Original Article

Malaria in Children

Frequency and Type of Malaria in All Febrile Children Up to Five Years of Age

Muhammad Ashfaq, Bader-un-Nisa, Ayesha Altaf and Jamal Raza

ABSTRACT

Objective: To determine the frequency and type of malaria in all febrile children up to five years of age visiting the OPD of NICH.

Study Design: Descriptive / cross-sectional study

Place and Duration of Study: This study was conducted at the Emergency and Outpatient Department of National Institute of Child Health, Karachi from 1st July 2016 till 31st December 2016.

Materials and Methods: All children of 1 month to 5 years of age of either gender having history of fever as primary complain since 24 hours or more were enrolled. Laboratory test was performed and presence of malaria (yes/no) and type of malaria (if malarial positive) was noted.

Results: Out of total 253 children, majority of the patients were presented with ≤2.5 years of age (Mean age 1.48 ±.500 years). The proportion of female children was lower 102 (40.3%) than that of male children 151 (59.7%). Frequency of malaria was found in 17 (6.76%) patients. Frequency of malaria was found in 17 (24.1%) patients. Among these 17 malaria cases, 2 (11.76%) had falciparum while 15 (88.23%) had vivax type of malaria. Educational status of mother (p-value 0.003), father (p-value 0.038) and economic status (p-value <0.001) were significant factors associated with presence of malaria in children.

Conclusion: The frequency of malaria was found to be higher with predominance of vivax type in all febrile children up to five years of age visiting the OPD of NICH.

Key Words: Malaria, Fever, Children, Falciparum, Vivax

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INTRODUCTION

Malaria remains a life-threatening issue and creates devastating effects on the health of children especially those who are malnourished and have low immunity status.[1,2]

The increasing epidemic of Malaria could be weighed by the estimates given by World Malaria Report which has revealed approximately 216 million malaria cases from 91 countries in 2016. These statistics are 5 million higher from the estimates reported in 2015.[3]

In spite of this, there are certain countries that has achieved 3 consecutive years of no malaria cases. In particular, World Health Organization (WHO) has certified 7 countries as having eliminated Malaria in recent years that include; United Arab Emirates, Morocco, Turkmenistan, Armenia, Maldives, Sri Lanka and Kyrgyzstan.[4] However, In Pakistan, situation is still not under control. A total estimated malaria cases from 874,000 to 1,933,000 were observed with the estimated deaths in 1100 cases.[5]

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Although studies are available on this topic from different hospitals but the issue is of generalization of results on the population and continues rise in the Malaria cases also urges the need of study that gives the current magnitude of the problem. National Institute of child health is the largest public tertiary care facility in the province of Sindh, which caters patients not only from all over Sindh but also from other part of the country as well. The data collected in this center will represent at least the magnitude of malaria and its type in children up to 5 years of age presenting with fever, of province of Sindh. By virtue of this study, resource allocation, and different strategies could be devised to screen such children thereby further morbidity could be prevented or reduced.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted at emergency and outpatient department of National Institute of Child Health Karachi from 1st July 2016 till 31st December 2016. Consecutive children of 1 month to 5 years of age of either gender presented with history of fever as primary complain for 24 hours or more were included. Whereas children already on malarial treatment for the last 24 hours or children not presented with high grade fever as primary cause were excluded.

Sample size for the study was calculated with Raosoft calculator, taking prevalence of malaria.[6] as 38.3%,

confidence level 95% and absolute precision 6%. The required sample size came out to be 253.

History taking from the parents and Laboratory test was performed post informed consent from the parents. Venous blood sample (2-3ml) was collected for microscopy. A structured proforma was filled for each patient to record patient's demographics, educational status of mother and father, socioeconomic status, residence, presence of malaria (yes/no) and type of malaria (if malarial positive).

Data were entered and analyzed by SPSS version 21. Mean ±SD was calculated for age. Frequencies and percentages were calculated for gender, educational status of mother and father, economic status, residence, frequency of malaria and type of malaria.

Chi square test was applied to compare the difference of age, gender, educational status of mother and father, economic status and residence on the outcome (frequency and type of malaria). p-value ≤0.05 was taken as significant.

