



Research Article

A RETROSPECTIVE STUDY OF MALARIA TRENDS OF GHAGUA HEALTH CENTRE, KAMRUP METROPOLITAN DISTRICT, ASSAM, INDIA

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ABSTRACT

The present study was carried out in Kamrup Metropolitan District, Assam, India with the principal objectives to analyze the trends of Malaria to create early warning signals and public awareness for prophylactic measures. Malaria is rapidly occurring in many parts of the world in all age groups. Data were collected from active and passive cases registered in Digaru state dispensary (SD) and Sonapur primary health center (PHC) from 2009 to 2018. Data were analyzed in MS-excel. The results showed the fluctuating but declining trends of cases. Preventive measures and changes in the treatment guideline may be the major factor for declining of cases. However, malaria admissions are fluctuating over these years. The outcome of this study shows timely analyzing various data to reduce disease burden and there is a need to continue all the preventive measures especially in vulnerable groups. It has been observed that Malaria infection was associated with time, place and person with major preventive contribution from disease surveillance.

Keywords: Retrospective, trend, early warning signal, prophylactic, vulnerable, disease burden.

INTRODUCTION

Malaria is an infectious disease transmitted by vector organisms, mosquitoes, and it is caused by parasite microorganisms. The disease has spread over tropical latitudes of climate, demographics, and societal conditions⁹. Being humanities oldest and world's most devastating parasitic disease; it has been a major public health problem since decades¹⁴. 50 % of the world population is affected by malaria^{1,19}. The transmission bionomics of malaria is partially linked with changes in temperature, rainfall and humidity. Sonapur block under Kamrup Metro district, Assam also has been reporting higher annual parasitic incidence (API) from the past. The prevalence gradually decreased due to many intervention programs. Despite continuous efforts, the persistence of malaria is as the major cause of morbidity, mortality and socioeconomic problems in many parts of the world². The various factors like expensiveness of the control program, the resistance of the parasite to anti malarials and vectors to insecticides, and complexity of control process are the major road blockade in the process of disease control process^{3,4,6-8,13}. At present, due to global support for malaria elimination is taking a major role for eliminating malaria and report from different parts of the world show decreasing trends of malaria but the exact factors for its reduction are not well defined. Therefore, this study was initiated to analyze the nine-year trend prevalence of malaria and to assess the impact of the control measures taken by the current national vector-borne disease control program on malaria prevalence in the study area.

Prevention and control activities of National Vector Borne Control Programs have been introduced during the course of time to reduce the burden of malaria. Four major intervention strategies that are being applied in Kamrup Metro district to combat malaria are early diagnosis and prompt treatment,

selective vector control that involves the use of indoor residual spraying (IRS), Insecticide-treated Nets (ITNs)/Long Lasting Insecticidal Net (LLIN) and public awareness programs. For malaria control, field evaluation of insecticide-treated mosquito nets (ITNs)¹¹ was carried out for the first time in India at Sonapur, in Kamrup Metro district, Assam. Global malaria control program has been intensified to evaluate and to estimate malaria incidence and time trends¹².

The study will provide current trends of malaria envisages that it might strengthen the information so far for scaling up and to design effective communication strategies to combat these diseases in the study area.

MATERIALS AND METHODS

Ethics statement

The study was carried out as per Action Plan of District Vector Borne Disease Control Program, Kamrup Metropolitan District, Assam 2015-16 and 2017-18 and the result was incorporated in Annual report. Consent was taken from subjects and study was in accordance with ICH GCP Guidelines.

Study area

This record review comparative study was conducted in Ghagua sub-center (SC) under Sonapur Block PHC (Figure 1) a rural setting where it is a hilly area with natural foothills, tea estates and water bodies, which is favorable for the transmission of malaria. Under this sub-center, the villages which are affected by malaria are with higher annual parasitic incidence (API) of the district. The study sites had accessibility to a health center and a state dispensary. Laboratory technicians and surveillance workers

tested for malaria in hospitals and rapid diagnostic kit at field respectively. A retrospective comparative study design was employed using data from local health services (passive and active). This was done by reviewing malaria morbidity records of local health facilities pertaining to villages within a specified radius of Ghagua sub-center. This sub-centre has been reporting malaria cases for many years. Although malaria has been controlled compared to the previous year's still it is proved to be endemic in the district. Insecticide-treated nets, a vital element of

actions to roll back malaria were field evaluated against *An. minimus* transmitted malaria in endemic villages of Kamrup district. *P. falciparum* was recorded in all age groups of both sexes. There was clustering of cases in villages near the vector-breeding habitats (perennial seepage streams) and foothill villages. The data presented are indicative of moderate to high levels of malaria transmission by *An. minimus* and would be of value for evolving future intervention strategies. The trend of malaria prevalence was analyzed.

