Nurses’ experiences when caring for patients infected with malaria in Tanzania

- A qualitative interview study
Summary

**Background:** Malaria is one of the mosquito-transmitted diseases that is killing millions of people every year, with the highest prevalence in Africa. In Tanzania, more than 90 percent of the inhabitants are at risk of being infected with malaria. The malaria parasite Plasmodium falciparum does not obtain specific symptoms and differential diagnoses can make it difficult to diagnose malaria. If malaria gets developed into a severe stage, it can affect organs and eventually cause death. Nurses have the role to educate inhabitants on how to prevent malaria.

**Purpose:** The aim of this study was to describe nurses’ experiences when caring for patients infected with malaria in Tanzania.

**Method:** Study with a qualitative approach. A content analysis with a manifest structure was carried out, based on individual semi-structured in-depth interviews with nurses.

**Result:** Nurses found it difficult to differentiate malaria from other diseases, like typhoid or meningitis. Nurses focused mostly on patients’ physical by working with medical treatment and education about malaria prevention.

**Conclusion:** This study highlighted the importance for nurses of being educated about malaria and knowing how to assess its condition as it can be a mortal disease.

**Keywords:** Person-centered care, Medical treatment, Differential diagnosis, Education, Prevention.
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Introduction
Around one billion people worldwide obtain an infection by vector-borne diseases annually, and one of these infections is malaria (World Health Organization, 2014). In 2017, there were 290 million cases of malaria worldwide (World Health Organization, 2018a). The prevalence over the world is non-consistent and 90 percent appears in Africa (World Health Organization, 2015). Between 2015-2016, the malaria parasites had an average prevalence of 14 percent in Tanzania and more than 90 percent of the inhabitants are currently under risk for transmission (Khatib et al., 2018). Even though the prevalence has been reduced in the 20th century, malaria is still a major cause of mortality in Africa (Fernandes, Moise, Maranto & Beier, 2018). Climate changes are one of the causes that generate and increases the spreading of malaria, which leads mostly to adverse health impacts (McMichael & Lindgren, 2011). Nurses’ have an important role in educating, preventing and giving symptomatic treatment when caring for patients. To be able to do this, nurses need to know about the mosquito vector ecology (Audain & Maher, 2017). According to Butcher (2004) nurses are in need of improving their knowledge and understanding about malaria in order to educate patients about preventive strategies and the risks malaria entails. This since nurses have the duty to inform patients about the danger associated with the disease and in a comprehensible way, still does this education often become brief. Malaria is a mortal disease when it’s not recognized and directly treated (Butcher 2004). Nurses’ experiences when working with patients infected with malaria are therefore a useful insight for nurses to increase knowledge about the disease over the globe.

Background
Malaria
Mosquitoes are the most common vectors, which are living organisms, that can transmit infectious diseases through animals to humans (World Health Organization, 2014). Anopheles is a mosquito species and the female of Anopheles carries Plasmodium parasites (World Health Organization, 2014; Wyand Walker, 2017). Plasmodium falciparum is one of the best-known parasites species that causes malaria (World Health Organization, 2014). The Anopheles mosquitoes are during its active hours between dusk till dawn, seeking humans to bite for a blood meal. Through the bite, malaria is being transferred from the saliva of the mosquitoes into the human’s bloodstream, where the parasites seek the liver and multiply asexually. A process occurs in the liver and the parasites are released for development in the red blood cells and are then reproducing which leads to clinical illness. Malaria can be transmitted to the mosquito when it bites a malaria infected person and when the mosquito thereafter bites other humans the malaria transformation continues (Carter & Mukonka, 2017). The incubation time variates from nine days to twelve months depending on which tribe of Plasmodium parasites that causes the infection (Wyand Walker, 2017). Children, pregnant women and people who have HIV or AIDS-infection have a lack of their immune system (López Del Prado et al., 2014). These people’s lack of immunity is, therefore, entailing a higher risk of becoming infected with malaria. Symptoms that first appear when a patient receives malaria are fever, headache, chills and vomiting (López Del Prado et al., 2014). The fever has generally a mean value of 38,4 Celsius (Sondo et al., 2019).
Non-treated malaria

Malaria causes high fever and can be progressed into a life-threatening phase or cause death if fast and effective healthcare is not available to maintain functional vital organs (World Health Organization, 2015). For instance, malaria can be developed into a severe stage, and patients that have lower immunity towards the parasite have a higher risk to develop severe malaria due to organ failure or metabolic disorders (Li & Weina, 2010). The Plasmodium falciparum parasite is more common to cause severe malaria and it affects organs, such as the brain called cerebral malaria that causes unarousable coma (Wassmer & Grau, 2017; Li & Weina, 2010). Brain swelling can be identified within 50 percent (Wassmer & Grau, 2017). Severe malaria entails anemia because of a ponderous parasite burden in the body that impairs the deformability of the red cells (White, 2018). Slower clearance of the parasites is connected to lower hemoglobin concentration (Zwang et al., 2017). The impact on the red blood cells causes thereafter tissue hypoxia and hyperlactatemia. A delay of safe-crossed blood transfusion for these patients can, therefore, lead to death. Plasmodium falciparum also causes most cases of deaths (White, 2018).

