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Clinical, Hematological and Biochemical Profile of Malaria and Dengue in Kharghar, Navi Mumbai - A Hot Spot of Mosquito Breeding

Authors
Dr Sarita Shrivastava[1], Dr N.Kamath[2]
[1]G 502, Rail Vihar, Sector 4, Kharghar, 410210
[2]601, Aston Tower, Plot No.9B,Sector 20, Kharghar.410210.Maharashtra.
Corresponding Author
Dr N.Kamath
601, Aston Tower, Plot No.9B,Sector 20, Kharghar.410210.Maharashtra. Mobile No.: 9967587087

Abstract
The aim of this study was to study the patients suffering from Malaria and Dengue between June 2016 to November 2016. 1762 blood samples of clinically suspected cases of malaria and dengue were examined out of which 154 were positive for P. Vivax and 04 were P. Falciparum and 5 were mixed infections.354patients were positive for dengue NS1 Ag and 14were positive for Dengue IgM and IgG. Analysis of 368 dengue patients showed abnormal liver function tests, anemia and thrombocytopenia. Analysis of 163 Malaria positive Patients showed anemia with raised bilirubin levels and thrombocytopenia with high incidence of P. Vivax. More number of male patient's population showed positive for malaria and dengue when compared with female patients. However, the incidence of the dengue was higher in children as compared to adults.
Keywords: *Malaria, dengue, SGOT, SGPT, Anemia, Thrombocytopenia, RMA-rapid malarial antigen test,NS1 Ag, ELISA,*

Introduction

Malaria and Dengue are a major health problem in our country. Malaria is a major cause of morbidity and mortality in the tropics. Malaria infects 300 to500 million and causes 1.3 million death annually[1].Cases of malaria infections associated with renal and hepatic impairment have been reported from different parts of countries endemic to malaria[2,3,4]. Malaria presents with acute episode of fever but also causes anemia in children and adults. It imparts an economic burden to the country[5].Among Indian population, fever is associated with different viral infections with thrombocytopenia, incidence of malaria with thrombocytopenia is in 24% to 94%[6].

Global incidence of dengue also is on rise dramatically in recent years. The WHO estimates that 2/5th of the world population is a risk of viral infection[7]. Every year during monsoon months and post monsoon season, many parts of the country witness outbreaks of dengue.

Materials and Methods

This study was carried out from OPD Patients of a quaternary health care unit in Kharghar Navi Mumbai over a period of six months from June 2016 to November 2016. A Total of 1762 patients were included and their blood samples analyzed for malaria and Dengue depending on the clinical symptoms. Those positive for malaria or dengue

or both were also evaluated for other parameters like Hb/CBC, SGOT, SGPT., Bilirubin. The main complaints of patients were fever with chills, body ache, headache, vomiting, abdominal pain, rashes, itching, bleeding manifestations, arthralgia. Out of these 1762 patients 1208 were advised CBC MP,114 were tested for CBC, MP, RMA, 125 were tested for CBCMP, RMA, Dengue, 201 were tested for CBC, MP, Dengue and 113 were advised for Dengue test alone. The blood collection was done in EDTA Coated vials (BD) for CBC, MP and Serum was obtained for biochemical parameters like serum Bilirubin, SGOT, SGPT and Dengue. Hb/CBC was estimated on a fully automated blood cell counter CELTAC alpha from NIHON-KOHDEN. Biochemical analysis was done on fully automatic biochemistry analyzer from Diasys. For RMA and Dengue card tests were done by immune-chromatographic technique and positive results were confirmed by ELISA test.

Results

Table 1 shows common symptoms like fever for more than 3 days, shivering (hot stage, cold stage and sweating stage), head ache, body ache etc, however in Malaria, predominant symptoms were fever, headache and body ache where as in dengue it was fever, rashes and arthralgia.

