

# LOGISTICS OF A SURGICAL BLOCK IMPLEMENTATION IN THE FOREST: THE NURSE'S ROLE

*Logística de implementação de bloco cirúrgico na floresta: atuação do enfermeiro*

*Logística de la implementación del bloque quirúrgico en el bosque: actuación del enfermero*

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**ABSTRACT: Objective:** To report the experience of volunteer nurses at the Civil Society Organization for Public Interest “Expedicionários da Saúde” during the implementation process of surgical, supply and sterilization centers of a field hospital in an indigenous village in northern Brazil. **Methods:** Descriptive and narrative experience report, with a qualitative approach conducted from September to November 2015. **Results:** The structural process and the implementation of surgical, supply and sterilization centers in isolated areas included five stages, which depended on the participation and involvement of nurses in activities ranging from planning and management to the execution phase. **Conclusion:** Nurse’s professional engagement and commitment in all stages contribute to ensuring the safety and quality of surgeries performed on indigenous patients, an effort that prioritizes organization, systematization, and scientific processes. **Keywords:** Nursing. Logistics. Surgicenters. Health of indigenous peoples. Volunteers.

**RESUMO: Objetivo:** Relatar a experiência de enfermeiros voluntários na Organização da Sociedade Civil de Interesse Público Expedicionários da Saúde no processo de implementação de centro cirúrgico e centro de material e esterilização de hospital de campanha em aldeia indígena na região norte do Brasil. **Método:** Pesquisa descritiva, narrativa, com abordagem qualitativa, do tipo relato de experiência, realizada entre os meses de setembro e novembro de 2015. **Resultados:** O processo de estruturação e implementação de um centro cirúrgico e centro de material e esterilização em áreas isoladas teve cinco etapas e contou com a participação e o envolvimento de enfermeiros desde o planejamento e gerenciamento das atividades até a etapa de execução. **Conclusão:** O engajamento e o compromisso dos profissionais enfermeiros em todas as etapas contribuem para a garantia da segurança e da qualidade das cirurgias realizadas no paciente indígena, por meio de um trabalho que prima pela organização, sistematização e cientificidade dos processos. **Palavras-chave:** Enfermagem. Logística. Centros cirúrgicos. Saúde de populações indígenas. Voluntários.

**RESUMEN: Objetivo:** Reportar la experiencia de enfermeros voluntarios en la “Organización de la Sociedad civil de Interés Público Expedicionarios de Salud” en el proceso de la implementación de quirófanos y centros de material de esterilización en hospitales de campaña en aldeas indígenas en la región norte del Brasil. **Método:** Investigación descriptiva, narrativa, con enfoque cualitativo, de tipo de relato de experiencias realizadas entre septiembre y noviembre del 2015. **Resultados:** El proceso de estructuración e implementación de un quirófano y centro de material y esterilización en áreas aisladas contiene cinco etapas, y cuenta con la participación y el desarrollo de enfermeros desde la planificación y el gerenciamento de las actividades hasta la etapa de ejecución. **Conclusión:** El empeño y lo compromiso de los profesionales enfermeros en todas las etapas contribuyen para la garantía de la seguridad y de la calidad de las cirugías realizadas en el paciente indígena, por medio de un trabajo que prioriza la organización, la sistematización y los procesos científicos. **Palabras clave:** Enfermería. Logística. Centros quirúrgicos. Salud de poblaciones indígenas. Voluntarios.

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Received: 04 May 2016 – Approved: 27 June 2016

DOI: 10.5327/Z1414-4425201600030007

## INTRODUCTION

The assistance to indigenous people in Brazil is marked by challenges that simultaneously consider universal, equal access to healthcare services, as well as the assurance and respect to culture, beliefs, traditions and customs of the multiple ethnicities present in the country. The Federal Constitution of 1988, in articles 231 and 232, recognizes the rights of indigenous peoples concerning the land and social and cultural organization. It also demonstrates that it is up to the Brazilian state to guarantee those rights, so that they can fully exercise their citizenship<sup>1</sup>.

