Application of the Nursing Process in a Pregnant Woman with *Falciparum* Malaria in the Brazilian Amazon: A Case Report

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Abstract

Objective: To implement the nursing process in a pregnant woman with falciparum malaria.

Method: Case study, qualitative approach, unique and intrinsic type. Conducted in the mixed unit in a county of the Brazilian Amazon in the months of May and June 2018. The primary data were obtained through anamnesis, physical examination and clinical judgment and the secondary data were extracted from the medical record to support the nursing diagnoses proposed by North American Nursing Diagnosis Association (NANDA), interventions and results as Nursing Interventions Classification (NIC) and Nursing Outcome Classification (NOC) respectively, in the light of Wanda Horta's theory.

Results: Nursing diagnoses found according to basic human needs were: intolerance to activity; hyperthermia; risk of electrolyte imbalance; acute pain and ineffective peripheral tissue perfusion.

Conclusion: Standardized and individualized nursing care provided quality care and health recovery of pregnant women, preventing severe complications.

Keywords: Nursing Process; Malaria; Pregnant; Plasmodium falciparum

Introduction

Malaria is the parasitic disease of tropical regions that causes the most social and economic problems for the world. According to the World Health Organization (WHO), 219 million people are infected and 660 thousand die every year. Children, the elderly and pregnant women suffer the most serious repercussions from the disease [1].

The disease is caused by the protozoan of the genus *Plasmodium*, divided into four species identified as *P. vivax*, *P. falciparum*, *P. ovale* and *P. malariae*. The latter was not recorded in Brazil, only on the African continent [1].

Malaria is transmitted by the blood supply of the female mosquito of the genus Anopheles, causing symptoms such as fever, chills among others. It is worth noting that man is the only important reservoir from the epidemiological point of view [2].

Between the cases recorded in Brazil, 99% are endemic to the Brazilian Amazon, divided into the states of Acre, Amapá, Amazonas, Maranhão, Mato Grosso, Pará, Rondônia, Roraima and Tocantins [1].

The *P. vivax* is the most prevalent agent in the Amazon region, especially in Pará, Amazonas and Rondônia. Second in numbers of infection in the region is *P. falciparum*, it is also more aggressive and multiplies rapidly. It is responsible for causing resistance to antimalarials and being the cause of the most severe and lethal cases [3].

In malignant malaria there are no relapse or latency periods and the clinical course is more acute and severe. If this type of malaria is not treated early, it will progress to numbness, coma and even death [1].

In pregnant women the parasites lodge in the capillaries of the placenta where they accumulate and multiply, as it is an isolated place away from the body's defenses. In this place there will be a large number of infected red blood cells that are released to attack more red blood cells, leading to blockage of the capillaries of the same, microcirculation congestion, hypoxia and blocking of nutrients to the fetus [4].

The pregnant woman's symptoms may include headache, myalgia, nausea and vomiting. During a physical examination it is possible to observe cutaneomucous pallor, jaundice and hepatosplenomegaly. These are all symptoms that are related to the disease and whether they appear before or after depends on the ability of the organism to cope with this invader [4].

The assistance to the individual with malaria is configured as fundamental, where nursing is inserted in the context of the nursing process (NP). This method gives nurses scientific support and autonomy, promoting quality care and safety in planning [5,6].

NP development includes the obtaining data, planning and directing individual care. This standardized method allows you to organize sequential actions that integrate the patient, family and community. It comprises of five stages: history (Anamnesis and physical examination), diagnostics, planning, implementation and evaluation [6,7].

Horta's theory, developed from Maslow's theory, imposes concepts that substantiate nursing, considering it as "the science and art of assisting human beings in meeting their basic needs" with the aim of patient independence. It also includes the concept of nursing assistance, which is the aid provided to human beings when they are unable to care for themselves [8].

Nursing based on scientific principles promotes safety and understanding of the clinical interventions observed and performed by the nurse during the (NP). Since the use of evidence-based practices (EBP), they combine study-backed care solutions and the professional's expertise, in addition to considering the principles and values of the client [9].

The study is justified by considering the severity and complications for both the mother and the fetus, as well as stimulating new studies involving women at risk for malaria in the Amazon region. Thus, the present study aims to implement the nursing process in a pregnant woman with *falciparum* malaria. The guiding question that directed the study was: Is it possible to apply the nursing process with the use of classification systems to a pregnant woman with *falciparum* malaria?

Method

This is a case study, with a qualitative approach, of a unique and intrinsic type. The case study is a method that tends to unravel complex phenomena inserted in some context of real life or in its natural environment without the interference of the researcher. It aims to describe the situations or facts, in addition to the search for knowledge of the phenomenon seeking to relate to case evidence [10].

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The case study does not accept a rigid roadmap, but follows the 4-phase design (Gil 17):

1. Delimitation of the unit-case;

2. Data collection;

3. Selection, analysis and interpretation of the data;

4. Preparation of the report.

Case Report

The participant was diagnosed with malaria as a pregnant teenager in the 18th week of gestation. The cause was *Plasmodium falciparum*, and she was hospitalized in the mixed unit of Atalaia do Norte - Amazonas.