Table 1: Clinical presentation of Malaria and Dengue in Kharghar, Navi Mumbai

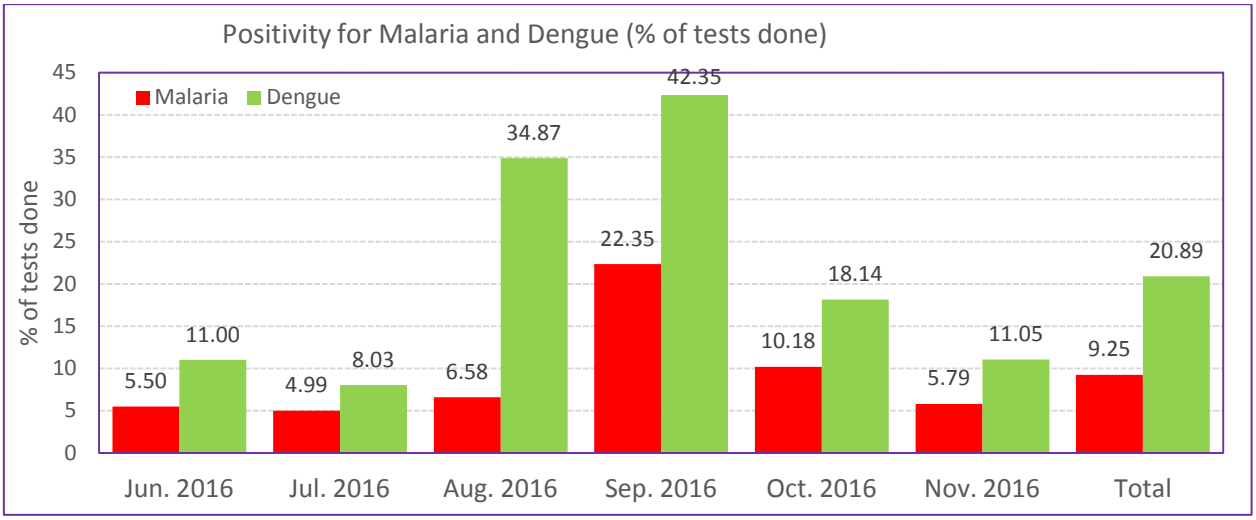
Symptoms/Clinical findings	Malaria (n=163)		Dengue (n=368)	
	No.	*%*	*No.*	*%*
Fever with rigors	51	31.29	70	19.02
Headache	2	1.23	34	9.24
Vomiting	5	3.07	42	11.41
Body ache	13	7.98	12	3.26
Rashes,itching	12	7.36	44	11.96
Joint pains	18	11.04	38	10.33
Jaundice	30	18.40	5	1.36
Abdominal pain	0	0.00	36	9.78
Throat infection-uncommon presentation	0	0.00	14	3.80
Mouth ulcers-uncommon presentation	1	0.61	10	2.72
Asymptomatic (Family members having malaria/dengue)	8	4.91	35	9.51
Bleeding/petechial rashes	13	7.98	8	2.17
Anemia,Thrombocytopenia	10	6.13	20	5.43

Table 2 shows the month wise distribution of the cases, which shows the maximum number of clinically suspected cases of malaria and dengue. September month shows more number of cases which is followed by October month.

Table 2: Cases of Malaria and Dengue in Kharghar, Navi Mumbai

Month	Tests advised	Malaria		Dengue	
		N	*%*	*N*	*%*
Jun. 2016	200	11	5.50	22	11.00
Jul. 2016	361	18	4.99	29	8.03
Aug. 2016	304	20	6.58	106	34.87
Sep. 2016	255	57	22.35	108	42.35
Oct. 2016	452	46	10.18	82	18.14
Nov. 2016	190	11	5.79	21	11.05
Total	1762	163	9.25	368	20.89

Figure 1: Positivity for Malaria and Dengue (% of tests done)



In Monsoon months (June July, August) cases were lesser than the post monsoon/early winter months (September/October). Water stagnation and mosquito breeding could be the important reason behind this rise in number of cases in later months.

