary to communicate the worst possible conditions of the patient. So that when the patient’s suffer emergency condition, nurses and doctors are ready with actions to save patients.

“Communication with doctors about the condition, vital sign and drugs given is so important to decide what action to take during emergency” (Participants 2,3,10,12,14)

Communication with family member is also important, so that families understand the patient’s condition. Communication regarding emergency conditions to the family is respecting the family’s right to know the patient’s condition. In addition, for medical staff, communication is beneficial for legal liability.

“Communication with family related to the condition of an emergency patient must be notified so that the family did not have any wrong perceptions” (Participants 5,6,7,11,15)

iii. *Airplane conditions*

During landing on the runway, the ground effect becomes an important factor for airplanes. When landing, aircraft re-check, the used equipment, documentation of vital signs and drugs provided need to be carried out assuring that there are no equipment/ any belongings left behind.

“Preparation during landing is the installation of seat belts on patients, nurses, and doctors. Thus, stopping the act of observation oral administration of drugs” (Participants 3,9)

The period of flight to the maximum cruising altitude is a crucial period in flight. The nurse needs to prepare the patient’s comfort, together with tools and position of the nurse to facilitate treatment. When taking off, all medical devices may be turned on and conditioned to be safe. The nurse needs to sit in a strategic position and wearing a seat belt.

“Choosing seats for vital sign observation and drug administration is important. Usually, we sit between arms and head” (Participants 6,10,13)

Turbulence is common in aviation. Turbulence experience for patient is something that must be minimized by nurses on board. Turbulence is caused

by bad weather and/ or approaching mountainous terrain. Sometimes it can be severe which results in a messy cabin and passengers become “helter-skelter”. Nurses must be prepared to face this kind turbulence. The main focus during turbulence is the safe conditions for nurses and stabilization of the patient’s condition. Nurses must coordinate about patient care when turbulence occurs so that patients can remain calm.

“Vibration during turbulence must be considered because it affects the device, intravenous fluids, and delivery of care” (Participants 3, 14, 15)

“Nurses must know the weather, and the mountains that will be traversed, so they are ready when turbulence occurs” (Participants 1, 2, 4, 6)

c) Hand over preparation

a) *Documentation before boarding*

Patient complaints are a sign that there is a problem with the patient during the service, action is needed to resolve this problem. Recording patient complaints is something that must be done to determine the progress of the disease, the effects of treatment, and the effects of travel on the plane. Patient complaints that can be treated will increase customer confidence.

“Patients’ complaints must be observed before leaving, during traveling and until reaching the destination. Because it determines the actions we will give”(Participants 1,3,4,5,10,12)

There are several types of investigations that will be performed according to the patient’s clinical condition. Each examination has its own indications. Investigations such as laboratory, radiology, ultrasonography, electrocardiography (ECG), blood tests, etc. are sometimes needed.

“Supporting examinations during treatment at the previous hospital is very important to understand the patient’s progress, establish the diagnosis and actions after the patient reaching the intended hospital” (Participants 2,6,13)

1. *Documentation on the plane*

Examination procedures performed by nurses on a person’s vital signs that aim to detect disorders, abnormalities or changes in the life support system is needed during the medical escort. Examination of vital signs is the most basic method of examining bodily functions that can be performed to determine clinical signs that have benefits in establishing the diagnosis of disease and determining appropriate

medical therapy plan. There are four main vital signs components that must be routinely monitored by health workers namely blood pressure, pulse, respiratory rate, and body temperature.

“Vital sign recording must be comprehensively conducted every 15-30 minutes” (Participants 4,7,8,9,11)

Provision of prepared drugs during flight must be administrated carefully and on time. Emergency medicine may only be used during emergency conditions. Medicines that are prohibited on airplanes still can be carried with patient assignment letter accompanying the drugs.