Differential diagnosis

Differential diagnoses are diseases with similar symptoms to one another (Domingo, Charrel, Schmidt-Chanasit, Zeller & Reusen, 2018). Malaria has non-specific symptoms in an early stage and can, therefore, be considered as a differential diagnosis when an acute febrile illness occurs in a patient (Gulati & Maheshwari, 2011). It can be difficult to diagnose malaria since patients are not showing specific symptoms of the Plasmodium falciparum parasite (Sondo et al., 2019). One febrile illness that also appears with non-specific symptoms during the first week is typhoid and two other differential diagnoses to malaria are yellow fever and gastroenteritis (Domingo, et al., 2018; Carter & Mukonka, 2017). In one study made in Tanzania, it has been shown that several children that suffered from fever which is not a malarial one, had amoebic gastroenteritis instead (D’Acremont et al., 2014). Another differential diagnosis is Tick-borne relapsing fever (Talagrand-Reboul, Boyer, Bergström, Vial & Boulanger, 2018; Melkert, 2016). The symptoms of this febrile disease are often indistinguishable from people infected with malaria (Melkert, 2016). In a study conducted in Tanzania, it is mentioned that meningitis and malaria are differential diagnoses to each other and almost ten percent of the patients diagnosed with meningitis were also positive for malaria (Storz, Matuja, Schutzhard & Wrinkler, 2016). To reduce deaths, it is essential to detect an early malaria diagnosis (López Del Prado et al., 2014). A symptomatic based diagnosis is, therefore, required when nurses provide and fulfill their patients care, which unfortunately does not exist for all patients infected with malaria (Domingo et al., 2018).

Treatment

The treatment for malaria varies based on if the patient has suspected or confirmed malaria, and if the patient has uncomplicated or severe malaria. If there is a case of suspected malaria, a blood sample must be taken with a positive or a negative result, and the treatment can start only when the diagnosis is confirmed. The most effective treatment for adults with uncomplicated malaria is the artemisinin combination therapy (ACT), a treatment that clears out the parasites and their life cycle in a broader length (Lallo, Shingadja, Bell, Beeching, Whitty & Chiodini, 2016). This results in a rapid clearance through three days of treatment. The ACT cure combining with the fast diagnosis has an important dent in malaria morbidity and mortality (Kelly, Koudakossi
In severe malaria are the drugs Quinine, Artesunate or Artemether administered, and the injection method depends on the choice of drug (Li & Weina, 2010). The most effective treatment for severe malaria is receiving antimalarials parenteral as fast as possible. Both in uncomplicated and severe malaria the nurses and doctors observe the patient with close intervals. If needed, fluids are given for maintaining the fluid balance (Lallo et al., 2016).

Prevention
Education is needed to make the population more aware of malaria (Hunter, Denman-Vilale, Garzon, Allen & Schumann, 2007). Nurses have an important role in teaching their patients how to prevent malaria and how to manage self-care, as this can contribute to the improvement of morbidity and mortality (Wyand Walker, 2017). It is also the task for nurses to educate patients that antimalarial drugs do not provide 100 percent protection. Antimalarial drugs must, therefore, be combined with other strategies to avoid mosquito bites (Brewer, 2014). The role of nurses in preventing malaria include informing patients about the increased risk of becoming bitten by a mosquito at night (Wyand Walker, 2017). Nurses’ role is also to inform patients about the risks of being exposed to malaria when traveling to areas with higher risk. Therefore, nurses must be educated about malaria and its preventive medicines (Butcher, 2004). Brewer (2014) describes several malaria prevention strategies for nurses to inform patients about. One of the recommendations is to apply DEET (N, N-diethyl-meta-toluamide), on the skin as an insect repellent, which is the most effective repellent in the market. Nurses should also inform patients about wearing long-sleeved shirts and long pants, which are especially beneficial in preventing mosquito bites in the evenings (Brewer, 2014). Another preventive measure, which is the most common one, is to prevent mosquitoes from biting by surrounding the beds with nets (Kelly, Koudakossi & Moore, 2017). Furthermore, it is important that nurses advise patients to eliminate stagnated water to reduce breeding grounds (Wyand Walker, 2017).

Person-centered care
The concept person-centered care (PCC) emphasizes the importance to acknowledge the person behind the patient and to see a human being with its own will, needs, and feelings (Ekman et al., 2011). PCC is grounded in the principle of caring for others and many nurses practice this care towards persons (Frisch & Rabinowitsch, 2019). Traditionally, the nursing profession has been seeing the person as a whole (McEvoy & Duffy, 2008) and according to Puchalski (2013) are PCC seen as “whole-person care”, which is care that also emphasizes psychological, social and spiritual domains of the person and not only the physical domain. Nursing is also theorized as an element of PCC (Siouta, Farrell, Chan, Walshe & Molassiotis, 2019). PCC is, moreover, determined as one of the nurse’s six core competencies (Cronenwett et al., 2007). PCC contains six components which include getting to know the care-receiver, establishing a partnership, share the responsibility and power, empower the person, show trust and respect and to communicate. Getting to know the care-receiver are health-care professionals’ responsibility, this component is important as it can help care-providers to see the uniquely person and not the disease (Sharma, Bamford & Dodman, 2015). People should, also, foremost, be treated as individuals rather than being defined as a condition (Kennedy, 2017). The person’s narrative stands centrally in conjunction with obtained results of thoroughly medical examinations and tests (Wallström & Ekman, 2018). A person’s rights, strengths, and future plans must, therefore, as well be considered (Ekman et al., 2011). Establishing a partnership is needed to enable PCC,
as this can encourage the person to participate in their care (Ekman et al., 2011). Letting the person be active in their care is also needed, as it entails shared responsibility and shared decision making (Sharma, Bamford & Dodman, 2015; Håkansson Eklund et al., 2019). When a person gets involved in their care, the care becomes individualized and are, therefore, based on the person’s needs, values, and wishes. Empowering means to support the person through practical expertise and to help through resources (Sharma, Bamford & Dodman, 2015). It’s important to have in consideration that the person is an expert on themselves and nurses are experts on the care and treatment (Ekman et al., 2011). A person’s own perspective in the care does, also, have as high importance as the nurse’s professional perspective (Moody, Nicholls, Shamji, Bridge, Dhanju & Singh, 2018). To show trust and respect is needed and this component involves seeing the individual with its own needs, values, experiences and preferences (Sharma, Bamford & Dodman, 2015). The last component is to communicate, which includes health-care professionals to provide persons with precise and understandable information about their care (Sharma, Bamford & Dodman, 2015). Additionally, the PCC approach is not only bound to the person it also includes the surroundings, the ones who are not living with an illness, such as the family and caregivers (Santana, Manalili, Jolley, Zelinsky, Quan & Lu, 2018).