Table 3: Positivity for Malaria and Dengue in Kharghar, Navi Mumbai

	Male (n=521)		Female (n=324)		Children (n=917)		Total (n=1762)	
	No.	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
Malaria								
P. Vivax	74	14.20	53	16.36	27	2.94	154	8.74
P. Falciparum	2	0.38	0	0.00	2	0.22	4	0.23
Mixed infection	2	0.38	1	0.31	2	0.22	5	0.28
Total Malaria	78	14.97	54	16.67	31	3.38	163	9.25
Dengue								
Dengue NS1 Ag	107	20.54	69	21.30	178	19.41	354	20.09
Dengue-Ig M/Ig G	5	0.96	2	0.62	7	0.76	14	0.79
Total Dengue	112	21.50	71	21.91	185	20.17	368	20.89

Statistical Analysis was done and P value for Malaria is found to be significant (p =<0.001) and in Dengue it is p>0.05 which is not significant. Positivity

Figure 2: Malaria (% of tests done)

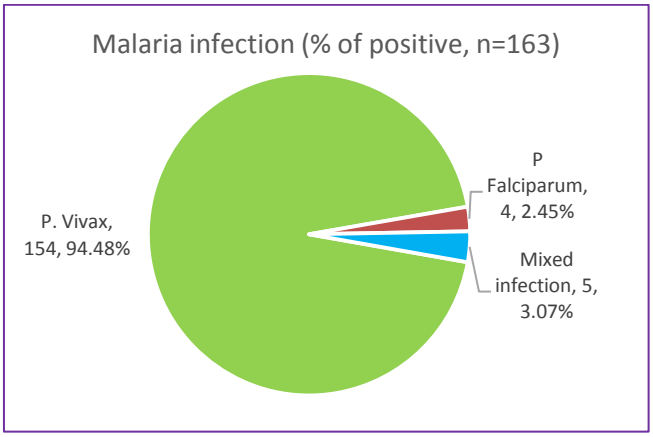
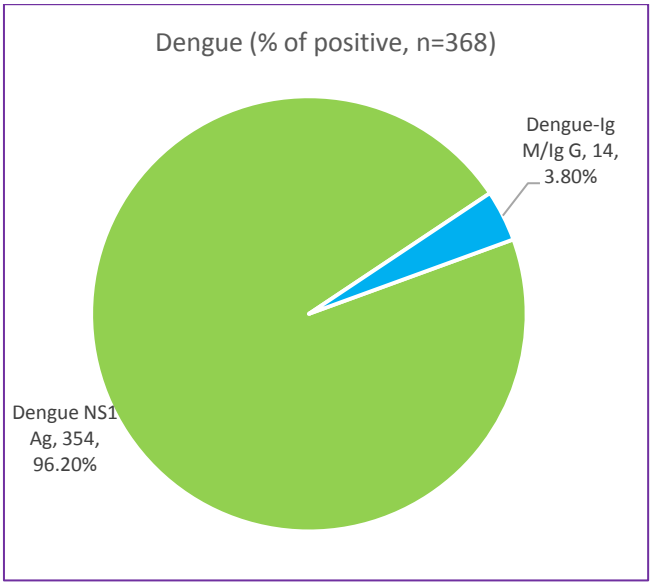


Figure 3: Dengue (% of tests done)



Out of 1762 cases clinically suspected to be malaria/dengue, 154 were positive for P.vivax (8.74%), 4 cases were positive for P.falciparum (0.22%) and 5 cases were positive for mixed infections (0.28%), 354 patients were positive for NS1 antigen (20.09%) and 14 were positive for IgG and IgM(0.79%).

Out of 1208 patients advised for CBC,MP, 35 patients were positive for P. Vivax(2.8%), one case was positive for P. Falciparum(0.08%) and one was positive for mixed infection(0.08%)

Out of 114 patients advised for CBC RMA, 84 were positive for P. Vivax(73.68%), and 3 were positive for P. Falciparum(2.6%), 4 were positive mixed infections(3.5%). One patient was advised for RMA alone which was found to be positive for P. Vivax(100%).

Out of 125 patients advised CBC,MP,RMA and Dengue, 28 were positive for P.vivax (22.4%),76 were positive for Dengue NS1 antigen(60.8%) and 5 patients were positive for Dengue IgG or Ig M.(4%).