Before the research was carried out, written consent was requested to participate in the study. The acceptance and signature of the informed consent form protected the confidentiality and secrecy of the information. To complete the history, primary data was obtained through anamnesis, physical examination and clinical judgment, guided by an interview script during the nursing consultation. The secondary data were extracted from the medical record to subsidize nursing diagnoses (ND).

The scenario of the study was a mixed Health Unit, in the city of Atalaia do Norte-Amazonas, in the period of May and June 2018.

After collecting the clinical evidence, the analysis took place in five stages: history, diagnosis, planning, implementation, and evaluation in the theoretical light of the basic human needs of Horta [8], in the context of the individual affected by malaria. The ND used were proposed by the North American Nursing Diagnosis Association (NANDA) [11], evaluating the interpretation of the data, the grouping and naming of the diagnostic titles.

The development of the study met the national standards of research ethics of resolution 466/2012 of the National Health Council [1], involving human beings and obtained approval of the research ethics committee of the Amazonas State University on May 09, 2018 under the opinion 2,645,959.

G. S. S, female, 24 years old, farmer, incomplete high School, family income of one minimum wage. Single, three minor children, lives with her parents in a wooden house 2 rooms without sanitation and Electric Light in the riverside community of the county of Atalaia do Norte, Amazonas.

She went to the hospital unit complaining of fever, chills and sweating. She reported that the symptoms first appeared three days ago, always in the late afternoon with chills, sweat, high fever, headache, weakness and fatigue. Mentioned further, four episodes of vomiting were preceded by nausea.

Five years ago, she was diagnosed and treated with malaria five years ago, caused by the agent *Plasmodium* vivax. She has a diabetic mother and hypertensive father. Gynecological history: menarche at 12 years, coitus at 10 years, was in the fourth gestation, has three children, all of normal birth and alive. Multiparous, denies abortions, date of last menstruation (DLM) January 5, 2018, probable date of delivery (PDD) October 13, 2018. The gestational age (GA) at the time of the consultation was 19th week of gestation.

She was apprehensive and concerned about the gestation and health of her fetus.

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It is known that children, pregnant women, travelers and immunodeficient people, newcomers to endemic areas are part of the risk group and can have manifestations in the most severe and fatal form of the disease. Complications occur mainly in the first trimester, when the child's organs are initially formed [12].

Physical examination

27/05/18 - Weight: 64 kg, height: 1,60 cm, regular general condition, walks with difficulty, pale (2/4++), ease of pain, feverish. Vital signs: temperature 39.7ºC, blood pressure: 110 x 80 mmHg, heart rate of 97 beat per minute, respiratory rate of 21 breath per minute. Perception and cognition: conscious, oriented and communicative. Preserved scalp, hypocorated oral and nasal mucosa, presence of caries and tooth failure in the upper and lower arch. Chest and pulmonary auscultation: symmetrical, good expandability, vesicular murmurs and absence of adventitious noises. Cardiac auscultation: within normal. Abdomen: the abdomen was slightly protruding and presence of hydro noises. Extremities: mobility in the upper and lower limbs and decreased muscle strength. Integument: sweating, chills skin pallor (2/4+++), capillary filling > 3 seconds.

Due to the gestational condition, the immune system is vulnerable; therefore, it is exposed sharply to several febrile infectious conditions, which can express symptoms similar to malaria. In order to confirm the clinical suspicion, it is necessary to collect blood samples and perform the visualization of the parasite under an optical [4].

Result

Blood examination was performed, which detected the presence of *Plasmodium falciparum* (+) + 5 gametocytes. Complementary tests such as complete blood count, urine type 1 or aminotransferases (TGO/TGP) that could help control the disease were not performed, due to the lack of material in the laboratory of the county hospital. After confirmation of the diagnosis made by the doctor on duty, the treatment started for pregnant women: Clindamycin 300 mg, 1 tablet of 6/6 hours and quinine 500 mg, 2 tablets of 12/12. For fever and vomiting received Dramin and Paracetamol.

Without immediate diagnosis and treatment, erythrocyte parasitemia can reach critical values, massive hemolysis, multi-organ dysfunction and induce death of the mother and fetus [12].

Nursing process planning

Based on clinical evidence, an assistance planning based on the basic human needs (BHN) of Wanda Horta theory and NANDA, NIC and NOC classification systems was developed.