RESULTS

Table No.1: Baseline characteristics of the patients (n=253)

	n	%
Age, years	1.48 ±0.51[ŧ]	
≤2.5 years	131	51.8
>2.5 years	122	48.2
Gender		
Male	151	59.7
Female	102	40.3
Area of residence		
Rural	198	78.3
Urban	55	21.7
Educational status of the mother		
Illiterate	33	13
Secondary	106	41.9
More than equal to secondary	114	45.1
Educational status of the father		
Illiterate	33	13
Secondary	135	53.4
More than equal to secondary	85	33.6
Economic status		
Lower	81	32
Middle	119	47
Upper middle	53	20.9

[ŧ]mean ±standard deviation, n: number

Out of total 253 children, majority of the patients presented with ≤2.5 years of age (Mean age 1.48 ±.500 years). The proportion of female children was lower 102 (40.3%) than that of male children 151 (59.7%). Majority of the children, 198 (78.3%) were from rural areas while 55 (21.70%) children were from urban areas. Most of the mothers 114 (45.10%) had intermediate educational qualification while majority of the fathers 135 (53.4%) had primary educational status. (Table 1)

Malaria was diagnosed in 17 (6.71%) patients. Among these 17 malarial cases, 2 (11.76%) had falciparum while 15 (88.23%) had vivax type of malaria. (Figure 1 & 2)

Educational status of mother (p-value 0.003), father (p-value 0.038) and economic status (p-value <0.001) were significant factors associated with presence of malaria in children whereas type of malaria was insignificantly associated with all the variables (p-value >0.05). (Table 2)

Table No.2: Comparison of presence of malaria with respect to baseline characteristics of the patients (n=253).

Variables	Presence of Malaria			p-value
	Yes (n=17)	No (n=236)	Total	
	n (%)	n (%)	n (%)	
Age, in years				
≤2.5	11 (64.7)	120 (50.8)	131 (51.8)	0.269
>2.5	6 (35.3)	116 (49.2)	122 (48.2)	
Gender				
Male	13 (76.5)	138 (58.5)	151 (59.7)	0.144
Female	4 (23.5)	98 (41.5)	102 (40.3)	
Residence				
Urban	2 (11.8)	53 (22.5)	55 (21.7)	0.302
Rural	15 (88.2)	183 (77.5)	198 (78.3)	
Educational status of mother				
Illiterate	8 (36.4)	25 (10.8)	33 (13)	0.003
Literate	14 (63.6)	206 (89.2)	220 (87)	
Educational status of father				
Illiterate	6 (27.3)	27 (11.7)	33 (13)	0.038
Literate	16 (72.7)	204 (88.3)	220 (87)	
Economic status				
Lower	12 (70.6)	69 (29.2)	81 (32)	<0.001
Middle/Upper Middle	5 (29.4)	167 (70.8)	172 (68)	
Chi-square test applied, p-value <0.05 was taken as significant				

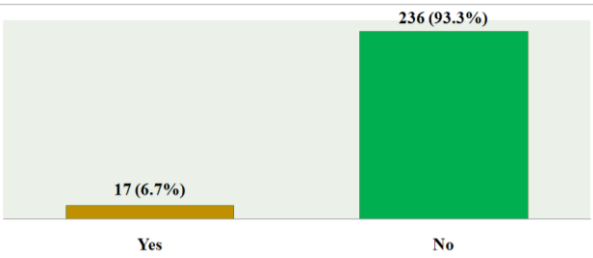

Figure No.1: Presence of malaria

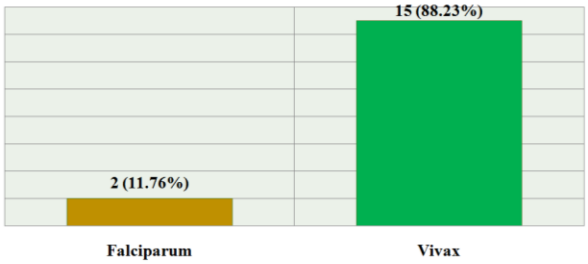

Figure No.2: Type of malaria (n=17)

DISCUSSION

Malaria is a still a leading public health problem in Pakistan. A study in 2013 reported that more than 60% of the Pakistan's population reside in malaria endemic regions.[7] It is reported that five hundred thousand malaria infections and fifty thousand malaria deaths occur each year in Pakistan which shows that the death toll of malaria in Pakistan is on the rise in spite of malaria control programs.[7] In 2010, more than one million malaria cases were reported from the Eastern Mediterranean region, among these 22% were from Pakistan.[8]

In this study, malaria was prevalent in 6.7% of the children under 5 years of age with the preponderance of plasmodium vivax specie. The finding of our study contrast with several studies from Pakistan in which malaria prevalence was found much higher. In a study conducted by Yasinzai MI et al, out of 6119 suspected cases, 38.3% were found to be positive for malarial parasite. However, similar to our study findings, Plasmodium vivax infection was found higher in their study than that of Plasmodium falciparum.[6] Another local study conducted by Fazil M et al has also reported higher frequency of plasmodium vivax.[9] A study from India has reported that out of 120 patients who were positive for malaria parasite, majority of the cases had Plasmodium Vivax followed by Plasmodium Falciparum while small number of individuals had mixed infection.[10]

A preponderance of Plasmodium Falciparum was reported in studies conducted in Quetta, Zhob, East Baluchistan, and Khuzdar.[11-14] The findings of these studies showed that prevalence of Plasmodium Falciparum infection is higher in Baluchistan province than in other regions of Pakistan.