Out of 201 patients advised with CBC,MP and Dengue, 6 were positive for P.vivax(2.98%), 178 were positive for Dengue NS1 antigen (88%)and8 were positive for Dengue IgM or IgG(3.98%).

Out of 113 patients advised exclusively for dengue test, 100 were positive for NS1 antigen(88.4%) and one was positive for IgM or IgG(0.8%).

Figure 4: Sr. Total bilirubin (mg%)

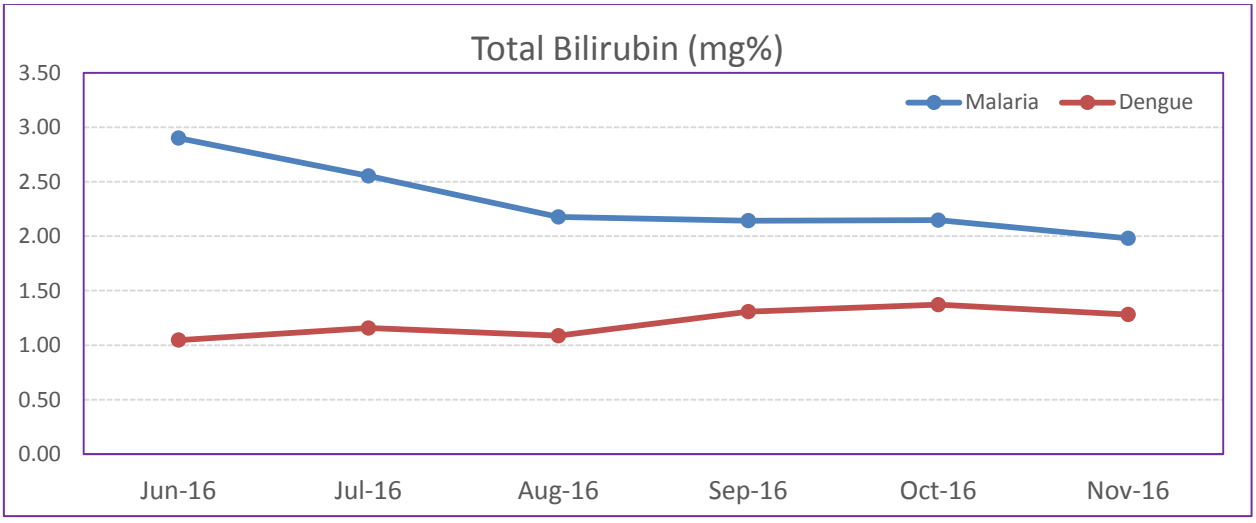


Figure 5: Hemoglobin (gm%)

