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Analysis of inputs used by the nursing team in the urgency and emergency service

Análise de insumos utilizados pela equipe de enfermagem no serviço de urgência e emergência

Análisis de insumos utilizados por el equipo de enfermeira em el servicio de urgencias y emergências

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RESUMO

Objetivos: avaliar os insumos mais utilizados nos cuidados de enfermagem na administração de soluções por via venosa periférica no Serviço de Emergência. **Método:** análise dos insumos mais utilizados pela equipe de enfermagem no processo de preparo e administração de fluidos por via venosa periférica no Serviço de Urgência e Emergência. **Resultados:** observou-se que a equipe de enfermagem adere mais ao cateter intravenoso semi-flexível número 22 gauge (46%) seguido do cateter intravenoso número 20 gauge (36%). Dos cateteres intravenosos agulhados *scalp* mais utilizados foram número 21 gauge (38%) seguido do número 23 gauge (57%). **Conclusão:** a avaliação possibilitou visualizar pontos de melhoria no processo de preparo e administração de soluções por via venosa periférica no Serviço de Urgência e Emergência.

DESCRITORES: Cuidados de enfermagem; Segurança do paciente; Educação; Saúde.

ABSTRACT

Objectives: to evaluate the supplies most commonly used in nursing care in the administration of peripheral venous solutions in the Emergency Department. **Method:** analysis of the inputs most used by the processo f preparing and administering fluids via the peripheral venous route in the Urgency and Emergency Service. **Results:** it was observed that the nursing team aderes more to the semi-flexible intravenous catheter number 22 gauge (46%) followed by the intravenous catheter number 20 gauge (36%). Of the most used *scalp* needled intravenous catheters were number 21 gauge (38%) followed by number 23 gauge (57%). **Conclusion:** evaluation made it possible to visualize points of improvement in the processo of preparation and administration of intravenous solutions in the Urgency and Emergency Service.

DESCRIPTORS: Nursing care; Patient safety; Education; Health.

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RESUMEN

Objetivos: evaluar los suministros más utilizados en los cuidados de enfermería en la administración de soluciones por vía venosa periférica en el Servicio de Urgencias. **Método:** análisis de los insumos más utilizados por el equipo de enfermeíra en el proceso de preparación y administración de líquidos por vía venosa periférica en el Servicio de Urgencias y Emergencias. **Resultados:** se observo que el equipo de enfermeíra se adhiere más al catéter intravenoso semiflexible número 22 gauge (46%) seguido del catéter intravenoso número 20 gauge (36%). De los catéteres intravenosos com aguja en el *scalp* más utilizados fueron e número 21 gauge (38%), seguido del número 23 gauge (57%). **Conclusión:** la evaluación permitió visualizar puntos de mejora en el proceso de preparación y administración de soluciones intravenosas en el Servicio de Urgencias y Emergencias.

DESCRIPTORES: Atención de enfermeíra; Seguridad del paciente; Educación; Salud.

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INTRODUCTION

The Brazilian climate presents characteristics that favor the development of diseases such as dengue fever, one of the biggest Brazilian public health problems, in which control and prevention are directly linked to the population's awareness regarding the disposal of inputs said to be necessary for the survival of man, as well as the characteristics of Brazil's own geodesy.

According to the Oswaldo Cruz Foundation, the infestation of the dengue mosquito is more intense in the summer, due to the rise in temperature and the intensity of rainfall, factors that favor the hatching of mosquito eggs. The cycle of the disease consists of man - Aedes aegypti - man. The highest rates of infestation by the vector Aedes aegypti are recorded in neighborhoods with high population density and low vegetation coverage.[1-2]

Early identification of dengue cases is of utmost importance for decision making and implementation of timely measures to prevent deaths, and can directly influence the control of morbidity and mortality by the disease, through clinical management of cases. However, research has shown that the care provided to patients has not reached the level of adequacy expected by the health services evaluated, it was also found that the alarm and shock signs for dengue are not routinely investigated, professionals have not used the clinical staging standardized by the Ministry of Health and that the hydration of patients was less than recommended by the manual.[1-3]

It is important to emphasize the need for effective engagement of the multiprofessional health care team, especially in emergencies, for the early detection of signs and symptoms of the disease, as well as the alarm signs. Intravenous fluid hydration is the treatment that aims to establish organic functions and avoid complications of the disease.

