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A STUDY ON PRESCRIBING PATTERN OF ANTI-MALARIAL DRUGS IN SOUTH INDIAN TEACHING HOSPITAL, KARNATAKA

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ABSTRACT

Background: Malaria is considered as one of most deadliest mosquito-borne disease caused by a single species of parasite Plasmodium with variable genera -P.Vivax, P.Falciparum, P.Ovale, P.Malariae and P.Knowlesi. Malaria istypically known as cyclical infection between Humans and Anopheles mosquitoes which is caused by Plasmodium. **Introduction**: Malaria is one of most worn out disease which is first reported as a zoonotic disease, of approximately 30 million years old in Palaeogene period. According to World Health Organisation's World Malaria Report 2017, nearly half the world's population lives in areas at risk of malaria transmission in 91 countries and territories with most prominent cause of death and incapicitation in vulnerable patients like Children and Pregnant Women. **Objectives**: The purpose of this study is to assess, analyze and evaluate the pharmacological treatment in the current practise of Anti-Malarial Drugs. **Methodology:** This study is carried for a period of six months from September 2017 to March 2018 in District Hospital Kalaburagi. A Prospective Observational study has been adopted for the patients data collection and relevant diagnostic reports. However 33 cases were recorded in respective to their diagnostic reports and prescription pattern. Out of which, 23 cases are reported with P.Vivax caused Malaria and 10 cases with P.Falciparum caused Malaria. **Results:** Findings of our study revealed that P.Vivax caused Malaria (23 cases) is most prevailed parasite in District of Gulbarga when compared with P.Falciparum caused Malaria (10 cases). Our study also revealed that use of solid dosage forms is comparatively highly effective and most commonly prescribed than intravenous forms. Considering the Age, Seasonal variations and Gender bias the severity of disease is moderate to high (Age<14years & >55years, Seasons -

Autumn, Gender- Females). **Conclusion:** Our study concluded that prescription pattern varies widely based on geograpical location, patient's characteristics (age and gender) and severity (mild and severe) and seasonal variations. Our study also disclosed the current practise for the treatment of Malaria in South Indian Teaching Hospital and pros and cons in Therapeutic Guidelines followed by acquainting National Drug Policy.

KEYWORDS: Falciparum, Vivax, Ovale, Zoonotic, Plasmodium, Malariae.

I. INTRODUCTION

The term malaria originates from medieval period from Italy: mala – "bad", aria –"air"; the disease was formerly called ague or marsh fever due to its association with swamps and marshland. The term Malaria was first appeared in English literature in 1829.[1] World Health Organization (WHO) defined Malaria as a life-threatening disease caused by parasites that are transmitted to people through the bites of infected female Anopheles mosquitoes. It is preventable and curable.[2]

Malaria is a protozoal disease caused by any one or combination of four species of plasmodia: Plasmodium vivax, Plasmodium falciparum, Plasmodium ovale and Plasmodium malariae. While Plasmodium falciparum causes malignant malaria, the other three species produce benign form of illness. These parasites are transmitted by bite of female Anopheles mosquito.[3]

1. Signs and Symptoms: The symptoms of malaria can be non-specific and mimic other diseases like viral infections, enteric fever etc. The main clinical features of malaria are cyclic peaks of high fever accompanied by chills, anemia and splenomegaly.[3]

The lack of a sense of wellbeing, headache, fatigue, abdominal discomfort, and muscle aches followed by fever are all similar to the symptoms of a minor viral illness. In some instances, a prominence of headache, chest pain, abdominal pain, cough, arthralgia, myalgia, or diarrhea. Nausea, vomiting, and orthostatic hypotension are common.[4]

2. Etiology: Six species of the genus Plasmodium cause nearly all malarial infections in humans. These are P.falciparum, P.vivax, two morphologically identical sympatric species of P.ovale (as suggested by recent evidence), P.malariae, and—in Southeast Asia—the monkey malaria parasite P.knowlesi. While almost all deaths are caused by falciparum malaria, P.knowlesi and occasionally P.vivax also can cause severe illness. Human infection begins

when a female anopheline mosquito inoculates plasmodial sporozites from its salivary gland during a blood meal. These microscopic motile forms of the malaria parasite are carried rapidly via the blood stream to the liver, where they invade hepatic parenchymal cells and begin a period of asexual reproduction.[4]

Environmental Factors That Increase Risk of Malaria Transmission Mosquito density is dependent on the abundance and diversity of vector habitats, especially for immature stages. The greater the number of local habitats, the greater the vector density. The habitat can either be temporary or permanent. A.gambiae prefers temporary breeding sites, whereas A.funestus shows a strong preference for permanent bodies of water. The rate of oviposition is related to recent rainfall. This is because oviposition is dependent on the presence of water bodies, and A.gambiae likes to oviposit in temporary water bodies such as puddles. For malaria transmission to occur, both favourable temperature and rainfall conditions have to coincide temporally. Rainfall indirectly affects mosquito abundance. Temperature also affects the development of the Plasmodium parasite within the. Mosquito. P. falciparum fails to develop between 16°C and 19°C. At an ambient temperature of 23°C, the parasite takes 16 days to mature and become infectious, whereas at 27°C it takes only 10 days.[5]

