

Military Nursing in “Operation Return to Brazil”: aeromedical evacuation in the coronavirus pandemic

Enfermagem Militar na “Operação Regresso ao Brasil”: evacuação aeromédica na pandemia do coronavírus
Enfermería militar en la “Operación Regreso a Brasil”: evacuación aeromédica en la pandemia de coronavirus

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ABSTRACT

Objective: to describe the experience of military nursing in “Operation Return to Brazil” in an aeromedical evacuation. **Method:** this is an experience report of the nursing staff in the Aeromedical Evacuation of potentially-contaminated Brazilians who were in Wuhan, China, after the outbreak of the new coronavirus. **Results:** the report was constructed from nursing care performed in three stages: pre-flight, screening, and flight. Pre-flight care would include aircraft configuration and material prediction. In screening, the staff was concerned with being properly attired. In the health assessment of returnees, in-flight, attention was focused on Personal Protective Equipment handling to minimize the risk of contamination by prolonged contact with potentially-contaminated passengers. **Final considerations:** nursing was committed to planning all the actions of this mission, which was one of the longest, strenuous and unprecedented in the history of aeromedical transport in Brazil.

Descriptors: Coronavirus Infections; Communicable Diseases; Infection; Military Nursing; Air Ambulances.

RESUMO

Objetivo: descrever a experiência da enfermagem militar na Operação Regresso ao Brasil em uma evacuação aeromédica. **Método:** trata-se de um relato de experiência da equipe de enfermagem, na evacuação aeromédica dos brasileiros potencialmente contaminados que estavam em Wuhan, China, após o surto do novo coronavírus. **Resultado:** o relato foi construído a partir de cuidados de enfermagem realizados em três etapas: pré-voo, triagem e voo. No pré-voo, os cuidados incluíram a configuração da aeronave e a previsão do material. Na triagem, a equipe preocupou-se em estar devidamente aparentada. Na avaliação de saúde dos repatriados, durante voo, concentrou-se a atenção no manejo dos Equipamentos de Proteção Individual para minimizar o risco de contaminação pelo contato prolongado, com passageiros potencialmente contaminados. **Considerações finais:** a enfermagem empenhou-se no planejamento de todas as ações dessa missão, que foi uma das mais longas, extenuantes e inéditas da história do transporte aeromédico do Brasil.

Descritores: Infecções por Coronavírus; Doenças Transmissíveis; Infecção; Enfermagem Militar; Evacuação; Resgate Aéreo.

RESUMEN

Objetivo: describir la experiencia de enfermería militar en la “Operación Regreso a Brasil” en una evacuación aeromédica. **Método:** este es un informe de experiencia del equipo de enfermería, en la evacuación aeromédica de brasileños potencialmente contaminados que se encontraban en Wuhan, China, después del brote del nuevo coronavirus. **Resultado:** el informe se construyó a partir de la atención de enfermería realizada en tres etapas: pre-vuelo, detección y vuelo. En el prevuelo, el cuidado incluyó la configuración de la aeronave y el pronóstico del material. En la evaluación, al equipo le preocupaba estar bien preparado. En la evaluación de la salud de los retornados, durante el vuelo, la atención se centró en el manejo de equipos de protección personal para minimizar el riesgo de contaminación por contacto prolongado con pasajeros potencialmente contaminados. **Consideraciones finales:** la enfermería se comprometió a planificar todas las acciones de esta misión, que fue una de las más largas, extenuantes y sin precedentes en la historia del transporte aeromédico en Brasil.

Descritores: Infecciones por Coronavirus; Enfermedades Transmisibles; Infeción; Enfermería Militar; Evacuación; Ambulancias Aéreas.

INTRODUCTION

Numerous epidemics of diseases caused by coronavirus have been recorded in humans and animals, with varying severity and geographically limited character. SARS-CoV-2 is an RNA virus belonging to the family *coronaviridae* and strain C of the genus *Betacoronavirus*⁽¹⁻²⁾. Since it is an RNA virus, it brings with it a greater tendency of mutations and to spread easily, often causing epidemic spikes.

According to information from China's Centers for Disease Control and Prevention (CDC), SARS-CoV-2 is the result of viral recombination that have given it the ability to break the biological barrier and escape the animal-animal cycle, also infecting humans, characterizing it as a zoonosis that hypothetically has the bat as primary host⁽³⁾. However, human-to-human transmission is what enhances the epidemic characteristic of the infection caused by SARS-CoV-2, as in the case of epidemics caused by both SARS-CoV and MERS-CoV⁽⁴⁻⁵⁾. According to the U.S. CDC's considerations, the incubation period of SARS-CoV-2 for infection among humans ranges from 2 to 14 days⁽⁶⁾.

