

Awareness of national malaria management guidelines among house officers in Khartoum state teaching hospitals. Sudan 2018

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Research article

Keywords: Malaria, management, guidelines, house officers.

Posted Date: April 6th, 2020

DOI: <https://doi.org/10.21203/rs.2.18883/v2>

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Abstract

Background Malaria is a protozoan disease which can lead to serious complications if not treated early and correctly. The aim of this study to assess the knowledge about malaria management guidelines among house officers. Methods this is the cross-sectional observational study conducted at 6 of Khartoum teaching hospitals Results The study showed that among the 115 participants evaluated there were 70.4% females and 29.6% were males. 94.8% of participants knew there are malaria management guidelines and 5.2% didn't know about the presence of these guidelines, 58.3% have some information and 10.4% just hear about these guidelines. 89.6% knew the management of simple malaria is outpatient management. 65.2% of the participants were aware of where to manage the cases of complicated malaria (inpatient or in ICU). 27.8% of the participants were aware of the management of simple malaria in the second and third trimester.

Background

Malaria has had a greater impact on world history than any other infectious disease, its endemic in over 90 countries in which 2400 million people live; this represents 40% of the world's population. Approximately 90% of malaria deaths occur in Africa [1]. The intensity of transmission ranges from extremely low in Khartoum and the north, to very high in the southwest of the country. Sudan showed a decline in national parasite prevalence from 3.7% in 2000 to 1.8% in 2009. However, subsequent increases to 3.3% in 2012 and 5.4% in 2016 were concerning. Reductions in funding for malaria control, suboptimal coverage of long-lasting insecticide-treated nets and lower rates of malaria testing [2].

Malaria is a protozoan disease caused by plasmodium parasites transmitted by bite of infected Anopheles mosquitoes. The plasmodium species [3] are *P. falciparum*, *P. vivax*, *P. ovale*, and *P. malariae* and almost all deaths are caused by falciparum malaria [4]. The patient presented with headache, malaise, hepatosplenomegaly, anemia, vomiting and Jaundice which is common due to hemolysis. The clinical features of malaria are non-specific and the diagnosis must be suspected in anyone returning from an endemic area who has features of infection. The risk of severe malaria. *P. vivax* and *P. ovale* increase with previous splenectomy [5]

According to World Health Organization (WHO) 2015 about malaria management guidelines; Treatment of children and adults with uncomplicated *P. falciparum* malaria (except pregnant women in their first trimester) with one of the following recommended ACTs: Artemether + lumefantrine, Artesunate + Amodiaquine, Artesunate + Mefloquine, Dihydroartemisinin + piperazine, Artesunate + Sulfadoxine–Pyrimethamine (SP). ACT regimens should provide 3 days' treatment with an Artemisinin derivative. Strong recommendation, high-quality evidence Revised dose recommendation for Dihydroartemisinin + piperazine in young children weighing <25kg treated with Dihydroartemisinin + piperazine should receive a minimum of 2.5 mg/kg per day of Dihydroartemisinin and 20 mg/ kg per day of piperazine daily for 3 days. In areas with chloroquine-susceptible infections, treat adults and children with Uncomplicated *P. vivax*, *P. ovale*, *P. malariae* or *P. knowlesi* malaria with either an ACT (except pregnant

women in their first trimester) or chloroquine. In areas with chloroquine-resistant infections, treat adults and children with Uncomplicated *P. vivax*, *P. ovale*, *P. malariae* or *P. knowlesi* malaria (except pregnant women in their first trimester) with an ACT. On the other hand the treatment of adults and children with severe malaria -including infants, pregnant women in all trimesters and lactating women- with intravenous or intramuscular artesunate for at least 24 h or until they can tolerate oral medication. Once a patient has received at least 24 h of parenteral therapy and can tolerate oral therapy, complete treatment with 3 days of an ACT (add single dose Primaquine in areas of low transmission) [6]

The aim of this study to assess the knowledge about malaria management guidelines among house officers in Khartoum state teaching hospital.

Methods

This is a cross-sectional observational study was conducted at 6 of Khartoum state teaching hospitals were chosen which include Hospital a, Hospital B, Hospital C, Hospital D, Hospital E, and Hospital E. Include 115 participants distributed at the year of 2018. The duration of the study was 3 months from January 2018 to the end of March 2018 The Inclusion criteria are house officers distributed during the mentioned period and completed or currently enrolled in the internal medicine shift. Excluded those who didn't complete or not currently enrolled in the internal medicine shift and those who are registered outside the time period mentioned. Those who refuse to participate. The data were collected by a structured questionnaire distributed to the house officer who presents in the emergency room or in inpatient rooms. The questions in the questionnaire were designed from WHO 2015 as guidelines for malaria management. The response from house officers was good and no one refused after verbal consent. But not all in the emergency room were in medicine shift or complete it; some of them at surgery or obstetrics and gynaecological or pediatric shift. The determination of knowledge level made by score or number of the correct answer in knowledge of malaria management guidelines which are 11 questions; if the participant answer 3 or low questions determine as poor level, if answer 4-8 determine as average level and if answer 9-11 questions determine as good level. The data were categorized and analyzed using IBM SPSS statistics 20.