In 2012 reports from WHO also revealed that that the two Plasmodium species prevalent in Pakistan are Plasmodium Vivax and Plasmodium Falciparum.[15] According to the report, these species accounts for more than half and more than one-fourth burden of the reported infections respectively.[15]

Although, Plasmodium Vivax is the most common specie found in majority of the studies. Still, it is hypothesized that the accurate estimate of the prevalence of Plasmodium infection is difficult, mainly because of the diversity in prevalence and species distribution of malaria causing parasites is still mysterious not only in Pakistan but in different parts of the world.[16-18] Further studies are recommended which gives the estimates of malaria and its type from all over the country.

CONCLUSION

The frequency of malaria was found to be higher with predominance of vivax type in all febrile children up to five years of age visiting the OPD of NICH. Educational status and socioeconomic status were the significant factors found to be associated with presence of malaria.

Author's Contribution:

Concept & Design of Study:	Muhammad Ashfaq
Drafting:	Bader-un-Nisa
Data Analysis:	Ayesha Altaf, Jamal Raza
Revisiting Critically:	Bader-un-Nisa, Muhammad Ashfaq
Final Approval of version:	Muhammad Ashfaq

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Kumar A, Valecha N, Jain T, Dash AP. Burden of malaria in India. Retrospective and Prospective view. AMJ Trop Med Hyg 2007;77(6 Suppl); 69-78.
2. Caufield LE, Richard SA, Black RE. Undernutrition as an underlying cause of Malaria Morbidity and Mortality in children less than 5 years old. AMJ Trop Med Hyg 2004;71 (2 Suppl):55-63.
3. WHO | World malaria report 2017 - World Health Organization. Available at: http://www.who.int/malaria/publications/world-malaria-report-2017/en/
4. Malaria Fact Sheet. Available at: http://www.who.int/mediacentre/factsheets/fs094/en/
5. http://www.who.int/malaria/publications/country-profiles/profile_pak_en.pdf
6. Yasinzai MI, Kakarsulemankhel JK. Prevalence of human malaria infection in Pakistani areas bordering with Iran. J Pak Med Assoc 2013; 63(3):313-6.

7. Aamer AK, Meera V, Muhammad FN, Humayoon SS. Prevalence and distribution of human plasmodium infection in Pakistan. Malaria J 2013; 12:297.
8. WHO: World malaria report. Geneva: World Health Organization; 2011.
9. Fazil M. The frequency of various human malaria parasite infections at Private Clinic in Mardan district of Khyber Pakhtunkhwa: a study of 230 cases of Malaria. Pak Paed J 2013;37(3):173-6.
10. Gill MK, Makkar M, Bhat S, Kaur T, Jain K, Dhir G. Thrombocytopenia in malaria and its correlation with different types of malaria. Ann Trop Med Public Health 2013;6:197-200.
11. Yasinzai MI, Kakarsulemankhel JK. Prevalence of human malaria infection in bordering areas of East Balochistan, adjoining with Punjab: Loralai and Musakhel. J Pak Med Assoc 2009;59:132–135.
12. Yasinzai MI, Kakarsulemankhel JK: Frequency of human malaria infection in south east area of Balochistan, District Lasdella. Pak J Biol Sci 2012; 28:167–170
13. Yasinzai MI, Kakarsulemankhel JK. Incidence of human malaria infection in northern hilly region of Balochistan, adjoining with NWFP, Pakistan: district Zhob. Pak J Biol Sci 2008;11:1620–1624
14. Farooq MA, Salamat A, Iqbal MA: Malaria–an experience at CMH Khuzdar (Balochistan). J Coll Physicians Surg Pak 2008;18:257–258
15. WHO. World malaria report 2012. Geneva: World Health Organization. 2012. Available from: http://www.who.int/malaria/publications/world_malaria_report_2012/wmr2012_full_report.pdf
16. Bouma MJ, Dye C, Van der Kaay HJ. Falciparum malaria and climate change in the northwest frontier province of Pakistan. Am J Trop Med Hyg 1996;55(2):131-7.
17. Gething PW, Elyazar IR, Moyes CL, Smith DL, Battle KE, Guerra CA, et al. A long neglected world malaria map: Plasmodium vivax endemicity in 2010. PLoS Neglected Trop Dis 2012; 6(9): e1814.
18. Tatem AJ, Jia P, Ordanovich D, Falkner M, Huang Z, Howes R, et al. The geography of imported malaria to non-endemic countries: a meta-analysis of nationally reported statistics. Lancet Infectious Dis 2017;17(1):98-107.