A STUDY ON PREVALENCE OF MALARIA IN KURNOOL DISTRICT

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ABSTRACT: BACKGROUND: Malaria affects mainly the poor underserved and marginalized population in remote rural areas which are characterized by inadequate control measures and limited access to health care. Malaria continues to pose a major public health threat in India, particularly due to P. falciparum which is prone to complications. OBJECTIVE: Study was conducted to know the prevalence of malaria in Kurnool district by age and sex distribution. METHODOLOGY: A retrospective study. Information was from the year January, 2008 to July, 2013. OBSERVATION: An increasing trend is observed in the prevalence of P. falciparum. And there is declining trend in the prevalence of P. vivax. There is almost ‘zero’ prevalence of infection in infants. There is no change in the prevalence of P. falciparum among 1-5 yr. age group. There is increasing trend in the prevalence of P. falciparum in the age group of 5-14 years from 2008 to 2011. There is no specific trend in P. falciparum in adult population. There is a clear cut decline trend in the number of P.vivax cases in all age groups. This is comparable with the declining trend of all India prevalence of P.vivax cases. The decline may be due to the active anti-malarial measures in the district. Males are affected more than females in both falciparum and vivax malaria cases. DISCUSSION: Increasing trend in the prevalence of P. falciparum is due to dense forest around the district and increasing resistance to Chloroquine and declining trend in the prevalence of P. vivax is due to the active coverage of DDT by 95.6% in urban area and 89.2% of rural area. ‘Zero’ prevalence in infants may be due to under reporting. There is no change in the prevalence of P. falciparum among 1-5 yr. age group and increasing trend in the prevalence of P. falciparum in the age group of 5-14 years from 2008 to 2011 may be due to the children in this age group (5-14) playing outside in the evening period. There is a clear cut decline trend in the number of P.vivax cases in all age groups which is comparable with the declining trend of all India prevalence of P.vivax cases. Males are affected more than females due to the different occupational habits. Males do have more outdoor activities. There is a drastic decline in cases from 2008 to 2012 which supports the national values. API of Kurnool district is less than 2 shows a decline in the disease prevalence. CONCLUSION: In Kurnool district P.vivax is more prevalent than falciparum. Male to female ratio in Kurnool district is 1: 0.76. Male to female ratio in Kurnool district is 1: 0.76. ABER of Kurnool dist. from 2008 to 2012 is 12.47 to 11.72. KEYWORDS: P. falciparum, P.vivax, underserved and marginalized.

INTRODUCTION: Malaria remains one of the most widespread, potentially fatal infectious disease.¹ Each year an estimation of 300-500 million clinical cases of malaria occur, making it one of the most prevalent infectious disease.² Malaria is one of the major health problems of the country. Around 1.5 million laboratory confirmed cases of malaria are annually reported is due to p. falciparum. One of the reasons attributed to rise in proportion of p. falciparum cases is resistance to chloroquine, which was used for a long time as a first line of treatment of malaria cases.
Kurnool district (AP) has a mid-year population of 41,81,052 (2013) with average rain fall of 40-60 cm humidity ranging from 40-60% temperature ranging from 18°- 43°C which all favors vector growth i.e. mosquito.

**METHODOLOGY:** Study Design: A retrospective study. Information about the total Number of Malaria cases were collected from the office of the District Medical and Health Officer, Kurnool District Information was from the year January, 2008 to July, 2013. Data consisted of Age and sex distribution, total number of slides examined, total number of Malaria positive cases, total number of slides positive for vivax, total number of slides positive for falciparum.

**OBSERVATIONS:**

| Period            | Total No. of slides examined among the District Population | Positive for Malaria | Positive for Plasmodium falciparum | Positive for Plasmodium vivax |
|-------------------|----------------------------------------------------------|-----------------------|------------------------------------|-----------------------------|
| YEAR              | No.                              | %                    | No. | %     | No. | %     | No. | %     |
| 2008              | 4,87,237                        | (12.47)              | 627 | (0.13)| 147 | (23.44)| 480 | (76.56)|
| 2009              | 4,85,397                        | (12.26)              | 415 | (0.09)| 84  | (20.24)| 331 | (79.76)|
| 2010              | 4,48,701                        | (11.19)              | 279 | (0.06)| 89  | (31.90)| 190 | (68.10)|
| 2011              | 4,56,655                        | (11.24)              | 264 | (0.06)| 106 | (40.15)| 158 | (59.85)|
| 2012              | 4,83,761                        | (11.72)              | 233 | (0.05)| 126 | (54.08)| 107 | (45.92)|
| 2013 upto July    | 2,96,434                        | (7.09)               | 104 | (0.04)| 39  | (37.50)| 65  | (62.50)|