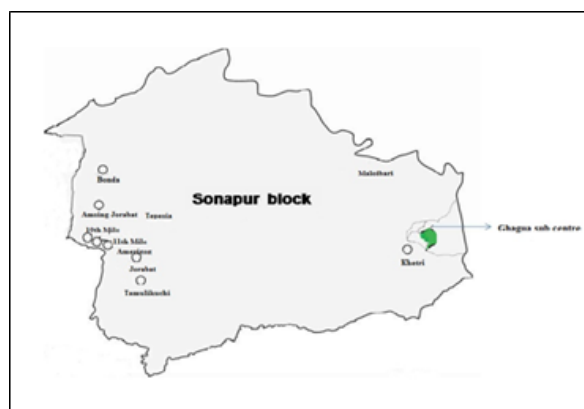


Figure 1: The map of Sonapur block showing location of Ghagua sub centre

Study design

A retrospective study is conducted to determine the trend of malaria by blood samples. The prevalence of malaria was done at Ghagua health-centre and Sonapur block PHC.

Data collection

Malaria cases are treated both clinically and as confirmed malaria accordance to national guideline¹⁷ depending on the degree of diagnostic capabilities at different levels of the healthcare system. Confirmed cases are registered on preformatted registration books (M3 format) at health care levels and reported both fourth night as well as monthly to the next higher level of the health management system. The present study included all malaria records of the local healthcare unit (SD). A format was prepared on a computer spreadsheet (Excel) collect the secondary data from the registers maintained at SD. All the patients who visited hospital tested positive for malaria and the patients tested positive by the surveillance workers in the field are recorded year wise. The detection of malaria is done by National Vector Borne Disease Control Program (NVBDCP) supplied antigen-based rapid diagnostic kits (RDK) and peripheral blood smear examination well-prepared and well-stained blood film is used as the gold standard in the centre. For this study data was collected from 2009 to 2018.

Factors affecting malaria trends

The department of vector control program has national formats to collect data on a monthly basis and compiled and analyzed monthly/annually to find the trend of the disease. The awareness of malaria and other vector-borne diseases increasing and many organizations are taking initiatives for preventive measures through vector control methods, health education, Inter personal communication to sensitize community people.

Data management and processing

The data on malaria cases records collected from the health institution of the study site is then transferred to Microsoft excel sheets and analyzed by statically. Results were summarized using Tables and Figures to show the distribution of prevalence.

RESULT

Annual trends of malaria prevalence

Within the last decade (2009–2018) a total of 16,431 blood samples were tested for malaria by health workers and technician. Out of which 142 PF and 71PV and a total of 213 cases have been recorded during these years. There was a fluctuating trend of malaria within the last decade, with the maximum (58) number of confirmed malaria cases being reported in 2010 and the minimum (8) confirmed cases of malaria being reported in 2015. Blood slide examined (BSE) in 2010 and 2015 was 1555 and 1569 respectively. If we look into the annual parasitic incidence, Ghagua sub-centre is reporting the highest API (>2) from 2010 to 2015 (Figure 2). Subsequently, though there is a fluctuating of malaria in 2012 and 2015 to 2018 there is a decreasing trend.

There is declining trend of malaria indicators i.e. slide positivity rate (SPR), slide falciparum rate (SPR) with respect to annual parasitic incidence (API) (Figure 3), both species of Plasmodium were reported in each year, which accounted for malaria morbidity in the study area.

In the year 2010 to 2011; *P. falciparum* was increasing, but in 2012 it was decreasing in the study area. But in 2013 it was again increasing trend. *P. vivax* is decreasing trend from 2010 to 2012. But in 2014 is reporting more cases than the last years (Figure 4). From 2015 onwards there is a declining trend and in 2016, 2017 and 2018 there are no positive cases reported in the sub-center.