Results

The study showed that among the 115 participants evaluated there were 70.4% females and 29.6% were males. 99.1% are aged 20-29 and only 0.9% are aged 30-39. The most common source was medical school 54.8% and the head of the medical unit 36.5%. (Table 1). We targeted the Khartoum teaching hospitals where 22.6% of participants was from Khartoum Bahri teaching hospital, 25.2% from Ibrahim Malik teaching hospital, 18.3% from Ahmed Gassim, teaching hospital, 15.7% from El academe teaching hospital, 11.3% from Haj Alsafi teaching hospital and 7% from El ban Gadeed teaching hospital (Table 2). 94.8% of participants knew there is malaria management guidelines and 5.2% didn't knew about presence of this guidelines, 58.3% have some information and 10.4% just hear about this guidelines (Table 3). 89.6% knew the management of simple malaria is an outpatient management. 71.3% knew the first line

of treatment (lumefantrine + artemether) and only 33% of them knew the second line for the management of simple malaria (Table 4). 65.2% of the participants were aware about where to manage the cases of complicated malaria (inpatient or in ICU) and 74.8% knew the treatment of complicated malaria (Table 5). 71.3% knew the first line of management of malaria in the first trimester (oral quinine). Only 27.8% of the participants were aware about the management of simple malaria in the second and third trimester. 83.5% knew the management of complicated malaria during pregnancy. 36.5% knew the treatment of malaria caused by plasmodium vivax and ovale (Table 6)

The level of awareness of the participants; 4.3% had an overall poor level of awareness “answered less than one third of the questions correctly”, and 74.8% had an overall average level of awareness “answered more than one third of the questions correctly” and 20.9% had an overall good level of awareness “answered more than two thirds of the questions correctly” (Table 7)

Discussion

Malaria is a protozoan disease caused by plasmodium parasites transmitted by bite of infected Anopheles mosquitoes. The plasmodium species [3] are P. falciparum, P. vivax, P. ovale, and P. malariae and almost all deaths are caused by falciparum malaria [4]. The patient presented with headache, malaise, hepatosplenomegaly, anemia, vomiting and Jaundice which is common due to hemolysis. The clinical features of malaria are non-specific and the diagnosis must be suspected in anyone returning from an endemic area who has features of infection. The risk of severe malaria. P. vivax and P. ovale increase with previous splenectomy [5]

The management of malaria based on the severity of the disease if it's simple malaria treated by Artemether + lumefantrine according to WHO guideline [6]. If it's complicated malaria the patient must be hospitalized and treated with artesunate IV or quinine IV [7]. During pregnancy the treatment is different according to severity and the trimester. In first trimester if it's simple malaria treated by Quinine plus clindamycin or quinine monotherapy. In second trimester treated by Artemether + lumefantrine or any ACT drug group or artesunate plus clindamycin or quinine. The complicated malaria in all trimester treated by artesunate or quinine [8]

This study was conducted among the 115 participants; 81 females and 34 males. Almost of them get their information from their medical college which must be the corner stone on learning and update the students about this guidelines and another guidelines of treatment of diseases. Also the head of medical unit play an important role in teaching and applying of this guidelines. In this study the weakest point in knowledge among the participants was the second line of treatment of simple malaria, management of malaria during second and third pregnancy and management of malaria caused by vivax and ovale species of malaria most probably due to the poor exposure of fresh doctors like the house officers to the fairly uncommon situations.

In this study the level of knowledge about malaria management guidelines is accepted in contrast to another study which the level of awareness of house officers about malaria management guidelines was

only 37.9% and this may be because the Khartoum state contain a lot of hospitals and it contain a lot of house officers from different states of Sudan [9].

Study limitation:

The limitation of this study is the small sample size due to the refusal of the Sudan medical council to provide us with the statistics about the registered house officers. We were select 115 house officers as sample size which we only think it will be representative with a total of which was distributed among the 6 hospitals. But the strength of this small sample size is represented knowledge of house officers from different states of Sudan from a different college.

Conclusion

Different levels of awareness about malaria management guidelines as a whole: 4.3% had an overall poor level of awareness, and 74.8% had an overall average level of awareness and 20.9% had an overall good level of awareness.

Abbreviations

ACT: Artesunate combined therapy

AL: Artemether-lumefantrine

AS: Artesunate

DHA: Dihydroartemisinin

EMT: Emergency medical technician

ECG: Electrocardiogram

EU: Europe

G6PD: Glucose 6 phosphate dehydrogenase

HIV: Human immunodeficiency virus

IM: Intramuscular

IV: Intravenous

KAP: Knowledge attitude and practice

MQ: Mefloquine

NHS: National Health Service

P: Plasmodium

PPQ: Piperaquine

RBC: Red blood cells

RDT: Rapid diagnostic test

SP: Sulfadoxine – pyrimethamine

SPSS: Statistical package of social sciences

UK: United Kingdom

WHO: World health organization.