The nurse's role in person-centered care regarding patients infected with malaria
When it comes to persons that are infected with malaria, the role of nurses is to apply and practice the above six mentioned components. To adapt PCC in the care, healthcare providers should see each person as an individual, give personal care, build continuity in the relationship, care for and enable the ability for the person to participate in their care (Moody et al., 2018). Nurses providing PCC are contributing the person to feel an increased level of well-being, which can lead to an improvement in the person’s functional abilities (Morgan & Yoder, 2012). The nurses’ role is to interact through a one to one communication with an understanding of each individual (Audain & Maher, 2017). Likewise, to have fundamental requirements of caring, be capable listeners and understand each person’s perspective of its situation (Moody et al., 2018; Wallström & Ekman, 2018). When generating affective bonds with a person, the quality of bonds is dependent on the carer’s emotional abilities, as well as competences. It is also essential for nurses to have sensitivity toward persons’ moods, minds, and actions (Giménez-Espert, Valero-Moreno & Prado-Gascó, 2019). An ethical view is required when caring through PCC, as well as a partnership approach for persons in need of care, and for their families (Wallström & Ekman, 2018). It is important that, regardless of the person’s class and income conditions, the nurses give equal care based on the individual’s needs. This, as there can be a burden of poverty, a rapidly growing population, a high rate of diseases and limited access to healthcare in low- and middle-income countries (Brownie, Wahedna & Crisp, 2018). Nurses are known for their personal approach and for being excellent educators. Nurses can influence changes in people’s behaviors by educating and informing. Therefore, nurses have the responsibility to improve people's understanding and influence it through education and awareness about protection from mosquito bites (Audain & Maher, 2017). Besides this, to educate about malaria, nurses need to know how to identify, access and manage the disease (Hunter et al., 2007).
Nurse´s role regarding nursing in Tanzania

Nursing consist of preventing illnesses, alleviate suffering, protect, promote as well as to restore the health of individuals (Frances Ndyetukira et al., 2019). Vaåga, Moland, Evjen-Olsen, Leshabari & Blystad (2013) describe when the staff in sub-Saharan Africa are short and supplies of material are limited, nurses therefore tend to fall back on medicalized- and task-oriented care instead of possessing patient-oriented care. In Tanzania, nurses are defined as professionals with knowledge that have the competence to care for persons and families with a nursing quality (Mboineki, Chen, Gerald & Boateng, 2019). Nurses have a diploma degree based on a holistic, spiritual and cultural education and are trained to work in team with other health care professionals. Nurses can also if they are perceived to have the knowledge, prescribe medications and perform complex tasks when there is a shortage of doctors. According to Tarimo, Moyo, Masenga, Magesa & Mzaya (2018) are nurses in the countryside often performing both nursing- and medical tasks, due to few available doctors comparing to nurses. These medical tasks are for example to diagnose, prescribe medications, take laboratory tests and to treat patients and children. Nursing tasks are to identify, control and educate patients about health problems and work with preventive strategies of endemic diseases. Other nursing tasks are to give common treatment for diseases or injuries, give essential medication, food supplies and, safe water, to provide for immunization, and maternal- and childcare (Tarimo et al., 2018).

Purpose

The purpose was to describe nurses´ experiences when caring for patients infected with malaria in Tanzania.

Material and methods

Design

An empirical study with interviews and a qualitative approach was carried out. An inductive approach was chosen, as the goal was to generate a theory at the end of the study, based on the results. This theory was in accordance with Henricson (2017a) discussed in relation to previous research. Data were analyzed through a content analysis with a manifest structure, which meant that the focus was on what the text mentioned (Graneheim & Lundman, 2004). This qualitative content analysis was based on individual semi-structured in-depth interviews (Danielson, 2017) with nurses working in the area of infection at a Tanzanian hospital.