On December 31, 2019, China announced to the world the occurrence of a mysterious acute respiratory syndrome that was present as pneumonia and hit residents of Wuhan city. In January 2020, WHO released the results of first analyses of the virus genetic sequence of the virus and proved to be a novel type of coronavirus (2019-nCoV).

The first death occurred on January 9, with a 61-year-old Chinese hospitalized with breathing difficulties and severe pneumonia, dying after a cardiac arrest. At that time, 41 patients were infected with the novel coronavirus. The first death outside China occurred on January 13, a woman returning from a trip to Wuhan. According to the WHO, it was an infected person in Thailand. On January 13, the virus spread and information about cases in Japan, South Korea, Thailand and Taiwan emerged.

Community transmission of the virus was admitted by the Chinese authorities on January 20, 2020. In the same period, Wuhan was considered the epicenter of the transmission of the virus. Wuhan was the first location to adopt social isolation, and on January 23, two other cities neighboring Wuhan, Huanggang and Ezhou, followed the same recommendation and also suspended circulation of trains.

January ended with a total of 9,976 cases reported in at least 21 countries⁽⁷⁾, including the first confirmed case of infection by 2019-nCoV in the United States.

COVID 19 has raised a worldwide concern since it emerged in Wuhan, as the infection can result in severe pneumonia and, in sets of chronic cardiorespiratory diseases, can rapidly evolve to death, causing major impacts on public health, which makes it essential to clarify the characteristics of the disease to keep control of transmission and evolution⁽⁸⁾.

Since the first reports of severe respiratory syndrome caused by the novel coronavirus, more data is emerging rapidly as the epidemic continues to expand, predominantly in China, but also worldwide⁽⁹⁾. The virus raised alert due to its high transmission capacity and high mobility and mortality⁽¹⁰⁾.

OBJECTIVE

This study aims to describe the experience of military nursing in "Operation Return to Brazil" in an Aeromedical Evacuation (AMEV).

METHODS

This is an experience report on the repatriation of Brazilians who were located in Wuhan, China, after the outbreak of the new coronavirus (2019-nCoV). The on-board records made by the nursing staff on the AMEV route were used. A preliminary diary reading was written by the military nurse who participated in the mission.

It should be noted that, in order to ensure compliance with ethical issues, the study was sent to the Research Ethics Committee of *Universidade Federal University do Estado do Rio de Janeiro* and approved, with Opinion 2,806,480 and CAAE (*Certificado de Apresentação para Apreciação Ética* - Certificate of Presentation for Ethical Consideration) 93054218.0.0000.5285.

EXPERIENCE REPORT

On January 27, 2020, the technical staff of the Brigadeiro Médico Roberto Teixeira Institute of Aerospace Medicine (IAM) verified the need to update knowledge about COVID-19, aiming at a possible activation of IAM for use in the Chemical, Biological, Radiological and Nuclear Defense Aeromedical Evacuation (CBRND AMEV - *Evacuação Aeromédica de Defesa Química, Biológica, Radiológica e Nuclear*), due to the COVID-19 epidemic in China.

Two days later, in a technical meeting, the entire staff was present and topics were given on updating the COVID-19, reviewing the use of Personal Protective Equipment (PPE) for CBRND performance (theoretical and practical) and training on use of isolation capsule for transporting contaminated patients. This meeting was attended by an infectious disease specialist, who presented specific guidelines on the new virus. The next day, the military again met at *Hospital de Aeronáutica dos Afonsos* (HAAF) to plan service and screening strategy to be carried out on passengers from Wuhan.

On February 1, 2020, the Technical Division (TD) of the Aeronautical Health Board (AHB) called IAM to participate in a transport planning meeting for returnees organized by the Ministry of Defense (MoD) in Brasília, to be held on February 3, 2020.

Finally, on the night of February 2, 2020, the Federal Government announced, in a national chain, that Brazil would carry out "Operation Return to Brazil" (*Operação Regresso à Pátria Amada Brasil*). This was an interministerial action aimed at repatriating potentially contaminated Brazilians who were located in the city of Wuhan, China, due to the outbreak of the new coronavirus (COVID-19).

At the MoD planning meeting, it was defined that IAM assignments at AMEV for repatriation of Brazilians from the epicenter of COVID-19 would comprise the following stages: Pre-Flight: aircraft preparation; guidance on the use of PPE required by the crew; screening passengers in Wuhan; In-Flight: monitoring of vital signs and medical assistance to passengers; control of biosafety; transmission of information to higher bodies; Post-Flight and Quarantine: monitoring vital signs three times a day, according to a pre-stipulated protocol; monitoring of low complexity medical care still in the White Zone (quarantine location - Anápolis Air Base Officers' Transit Hotel).