Needs Humans Basics	Nursing Diagnoses NANDA	Nursing Interventions NIC	Expected Results NOC
1. Oxygenation	1.Intolerance to activity related to the supply and demand of oxygen evidenced by fatigue at minimum efforts/ weakness	1. Power control • Assess the physiological condition in activities that result in fatigue; • Guide to keep bed rest as long as possible; • Monitor and note signs of fatigue or exertion; • Monitor laboratory tests with an emphasis on hematocrit and hemoglobin, when available.	1. Energy conservation Indicator: • Balances activity and rest; • Recognizes power limitations; • Uses techniques to conserve energy; • Organizes activities to conserve energy.
2. Sleep and Rest	2. Acute pain related to biological injurious agent (*Plasmodium falciparum*) evidenced by verbal report of pain/ pain facies/headache	2. Pain control • Assess location, characteristics, intensity, duration and frequency of pain using the numerical scale 0 to 10 points; • Explore the factors that improve or worsen pain; • Control environmental factors that may influence the response of discomfort; • Provide and encourage the use of activities for distraction.	2. State of comfort; Comfort State: ambient Indicator: • Physical well-being; • Environment temperature; • Environment lighting; • Noise control.

3. Thermal Regulation	3. Hyperthermia related to increased metabolic rate evidenced by axillary temperature (39.7^{0}C)/warm skin.	3. Temperature regulation • Apply cold bags to thermoregulatory places (armpits, popliteal fossa); • Remove thick clothes and blankets; • Monitor skin color and temperature; • Adjust the ambient temperature of the room to the needs of the patient.	3. Thermoregulation/comfort State: Environment Indicator: • Decreased skin temperature; • Reported thermal comfort; • Change in skin color; • Environment temperature.
4.Electrolytic Regulation	4. Risk of electrolyte imbalance evidenced by Nausea/and vomiting episodes	4. Control of vomiting/Hydrous Control • Evaluate the emesis (color, consistency, presence of blood); • Identify the aggravating factors of vomiting; • Monitor hydration status; • Monitor electrolytes in laboratory tests.	4. Electrolyte balance/Hydrous balance Indicator: • Cutaneous Turgor; • Moist membranes/mucous membranes; • Balance of intake and elimination in 24 hours; • Serum electrolytes.
5. Vascular Regulation	5. Ineffective peripheral tissue perfusion related to impaired blood flow evidenced by skin pallor/capillary filling > 3 seconds	5. Circulatory precautions • Conduct comprehensive assessment of peripheral circulation; • Perform capillary filling control; • Monitor skin color and temperature; • Keep limbs warm with blanket or socks.	5. Tissue perfusion: peripheral Indicator: • Capillary filling on the toes; • Skin temperature on the extremities; • Blood flow through the peripheral vessels

Table 1: Assistance planning based on the theory of basic human needs of Wanda Horta and classification systems NANDA, NIC and NOC.

Nursing evaluation

11.06.2018 - During the evaluation, the BHN found were oxygenation, sleep and rest, thermal regulation, electrolyte regulation and vascular regulation. That way, they subsidized the care plan based on intolerance to activity; acute pain; hyperthermia; risk of electrolyte imbalance and ineffective peripheral tissue perfusion, identified during the hospitalization period. Thus, the nursing team pointed out the important aspects to be observed and the behaviors to be implemented in order to prevent possible complications and promote the

recovery of the participant, based on the clinical picture presented. The identification of the nursing diagnosis of intolerance to activity was perceived immediately and energy conservation measures were implemented with expected results in the identified indicators.

The importance of care about hyperthermia is highlighted, since most of the symptoms were linked to *P. falciparum* (gametocytes) confirmed by the examination of thick gout, but the most recorded agent is *Plasmodium* vivax in the general population and pregnant women. After the interventions the temperature fell within normal parameters (36.7ºC). There was an improvement in the electrolyte imbalance, vomiting episodes ceased, and acute pain indicators remained on a numerical scale of 0. Apprehension related to pregnancy and fetus was perceived as substantial 2.

Early diagnosis during pregnancy is considered essential for the control and immediate initiation of treatment in order to avoid the complications inherent in *falciparum* malaria.

The presence of parasitemia in an asymptomatic or transient form can cause deleterious effects on the fetus and mother. After treatment and evaluation of healing check Blade, the patient was discharged from the hospital [13-19].

Final Considerations

The Amazon is an endemic area for malaria. The early diagnosis, the implementation of the care plan, the involvement of the multi-professional team became a condition yes here not for everything to become effective and avoid severe complications or even death.

Gestational malaria infers significant complications in fetal development, adding the risk of neonatal death, miscarriage and premature birth, as well as slowing intrauterine growth, culminating in fetal development delay and low birth weight. For pregnant women, complications can be severe, since the placenta is a site conducive to the multiplication and spread of the parasite, and severe anemia, cerebral malaria and shock can develop.

It is noteworthy that the implementation of the nursing process using the classification systems NANDA, NIC and NOC was unique in the care and resolution of the clinical evidence present. An important finding lies in the fact that NP is not used in this institution, the study contributed to foster the interest of the nursing staff of the hospital practice in using this methodology with their patients in the planning of care actions.

The contribution of the study lies in the adoption of the systematized practice in pregnant women with malaria, the risk of presenting changes during pregnancy in the course of an episode of the disease, seems to be similar regardless of age, parity or background.

The study was limited by the unique character and intrinsic type where and when the collection takes place. Finally, we suggest the need for other studies where pregnant women are the target of Health actions in endemic areas of the Amazon and will need immediate care to avoid complications to the mother and child binomial.

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