However, the 1990 Organic Health Law established the commitment to prevention, promotion, recovery, and rehabilitation of indigenous health in the Unified Health System (SUS), by forming the Subsystem of Indigenous Health Care<sup>2</sup>. In 2002, an important initiative from the Ministry of Health to restructure Indigenous Health Care reinsured the specialized and differentiated characteristics of the healthcare provided to these peoples by instituting the National Policy of Health Care for Indigenous Peoples (PNASPI)<sup>3</sup>.

In this context, several movements in Brazilian society act in order to increase the access to health practices among indigenous peoples. The Civil Society Organization of Public Interest (OSCIP) Expedicionários da Saúde (EDS) began working in 2003 with the intention of promoting, complementing, and integrating specialized surgical care through volunteer work to indigenous peoples in isolated areas of the country. After the articulation and technical cooperation established with public institutions (i.e. Ministry of Defense, Ministry of Health and National Indian Foundation [FUNAI]), and private companies, with financial donations, services and materials, EDS was established and collectively built a process of volunteer work as well as provided essential information to promote and contribute to indigenous population health.

For being practical, volunteer work brings social and collective values to the individual, according to their lived experiences. The importance of taking part in volunteer activities lies in the fact that it actively encourages social responsibility, autonomy, and creativity in the participants<sup>4,5</sup>.

By being agents of health education, care, and management, nurses compose the multi-professional team of EDS, aiming at implementing and developing technical skills and procedures on a scientific basis, focusing on promoting an efficient work process. Working in accordance with the Resolution from the Federal Nursing Council (COFEN)

n. 424/2012<sup>6</sup>, the nurses are involved and present in all stages of the Expedition, especially concerning the logistics to construct a surgical center (SC), and a material and sterilization center (MSC) in Indian villages. Currently, besides nurses, the EDS team is composed of doctors (anesthetist, surgeon, pediatrician, gynecologist, ophthalmologist, general practitioner and orthopedists), pharmacists, odontologists, and other professionals working with logistics.

Nursing gains visibility and new opportunities by demonstrating its integrative and interactive care skills, whether in health promotion and education, in the sensitization and mobilization to implement policies addressing the well-being of families and communities<sup>7</sup>. The holistic component present in the professional behavior of nurses leads to the inseparability of their presence and the implementation of actions, interventions and work processes in safe, participative, continuous, whole, individualized, documented and evaluated SCs and MSCs<sup>8</sup>.

Concerning their relationship with indigenous health practices, the nursing professional needs to understand the population's ethnic and cultural differences, in addition to the health and sickness profiles of this population, by respecting and appreciating the traditional knowledge and their sociocultural identity. Additionally, it is essential to be aware of the juridical-political aspects that legitimates, qualifies and guarantees the rights of these peoples, thus contributing to minimize the history of inequality they experience in the country<sup>9,10</sup>.

In EDS, the professional nurse plays an essential role: beginning with the stage of planning/organization, executing the work, and ensuring the systematic operation of the processes of storage, conservation, distribution, transportation and management of materials and equipment that will be used; with the goal to maintain their integrity, validity, and quality to guarantee the safety of the patients. The processes have been systematically organized by professionals with experience and practice, on a scientific basis.

Key elements in the work of EDS include valuing nurses, dialogue and communication, which are well established among the members of the multi-disciplinary team. The activities, when carried out as a group and in respect to the background and participation of each member, lead the team to incorporate the human aspect of the work in understanding that the meaning of their presence in the group is greater than the simple execution of services<sup>11</sup>.

Therefore, contextualized in this evolving environment of social skills, the nurse generates and shares new knowledge

in the SC and MSC environments, in isolated areas, and trains these teams on hospital processes, focusing on stimulating the self-critical thinking that can contribute to advancing a safe, high quality practice.

## OBJECTIVE

To report the experience of volunteer nurses in the process of implementing SC and MSC of a campaign hospital in an Indian village in the North of Brazil.