“Drugs given during treatment in hospital and drugs given for in-flight medication should be noted carefully in terms of dosage and time of administration” (Participants 1,3,14,15)

## Discussion

Preparation before medical escort need to be highly considered, these considerations consist of: patients, equipment and administration<sup>21</sup>. Patient Eligibility is a condition of a patient who is declared eligible for transport using a stretcher<sup>22</sup>. In addition, the weather, state activities, and regulations were several other things need to be also considered<sup>23</sup>. Airworthiness is often a nurse’s dilemma, because of the patient’s family and the company that employs the nurse sometime choose the economy-class flight services<sup>24</sup>. Another study explains the feasibility of flying is an important factor in the success of medical escort<sup>25</sup>. In practice, families often force medical companions to provide eligibility documents. Companies also often impose conditions on patients to be eligible to fly<sup>26</sup>.

Another preparation that is being considered is administration<sup>27</sup>. The most important administration is informed consent<sup>28</sup>. The most important informed consent is clear, comprehensive communication and a focus on patient and family safety<sup>29</sup>. A study conducted by Whitty et al focuses on effective communication<sup>30</sup>. However, in practice this causes the family to be confused, because the information is somehow incomplete. Another study that patient-focused information causes families to be unprepared for future conditions<sup>31</sup>. But this can be circumvented with informed consent for the family and focus on patient and family safety<sup>32</sup>.

For the standard flight service procedures, each passenger must provide detailed health condition information to the officer during the check-in process.

In addition, it can be reported before air travel<sup>33</sup>. The airlines stated that anything which cause a disturb and smell on the plane are considered a prohibition. In accordance with the recommendation by the Centers for Disease Control and Prevention (CDC), if a passenger has a serious infectious disease that has the potential to spread during the flight, especially by air or direct contact, the airline also has the legal right to refuse the person concerned to board the flight<sup>34,35</sup>.

The thing nurses should consider is giving oxygen. because oxygen is strongly influenced by air pressure in the plane<sup>36</sup>. Air pressure drops at high altitude. So, when the plane goes up, the air pressure inside the plane decreases. In commercial aircraft, cabin pressure also set limit of the pressure drop<sup>37</sup>. This allows the aircraft to reach altitudes of up to 40,000 feet without causing travelers to experience dangerous low-level air pressure. The cabin pressure level varies by type of aircraft<sup>38</sup>. The United States Federal Aviation Administration (FAA) requires that cabin pressure on commercial aircraft be maintained at a level equivalent to atmospheric pressure below 8,000 feet. The FAA allows for a brief drop in air pressure only for safety purposes, such as to avoid adverse weather conditions. The minimum air pressure that allows tourists to be exposed for short periods is the same as that found 10,000 feet above sea level. This will be even worse if there are patients who use oxygen in the plane. This statement was in accordance with the obtained results that patients must be given minimal oxygen. The supply of oxygen capabilities offered by various airlines are also varied. For example, supply options can range from only one or two choices (for example, 2 or 4 liters per minute) to adjustable ranges of 1 to 15 liters per minute<sup>39</sup>.

The final preparation that also important is the equipment<sup>40</sup>. Equipment used during medical escort needs to be re-checked<sup>41</sup>. Katoch found that the importance of regular calibration tools. Tools prepared for stretcher patients are normally non-emergency equipment<sup>42</sup>. But it is also necessary to prepare emergency medicine if we record a history of decreased consciousness. Equipment is placed in one bag that is reachable by the escort. Result presented by New South Wales Government indicated that all equipment must be carried out to safeguard risks, but this study could not carry a lot of equipment due to airline policy<sup>43</sup>.

In an effort to provide a more convenient method for immobilizing the spine to be transported using a stretcher on commercial aircraft, the US Army

Surgical Research Institute has established a vacuum spinal board to be the method of immobilization that might be chosen during the transportation of potentially unstable thoracolumbar fractures. This were able to demonstrate a significant reduction in the development of pressure ulceration associated with the use of vacuum spinal boards compared with historical controls using rigid spinal boards<sup>44</sup>. This is the basis of knowledge that patients with stretcher should use mattress vacuum, in order to reduce complications due to travel.

Observation during flight is one of the important things that need major attention<sup>45</sup>. Good coordination between doctors and nurses need to be maintained so that patients continue to be monitored<sup>46</sup>. However, the results of the study showed that the escort not only treating patients, but also keep an eye on the family comfort and family conditions. This causes medical escorts to be dividing their attention and need to pay extra concern on the patients monitoring.