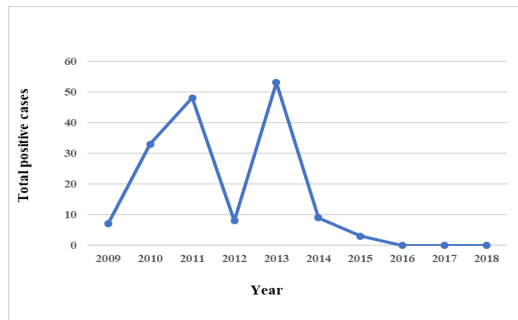


Figure 2: Annual trends of malaria cases from 2009-2018

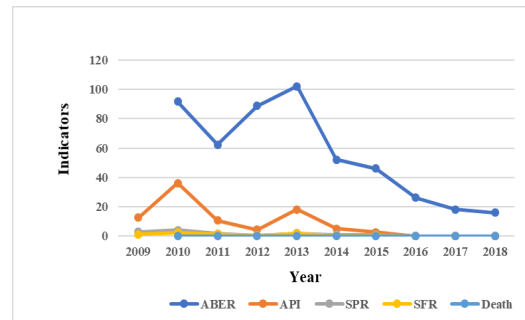


Figure 3: Annual trends of malaria indicators from 2009-2018

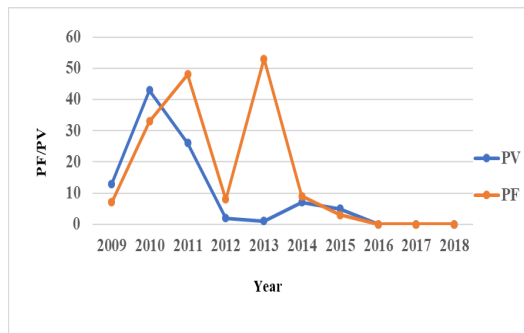


Figure 4: Species trends of malaria parasite of Ghagua sub centre from 2009-2018

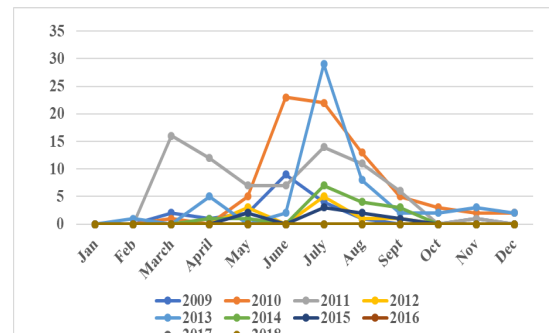


Figure 5: Month wise trend of malaria cases from 2009-2018

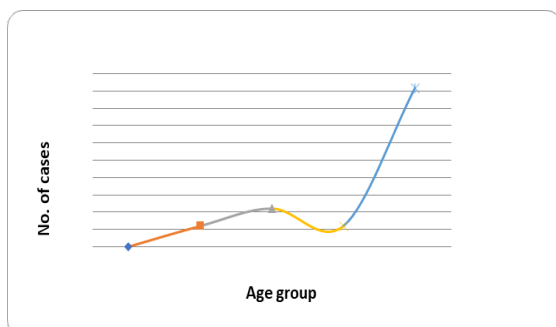


Figure 6: Distribution of cases in different age groups from 2009-2018

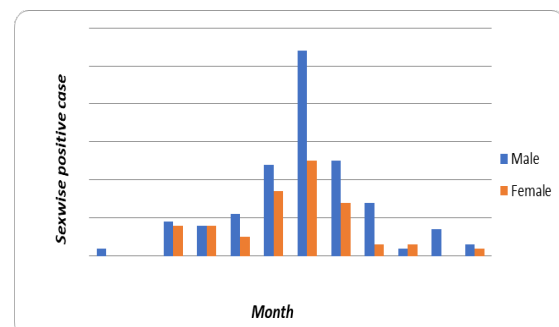


Figure 7: Distribution of cases in sexwise positive cases from 2009-2018

Age group variation

This study reveals that adult age groups are more affected than pediatric groups. No cases of below 1< have been reported during 2013-2015. Males are more affected than female (Figure 4 and 5).