The aeromedical crew, as well as all military and civilian personnel who came into direct contact with the returnees, should be quarantined at Anápolis Air Base (GO) and undergo periodic testing for COVID-19.

PRE-FLIGHT CARE

Two VC-2 aircraft, model Embraer – 190 (Embraer S.A. is a Brazilian aerospace conglomerate that produces commercial, military, executive and agricultural aircraft and provides aeronautical services), took off from Wing 1 - Brasília Air Base, on February 5, at 12:20 p.m., bound for Wuhan.

Twelve military specialists specialized in aeromedical transport of contaminated patients were on board, including 6 doctors, 01 nurse, 03 nursing technicians and 02 military personnel responsible for equipping and properly detaching the entire staff.

Health professionals were trained to carry out CBRND missions. They consist of employing Air Force means to displace personnel and material that has been subjected to the action of chemical, biological, radiological and/or nuclear agents, in addition to transporting personnel and material specialized in activities resulting from CBRND events.

In coordination with the Ministry of Health (MoH) and the Brazilian National Health Surveillance Agency (ANVISA - *Agência Nacional de Vigilância Sanitária*), Wing 2 - Anápolis Air Base and its Transit Hotels were prepared to receive Brazilian returnees. The IAM aeromedical staff was then divided into two staffs of six soldiers (one staff for each aircraft). Takeoff took place in Brasília to Wuhan at 12:20 p.m., with the following schedule: Brasília - Fortaleza - Las Palmas (Spain) - Warsaw (Poland) - Urumqi (China) - Wuhan (China).

Aeromedical transport planning was done in a multidisciplinary work between the medical and nursing staff. The following steps were taken into account: staff sizing, quantity of medical supplies, selection of necessary equipment for adequate monitoring and definition of aircraft configuration.

Aeromedical staff sizing was linked to the number of patients defined for the mission, the degree of dependence and the patient's classification. The greater the degree of dependence the more judicious the choice of quantity and specialization of nursing staff members should be.

In view of all these aspects, on the morning of February 4, IAM nursing staff started the process of preparing the inputs and equipment that would be needed to equip two VC-2 aircraft, model Embraer - 190.

The staff was concerned with predicting the number of N-95 masks (used by the crew), surgical masks (used by repatriated passengers and scheduled to be changed every 4 hours), in addition to protective suits, goggles, alcohol in gel, contaminated garbage bags, among other inputs.

Another important precaution in the transport of potentially contaminated passengers, especially when the contamination route is aerial, was their position in relation to the aircraft's air flow. Boarding planning provided for the passengers' seats at the bottom of the aircraft due to the type of airflow. It was also necessary to provide restrooms for the exclusive use of passengers and availability of alcohol gel distributed at strategic locations on the aircraft.

Based on the knowledge of managing CBRN contamination areas, the IAM military began configuring the aircraft in three distinct areas (Figure 1):

Hot zone: or critical, is the place for patient transportation. All professionals who remain in this area must wear PPE and the patient is accommodated in a portable airtight isolation capsule.

The selected location was the seats located at the rear of the aircraft and where potentially contaminated passengers would be.

Warm Zone: it serves to store equipment and materials for the patient's use as well as a preparation area for professionals who need to have some kind of contact with those in the Hot Zone. It is a transition zone between the Hot Zone and the Cold Zone and also the place where the staff is unprepared.

Cold Zone: shelters pilots, mechanics and other specialists who need to be on the flight, considered free from contamination. For this configuration, seats located in front of the aircraft were reserved, where the flight crew was isolated.

On February 5, 2020, IAM aeromedical staff was ready to start the Operation, with all the necessary material for the mission. However, a peculiarity of aeromedical transport is weight control and cubage of materials and inputs used in the mission, considering that aircraft has weight restrictions. This difficulty was perceived by the nursing staff, who had to reorganize and recalculate the material planned for the mission, still on the morning of February 5.

The nursing staff, during part of the journey to Wuhan, dedicated their time to fine-tuning the aircraft's configuration such as assembling the emergency flight bed, distributing gel alcohol in strategic locations and organizing supplies and medical and hospital equipment.

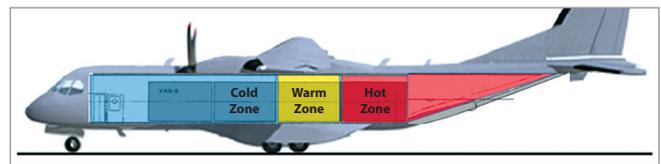


Figure 1 - The military aircraft is divided internally into three zones: hot, warm and cold

SCREENING CARE

On the outward journey to Wuhan, a stopover was made in Warsaw, Poland, which lasted approximately 11 hours. On this scale, the aeromedical staff defined the procedures that would be performed in the screening of passengers in China, so that it could be done as quickly and effectively as possible, since we still did not know what the conditions and the location intended by the Chinese would be yet. to carry out the same.