Dengue is characterized as a short-lived febrile illness of variable severity, caused by an arbovirus belonging to the Flaviviridae family of the Flavivirus genus, which is known to have four serotypes: DEN 1, 2, 3, and 4. The transmission period occurs in two cycles: intrinsic, is the one that passes to man, beginning one day before the onset of symptoms until the sixth day of the disease; and extrinsic, is what happens in arthropods, the virus ingested along with the blood multiplies in the salivary glands of the mosquito, after 8 to 12 days of the incubation period, they become infectious.[1-3]

Dengue virus infection causes a disease of broad clinical spectrum, including from oligosymptomatic forms to severe pictures. In the classical presentation, the first manifestation is high fever (39°C to

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40°C), of abrupt onset, associated with headache, adynamia, myalgia, arthralgia, retroorbital pain. The exanthema is present in 50% of cases and is of the macular-papular type, affecting the face, trunk, and limbs. Anorexia, nausea, vomiting, and diarrhea may be present.[1-3]

In this scenario, the Portaria nº 2048/GM of 5/11/2002 describes risk classification as a process carried out by a senior health professional through specific training and the use of pre-established protocols with the objective of assessing the degree of urgency of the clients' complaints, placing them in order of priority for care.[4-6] It is important to emphasize that after risk classification, all clients receive care from the specialized physician.

The risk classification is done through the priority classification by colors, with the following levels: red is an emergency priority requiring immediate care; yellow is an emergency priority requiring the fastest possible care; green is a priority not requiring urgent care, and blue is a priority, which constitutes low complexity consultations.[5-7]

With regard to adverse events related to the practice of intravenous therapy, it is estimated that 5% of hospitalized patients suffer an adverse drug event (ADE); damage experienced by the patient as a result of medication, either as a side effect or as a result of an error at some point during hospitalization. The cost of preventable medication-related errors in U.S. hospitals has been estimated at $16.4 billion annually.[8-13]

The causes of adverse events may be related to individual factors such as lack of attention, memory lapses, deficiencies in academic training and inexperience, but may also be related to systemic failures such as: problems in the environment (lighting, noise level, frequent interruptions, lack of training, lack of professionals, communication failure, problems in policies and procedures).[8-13] The object of the research is to characterize the administration of intravenous medications in the adult emergency department, and the National Policy on Urgency and Emergency.

The research is justified in the health service because it has three contributing factors, which usually occur simultaneously and can cause the adverse event. Human factors, which reflect in the communication between professionals and team relationship; operational factors, such as the work environment and the level of concern with patient safety; and external factors, which are beyond the organization's control, such as the environment and legislative policies.[8-13] The objectives are to evaluate the supplies most used in nursing care in the administration of solutions by peripheral venous route in the Emergency Department.

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METHOD

Analysis of the supplies most used by the nursing team in the process of preparation and administration of fluids by peripheral venous route in the Emergency and Urgent Care Service of a small-sized Municipal Hospital in the Cadastro Nacional de Estabelecimentos de Saúde (CNES). The research was carried out during the academic activities of the professional master's degree course in Health and Technology in Hospital Space at the Federal University of Rio de Janeiro/RJ.

The search period comprised the years 2016 and 2017, literature review, through the main online databases of indexed research, books and current legislation. Research carried out with information spreadsheet of cost management of materials of the Urgency and Emergency Service, year 2015. A new literature review was done in the years 2020 and 2021, a period marked by the Public Health Emergency of International Importance COVID-19 and the National Vaccination Campaign against COVID-19. This research respects the Resolution n°580, of March 22, 2018 that disposes the ethical specificities of research of strategic interest for the Unified Health System.14 And in accordance with the Law Nº12.305, of August 02, 2010, National Solid Waste Policy, Solid Waste Management Plan and Environmental Management.[15]

The objectives walked, and consisted of addressing the actions to combat the Aedes aegypti mosquito and the proper disposal of solid waste in the activities of the Programa Saúde na Escola e Crescer Saudável (PSE). Research carried out in a municipality located in the Sul-Fluminense region, in the interior of the state of Rio de Janeiro/Brazil, with a geographical area of 245, 139 km^2 in the Atlantic Forest biome, established on June 1st 1989, with a current population estimated at 30 thousand inhabitants.[16] It is a small public hospital with a Clinical Medicine Service with wards and adult beds; an Emergency Care Service with hypertension beds and a Stabilization bed; a Laundry; a Kitchen; a Sterilization Center; a Surgical Center with capacity for medium complexity procedures and two General Surgery beds; a Maternity Ward with a pre and post delivery room; a Pediatrics Service; a Neonatology Service; and a Hospital Infection Control Committee.