## METHOD

This is a descriptive and narrative study, with a qualitative approach, characterized as an experiential report. The report was based on the experiences of volunteer nurses in the logistics of implementing a SC and a MSC in an Indian village in the North, between September and November 2015, regarding the 34<sup>th</sup> Expedition named “Munduruku.” However, it is important to mention that this experience has been improved over the course of 13 years, enabling the development of competencies and technical-scientific skills, as well as ethical, social, and cultural skills.

SC and MSC are structured based on campaign hospitals for humanitarian actions. These hospitals are characterized by a mobile modular structure, with equipment that assures logistical autonomy for healthcare (generators, lightning, thermic isolation, purification of water, acclimatizing units, fuel etc.). Therefore, they have the potential to provide healthcare at different levels of attention in isolated areas, in addition to intervening in environments where the health structure is poor. The mobile SC of EDS depends on six surgical tents to provide care in the fields of ophthalmology, gynecology and odontology, in addition to state-of-the-art equipment to guarantee care according to the principles of safety, prevention, and quality.

The study aimed at describing the five necessary logistical stages to reach the objectives of the 34<sup>th</sup> Expedition:

1. Preparation of the material and the equipment in the distribution center;
2. Logistic preparation of the structure of the Expedition;
3. Setting up the SC and the MSC;
4. Maintaining the SC and the MSC;
5. Returning the materials and the equipment in the distribution center.

## RESULTS

The association Expedicionários da Saúde began its activities 13 years ago, and it is based in the state of São Paulo. This office not only handles administrative and management issues, but also hosts the meetings of the multi-professional team. Additionally, there is a distribution center (DC) to store and keep the materials and equipment that will be used in the Expeditions. Since the beginning, the nurse is part of the team and participates in the planning and decision-making processes in all stages of the Expedition.

Currently, EDS has a nursing team composed of a nurse coordinator and a rotating group of volunteer nurses. Each Expedition has the ability to include ten volunteer nurses, in addition to a nurse coordinator. During the execution of the Expedition, the volunteer nurses of EDS and the nursing team from the Special Sanitary District of Indigenous Health (DSEI), are distributed among the SC, MSC, preoperative, postoperative sectors, gynecology outpatient clinic, ophthalmology outpatient clinic, other clinics and screening centers.

### Preparing the material and equipment in the Distribution Center

The first stage regarding logistical and operational preparation is called mobilization, which begins 60 days before the operation stage. It comprises the set of processes and actions that prepare and distribute the staff and load to the operation location, as well as assemble, turn on, and test all of the equipment.

The management of material resources and equipment is a responsibility of the nurse coordinator, which includes the prediction and provision of materials and equipment, whereas the process of checking, preparing and organizing the temporary and permanent material is conducted mainly by volunteer nurses, but with the coordinator. It is important to mention that some equipment is borrowed from partner companies.

The work dynamics, at first, includes a list of the available stored materials, in order to control the stock and the adequate use of materials to avoid waste. It is essential that the professional involved in this stage pay attention to the quality and quantity of the material to be used, verifying the expiration date and the integrity of the package, in order to reduce risks and guarantee the continuity of care.

The stage of organizing boxes (such as containers) with the material predicted for the Expedition is called waybill, and it takes two to three days to be finalized through group work. The inputs are checked (expiration date, integrity of the package and quantity), placed in individual plastic bags according to type, and then stored in larger plastic bags inside the box (Figure 1). The use of plastic bags aims at preventing the damage to the material in case the box is opened due to extreme transportation conditions until the final destination, which is the village.

The box is made of a hard, waterproof plastic material with a lid, includes a variety of different colors and numbers, and has a capacity of 180 liters. However, it is ideal to store up to only 30 kg to make transportation easier. Each box has a list of types and number of materials, which should be signed by the professional in charge of organizing it. The equipment load and inputs account for an approximate total of 15 thousand kg in each expedition.