The context

This study was carried out in two medical wards located in the region of Manyara, Tanzania, in September 2019. There was one ward for females and one for males. Each ward had eight rooms with circa three to 20 hospital beds in each room. Some days the wards were full of patients and some days not all the rooms were in use. Relatives to patients had a chair to sit next to each bed, and relatives helped patients with meals, personal hygiene and bathroom visits. Three nurses were working per shift, morning or evening, in each ward with the assistance of nurse-students from the hospital’s connected nurse school. Nurse’s responsibilities were to receive patients and to administrate prescribed medications ordered by the doctor. Nurse’s also contacted the doctor if the patients’ health deteriorated. If patients were unconscious or had no family around, nurses´ also had the responsibility in helping
with hygiene and food intake. Doctors were doing medical rounds in the mornings to diagnose and plan medical actions and treatments together with nurses’ hand of help with taking vitals. Thereafter, were doctors on call for the rest of the day with availability when required. The staff at the hospital sometimes also chose to waive their right to salary because some patients could not afford to pay for the care.

Sample and data gathering
For this study, a convenience sample was used, which is generally implemented when recruiting participants who are currently available to participate in the sample (Danielson, 2017). In this study, the participants were registered nurses, who were interviewed individually. The inclusion criteria for the participants were to have a comprehensible English language, as well as a minimum of three months of experience from the area of infections. The nurse in charge of the medical wards got orally and written information about the study. The information consisted of the study’s questions, purpose, ethical considerations and how the study’s clinical implications were beneficial for nurses globally. The written permission-contract was thereafter signed. The participants were mostly collected single-handed and some available candidates was reached through the nurse in charge. All nurses were orally asked if they would be interested in being interviewed. The interviews were planned to start after acceptance and the time schedule was six weeks. Nine participants participated in the study which are presented in table 1. Every participating nurse had a comprehensible English since the medical language was spoken in English. The nurses were both females and males, and their working experience varied from one year up to 34 years. The experience in the area of infections varied from three months to two years.

Table 1 Sociodemographic characteristics of sample (n = 9)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>5</td>
</tr>
<tr>
<td>Women</td>
<td>4</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>23-59</td>
</tr>
<tr>
<td>20-30</td>
<td>4</td>
</tr>
<tr>
<td>31-40</td>
<td>2</td>
</tr>
<tr>
<td>41-50</td>
<td>1</td>
</tr>
<tr>
<td>51-60</td>
<td>2</td>
</tr>
<tr>
<td>Years of working as a nurse</td>
<td></td>
</tr>
<tr>
<td>1-10</td>
<td>6</td>
</tr>
<tr>
<td>11-20</td>
<td>1</td>
</tr>
<tr>
<td>21-30</td>
<td>1</td>
</tr>
<tr>
<td>31-40</td>
<td>1</td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>Bachelor of Nursing</td>
<td>7</td>
</tr>
<tr>
<td>Midwifery</td>
<td>2</td>
</tr>
</tbody>
</table>

The interviews were semi-structured, which are characterized by their open questions (Danielson, 2017). Danielson further describes how the interviewer adapts themselves to the information that comes up during the interview. The ones performing this study proceeded the interviews as above described content by Danielson’s. The semi-
structured interviews had questions that contained information on nurses’ experiences when caring for patients infected with malaria. The questions therefore included contents with specific care, knowledge, education, importance in caring, treatment- and prevention, benefits- and disadvantages when working with patients infected with malaria (appendix 1). The interviews took place in the wards tea-rooms where each interview was held individually and lasted between 20-40 minutes. Unfortunately, the location of the interviews led to disturbance during two interviews, like an unexpected appearance of a nurse student and a patient emergency during another. The interviews were meanwhile recorded and composed with the aim of gathering data and develop the analysis. The content of the recorded interviews was manually written down and the recordings were then deleted. There were two interviewers that fulfilled this study. Both interviewers were always on-site during the interviews and took turns in each interview to inform about the study and ask questions.

Data analysis
The data from the interviews were analyzed through a conventional content analysis with an inductive approach. A manifest structure was chosen, since a goal of what the text mentions were to describe visible and obvious components, which focused on the content aspects of the experiences. All the interviews were read several times for obtaining an overview (Graneheim & Lundman, 2004). Then, in order to keep track on meaning units answering to the purpose, they were highlighted with colors (Graneheim & Lundman, 2004; Henricson & Billhult, 2017). This text was then divided into meaning units that was related to the same meaning and was condensed into smaller meanings by decreasing text and remaining quality of the text. Of this text, codes were thereafter created. This abstract process is called aggregation and it’s the way to create categories. Sub-categories were established from the codes, and these were thereafter sorted into categories (Graneheim & Lundman, 2004). An example of the content analysis is presented below (figure 1).

<table>
<thead>
<tr>
<th>Meaning unit</th>
<th>Condensation</th>
<th>Code</th>
<th>Subcategory</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>When the patient comes into the hospital, they are given health education and when they go to the community, they may cause no other cases to come into the hospital</td>
<td>Nurses provide the patients with health education, so their return rate will decrease</td>
<td>Health education is given to patients</td>
<td>Patients need for education</td>
<td>Basic nursing</td>
</tr>
</tbody>
</table>

**Figure 1.** Example of the meaning unit, condensation, code, subcategory and category.
Ethical consideration
A form for Jönköping University’s ethical self-examination was filled in and signed before the study began (appendix 2). The permission paper to the nurse in charge was under the Declaration of Helsinki (2013). Participants have the right to uphold autonomy and to voluntarily give informed consent. The informed consent must be documented and be given in the presence of a witness. Every participant should have the opportunity to be informed about the general outcome of the study. Furthermore, a consideration of the risky outcomes in comparison with benefits for participants should be preceded thoroughly (Declaration of Helsinki, 2013). It’s of big importance of how the interviewer handles the material (Danielson, 2017).