Data were collected by means of a documental survey of cost control from the Logistics Manager of the Storeroom Service. Inclusion criteria: nursing care in the procedure of preparation and administration of fluids by peripheral venous route in the Urgent Care and Emergency Service. To develop the study of dengue virus prevalence and incidence in Brazil, the Epidemiological Bulletins of the Ministry of

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Health were consulted and analyzed by geographic region.

Infusion solutions were excluded from the research, as these data are controlled by the Pharmacy Service, therefore infusion products were not accounted for, and only those for preparation and administration were evaluated. Also not counted were: micropore tape, aseptics, and personal protection equipment. For data analysis a multiple case study was performed, "this type of research analyzes a phenomenon or situation by means of a study carried out in a specific time-space. The multiple case study was used to bring more reliability and generalization power to the effectiveness of the measurement instrument created. It will also allow some more consistent conclusions in comparison between the various results found". [17]

RESULTS AND DISCUSSION

The nurse is the professional of the multiprofessional team who performs the first contact with the client in emergency units through risk classification, this activity is understood as an initial assistance aiming to recognize the main signs and symptoms associated with the disease and subsequent referral to the specialties. A good initial assessment results in lower rates of complications associated with the disease.

Regarding dengue in Brazil, from the third to the seventh day of the onset of the disease, when defervescence occurs, signs and symptoms may appear such as: significant and frequent vomiting, intense and continuous abdominal pain, painful hepatomegaly, respiratory distress, sleepiness or excessive irritability, hypothermia, bleeding of mucous membranes, decreased sweating, and cavitary effusion.[1-3]

Knowledge about the disease cycle is important for a good evaluation; many signs and symptoms may be accompanied by other comorbidities; therefore, the health team that works in emergencies must be previously trained according to the recommended conduct and staging. The nurse as a member of the health team is one of the professionals who most promotes and disseminates information, it provides collective knowledge.

The hemorrhagic manifestations such as epistaxis, gingivorrhagia, metrorrhagia, hematemesis, melena, hematuria, associated with thrombocytopenia, are an alarm signal for health professionals, because the patient is at risk of developing severe forms of the disease.[1-3] The severe manifestations of the disease must be closely monitored and followed by health professionals, and notification must be made as soon as the disease is diagnosed.

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A suspected case of dengue is any patient with acute febrile illness lasting for seven days, accompanied by at least two of the signs or symptoms associated with dengue. Every suspected case of dengue should be reported to the Epidemiological Surveillance Office, and serious forms of the disease must be reported immediately.[1-3]

Epidemiological surveillance is defined by the Organic Law on Health, described in the Manual of the Ministry of Health as: "A set of actions that provides knowledge, detection, or prevention of any change in the determining and conditioning factors of individual or collective health, in order to recommend and adopt measures for prevention and control of diseases or illnesses.

The data collected from the anamnesis and physical examination allow us to direct the treatment to the correct use of therapeutic measures. The appropriate management of clients presenting with signs and symptoms characteristic of dengue aims at early recognition of alarm signs, monitoring and reestablishment of cases, and prompt water replacement.

In this context, below are some guidelines from the Ministry of Health, regarding risk classification of the client, characteristic signs and symptoms of dengue, with the aim of directing therapeutic measures appropriate to each staging and reducing waiting times in the health service:[1-3]

Special clinical conditions: Infants < 2 years; pregnant women; adults over 65 years of age, with hypertension or severe cardiovascular disease, diabetes mellitus, chronic obstructive pulmonary disease, chronic kidney disease, peptic acid disease, hepatomegaly, and autoimmune diseases.[1-3]

Blue Group - A: No alarm signs or symptoms, negative snare test (induced skin bleeding), and no special medical conditions or comorbidities. Management: Viral isolation for serology. Treatment: Symptomatic.[8,10-11]

Green Group - B: Absence of alarm signs and symptoms with petechiae, positive loop test, with special clinical conditions or comorbidities. Management: Serology, complete blood count. Treatment in an outpatient regime with daily clinical reevaluation. Supervised oral hydration.[1-3]

Yellow Group - C: Fever for up to seven days, accompanied by at least two non-specific signs and symptoms (headache, prostration, retro-orbital pain, exanthema, myalgia, arthralgia) and compatible epidemiological history. Presence of any alarm sign. Hemorrhagic manifestations present or absent. Management: Serology, complete blood count, dosage of serum albumin and transaminases, imaging exams.