### Logistics preparation to organize the Expedition

Logistical preparation occurs approximately six days before the Expedition. One volunteer is in charge of leading the assembly and is introduced to all participants. Every day the team regrouped and was oriented regarding the designated activities, and communication took place through radios and meetings, according to the need.

The assembly team is composed of groups, and each one is responsible for specific areas such as: installation of the electrical network and generators, tent assembly,

furniture cleaning and reallocation, equipment, medication and inputs. The assembly is concluded two days before the Expedition. At this time, the full electric charge is simulated using all of the electrical and electronic equipment in the Expedition, with the objective of detecting possible overload. In case the generators fail, contingency plans are developed regarding the distribution of drinking water, problems in the sanitary network, among others. There are volunteers to repair electric, hydraulic, and general services. The Expedition has the potential of up to 40 surgeries a day.

### Assembling the Surgical Center and the Material and Sterilization Center

The organization of the SC and the MSC constitutes one of the most important stages for the efficacy of the surgical process. However, the technical-scientific knowledge of the nurse during the Expedition is essential in supporting the other volunteers in the logistics department, as most of these volunteers come from other areas.

Therefore, nursing knowledge becomes a useful tool in adapting the physical structure of a SC and a MSC to the reality of a campaign hospital in the forest, guiding its actions according to RDC n. 50 and 15<sup>12,13</sup>. It is also possible to use support tools, such as the nursing process, which establish and quantify indicators of quality and quantity.

The place chosen to construct the SC and the MSC was a shed, previously built by the local Indian community, which included the SC, the MSC and the ophthalmology outpatient clinic. Strategically, the MSC was placed next to the SC in order to optimize the delivery and collection of materials, as well as processing the medical instruments (Figure 2).

After the logistics team set up the tent structures, installed the air-conditioning equipment and the entire electric and hydraulic structure, the SC and the MSC were ready to receive the final assembly and to validate the equipment.

In the SC, the team of volunteer nurses at EDS have to: administrate and assist in the process of organizing the main equipment for surgery; clean and organize operation room; provide inputs; and guarantee the control of the influx of patients in addition to their safety and comfort. With the medical team, the nurses manage the schedule of procedures by determining which cases are of higher surgical complexity. Additionally, other factors are considered to prioritize the surgery, such as age,



Source: Expedicionários da Saúde, 2015.

**Figure 1.** Transportation containers to take material and equipment, placed in the Center of Material Distribution, in Manaus.

chronic conditions, capacity of preoperative demand, and daily surgical potential.

Among the responsibilities mentioned, considering the extreme transportation conditions (land, air, and water) that can cause breakage or miscarriage, the materials and equipment were checked for integrity, and tests for the electronic devices were conducted.

With the nursing team from DSEI, the nurses volunteering at EDS began to clean the SC and MSC tents and then cleaned the furniture. After these procedures, two rooms were organized, one for general surgery and another one for ophthalmologic surgery. The clinical engineering team assembled the equipment.

The corridor to enter the SC has surgical clothes and personal protective equipment (PPE): caps, masks and foot protection. Even though the latter has not been so common lately<sup>14</sup>, it is still used in the Expedition in order to reduce the contamination with external dirt, not with the goal of preventing infections. The restroom is placed between both surgical rooms. The nursing team is also in charge of providing surgical brushes with antiseptic solution and liquid soap to disinfect hands.

The structure of the MSC was based on a model of campaign hospital tents (Figure 3). According to the recommendations of RDC n. 15<sup>13</sup>, it was divided in a clean and a dirty area in order to maintain them independent and to guarantee the unidirectional flow.

The cleaning station is composed of a stainless sink with two bowls, two ultrasonic washers, besides, tables and benches. The materials coming from the SC, the

ophthalmologic clinic, the gynecology outpatient clinic, pediatrics and odontology come in sealed boxes, exclusively to transport used material, and are delivered through a window, also exclusive for this type of material.