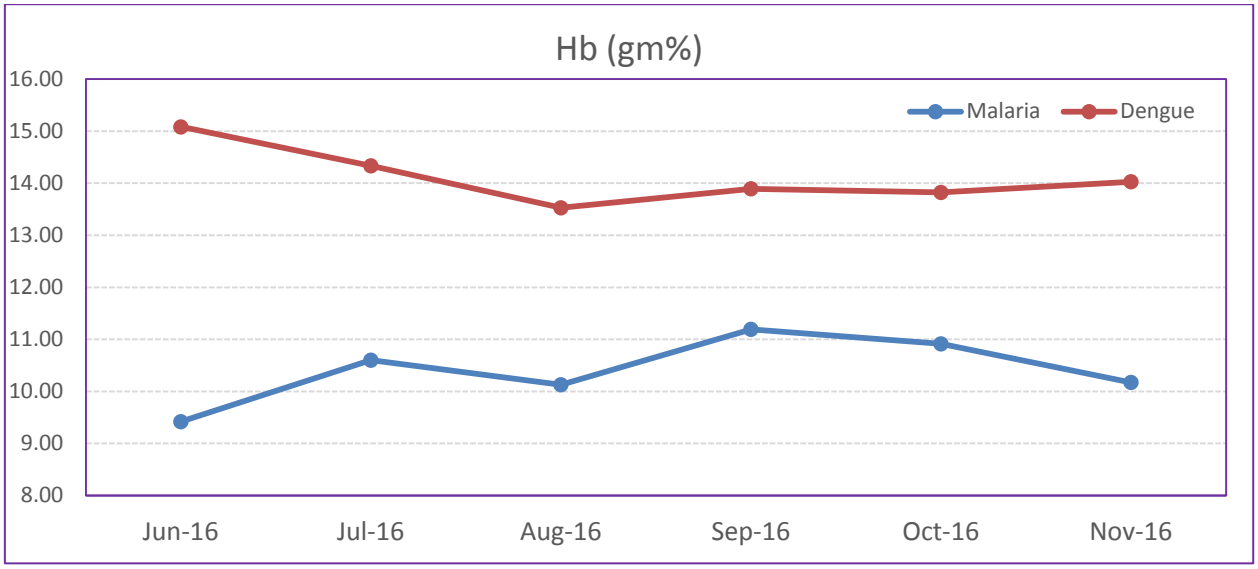


Figure 6: Platelet count (Lakhs/cmm)

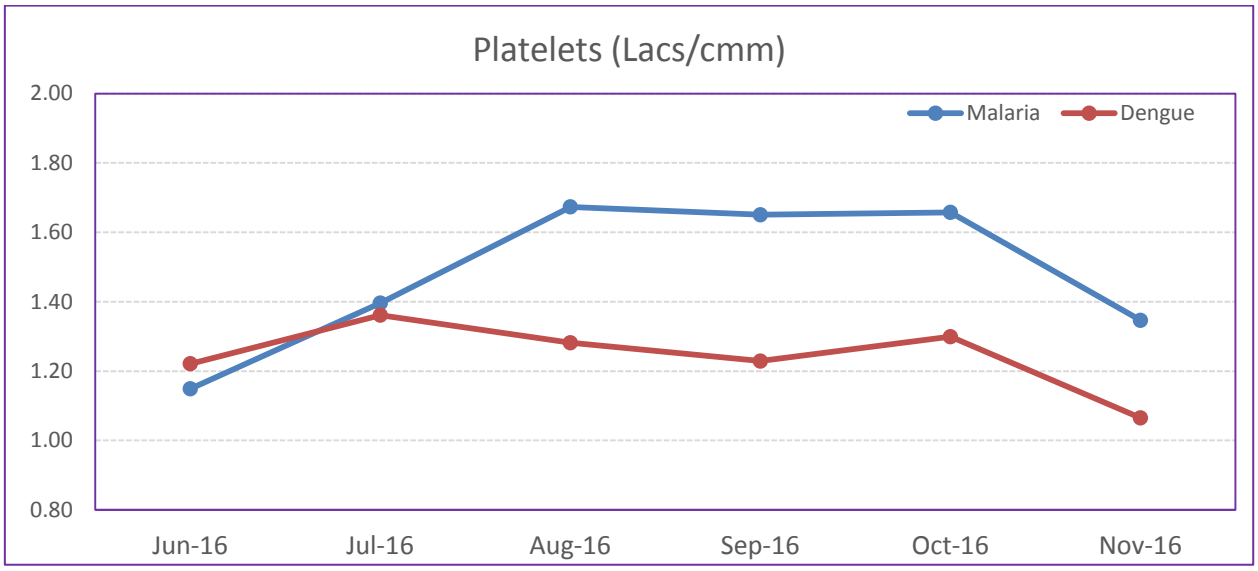


Figure 7: SGPT (IU/mL)