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Treatment: Inpatient bed for 48 hours. Volume replacement.[1-3]

Red Group - D: Fever for up to seven days, accompanied by at least two nonspecific signs and symptoms (Headache, prostration, retro-orbital pain, exanthema, myalgia, arthralgia) and compatible epidemiological history. Presence of signs of shock, respiratory distress, or organ dysfunction. Hemorrhagic manifestations present or absent. Management: Serology, complete blood count, serum albumin and transaminases dosage, imaging exams. Treatment: Intensive care bed. Rapid venous hydration.[1-3]

Shock with myocardial dysfunction may require inotropic agents, both in the extravasation phase and in the plasma reabsorption phase, remembering that in the first phase it requires fluid replacement and in the second phase there is fluid restriction.[1-3] Thus, it is possible to recognize the best conduct for the treatment of the disease; fluid replacement is essential in the initial phase, but it is worth noting that in the plasma reabsorption phase there is fluid restriction, hence the need for a good characterization of the correct staging of the disease.

Hemorrhagic disorders in dengue are caused by capillary fragility, thrombocytopenia, and consumptive coagulopathies, and should be investigated laboratorially; it is associated with frequent bleeding and a prolonged state of hypovolemia. Early and adequate volume replacement is a determining factor for the prevention of hemorrhagic phenomena.[1-3]

Dengue Hemorrhagic Fever and Dengue Shock Syndrome are the forms of viral sepsis, is characterized by the extravasation of fluids and proteins from the vascular bed into the interstitial space and serous cavities due to generalized or selective increased vascular permeability caused by a generalized systemic inflammatory response.[1-3]

Signs of shock include rapid and weak pulse; hypotension; converging blood pressure (BP), difference between Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) ≤ 20mmHg in children, and in adults, the same value indicates more severe shock; cold extremities; slow capillary filling; moist and sticky skin; oliguria; neurological manifestations, such as agitation, seizures, and irritability in some patients.[1-3]

The main causes of death are associated with severe refractory shock, Disseminated Intravascular Coagulation, Adult Respiratory Distress Syndrome, liver failure, heart failure, encephalitis, meningitis, Multiple Organ Dysfunction Syndrome.[1-3]

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Finally, it should be noted that intravenous fluid replacement is the recommended treatment for the reestablishment of organic functions in cases of dengue. The care nurse is the professional of the multiprofessional team who performs the initial contact with the client in the emergency room when performing the risk classification, directing him to the specialties, in view of this, he needs prior knowledge about the management and treatment of the disease.

Chart 1 - Distribution of supplies used in the process of preparation and administration of solutions by peripheral venous catheters in the Urgency and Emergency Service. Itatiaia, RJ, Brazil, 2015

Supplies	Quantity
Alcohol 70%	274
Needle 13x4,5	6000
Needle 25x7	5400
Needle 30x8	10700
Needle 40x12	12210
Intravenous catheter 14G	115
Intravenous catheter 16G	85
Intravenous catheter 18G	930
Intravenous catheter 20G	3532
Intravenous catheter 22G	5013
Intravenous catheter 24G	1295
Scalp 16	394
Scalp 21	3149
Scalp 23	4780
Syringe 1 ml	1965
Syringe 3 ml	6107
Syringe 5 ml	11030
Syringe 10 ml	12230
Syringe 20 ml	9317
Total	**94526**

Source: Municipal Hospital Warehouse Service

In the analysis of materials used for venoclysis in the Adult Emergency Department, of the 19 products analyzed 100% have direct relationship with the process of preparation and administration of solutions by peripheral venous route, it was observed that the nursing staff adheres more to the semi-flexible intravenous catheter number 22 gauge (46%) followed by intravenous catheter number 20 gauge (36%). Of the needled intravenous catheters scalp most used were number 21 gauge (38%) followed by number 23 gauge (57%).

Graph 2 - Distribution of the most used needles in the Emergency and Urgent Care Service. Itatiaia, RJ, Brazil, 2015

Needles	% Uso
Needle 13x4,5	17%
Needle 25x7	16%
Needle 30x8	31%
Needle 40x12	36%
Total	**100%**

Source: Municipal Hospital Warehouse Service

Data show that nurses tend to choose smaller caliber catheters to develop their actions. The 40x12mm needle has great representativeness in nursing actions, and the larger gauge is the most used (36%) to manipulate, aspirate and dilute drugs; however, a decrease in use was observed in the second trimester.