Declarations

Ethical approval and consent to participate:

The ethics committee at each hospital was notified and permission was taken, each participant was asked for verbal consent before participating and all conflicts were discussed.

Availability of data and materials:

The data generated and analyzed during the current study are not publicly available because this paper not sent to any per review.

Competing interest:

No one of authors has a conflict of interest

Funding:

This study was not received any financial supports.

Authors' contribution:

Mohammed AA A, Mohammed A A M, Mohamed E A, M A Alaqbash and MM: All of those authors contribute in data collection, data analysis and writing.

NA: Supervised all steps of completion of this paper

Consent for publication:

All authors have read and approved the manuscript

Acknowledgements

Thanks to Nagla Abdelrahim Mohamed Ahmed Community Medicine Department, faculty of medicine- university of AL Zaiem Al azhari University for her support and supervision of us in our study and to all hel d us to accomplish this works and to our families and friends for their continued support.

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Tables

Table 1: Gender, Age of participants and the Source of the information about the malaria guidelines:

Variables	Frequency	Percent
N=115		
Female	81	70.4%
Male	34	29.6%
Age		
20-29 years	114	99.1%
30-39 years	1	0.9%
Source of information		
College	63	54.8%
Workshop	33	28.7%
Head of the medical unit	42	36.5%
Internet	23	20%
Colleagues	28	24.3%

Table 2: The Khartoum teaching hospitals where the data have been collected:

Hospital's name	Frequency	Percent
N=115		
HOSPITAL A	21	18.3
HOSPITAL B	18	15.7
HOSPITAL C	8	7.0
HOSPITAL D	13	11.3
HOSPITAL E	29	25.2
HOSPITAL F	26	22.6

Table 3: Knowledge about the presence of malaria management guidelines and the amount of information:

Variables	Frequency	Percent
N=115		
NO presence of malaria guidelines	6	5.2%
Presence of malaria guidelines	109	94.8%
A lot of information about it.	36	31.3%
Less information about it.	67	58.3%
Just hear about it but I have no idea.	12	10.4%

Table 4: Knowledge about the management of simple malaria:

Variables	Frequency (N=115)	Percent
Outpatient management of simple malaria	103	89.6
Inpatient management of simple malaria	12	10.4
The first line of treatment for simple malaria:		
A. Quinine	11	9.6
B. lumefantrine	12	10.4
C. lumefantrine + artemether	82	71.3
D. IV artesunate.	10	8.7
The second line of treatment for simple malaria		
A. Dihydroartemisinin + piperaquine or Quinine	38	33.0
B. sulfadoxine-pyrimethamine + artesunate	34	29.6
C. Co-artemether	15	13.0
D. IV artesunate	28	24.3

Table 5: Knowledge about the management of complicated malaria:

Variables	Frequency	Percent
	N=115	
A. Outpatient	6	5.2
B. Inpatient.	29	25.2
C. ICU	5	4.3
D. inpatient or ICU	75	65.2
Treatment of complicated malaria		
A. Artemether IM	17	14.8
B. Quinine IV or artesunate IV	86	74.8
C. sulfadoxine-pyrimethamine + artesunate	3	2.6
D. Co-artemether	9	7.8

Table 6: Knowledge about the management of malaria in pregnancy, and the management of malaria caused by P. vivax and P. ovale:

Variables	Frequency	Percent
	N=115	
Treatment of simple malaria in the first trimester		
A. Artesunate	18	15.7
B. Sulfadoxine-pyrimethamine + artesunate.	7	6.1
C. oral Quinine	82	71.3
D. Co-artemether.	8	7.0
Treatment of simple malaria in the second and third trimester		
A. Artemether + lumefantrine	15	13.0
B. Artesunate.	17	14.8
C. Quinine.	51	44.3
D. All of these drugs	32	27.8
Treatment of complicated malaria in all trimester		
A. Quinine or Artesunate	96	83.5
B. Dihydroartemisinin + piperazine	6	5.2
C. Sulfadoxine-pyrimethamine + artesunate.	6	5.2
D. Artemether + lumefantrine.	7	6.1
Treatment of malaria caused by P. vivax and P. ovale		
A. Artesunate IV or IM.	4	3.5
B. Quinine.	17	14.8
C. Primaquine.	52	45.2
D. Artemether + lumefantrine after that Primaquine.	42	36.5

Table 7: The level of Knowledge:

Level	Frequency	Percent
N=115		
Poor level	5	4.3
Average level	86	74.8
Good level	24	20.9

The most important factor associated with a good level of knowledge is good teaching during college as in Table 1.