3. Epidemiology: According to the latest World Malaria Report, released in November 2017, there were 216 million cases of malaria in 2016, up from 211 million cases in 2015. Some 15 countries – all in sub-Saharan Africa, except India – accounted for 80% of the global malaria burden. Malaria deaths reached 445 000 in 2016, a similar number (446 000) to 2015.[8]

The WHO African Region carries a disproportionately high share of the global malaria burden. In 2016, the region was home to 90% of malaria cases and 91% of malaria deaths.[2]

In southwestern India, Karnataka has a population of around 64 million people and accounts for 3% of India's total P.vivax malaria burden. Most of the population is involved in agriculture and the climate varies from rather wet in the Malnad and coastal regions and dry in Deccan Plateau in the north of the state. There was a dramatic increase in the number of cases of malaria at the start of the decade, mainly due to malaria outbreaks in northern districts. In the year of 2016 a total number of 9382 malaria cases were recorded in Karnataka, out of which P.Falciparum were 1597 and P. Vivax were 1009 and no deaths were recorded. In the year of 2017 a total number of 6529 malaria cases were recorded in Karnataka, out of which P. Falciparum were 1118 and P.Vivax were 795 and no deaths were

recorded. In Gulbarga District, 177 malaria cases were found in the year of 2017 and 3 cases were recorded in the Months of January and February of 2018.[8]

II. MATERIALS AND METHODOLOGY

This Study is carried during the period of 6 months from September 2017 to March 2018 at District Hospital, Kalaburagi, with the approval of Institutional Ethical Review Board Gulbarga. The Participants in our study are selected by their own interest and the reports were recorded and reported with their written and signed consent form.

A. Study design: This was a prospective observational study where the study participants are hand-picked by following parameters such as specific diagnostic reports, Prescription Card from Department of General Medicine and Pediatrics. Healthy Volunteers, Pregnant and Lactating women are excluded in our study to prevent the differential and individual bias. Although this may have resulted in a sampling bias, but our intention was to study apparently the prescription pattern of Anti-Malarial Drugs.

III. RESULTS

In our study out of 33 subjects diagnosed with Malaria are categorized based on the Parameters considered to understand the Prescribing Pattern of Anti- Malarial Drugs in South Indian Teaching Hospital – These Parameters are further divided into Direct association with malaria and Indirect association with Malaria.

Table No. 01.

S. No.	Associated Parameters	Co-Associated Parameters
1	Type of Anti-Malarials Prescribed	Diagnostic Report
2	Dose of Anti-Malarials Prescribed	Date of Admission
3	Dosage form of Anti-Malarials Prescribed	Type of Admission
4.	Treatment Specific to Anti- Malarials Prescribed	Gender of study participants

A. Associated Parameters

1. Type of Anti-Malarials Prescribed

Out of 33 cases collected with actual diagnosis of Malaria 9 patients with single therapy of Artesunate and 3 patients with single therapy of Chloroquine, 12 patients were prescribed with combination of Artesunate + Primaquine and 7 patients were treated with combination of Artesuante + Doxycycline, 2 cases with triple therapy of Art + Pri + Doxy.

Table No. 02.

S. No.	Drugs Prescribed	No. of Subjects	Percentage
1	Artesunate	09	27.2%
2	Artesunate + Primaquine	12	36.3%
3	Chloroquine	03	9.09%
4.	Artesunate + Doxycycline	07	21.2%
5.	Art + Pri + Doxy	02	6.06%

2. Dose of Anti-Malarials Prescribed: Out of 33 patients diagnosed with Malaria, 12 patients were treated with single drug therapy of Artesunate and Chloroquine, the rest 21 patients are treated with Multiple drug therapy as follows.

Table No. 03.

S. No.	Type of Drug	Dose Prescribed/Day	No. of Patients
1.	Artesunate	120mg OD	9
2.	Artesunate + Primaquine	120mg- ART OD 7.5mg- PRI OD	12
3.	Chloroquine	250mg- CQ QID	3(Adults)
4.	Artesunate + Doxycycline	120mg- ART OD 100mg - DOX BD	7 (Adults)
5.	Artesunate + Doxycycline+ Primaquine	120mg- ART OD 100mg - DOXY BD 2.5mg - PRI TID	2 (Adults)

3. Type of Dosage form of Anti-Malarials Prescribed: Out of 33 patients reported with Malaria, 3 patients were treated with only oral dosage form, 9 patients were treated with only intravenous dosage form and remaining 11 patients were treated with both oral and intravenous respectively.

Table No. 04.

S No.	Sno. Type of dosage form	No. of Patients Prescribed
1	Oral Dosage form (Chloroquine)	3
2	Intravenous (Artesunate)	9
3	Both Oral and Liquid Dosage forms	11

4. Type of Treatment on Specific Malarial parasite

In our study Comprised of 33 patients specifically diagnosed with 23 cases of Plasmodium Vivax and 10 cases of Plasmodium Falciparum were treated as follows.

Table No. 05.