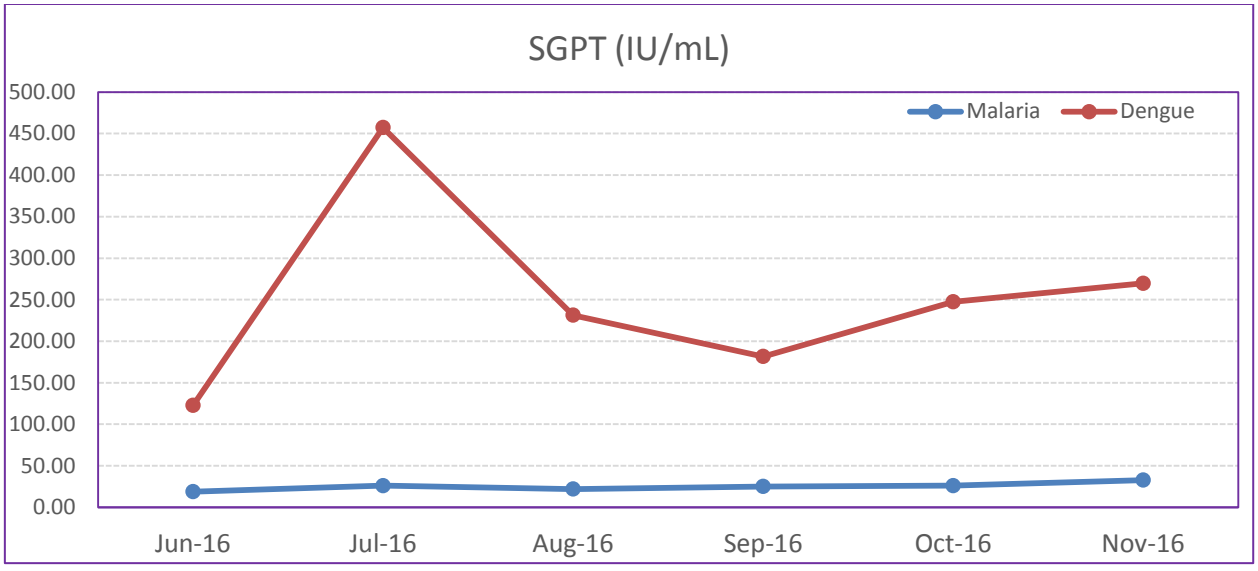
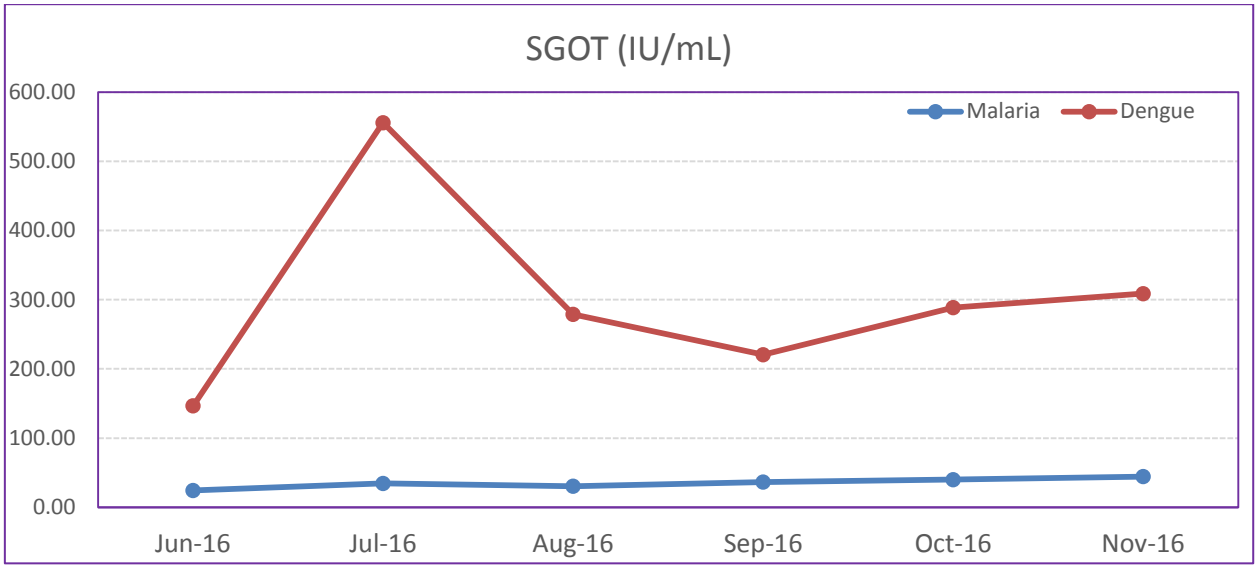