Information was given out, including voluntarily-, and anonymously participation for nurses as well as the ability to drop out during the study if wanted, with no specific explanation needed. Therefore, the integrity of the participants was respected. It also included information about how many nurses were needed and for how long each interview was going to last. It was explained why it was of importance to sound record the interviews and how the data was stored with information that only the interviewers had access to. All nurses with an interest in participating were offered a physical copy of the questions. The participants could think through a decision before taking part after receiving this information. However, some nurses preferred to do an interview right away after being informed, while others preferred to think and read through the questions to be prepared for their next shift. This was accepted since the participation was voluntary. The interviewed data was stored with a password for each file so unauthorized people wouldn’t have access to the information, and the data gathering was deleted after completing the examination. Even with obtained consent, there is the responsibility for protecting the privacy of the people involved in the research subject (Declaration of Helsinki, 2013), which lays in the hands of the ones conducting the study. Unfortunately, it was not possible for the interviewed nurses to obtain the result of the study for confidentiality reasons.

Result
The content analysis resulted in two categories and four subcategories, presented below (figure 2). Each subcategory has quotes presented in italicized text from the interviews to fortify the result. The participants are presented as P1-9, in order to clarify a variety of quotes from different interviews. In the results, the context is from different interviews that are compiled and answers to the purpose, and the participants are termed, nurses.

<table>
<thead>
<tr>
<th>Subcategories</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>The patients are diagnosed</td>
<td>Specific nursing</td>
</tr>
<tr>
<td>The patient’s medical treatment</td>
<td></td>
</tr>
<tr>
<td>The delivered care from nurses</td>
<td>Basic nursing</td>
</tr>
<tr>
<td>The patients need for education</td>
<td></td>
</tr>
</tbody>
</table>

Figure 2. Nurse’s experiences when caring for patients infected with malaria are presented through subcategories and categories.
Specific nursing
This category describes nurses’ experiences in specific nursing. Nurses emphasized that full information with an anamnesis, aside from laboratory tests, was useful for nurses to know about. Nurses experienced delays for a proper diagnosis since it was easy to misdiagnose malaria. However, experienced nurses had it easier to differentiate malaria from other conditions in comparison with less experienced nurses. Medical treatment varied depending on the stage of malaria and the risk of death when prolonging medication was also mentioned.

The patients are diagnosed
The first action nurses did when suspecting a case of malaria, was to take a laboratory test of the patient’s blood. This blood sample showed a positive or negative result for malaria infection and a proper diagnosis by the doctor could be determined. Whether the test was positive or negative, nurses explained they contacted the doctor for a consultation. Besides tests, nurses gained lots of useful information through communication with patients and through their physical observation. Nurses though it was useful to gain an anamnesis for a diagnosis, such as where the patient had been traveling lately and from which environment the patient came from. This since different areas in Tanzania had the first priority for malaria while other areas had first priority for other diseases, such as typhoid fever.

“If you get full information from the patient, where he or she lives, do the psychical exam, and when the disease started and progressed, we found out.” (P5)

Patients with malaria did not only show the general symptoms of malaria. According to the nurses, appearing signs of acute mental conditions such as changed behavior or fainting, as well as confusion or unconsciousness were also presented.

“The patient, when he suffers from severe malaria, maybe he comes to change behavior ... It’s affecting the brain ... I think the disadvantage is not happy for me, when the patients come with cerebral malaria” (P9)

Nurses with fewer years of working experience in the hospital described difficulties to differentiate diagnoses such as malaria, compared to experienced nurses. This can be explained since malaria had been more severe back in time than now. Nurses with many years of experience could know the signs of presented and not presented malaria and had, therefore, easier to differentiate. Nurses explained the importance of seeing early signs of malaria since the diagnosis often is misdiagnosed with diseases such as meningitis or typhoid fever. Nurses also mentioned an example of this which is typhoid fever that can only be differentiated when checking the fever over time since it shows only high temperature and appears mostly during night-time.

“Usually when they delay coming to the hospital, or even if they come early and we miss to diagnose. For example, the woman in room eight, they say it is senile dementia and then meningitis, and then after seven tests they found it was malaria. When starting malaria treatment, she recovered, no more fighting, no more dementia, so they misdiagnosed. So, it's easy to misdiagnose malaria.” (P3)
It was also explained by nurses that patients were admitted to the hospital with several conditions, occasionally. For example, patients with severe malaria could also have other diagnoses parallelly, like typhoid fever or brucella. This was shown with no improvement in medical treatment for malaria, and new lab tests were needed to confirm another condition.

**The patient’s medical treatment**

When a laboratory test was positive, nurses proceeded with medical treatment for malaria and this treatment depended on how severe the malaria was. Nurses explained the importance for patients to maintain body fluids when having a fever, therefore, patients received intravenous antipyretics and intravenous fluids. While the fluids were being administrated, the choice of drug was determined by the doctor.