The cleaning area has benches, shelves and tables, which are used to keep 5 steam gravity autoclaves, with the capacity for 21 L, 1 54 L autoclave, 1 water distiller, 1 incubator for biological tests, and 2 surgical sealants. Additionally, 2 21 L autoclaves and 2 back-up sealants were available. The processed materials are distributed in closed boxes, also through an exclusive window.

The final assembly of the MSC also counted on the support of DSEI's nursing specialists in addition to the expert volunteer of EDS and the technical person in charge of the sector. The EDS nurses and the clinical engineering team checked the electric and hydraulic areas to guarantee the equipment was functional, as well as the safety of the team.

Only after the safe conclusion of the final assembly (Figure 4), in which all equipment and inputs were installed and allocated, tests were conducted to validate the autoclaves and the other equipment, all with satisfactory results. These results initiated the document records of quality and quantity indicators. These indicators are important tools to improve these processes, which include logistics<sup>14</sup>.

The role of nursing in organizing both the sector and the Expedition makes logistics easier, generates costs reduction, optimizes the processes, and guarantees the safety of the team and the patients.



Source: Expedicionários da Saúde, 2015.

**Figure 2.** External structure of the Campaign Hospital, view of the entrance and exit of the surgical center.



Source: Expedicionários da Saúde, 2015.

**Figure 3.** Internal structure of the material and sterilization center, view to the clean and dirty areas.

## Disassembling the Surgical Center and the Material and Sterilization Center

On the last day of the Expedition, the sectors began to be disassembled with the help of DSEI's nursing team. When the procedures were concluded, all equipment and materials were cleaned, dried, packed and stored in transportation boxes. A box with sterilized surgical instruments was organized in case there were possible complications with patients and/or team.

The procedures to disassemble the SC and the MSC require skilled professionals with specific knowledge. Therefore, the nursing professional is an essential participant in this stage as well<sup>14</sup>. In the disassembly, the logistics team had a checklist that facilitated the organization and the checking of furniture and equipment used during the Expedition, which afterwards were inputted into software to control the output of materials, equipment and supplements used during the Expedition and the return to the DC.

In this stage, nursing and logistics volunteers conducted an inspection at EDS, which generated a maintenance report of the equipment. The equipment and furniture were stored in the same way they were organized to enter, that is, sealed in container boxes and identified by colors and numbers. At the end of this stage, other teams continued to disassemble the tents and the entire electric and hydraulic structure.

## Return of the materials and equipment to the distribution center

On the next day, after the conclusion of the Expedition (Figure 5), all of the accounted material was accompanied



Source: Expedicionários da Saúde, 2015.

**Figure 4.** Internal structure of the surgical center, operation room.

on the return to the DC by the EDS logistics team. Since this logistics involved land, water and air transportation, climactic variations caused a delay in the return of the load – it took 20 days to arrive to the DC.

After the boxes were kept in the DC by the EDS logistics team and professionals in the transportation company, the process of demobilizing the load began. Groups, including the nursing and the logistics team of EDS, conducted this process.

In the demobilization step, all boxes were opened to check the materials and inputs for their quantity and integrity, and then reorganized in the DC. The equipment lent to EDS was returned to the original companies, and the EDS equipment were sent to preventive and corrective maintenance.

At this stage of concluding the Expedition, some transportation boxes were damaged. However, the internal content was not compromised nor lost.

## DISCUSSION

A large part of the population does not have access to surgical services since there is deficit of surgeons, anesthetists, and obstetricians in the world. Historically, non-governmental organizations (NGOs) have been trying to fill this specific need. However, the exact contribution of these institutions has not been well documented<sup>15</sup>.

Between 2008 and 2012, all of the continents presented significant rates of volunteer work, with an average of 37.9% in Oceania, 22.8% in the Americas, 19.7% in Asia, 17.2% in



Source: Expedicionários da Saúde, 2015.

**Figure 5.** Moment of celebration of the volunteers in Expedicionários da Saúde and Indians of the Munduruku and Kaiapó community, after the conclusion of the 34<sup>th</sup> Expedition Expedicionários da Saúde.