Seasonal variation of malaria prevalence

The reflection of malaria cases has been noticed throughout the year. The highest peak of malaria cases in the month of July followed by June and August (Figure 6). During winter (December, January, and February) minimum numbers observed and the maximum malaria cases were observed during summer (June, July, and August) seasons.

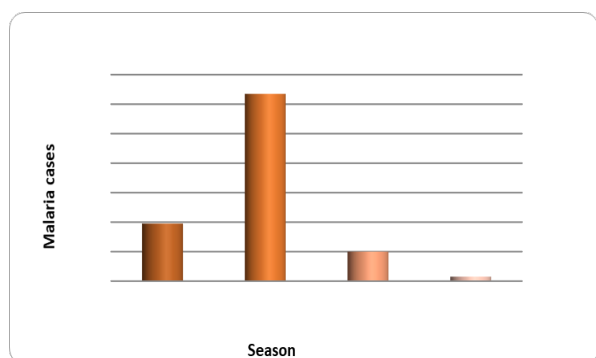


Figure 8: Seasonal variation of malaria cases under from 2009-2018

DISCUSSION

Malaria is a major public health program in terms of morbidity, mortality, and burden of the healthcare facility. The present study reveals the prevalence of malaria in the study area of Kamrup Metro district and major species is *P. falciparum*. This is very lower than studies reported from other parts of the country and the world^{5,15,16}. The difference may be due to the endemicity of malaria, study design used climatic differences, altitude variation, malaria diagnosis technique variation, the skill of the laboratory personnel to detect and identify malaria parasites other factors that affect malaria case occurrences in different study factors. The study reveals a fluctuating trend occurrence of malaria cases was observed in the study area. A decrease in the number of malaria cases number occurred in 2012 and 2015 with a minimum number in 2015. However, 2010, 2011 and 2013 being reported pick numbers of malaria cases, most recently 2013. In 2016, 2017 and 2018, there are no positive cases reported in the sub-centre. Last nine years studied shows remarkable changes of PF and PV cases and *P. falciparum* found to be common in the study area. The study shows an increasing trend of malaria cases in 2013 with more numbers of *P. falciparum* but in 2015, the increasing trend of *P. vivax* is seen than the last 3 years. There was a fluctuation of malaria cases throughout these years (Figure 9). Earlier studies also showed^{11,2,4,6,10-11} similar trends of malaria cases. The Annual Report of National Vector Control program, Kamrup Metropolitan District showed that there is a similar decreasing trend of other sub-centers of the district where there were symptomatic and as well asymptomatic cases were reported earlier (Hazongbari village, Suwali Lukua village, Sampothar and Kilingog village of Hazongbari sub-centre of Sonapur Block¹⁸.

The different studies of different parts of the world reported earlier may be because of many factors like climate, ecologic and environment^{3,4,6-8,13}, host and vector characteristics, social and economic determinants such as healthcare infra structures. Although, many intervention programs such as ITN/LLIN, IRS, and awareness program have reduced morbidity and mortality of malaria cases, the prevalence is still sustained.

The observed decline in malaria in 2015 could be strongly attributed to the interventions. *Plasmodium falciparum* was the predominant species in the study area and accounted for malaria morbidity. This study also shows that since 2011 *P. vivax* is decreasing but in 2014 there is an increasing trend which indicates a trend shift. The severity of *Plasmodium falciparum* and problem caused by, *P. vivax* might be neglected in society and might be the reason for the rising of cases^{2,10}.

Age and sex group distribution reveals that adult and male groups are more affected. This is because of their occupation and staying

outside the home and sleeping behaviour or may be other reasons males are more exposed to Anopheles mosquito bites, which can transmit malaria parasites.

Seasonal variation plays an important role in malaria transmission. In this study, it is seen that the highest numbers of cases reported in summer (June, July, and August). After spring, it has become favourable for malaria transmission. In Assam major transmission occurs in this season after the rain. The environmental setting and climatic condition provide the vector for continual breeding and sites¹⁶.

This study reveals the prevalence of malaria in the rural setting and due to interventions fluctuation of cases has been noticed.

CONCLUSION

Comparatively, after the introduction of current control strategies, the morbidity and mortality of malaria is decreasing but still prevalent. The highest peak of cases was observed in seasonal trend. Periodical epidemiological study for generating impending outbreak and timely intervention programs should best strengthened for a seasonal occurrence of these diseases in the study area.

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