“If you want to slow down the fever, you give fluids. Almost two or three liters ... cause many patients comes with dehydration, so you start to hydrate the patient and then give the patient drugs.” (P2)

Before starting antimalarial treatment, nurses stated the importance of checking for a stable hemoglobin level. When nurses began the treatment, they explained that Artemether-Lumefantrine (ALu) or Artesunate was the first drug of choice when a patient had uncomplicated malaria. ALu could also be used if the diagnosis was not yet confirmed. When Artesunate was given, the patient’s weight was taken for calculating the dose. If the patient instead had severe malaria, the drug Quinine was the first choice. Nurses emphasized that severe malaria was treated with the help of a medical guideline, during which both doctors and nurses worked along. If a patient vomited, nurses gave the drugs in injection form instead of orally. If patients could not eat by themselves, nurses inserted nasogastric tubes for relieving their feeding. Further on, nurses experienced a risk for patients when medicine administration and/or care was prolonged, with an explanation that this could cause death. An example of this was late hospitalized patients who had a severe stage of malaria and could, therefore, be in a life-threatening situation.

**Basic nursing**

The main findings empathize that nurses experienced the need of knowledge about malaria when working as a nurse. To work preventively in a manner to not spread malaria around was emphasized. It was important to work in a team and to provide patients with care along with what was needed to be done for the patient’s survival. When patients recovered, nurses gave education about malaria and how to prevent it to increase their knowledge before going back home. Nurses thought this education had gained more knowledge for the inhabitants and was, therefore, a reason for a decreased prevalence of malaria.

**The delivered care from nurses**

Nurses highlighted the importance of having knowledge about the disease and knowing how to assess the condition, begin the care and how to prioritize it. The temperature was the first thing nurses checked on patients. Nurses explained that depending on whether the temperature was high or low, various nursing actions were performed.
"To reduce fever, I can advise her just to minimize her clothes, she maybe has a lot of clothes, just to remind her, open the window ... I can give her water.” (P7)

When patients entered the stage of low temperature and shivering was presented, nurses provided patients with more clothes and blankets, as well as hot beverages. During the hospital stay, nurses hang up bed-nets around malaria patients to prevent surrounding patients and relatives from being infected. Nurses also emphasized their own self-protection as important, such as having good hygiene and wearing gloves when inserting a cannula. If patients were unconscious, nurses usually changed the patient’s position in bed. Nurses explained the importance of paying close attention to unconscious patients.

“... I think close monitoring is important, especially when someone is unconscious are vital signs important, it's important to know how the vital organs works. “(P4)

When caring for patients infected with malaria, nurses thought that knowledge was gained through a physically view rather than from books, which entailed how to manage the real practice. Nurses said they learned a lot from their patients, like when the disease started and progressed and how signs and symptoms were presented. Nurses also explained that teamwork was needed when caring for malaria patients, indeed one nurse only was not beneficial for patients. By working together as a team, patients’ lives could be saved. When patients were admitted in the early uncomplicated stage of malaria, nurses experienced an advantage for themselves and for the patient, as the patient got cured and could be discharged home. Then, nurses felt as they contributed to decreased rates of mortality in malaria. When patients instead were admitted with severe malaria, nurses experienced a disadvantage. The disadvantaged feelings left discomfort, especially when children or elderly patients suffered from this condition, or when a patient passed away.

“It’s discomfort to me if he or she will become alive or not. It's very hard. But I know that I with my best level give him a good way or to pass away ... but when god plan, my job is to restart again, do better and help people with health.” (P1)

The patients need for education
Nurses thought it was beneficial for themselves and for the inhabitants to know what a mosquito-bite can bring when living in Tanzania. When patients with malaria recovered and had the strength to manage new information, nurses told that patients were given education about malaria and how to prevent it. This education resulted in increased knowledge of how to prevent malaria for themselves.

“If the patient has malaria, specially what you are using is to give ... mosquito net in order to prevent the infection from one person to another... in order to prevent the neighbors who are near to.” (P8)

Education was given by nurses, so the patient and its family could prevent relapsing infections of malaria when going back home. Nurses told this education which contained the appearance of symptoms, how the diseases transmitted through
mosquitoes, how to prevent mosquito-bites and information about treatment that needed to be continued when going back home.

“When the patient comes into the hospital, they are given health educations and when they go to the community, they may cause no other cases to come into the hospital.” (P6)

Some examples of this education were the use of mosquito-nets, to remove stagnated water around houses, to use repellent-cream and to eat prophylaxis in the case of pregnant women. When going back home, nurses explained that mosquito-nets was important as prevention and nets were given to the patients before they leave. Nurses also told that inhabitants nowadays have supposedly gained more education about malaria and thanks to this its incidence has decreased.

**Discussion**

**Method discussion**
The planned purpose for this study was to find out nurse’s experiences when caring for patients infected with mosquito-transmitted diseases such as malaria, yellow fever and dengue fever in Tanzania. Unfortunately, the nurses did not have enough experiences of yellow-, and dengue fever which led to the decision after only two interviews to change the purpose and to focus only on malaria. In addition, this allowed a deeper comprehension of malaria than planned, since the participants had more time during the interviews to focus on this phenomenon.