Table 1: Showing prevalence of malaria

In table 1 it shows that as years are going on the percentage of p. falciparum is increasing whereas P. vivax cases are declining. As years are going on no. of cases are in declining order.

| Age   | Total | <1 yr. | 1-5 yrs. | 5-14 yrs. | Above 14 yrs. |
|-------|-------|--------|----------|-----------|---------------|
| Period (year) | No. | %      | No. | % | No. | % | No. | % | No. | % |
| 2008  | 147  | (23.44) | 1   | (0.7) | 5   | (3.4) | 21  | (14.29) | 120  | (81.6) |
| 2009  | 84   | (20.24) | 0   | (0.0) | 4   | (4.8) | 28  | (33.3)  | 52   | (61.9) |
| 2010  | 89   | (31.90) | 0   | (0.0) | 3   | (3.4) | 26  | (29.2)  | 60   | (67.4) |
| 2011  | 106  | (40.15) | 0   | (0.0) | 6   | (5.7) | 43  | (40.6)  | 57   | (53.8) |
| 2012  | 126  | (54.08) | 0   | (0.0) | 6   | (4.8) | 39  | (31.0)  | 84   | (66.7) |
| 2013 upto July | 39  | (37.50) | 0   | (0.0) | 2   | (5.1) | 6   | (15.4)  | 31   | (79.5) |

Table 2: Age wise prevalence of p.falciparum

Table 2 shows that there is almost 0% percentage of infection in infants. Declining trends in adult population. There is no change in the % of 1-5 & 5-14years age group.
In Table 3, we can see a declining trend in the prevalence of *P. vivax* in all age groups.

| Period       | No of positives | <1 yr. | 1-5 yr. | 5-14 yr. | >14 yr. |
|--------------|-----------------|--------|---------|----------|---------|
| Year         | No.             | %      | No.     | %        | No.     | %      | No.     | %      |
| 2008         | 480             | (76.6) | 0       | (0.0)    | 16      | (3.3)  | 103     | (21.5) |
|              |                 |        |         |          |         |        | 361     | (75.2) |
| 2009         | 331             | (79.8) | 0       | (0.0)    | 22      | (6.7)  | 95      | (28.7) |
|              |                 |        |         |          |         |        | 214     | (64.7) |
| 2010         | 190             | (68.1) | 0       | (0.0)    | 21      | (11.1) | 77      | (40.5) |
|              |                 |        |         |          |         |        | 92      | (48.4) |
| 2011         | 158             | (59.9) | 0       | (0.0)    | 8       | (5.1)  | 68      | (43.0) |
|              |                 |        |         |          |         |        | 82      | (51.9) |
| 2012         | 107             | (45.9) | 0       | (0.0)    | 7       | (6.5)  | 37      | (34.6) |
|              |                 |        |         |          |         |        | 63      | (58.9) |
| 2013 up to July | 65            | (62.5) | 0       | (0.0)    | 3       | (4.6)  | 24      | (36.9) |
|              |                 |        |         |          |         |        | 38      | (58.5) |

Table 3: Age wise prevalence of *P. vivax*

In Table 3, we can see a declining trend in the prevalence of *P. vivax* in all age groups.

| Period       | Total Positive | Male | Female |
|--------------|----------------|------|--------|
| YEAR         | No.            | %    | No.    | %    |
| 2008         | 147            | (23.4)| 85     | (57.8)|
|              |                |      | 62     | (42.2)|
| 2009         | 84             | (20.2)| 58     | (69.0)|
|              |                |      | 26     | (31.0)|
| 2010         | 89             | (31.9)| 63     | (70.8)|
|              |                |      | 26     | (29.2)|
| 2011         | 106            | (40.1)| 59     | (55.7)|
|              |                |      | 47     | (44.3)|
| 2012         | 129            | (54.1)| 79     | (61.2)|
|              |                |      | 50     | (38.8)|
| 2013 up to July | 39          | (37.5)| 27     | (69.2)|
|              |                |      | 12     | (30.8)|

Table 4: Prevalence of *P. falciparum* - sex wise

In Table 4, we can observe that males are more affected than females in all years.

| Period       | Total positive | Males | Females |
|--------------|----------------|-------|---------|
| Year         | No.            | %     | No.     | %     |
| 2008         | 480            | (76.6)| 258     | (53.8)|
|              |                |       | 258     | (53.8)|
| 2009         | 331            | (79.8)| 162     | (48.9)|
|              |                |       | 162     | (48.9)|
| 2010         | 190            | (68.1)| 111     | (58.4)|
|              |                |       | 111     | (58.4)|
| 2011         | 158            | (59.9)| 82      | (51.9)|
|              |                |       | 82      | (51.9)|
| 2012         | 107            | (45.9)| 63      | (58.9)|
|              |                |       | 63      | (58.9)|
| 2013 upto July | 65          | (62.5)| 38      | (58.5)|
|              |                |       | 38      | (58.5)|