In addition to observations, administration during handling patients on the plane should also be noted<sup>47</sup>. Miles found that treating patients is the most important thing<sup>48</sup>. However, this study contradicts that result because in the case of medical colleagues, administration of the use of drugs during travel is more important to determine future care. Other than that, the dose of drug administration must be recorded in full because it will be taken into consideration for the patient's severity.

The most important thing is preparing for an emergency condition<sup>49</sup>. Emergency conditions must be considered by the medical escort<sup>50</sup>. Samadbeiket al. reported the importance of emergency preparation so that it influences subsequent handling<sup>51</sup>. The success of patient emergency management is strongly influenced by prior preparation, as also observed in this study. Patient emergencies must be predicted by the team, so they are ready to deal with the worst. Adverse conditions of patients with this consideration will be treatable. Other things considered to be major in dealing with emergencies are nurses' experiences, nurse skills, and team coordination.

The main focus in medical escort services is patient safety, so the patient's condition is the most important consideration<sup>52</sup>. However, aircraft conditions that often experience turbulence will affect the patient's condition and their psychological state. Leggio et al. confirm that unstable aircraft conditions affect passengers on board<sup>53</sup>. The practice on the plane

nurses must coordinate with flight attendants and pilots to let them know that unwanted conditions are occurred. This needs to be carried out to prepare the equipment and medicines needed. This is similar to the finding that the choice of aircraft with better in-flight experience will benefit the medical escort services.

This turbulence has several causes. The first cause is included in the category of low-level turbulence, or when the aircraft is low. Second, turbulence is close to the cumulonimbus cloud or when a plane passes near the cumulonimbus cloud. The third is mountain wave turbulence or when planes fly near mountains. Clear air turbulence can also occur due to several aspects. Moreover, at this time, extreme weather conditions increase vulnerability to turbulence on flights<sup>17</sup>. The transition period of the season, as happened in Indonesia, did result in a striking temperature difference in the air. Seasonal consideration also needs to be concerned to bring stretcher patients, since the rainy season in Indonesia tend to cause more turbulence in flight<sup>24</sup>, as an addition to the nurse's information understanding about weather and mountainous changes to be passed.

Hand over must be conducted for patients and teams before arriving at the destination hospital<sup>55</sup>. Hand over is very important for the patient's health in the future<sup>8</sup>. Things that must be prepared before hand over are preparation before boarding and preparation of documentation on the plane<sup>24</sup>. Documentation on the plane becomes an important part when handling patients because it is part of the hand over<sup>24</sup>. Result presented by Bruton et al. reported that after landing, the patient's condition will normally remain stable until the destination hospital<sup>31</sup>. However, this contradicts that findings because there are traffic jams and long-standing administrative problems that cause the patient's condition to be unstable. These considerations may form the basis for documentation procedure to be completed while at the destination hospital.

Future studies on how to deal with the stretcher patient related to the preparation of nurse's equipment and act of emergency during flight will greatly contribute

to the knowledge of air medical escort. Further study on how the nurses should adapt their role and develop both physical and mental endurance are considered to be worthy to be explored in future. Utilization of mixed methods to contradict and/or complement the single interview data collection method is highly suggested to enrich the discussion on this topic.

### Conclusion

This study was able to dig deeper into the experience of nurses handling stretcher patients on commercial flights that may benefit for future services. This research has found the importance of preparation that affect the success of medical escort. Patient handling before take-off, patient safety during flight, and preparing hand over of patients were considered to be the most important factor for air medical escort service. In short, this study reveals the following Patient preparation and equipment, handling of patients on the plane, and hand over preparation were the main themes identified on this study. Further investigation on the preparedness of nurses in handling air medical escort patients is considered to benefit this research result.

### Authors's contribution:

Data gathering and idea owner of this study: RSA, FKS

Study design: AY, SBK, SRSA.

Data gathering: RSA, AY.

Writing and submitting manuscript: SBK, SRSA.

Editing and approval of final draft: RSA, FKS, AY.

### Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Acknowledgements

The authors would like to acknowledge all nurses who participated in this study for the support in the research work.

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