An empirical and a semi-structured qualitative interview study was considered as a better alternative to a quantitative study. This because individual interviews with nurses provide more individual answers, which contain experiences, perceptions, and opinions in order to answer the purpose. This entails a deeper comprehension of the focused phenomenon in consideration (Peters & Halcomb, 2014; Timmins, 2015). The number of interviewees, the information they received, where the study proceeds and by whom the participants were interviewed influences a study’s credibility and transferability (Henricson, 2017b). The interviews were planned to start after an agreement was found and the dedicated time schedule was six weeks. The study got accepted during its first week and the first interview took place in the third week. The planned method was to collect participants through the nurse in charge. Unfortunately, the nurse in charge was no longer present at the hospital for the first two weeks after the signed permission-contract. It was instead decided to find participants single-handed and nurses were thereafter orally asked if they would be interested in being interviewed. This method was more effective and produced two to four interviews per week. The participants were considered to be six to ten nurses, depending on whether the data saturation was reached. Therefore, the data collection and transcription were conducted parallelly, and the final number of participants were nine nurses. Nine participants were considered as a suitable choice, since each interview produced enough qualitative data. A wider sample of participants results in a bigger data collection, which can bring difficulties (Henricson & Billhult, 2017).

Henricson (2017b) highlights how variations in the sample heighten both the transferability and credibility. It was considered that the study’s transferability had a variety of sample, such as enough number of participants, different ages, genus, and working experience. The last-mentioned would, however, be more transferable if the
working experience was of minimum of six months in the ward of infections instead of three months. The experience in the ward of infections varied from three months to two years. The reason for a short time of working experience in this ward, was because nurses frequently changed wards within the hospital. If including this six-month criterion, it would have been surer that the participants would have possessed even wider and rich information. During the interviews did, unfortunately, one nurse student show up unexpectedly in the tea-room and participated without permission. The information given by this nurse student was not included in the study. During another interview, the nurse needed to go away because of a patient emergency. Both the above-mentioned disturbances might have had a negative influence on the result of the interviews.

In order to have dependability in the study should it be clarified who did the interviews and who transcribed them (Mårtensson & Fridlund, 2017). The interviews were made together, and analysis of the interviews was made both individually and together. Both interviewers went through and reviewed each other’s texts, by doing this the credibility increases (Henricson, 2017b). Mårtensson & Fridlund (2017) also describes that the confirmability in the study’s analysis and result increases when its reviewed by others, which has been done during seminars, in order to preserve neutral data. Data was stored in an offline document with a password and printed papers were locked. Quotes from each participant were used, which according to Carlson (2017) heightens and strengthens the credibility since quotes from each participant represent well the whole sample. The credibility is instead lowered when participants do not take part in the study’s result (Carlson, 2017). Unfortunately, the participants did not receive the result of the study in order to not recognize the interviewees. The result of this study can be transferable to nurses in global contexts. This since mosquito-transmitted diseases, such as malaria, is currently increasing worldwide (Fernandes et al., 2018) and it is spreading around due to climate changes (McMichael & Lindgren, 2011).

Result discussion
The main findings showed that nurses experienced the need for knowledge about malaria, in order to know how to assess the condition, how care could be given, as well as the importance of educating patients on measures to prevent malaria. The nurse’s focus when it came to both specific nursing and basic nursing was mainly on the patients’ physical part and survival. Also, nurses experienced that malaria sometimes was difficult to differentiate from other diseases and was therefore often misdiagnosed. Malaria is known for being a differential diagnosis to other febrile diseases and two of these are meningitis and typhoid (Gulati & Maheshwari, 2011; Storz et al., 2016). Sondo et al. (2019) describe that there are no specific symptoms caused by the Plasmodium falciparum and Butcher (2004) describes how this type of malaria instead are mimicking other diseases. Nurses need to know how to assess and manage malaria and to provide patients with education about the disease (Hunter et al., 2007). Metta, Haisma, Kessy, Hutter & Bailey (2014) highlights self-care as an important aspect for the public health as well as for the role it has in the health care system. Some of the preventive education nurses mentioned are the same as Brewers (2014) prevention strategies, such as self-care. World Health Organization (2018b) mentions that the preventive strategies for malaria and its treatment has been improved during the last decade in Tanzania and as a result, the mortality caused by malaria has decreased. Although efforts to prevent malaria have reduced the number of malaria cases, this serious disease has found changing ways of spreading. For example, malaria mosquitoes have spread to new heights as a result of climate change (McMichael &
Lindgren, 2011). Thus, are sustainable climate change actions considered important for malaria prevention. Another prevention is considered which is the artemisinin-based combination treatment, this treatment is the most cost-effective strategy for controlling malaria in sub-Saharan Africa (Morel, Lauer & Evans, 2005).

In PCC, the care includes both patients and family members (Santana, Manalili, Jolley, Zelinsky, Quan & Lu, 2018). By caring for a patient’s physical part, as the result highlighted, is only one of the four dimensions a nurse should care for in PCC. The other three dimensions are the psychological, social and spiritual parts (Puchalski, 2013). Based on the results of the study, the main focus nurses had in the care was on the fundamental needs for a patient’s survival. According to Hale, Ricotta, Freed, Smith & Huang (2018) is the physical part the most fundamental need for a human, this is the decisive factor for a patient’s health. The fundamental needs include intake of water, food and rest, in order to sustain and satisfy the body (Duncan & Blugis, 2011). These fundamentals needs are seen through the nurse’s experiences in both specific nursing and basic nursing. Still, it is believed that nurses have empathy for their patients since nurses are perceived as talking about the patient with deep care in their words. It may be a struggle for nurses to fulfill PCC and it is seen how relatives instead provide this care to the patient. Also, this is noted as a positive impact on the patients, especially since feelings of loneliness are not apprehending. In African countries, the family members of the patient are often used as an instrument for PCC (Basu, Frescas Jr & Kiwelu, 2014). Due to obstacles, in certain occasions, it is considered that nurses feel unable to fulfill standard nursing care, such as nursing procedures and PCC approach. According to Tjoflåt, John Melissa, Mduma, Hansen, Karlsen & Søreide (2018) can obstacles like overcrowded wards, shortage of personnel or material limitations challenge nurses in Tanzania to fulfill high-quality nursing care to patients. This is a struggle that doesn’t only concern the provision of an adequate care, but it also concerns the ethical standards in nursing (Tjoflåt et al., 2018). An ethical view and a partnership approach to the patient is required when nurses are caring through PCC (Wallström & Ekman, 2018). Hägström, Mbusa & Wadensten (2008) mention that nurses in Tanzania experience ethical difficulties when working with patients. For example, according to Tjoflåt et al. (2018) nurses explains that a patient’s chance for survival and well care are dependent on which resources that are available, one difficulty is the shortness of staff. Still, nurses do try to obtain good care for patients and think about what is best for them in their daily work (Tjoflåt et al., 2018).