Europe, and 17.0% in Africa. These data show that active and regular volunteer participation is vital to sustain the activities of communities and nonprofit organizations<sup>16,17</sup>.

An integrative review conducted with the objective of numbering and describing the NGOs offering surgical care found 403 working in 139 countries, but only 2% work in mobile surgical centers in rural or remote areas<sup>15</sup>. EDS was not included in this review. However, it should be highlighted that EDS is part of a minority, which, in this specific case, mounts a campaign hospital in the forest.

The nursing work with indigenous peoples is based on two basic premises: on the technical skill of the professional and on the relationship of trust. In support centers for indigenous health (CASAs), the nursing team plans the assistance and the actions that should be conducted with indigenous patients, which includes managing transportation, food and lodging, since they need to travel great distances to have access to medical care<sup>18</sup>. However, the EDS is mobilized and adapts its logistics so that surgical care to the indigenous peoples are offered in the forest and in the villages that were previously selected according to the demand and the support of FUNAI, the Special Secretariat of Indigenous Health (SESAI) and DSEI.

The measure of good performance of a SC is directly related to the quality of its own processes and the services it supports, which results from the combination of physical and technological installations, adequate equipment, and the skilled, trained and competent work of the nursing team. Therefore, to maintain the agility and organization of the surgical process, it is necessary that the members of the nursing team have deep knowledge and experience in the field<sup>19</sup>.

Since this is a different environment, focused on the health of the indigenous population, the work dynamics and the professional relationships on an Expedition should be reciprocal with a skilled, trained team able to face the demands and the challenges imposed by the changes in the environment, the culture, the technology, and the sociopolitical and economic issues of public health<sup>20</sup>. Since there are not many Brazilian publications on nursing work concerning the logistics of a health Expedition, especially regarding care in isolated areas, there is a need for more studies in this field.

From this perspective, EDS recognizes and values the importance of the nurse; therefore, it has a relationship with a team of nurse volunteers who actively participate in all the logistical stages of an Expedition. These professionals understand the influence of their collaboration, which surpasses their physical presence. In this context, technical and

scientific knowledge, creativity, and dynamism are essential to assist the medical team and obtain success in surgical procedures offered to indigenous peoples.

## CONCLUSION

The possibility of working as volunteer nurses with indigenous peoples in isolated areas contributes to the development of human and social competencies and skills. The technical knowledge based on evidence, improved with the experiences of logistics in the implementation of SC and MSC, is only possible because of the engagement and commitment of the professionals involved. Their maximum effort is the guarantee of safety for the indigenous patient, through work that emphasizes the organization, the systematization and the quality of the processes.

The planning and management steps that come before the Expedition itself are essential to control the work processes, in order to minimize and/or prevent the occurrence of avoidable damage. Additionally, the systematic record of all actions conducted in all stages is a valued and mandatory tool in EDS, since it allows for assessing the results, generating indicators and qualifying care.

Implementing a SC and a MSC in the forest becomes viable from the moment when there is a dedication to fulfilling technical rules. Each professional involved is aware of their responsibility, both technical and ethical, so that surgical procedures can be executed with the same care from their original work environments.

The obstacles faced by transportation and geographic and cultural barriers are overcome by the multidisciplinary composition of EDS, by the inclusion of professionals and health workers of DSEIs, by the partnerships established with governmental institutions and private initiatives; and, above all, by the respect to the culture and the traditions of indigenous peoples.

EDS intends to create a referential model of specialized medical care to geographically isolated populations and facilitate the access to qualified care. Therefore, its mission is to bring excellent medical care, especially surgeries, to isolated indigenous populations, through quality services and responsible management. Therefore, by being inserted in contexts with characteristics that are completely different than usual, by receiving opportunities and defining their roles, nurses demonstrate the importance of nursing as an art, science, and practice to bring efficient healthcare services to different populations.

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