Table 5: Prevalence of *P. vivax* - sex wise

In Table 4 & 5, we can observe that males are more affected than females in all years.

| PERIOD       | Total no of slides examined | Positive for malaria | API |
|--------------|----------------------------|----------------------|-----|
| 2008         | 4,87,237                   | 617                  | 1.27|
| 2009         | 4,85,397                   | 415                  | 0.86|
| 2010         | 4,48,701                   | 279                  | 0.62|
| 2011         | 4,56,665                   | 264                  | 0.58|
| 2012         | 4,83,761                   | 233                  | 0.48|
| 2013 upto July | 2,96,434                 | 104                  | 0.35|

Table 6: ANNUAL PARASITE INCIDENCE (API)
In table 6 it clearly shows that the API of Kurnool dist. is declining as years are passing on.

| PERIOD (Year) | TOTAL NO. OF SLIDES EXAMINED | Mid-Year Population of Kurnool District | ABER |
|---------------|-----------------------------|---------------------------------------|------|
| 2008          | 4,87,237                    | 39,06,984                             | 12.47|
| 2009          | 4,85,397                    | 39,58,695                             | 12.26|
| 2010          | 4,48,701                    | 40,10,406                             | 11.19|
| 2011          | 4,56,665                    | 40,62,117                             | 11.24|
| 2012          | 4,83,761                    | 41,29,341                             | 11.72|
| 2013 upto July| 2,96,434                    | 41,81,052                             | 7.09 |

Table 7: ANNUAL BLOOD EXAMINATION RATE (ABER)

In table 7 it clearly shows that there is declining trends in ABER as years are passing on.

**DISCUSSION:** In Kurnool district *P.vivax* is more prevalent than *p.falciparum*. This was in agreement with other previous studies. Where in studies done by Addidabeba, K. Y. Asnakew et.al, D. Sintasath, T. A. Ghebreyesus et.al, K. Karunamoorthi et.al, J. M. Ramos et.al, reported that the most prevalent species was *P. falciparum*, followed by *P. vivax*. As the years are passing on there is declining trends in malaria cases which is seen as same pattern in some region like ethopia. Males were more infected than females, which was statistically significant. This is in line with the other previous studies. Male to female ratio in Kurnool district is 1:0.76.

Whereas studies done by Aswani kumar et.al it is 1:0.56. The actual incidence is definitely far more than presently known. The reason attributed to such gap are deficiencies in coverage, collection and examination of blood smears and reporting system. Male to female ratio in Kurnool district is 1: 0.76.

As supportive in work done by Addis ababa. As per the NVBDCP incidence records, in most of India, the API was <2, whereas 2–5 API was in scattered regions, and regions with >5 API were scattered in the states of Rajasthan, Gujarat, Karnataka, Goa, Southern Madhya Pradesh, Chhattisgarh, Jharkhand, and Orissa and in northeastern state. ABER of Kurnool district from 2008 to 2012 is 12.47 to 11.72. Where as in other studies it showed that the average ABER was 9% in India. In 14 of 29 states, however, it ranged from 1% to 8%, and in the remaining 15 states and union territories, ABER ranged from 10% to 40%.

**CONCLUSION:** An increasing trend is observed in the prevalence of *P. falciparum*. It may be due to dense forest around the district and increasing resistance to Chloroquine. There is declining trend in the prevalence of *P. vivax*. It may be due to the active coverage of DDT by 95.6% in urban area and 89.2% of rural area. There is almost ‘zero’ prevalence of infection in infants may be due to under reporting, most of the time mother will be beside child which she won't allow mosquito bite and positive impact of Health Education on Malaria.

Prevalence of *P.falciparum* is variable in different age groups. There is no change in the prevalence of *P.falciparum* among 1-5 yr. age group and There is increasing trend in the prevalence of *P.falciparum* in the age group of 5-14 years from 2008 to 2011 may be due to the children in this age group (5-14) playing outside in the evening period; hence mosquito bites are common there is
decline from 2011 onwards may be due to preventive measures awareness. There is no specific trend in P.falciparum in adult population. There is a clear cut decline trend in the number of P.vivax cases in all age groups. This is comparable with the declining trend of all India prevalence of P.vivax cases. The decline may be due to the active anti-malarial measures in the district.

Males are affected more than females in both falciparum and vivax malaria cases due to the different occupational habits. Males do have more outdoor activities and number of working hours will be more when compared to females. There is a drastic decline in cases from 2008 to 2012 which supports the national values. API of Kurnool district is less than 2 during the past 5 years. This shows a decline in the disease prevalence.

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