S. No.	Type of Diagnosis	No. Of Patients	Treatment Specified
1.	P. Flaciparum	10	ART + DOXY- (8 cases) ART + DOXY +PRI – (2 cases)
2.	P. Vivax	23	ART – (8cases) ART + PRI– (12cases) Chloroquine – (3 cases)

B. Co-Associated Parameters

1. Diagnostic Reports: Subjects involved in the study are determined by Malarial Parasite Test to confirm the type of Plasmodium Parasite. The results are as follows.

Table No. 06.

S. No.	Parasite Identified	No. of Patients
1.	P. Vivax	23
2.	P. Flaciparum	10

2. Date of Admission: In our study composed of 33 cases diagnosed with malaria 13 cases are reported in the month of September, 9 cases reported in the month of October and following 5 in the month of November, 3 in the month of December, 2 in the month of January and 1 case reported in the month of February.

Table No. 07.

S. No.	Month of Admission	No. of Patients Reported
1.	September	13
2.	October	9
3.	November	5
4.	December	3
5.	January	2
6.	February	1

3. Gender of Study Participants: The Prescribing Pattern of Anti Malarial drugs varied based on the gender, due to less immunity of Women when compared with Men. Hence out of 33 cases collected with malaria, of which 18 patients were females and 15 patients were males, from 2 differbinations (urban & rural).

Table No. 09.

S. No.	Gender	Type of Therapy	No. Of Patients
1.	Male	Urban	3
2.	Male	Rural	12
3.	Female	Urban	15
4.	Female	Rural	3

V. DISCUSSION AND SUMMARY

This is a prospective observational study conducted in District Hospital Kalaburagi, from September 2017 to February 2018. The population of our study comprised of 33 malaria patients admitted in District hospital, Kalaburagi, who are prescribed with Antimalarial drugs.

The present study has highlighted the prescription pattern of antimalarial drugs in malaria in a district hospital, kalaburagi. The patients were enrolled, and the results can be categorised into two types.

i. Parameters Associated in Prescribing pattern of Anti Malarial Drugs.

ii. Parameters Co-Associated in Prescribing of Anti Malarial Drugs.

Most common anti-malarial drug combinations prescribed in the study population were Artesunate with primaquine (36.3%) and Artesunate with doxycycline (21.2%). 6.06% of the admitted patients received a combination of 3 anti malarial drugs which are Artesunate+Doxycycline+Primaquine.[Table no-2].

Oral chloroquine was prescribed to 9.09% of patients and the controversial monotherapy of Artesunate was prescribed to 27.2% of patients which is not rational therapy for prescription of antimalarial according to NVDCP guidelines which correlates with the study conducted by Jamuna, Bipin kafle et.al.[Table no:02] Most number of patients were prescribed with Artisunate 120mg OD + Primaquine 7.5mg TID, followed by Artisunate 120mg OD + Doxycycline 100mg OD, along with Chloroquine 250mg QID for all the age groups and the combination of Artisunate 120mg OD + Primaquine 7.5mg TID + Doxycycline 100mg OD.[Table no-3]. Most of the patients were prescribed with both the combination of oral drugs and injectable antimalarial drug (11).

9 patients received injectable anti malarial drug, only 3 patients were prescribed with oral drug (chloroquine). [Table no-4].

At the study site, the number of patients diagnosed as Plasmodium vivax are 23 followed by 10 patients as Plasmodium falciparum. This may be due to P.vivax are more common in tropical regions and also they are more resistant to dry weather as compare with the P.falciparum. [Table no:6]

In P.vivax infection, patients prescribed with both the combination therapy, Artisunate 120mg OD+Primaquine 7.5mg OD (12) and monotherapy with Artisunate 120mg OD (8) and chloroquine 250mg QID (3).

In P.Falciparum infection, patients prescribed with combination therapy, Artisunate 120mg OD+Doxycycline 100mg OD (8) and Artisunate 120mg OD+Doxycycline 100mg OD +Primaquine 7.5mg TID (2).[Table no : 8].

During the study period a total number of 33 patients were enrolled in to the study. Out of which patients 18 were female and 15 were male. The maximum cases were reported in females. [Table No: 9].

Among the 33 patients, the incidence of malaria was higher in the months of September, October, November and lesser incidence in the months of Deccember, January, February because the winter weather helps in the reproduction of Malarial Parasites.

V. CONCLUSION & IMPLICATIONS

Finally it can be said that drug prescription pattern varies widely based on geographical location, prescriber and patient characteristics and many other factors.

• The available data indicate that malaria is hypoendemic and both the species, namely P.vivax and P.falciparum were prevalent in this area In this study the use of artemisins was comparatively more than chloroquine, this corresponds well with the national drug policy on malaria, 2014 guidelines.

• There is an increased use of artemisinin as first line drug in Gulbarga, which is a unhealthy practice. Artemisinin derivatives must never be administered as monotherapy for uncomplicated malaria. These rapidly acting drugs, if used alone, can lead to development of parasite resistance.

• The incidence of malaria was drastically decreased in the recent past years, the Govt. of India is now taking good care to prevent the malaria in India.

• The awareness of Malaria was increased among the people of India, this also leads to decreased incidence of malaria in India.

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