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Chart 3 - Distribution by quarter of the products most used by nurses and nursing technicians in the Urgent Care and Emergency Service. Itatiaia, RJ, Brazil, 2015

Supplies	Use of inputs per quarter		
	1st quarter	2nd quarter	3rd quarter
Syringes 10ml	5180	3510	3540
Catheter 22	2069	854	1190
Needles 40x12	6200	4110	8400
Total	**13449**	**8474**	**13130**

Source: Municipal Hospital Warehouse Service

For the administration of solutions via peripheral venous catheters, there is greater adherence with the 30x08mm needle (31%) followed by the 25x07mm needle (16%), but needles and syringes can also be used to administer solutions intramuscularly, subcutaneously, and intradermally. Group E piercing-cutting materials must be packaged separately, in a rigid, watertight container and also identified by the symbology of infectious substance: biological risk.

Graph 4 - Distribution of the most used syringes by the nursing team in the Emergency and Urgent Care Service. Itatiaia, RJ, Brazil, 2015

Syringes	% utilization
Syringe 1 ml	5%
Syringe 3 ml	15%
Syringe 5 ml	27%
Syringe 10 ml	30%
Syringe 20 ml	23%
Total	**100%**

Source: Municipal Hospital Warehouse Service

The most used syringes were: 5ml (27%), 10ml (30%), 20ml (23%). The macrogot infusion line was used in large volume infusions (64%), and when associated with the polyfix two-way infusion line in infusion of multiple drugs (36%), it demonstrates the presence of peripheral venous infusions in large volumes of solutions associated with polytherapy.

Graph 5 - Distribution of expenses per month of peripheral venous catheters number 20 and 22 gauge in the Emergency and Urgent Care Service. Itatiaia, RJ, Brazil, 2015

Month	Expense R$
January	229,8
February	256,4
March	603,2
April	752,4
May	288,6
June	204,9
July	273,5
August	243,4
September	239,2
October	249,6
November	275,6
December	280,8
Total	**3.897,4**

Source: Municipal Hospital Warehouse Service

In March and April the usual consumption of supplies in the Urgency and Emergency Service exceeded 50% of normal values. In the distribution per month of 20 and 22 gauge peripheral venous catheters in the Urgency and Emergency Service, they comprised the months of recording of incidence and prevalence by the dengue virus in Epidemiological Bulletins in Brazil.[18]

Permanent Preservation Areas (APPs) are made upo f forests and other forms of natural vegetation, located along rivers, water courses, lakes, natural or artificial

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reservoirs, springs and sandbanks. These areas have the environmental function of preserving water resources, landscapes, geogogical stability, biodiversity and gene flow; transfer from one population to another, of fauna and flora. APPs occupy more than 20% of the Brazilian territory and were established by the current forest Code (Law 4.771/65).[15]

On the other hand, Areas of Social Interest, territories where essential activities are carried out to protect the integrity of native vegetation, such as: prevention, fire fighting, erosion control; and protection of plantations with native species, as well as Works, plans, activities or projects defined bey the National Council for the Environment (Conama). The area of social interest also includes locations where are sustainable agroforestry management activities, practices on small Family properties that do not harm the vegetation cover or the environmental function of the place.[15]

The Public Utility Area is divided into three modalities: the first is intended for national security and health protection activities; the second comprises essential infrastructure Works for public transport, asnitation and energy services, such as telecommunications and broadcasting services; the third encompasses the other Works, plans, activities or projects provided for in a resolution of the National Council for the Environment (Conama).[15]

Historically, during nursing education, emphasis is given to humanization and the process of personal interaction and inter-relationships. Besides, it is up to the nursing professional, in the hospital routine, to be closer to the client. These factors seem to contribute to nurses "listening" more to the client and acting in a more shared manner.[22]

CONCLUSION

The evaluation made it possible to visualize points for improvement in the process of preparation and administration of solutions by peripheral venous route in the Urgent and Emergency Care Service, contributing to the strengthening of continuing education in health.

The observations in the use of smaller caliber catheters by the nursing staff in urgency and emergency in large volume infusions may indicate standardized inputs acquisition processes, as well as the profile of users of the Unified Health System with characteristics of capillary fragility, however, research needs to be improved.

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