**Conclusion**

The conclusion of this study highlighted the importance of having knowledge about malaria and knowing how to assess and prevent its conditions. When diagnosing febrile patients, malaria was sometimes difficult to differentiate from other febrile diseases, such as meningitis and typhoid. From a PCC view, nurses had mostly their focus on the physical part, since there was mainly focus on each patient’s survival. It was also important to provide the patients and their family with education, especially preventive strategies toward mosquitos, such as self-care.

**Clinical implications**

It is believed that this study has confirmed previous studies and contributed to new knowledge regarding malaria discernment, which can be useful in the clinics. The result of this study can be implicated in clinical practice since it enhances useful
knowledge from nurses’ experiences. If nurses globally gain more clinical experience regarding malaria and its significance for their patients, then they can contribute to a better-fulfilled care. The more experience a nurse gain, the easier it becomes to fulfill the patient’s care with the right nursing actions. The results of the study are especially useful and beneficial to apply in future nursing and as Fernandes et al. (2018) describe, mosquito-transmitted diseases, such as malaria, are increasing worldwide. Further research on the role of nurses and the care for patients with malaria in other countries with high malaria prevalence, can be a useful insight for health care professionals worldwide. Since malaria is a mortal disease, nurses can learn from each other through the research about nursing care in different countries, in order to heighten the knowledge of how to manage and use preventive strategies for malaria.
References


Interview questions

Interview questions:
- Age?
- What gender?
- Years of working as a nurse?
- Education/specialist-nurse in an area, example infections?
- Years of working in the area of infection diseases?

1. Can you tell us/me about your experiences when caring for patients infected with mosquito-transmitted diseases? (malaria, dengue fever, yellow fever)
2. Which specific care need these patients?
   a. Do you miss something in connection to this specific care?
3. What is important to think about when caring for these patients?
4. What knowledge is needed to care for these patients?
   a. Do you think you have this knowledge?
   b. (If not) what kind of education do you need?
5. Do you give information/education about the different diagnosis (treatment and prevention) to the patients?
   a. If yes, what do you educate about?
   b. (If not) how come?
6. What are the benefits of working with these patients?
7. What are the disadvantages of working with these patients?
8. Anything more you want to add?
## Appendix 2

### EGENGRANSKNING VID EXAMENSARBETEN

**Examensarbetets titel:** Nurses experiences when caring for patients infected with malaria- transmitted AIDS in Tanzania, Africa

**Student/studenter:** Emmie Lindgren & Evelina Persson

**Handledare:** Berit Münck

<table>
<thead>
<tr>
<th>1. Kan projektet innehålla någon eller några av följande nackdelar för deltagaren (patient, försöksperson, informant)?</th>
<th>Ja</th>
<th>Tveksamt</th>
<th>Nej</th>
</tr>
</thead>
<tbody>
<tr>
<td>a/ Medicinsk risk</td>
<td>☒</td>
<td>☐</td>
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<tr>
<td>b/ Smärta</td>
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<td>c/ Hot mot personlig integritet</td>
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<td>d/ Annat obelag</td>
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| 2. Kan det garanteras att deltagarna inte kan identifieras i resultatredovisningen? | ☒ | ☐ | ☐ |

| 3. Är deltagandet i projektet frivilligt? | ☒ | ☐ | ☐ |

| 4. Kan en deltagare när som helst och utan angivande av skäl avbryta sitt deltagande? | ☒ | ☐ | ☐ |

| 5. Innebär studien att personregister upprättas - om ja - vem ansvarar för registret och till vem anmäls registret? | ☒ | ☐ | ☐ |

| (registeransvarig person) |

| 6. Hur är den skriftliga informationen utformad? | ☒ | ☐ | ☐ |
|---|---|---|
| a/ Beskrivs projektet så att deltagarna förstår dess uppläggning och syfte (Inga fickattryck, klar svenska) | ☒ | ☐ | ☐ |
| b/ Framgår det att vården eller andra insatser inte påverkas av beslut om att medverka eller avstå från medverkan? | ☒ | ☐ | ☐ |
| c/ Framgår det att vården eller andra insatser inte påverkas om deltagaren avbryter sin medverkan? | ☒ | ☐ | ☐ |

| 7. Erbjuds försökspersonerna att ta del av forskningsresultatet? | ☒ | ☐ | ☐ |

Ovanstående frågor är noga penetrerade och sammansättning besvarade.

Jönköping den

4/10 - 2019

**Student/studenter**

**Handledare**