On February 7 at 6 p.m., Brazilian aircraft landed in Wuhan. The aeromedical staffs descended at the airport, suitably attired, and carried out the screening of passengers in the airport's elevator hall. Passengers descended the elevator in groups of 5 so that their health conditions could be assessed by the aeromedical staff.

Screening in Wuhan was carried out through simultaneous and fractional visits. One member of the medical staff was responsible for anamnesis, another for pulmonary auscultation and a third for evaluation of nose and throat, while the nursing staff was in charge of checking the temperature and pulse oximetry of passengers.

On the aircraft access ladder, a nursing staff member remained, to ensure that everyone performed hand hygiene with gel alcohol and changed masks before entering the aircraft. This procedure provided security for the mask change protocol to occur every 4 hours from the moment of entering the aircraft.

A screening form containing questions about the occurrence of fever, respiratory symptoms, the occurrence of contact with

sick people by COVID-19 or whether the passenger had a chronic illness was applied to all passengers.

IN-FLIGHT CARE

The ground time in Wuhan was 02 hours. After authorization from the aeromedical staff, the 39 passengers (34 Brazilians and 5 Poles) were released to board the two FAB aircraft (21 passengers on aircraft 1 and 19 on aircraft 2).

During the entire time on board the aircraft, hand hygiene was carried out with alcohol gel and masks were changed every 4 hours. Entry of aeromedical staffs and flight attendants in the aircraft's Hot Zone was only carried out with appropriate PPE. That barrier remained intact throughout the flight.

At each shift change, another very important care was the lack of separation (removal of all PPE) and hand hygiene. This was coordinated by a professional from the staff who pointed out the systematic removal of each equipment. This is a valuable strategy for minimizing contamination risks during PPE removal.

A military man was present on board each aircraft with exclusive attention to all stages of this process. Within the CBRND doctrine, this military man is called Control Element and, throughout the return flight, he stayed in the warm zone, helping in the correct fulfillment of all the correct sequence of aeromedical staff unattire.

Equipping followed the steps: first, putting on the N95 mask; then, placing the first latex glove on top of the Tenth RUMAER Uniform (Uniform Regulations for the Air Force military), placing the Tyvek jumpsuit (made with polyethylene fabric with the main characteristics of high strength and impermeability); placing the second latex glove on top of the Tyvek jumpsuit, taking care to secure it to the jumpsuit with waterproof tape; placement of the third latex glove; and putting on goggles.

However, one of the most critical moments for risk of aeromedical staff contamination in the CBRND mission is, without a doubt, lack of clearance. At this moment, the entire external area of the garment is considered contaminated and the aid of Control Element becomes essential. PPE removal stages were strictly performed in the following sequence: removal of the third latex glove in the transition between the Hot and Warm Zones; removal of Tyvek jumpsuit and second glove; removal of goggles; removal of the N95 mask; and removal of the first glove.

After unattire, hand wash with soap and water was carried out meticulously.

During the entire trip back to Brazil, there was a rotation among the aeromedical staff crew to provide care to passengers in the Hot Zone. This relay was carried out with 5-hour shifts, due to the great fatigue generated by the use of PPE for long periods.

The staff member who was carrying out his shift remained in the Hot Zone properly dressed. He was the professional responsible for checking the body temperature and entering the data on the temperature map of each passenger, in addition to requesting hand hygiene with alcohol gel and the exchange of surgical masks.

After 37 hours of flight, the arrival was at Wing 2 - Anápolis Air Base (GO). The Transit Hotel had been fully prepared to receive a group of 58 people who underwent the quarantine process. In addition to the 34 returnees from Wuhan, military personnel from the IAM staff, members of Special Transport Group (STG) crews, doctors linked to the MoH and two professionals in the area of communication, one from the Brazilian Aeronautical Social Communication Center (AERSCOMCE) and another from *Empresa Brasil de Comunicação* (EBC – Brazil Communication Company), also remained in the observation period.

FINAL CONSIDERATIONS

The study provides a description of specific care in pre, during and post-AMEV. The importance of training for quality service and safety for everyone involved in the event.

In this sense, it is possible to observe that in order to perform this type of function, the nursing professional must be well trained, in addition to being prepared to perform their role together with a multidisciplinary staff. Therefore, communication skills, management and body spirit are fundamental.

Nursing was committed to planning all the specificities of actions/activities of this AMEV, which, by far, would be one of the longest, strenuous and unprecedented missions in the history of potentially contaminated passenger air transport in Brazil.

The results of this study contribute to reflections in the scope of nursing about the way in which it works at AMEV, especially because it is a little explored area, with potential for expansion, requiring properly trained and prepared human resources for this demand.

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