Figure 8: Sr. SGOT(IU/mL)



Out of 1762 suspected cases, 521 (29.56%) were males, 324(18.3%) were females and 917 (52.04%) were children. Out of 521 males 74 were positive for P.vivax (14.2%) two were positive for P. falciparum (0.38%) and 2 were positive for mixed infection.(0.38%)

Out of 521 male patients 107 were positive for Dengue NS1 antigen (20.53%) and 5 were positive for either IgM or IgG(0.95%).

Out of 324 female patients 53 were positive for P.vivax (16.35%) and 1 was positive for mixed infection (0.30%).69 female patients were positive for Dengue NS1 antigen (21.2%) 2 were positive for Dengue IgM or IgG (0.61%).

Out of 917 children below 12 years of age 27 were positive for P.vivax (2.94%)2 were positive for P.falciparum (0.21%) and 2 were positive for mixed infection(0.21%).

178 children were positive for Dengue NS1 antigen (19.41%, and 7 were positive for IgM or IgG (0.76%).

Discussion

There was a universal involvement of Liver in Dengue as evidenced by elevated levels of SGOT and SGPT in all Patients. Liver involvement has been reported in children. Our findings are similar to Vaibhav Shukla et al[8] who reported hepatic dysfunction in dengue where asitis different from Srivenu et al who found no elevation of Enzymes[9]. We also found that Serum Bilirubin levels were high in malaria patients as compared to Dengue the reason being malaria involves the liver where infective sporozoites invade and multiply in the hepatocytes and in the erythrocytic stage them erozoites caused estruction of infected RBCS by the parasites. Thrombocytopenia was seen in both malaria and dengue patients. As we have seen in our study the evaluation of various hematological and Biochemical parameters in malaria and dengue helps in intensive care for the patients and prevents death from such complications.

Prevalence of malarial parasite in our study was 8.74% for P.Vivax, 0.22% for P.Falciparum and 0.28% for mixed infection. The prevalence rate for Dengue was 20.79% for Dengue NS1 or Dengue IgG or IgM. Maximum number of malaria and Dengue cases were detected n the month of September. The Prevalence of Dengue was more in children as compared to the Adults. Our study is closer to Gurjeet Singh et al[10] who reported a prevalenceof16.58 % of malaria in Navi Mumbai. However, we found maximum number of cases in September as compared to their study where the peak was in October.

Conclusion

This Study concludes that while evaluating patients of Malaria and Dengue, various clinical

symptoms, hematological and Biochemical parameters have to be kept in mind which could be useful in treating critical patients and evaluating their Prognosis. This is just the tip of the iceberg as many of the patients may not be able to get the blood sample tested or visit the right physician due to low socio economic status and awareness. There is increase in cases of malaria and dengue in September and October and P.Vivax malaria more prevalent in adult patients than in children and in children Dengue is more commonly suspected than Malaria. This study concludes that Kharghar is endemic for Malaria and Dengue with the increased incidence rate in September and October Months.

Further scope

There is a need for subtypes of dengue to be identified by PCR and effective preventive measures to be incorporated to bring down and eradicate both Malaria and Dengue. Healthcare providers, citizens and the government authorities need to knit together and finalize the strategies to eradicate these vector borne diseases including Chikungunya which is also 3rd most common infection in Navi Mumbai. More research/studies when published which shows us the status of the epidemiology and prevalence of the infections. School have to make it mandatory for Children to wear full shirts and full pants till the monsoon and post monsoon season to cover the biting area (hand and legs commonly) and also to apply mosquito repellant cream on exposed parts.

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Dr. Deepak Langde, Reader, Dept. Pharmacology, BVP Dental College and Hospital, Navi Mumbai.

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